

# SIERRA WIRELESS, INC.

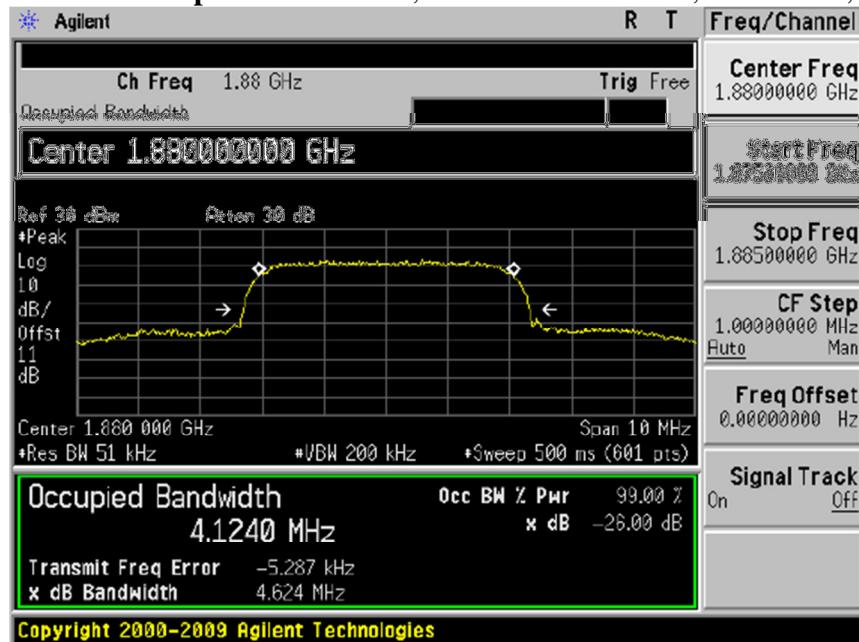
FCC Part 22, 24 / RSS 132, 133

SL9090

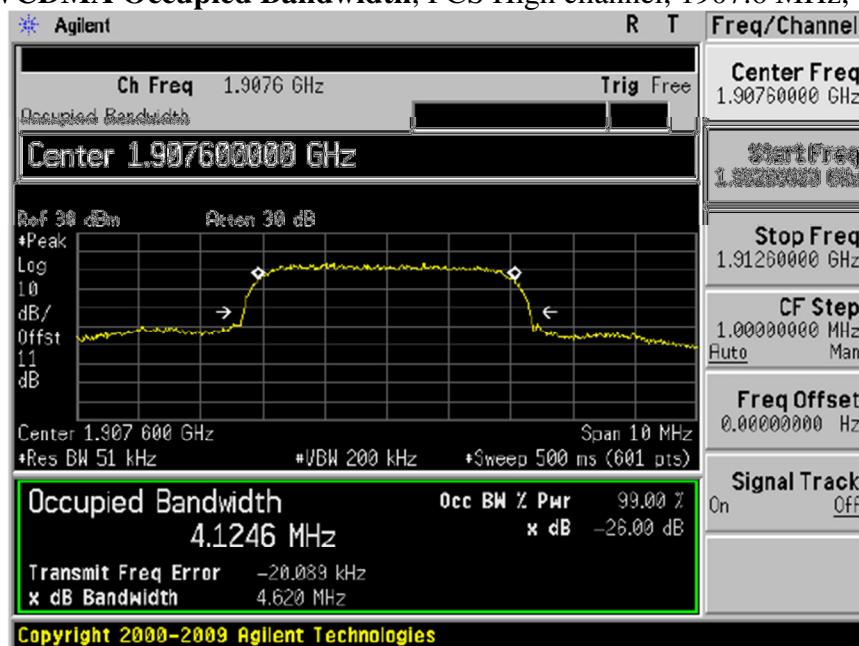
May30, 2012

Page 25 of 74

### 5.3.17) WCDMA Occupied Bandwidth, PCS Middle channel, 1880 MHz, 99% BW



### 5.3.18) WCDMA Occupied Bandwidth, PCS High channel, 1907.6 MHz, 99% BW



## 6 Out of Band Emissions at Antenna Terminals

FCC 22.901(d), 22.917, 24.238(a)

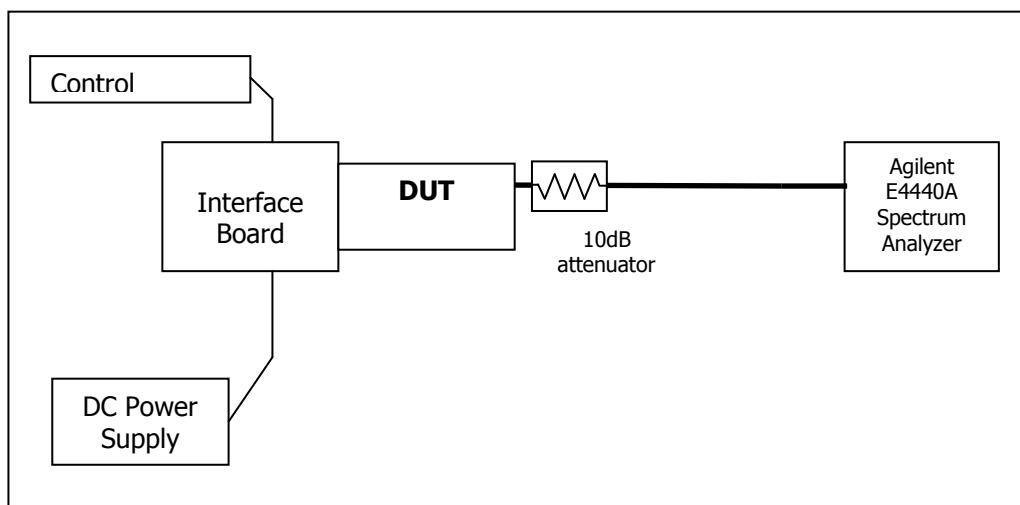
### Out of Band Emissions:

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least  $(43 + 10 \log P)$  dB. The out of band emission limit translates to a worst case absolute limit of -13dBm in this case.

### **6.1 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 10<sup>th</sup> harmonic. The EUT was scanned for spurious emissions from 1MHz to 20GHz with sufficient bandwidth and video resolution. Data plots are included. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were captured.

### **Test Setup**



### **6.2 Test Equipment**

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE
Control Computer	TC	Generic PC	100488	N/A
Wireless Test Set	Rohde & Schwarz	CMU200	110520	November 17, 2011
Spectrum Analyzer	Agilent	E4440A	200078	November 15, 2011
DC Power Supply	HP	6632A	3530A	N/A
Interface Board	Shop built	ATEMux	N/A	N/A
Directional Coupler	Pasternack	PE2209-10	N/A	N/A

## SIERRA WIRELESS, INC.

FCC Part 22, 24 / RSS 132, 133	SL9090	May30, 2012	Page 27 of 74
--------------------------------	--------	-------------	---------------

### 6.3 Test Results

Refer to the following plots.

- **Cellular Band**

Plot Number	Description
6.4.1 – 6.4.3	GMSK Mode, Low channel, 824.20 MHz
6.4.4 – 6.4.6	GMSK Mode, Middle Channel, 836.6 MHz
6.4.7 – 6.4.9	GMSK Mode, High Channel, 848.8 MHz
6.4.10 – 6.4.12	8-PSK Mode, Low channel, 824.20 MHz
6.4.13 – 6.4.15	8-PSK Mode, Middle Channel, 836.6 MHz
6.4.16 – 6.4.18	8-PSK Mode, High Channel, 848.8 MHz

- **PCS Band**

Plot Number	Description
6.4.19 – 6.4.21	GMSK Mode, Low Channel, 1850.2 MHz
6.4.22 – 6.4.24	GMSK Mode, Middle Channel, 1880.0 MHz
6.4.25 – 6.4.27	GMSK Mode, High Channel, 1909.8 MHz
6.4.28 – 6.4.30	8-PSK, Mode, Low Channel, 1850.2 MHz
6.4.31 – 6.4.33	8-PSK Mode, Middle Channel, 1880.0 MHz
6.4.34 – 6.4.36	8-PSK Mode, High Channel, 1909.8 MHz

- **UMTS Cellular Band**

Plot Number	Description
6.4.37 – 6.4.39	WCDMA Mode, Low Channel, 826.4 MHz
6.4.40 – 6.4.42	WCDMA Mode, Middle Channel, 836.4 MHz
6.4.43 – 6.4.45	WCDMA Mode, High Channel, 846.6 MHz

- **UMTS PCS Band**

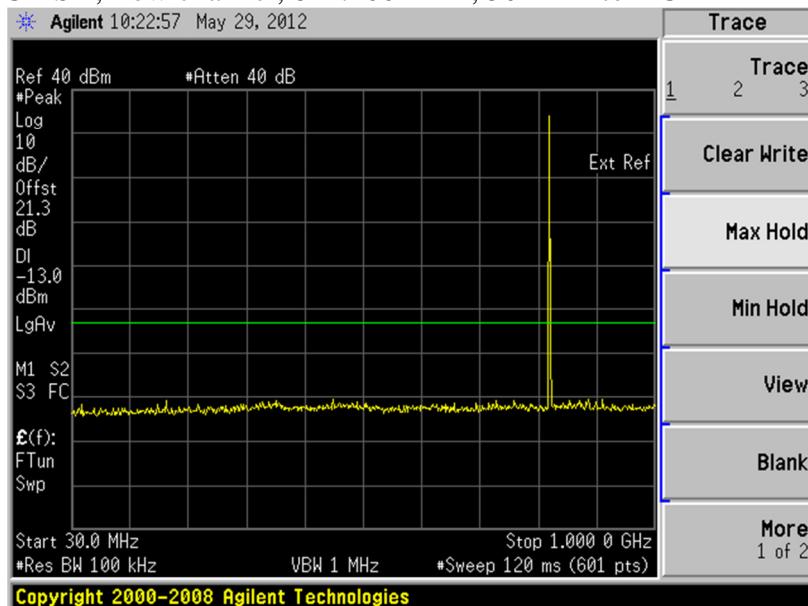
Plot Number	Description
6.4.46 – 6.4.48	WCDMA Mode, Low Channel, 1852.4 MHz
6.4.49 – 6.4.51	WCDMA Mode, Middle Channel, 1880.0 MHz
6.4.52 – 6.4.54	WCDMA Mode, High Channel, 1907.6 MHz

The plots below show that the conducted emission limits requirements are met.

## 6.4 Test Plots

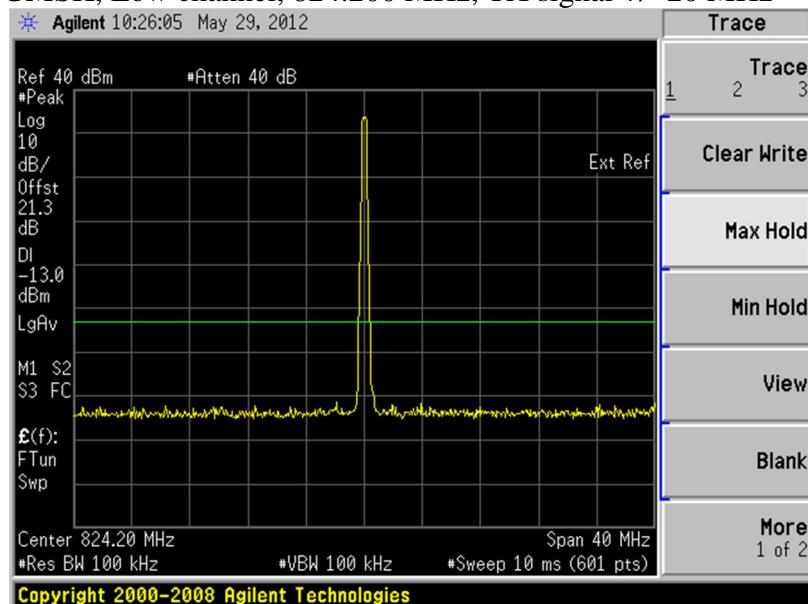
### Plot 6.4.1) Out of Band Emissions at Antenna Terminals

GMSK, Low channel, 824.200 MHz, 30 MHz to 1 GHz



### Plot 6.4.2) Out of Band Emissions at Antenna Terminals

GMSK, Low channel, 824.200 MHz, TX signal +/- 20 MHz



The strong emission shown in each case is the carrier signal.

# SIERRA WIRELESS, INC.

FCC Part 22, 24 / RSS 132, 133

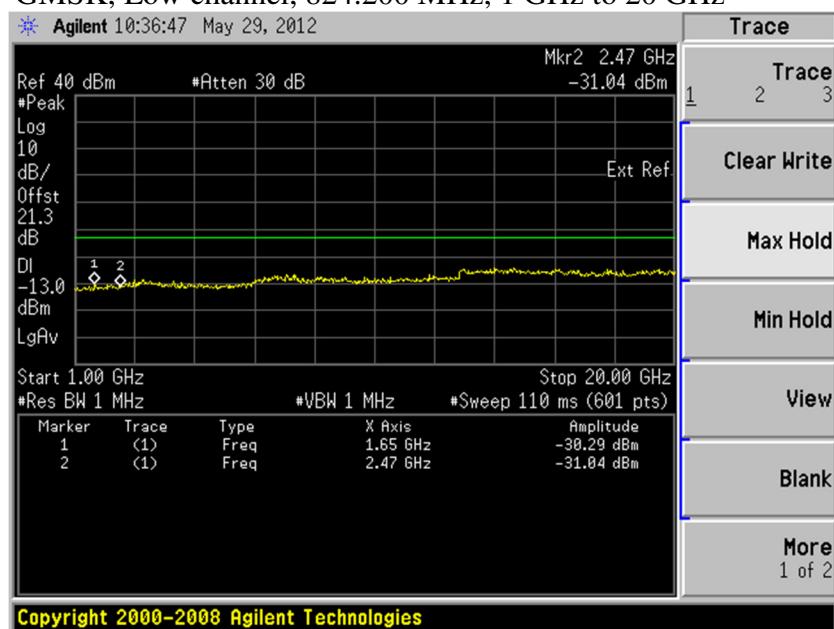
SL9090

May30, 2012

Page 29 of 74

### Plot 6.4.3) Out of Band Emissions at Antenna Terminals

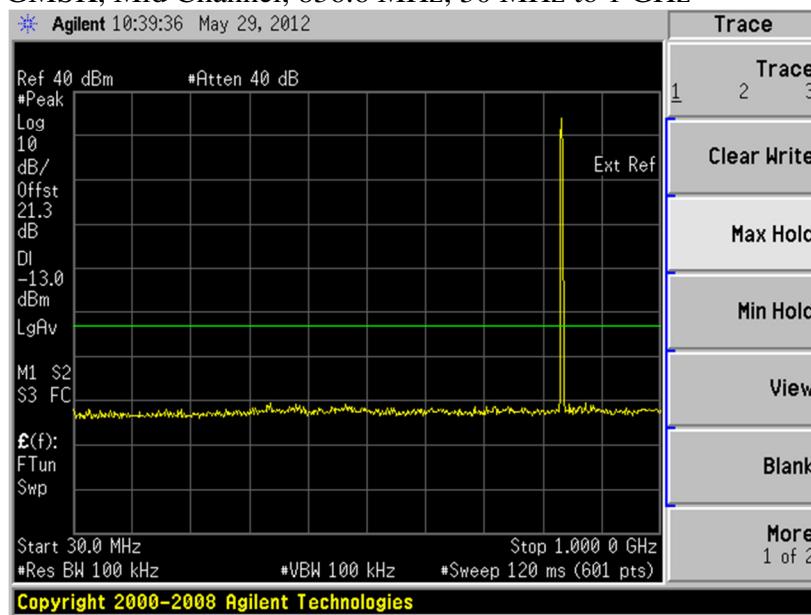
GMSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz



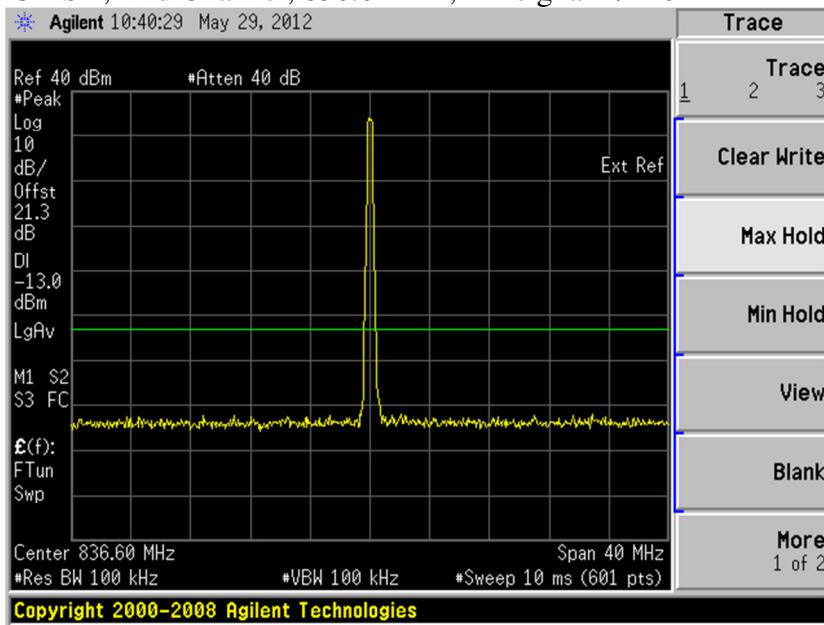
Cellular Harmonics for Ch. 128 (824.2 MHz)	Level (dBm)
Second	-30.29 dBm
Third	-31.04 dBm
Others	----

**Plot 6.4.4) Out of Band Emissions at Antenna Terminals**

GMSK, Mid Channel, 836.6 MHz, 30 MHz to 1 GHz

**Plot 6.4.5) Out of Band Emissions at Antenna Terminals**

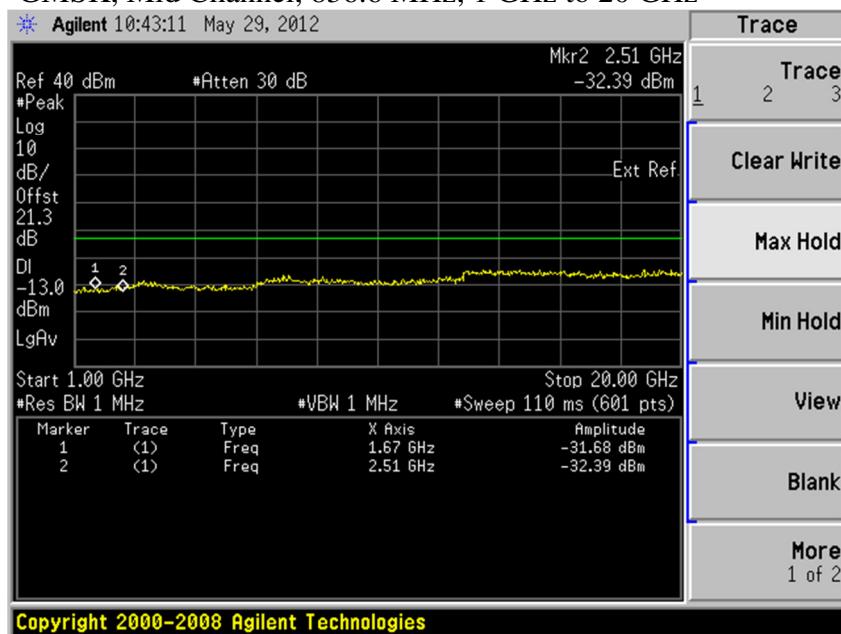
GMSK, Mid Channel, 836.6 MHz, TX signal +/- 20 MHz



The strong emission shown in each case is the carrier signal.

**Plot 6.4.6) Out of Band Emissions at Antenna Terminals**

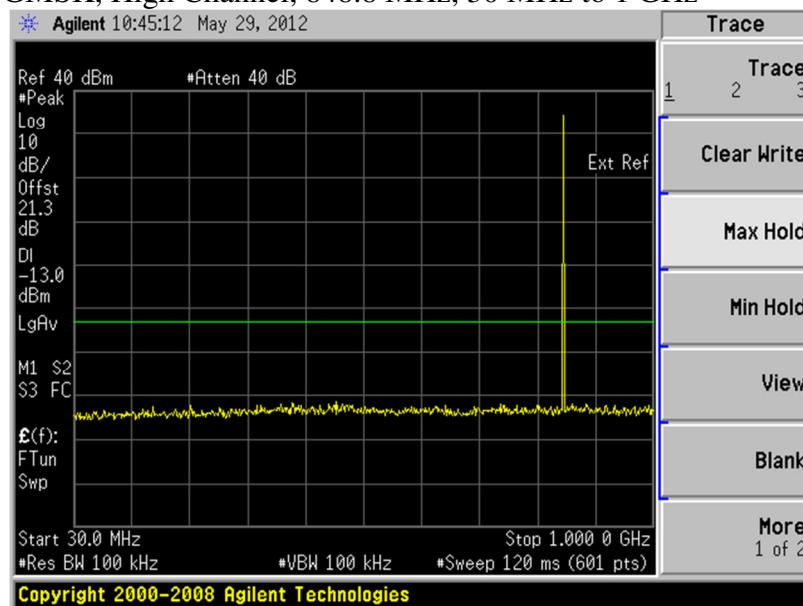
GMSK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz



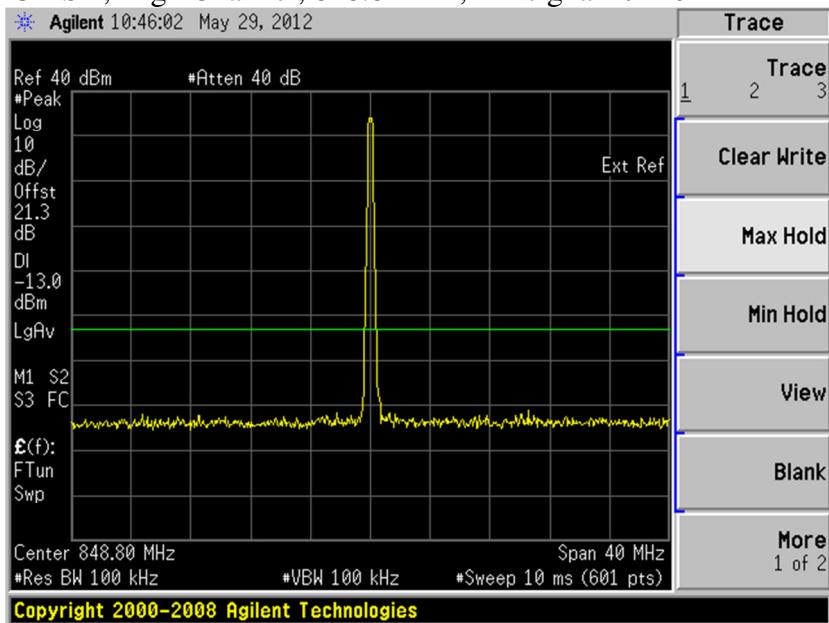
Cellular Harmonics for Ch. 190 (836.6 MHz)	Level (dBm)
Second	<b>-31.68 dBm</b>
Third	<b>-32.39 dBm</b>
Others	----

**Plot 6.4.7) Out of Band Emissions at Antenna Terminals**

GMSK, High Channel, 848.8 MHz, 30 MHz to 1 GHz

**Plot 6.4.8) Out of Band Emissions at Antenna Terminals**

GMSK, High Channel, 848.8 MHz, TX signal +/- 20 MHz



The strong emission shown in each case is the carrier signal.

# SIERRA WIRELESS, INC.

FCC Part 22, 24 / RSS 132, 133

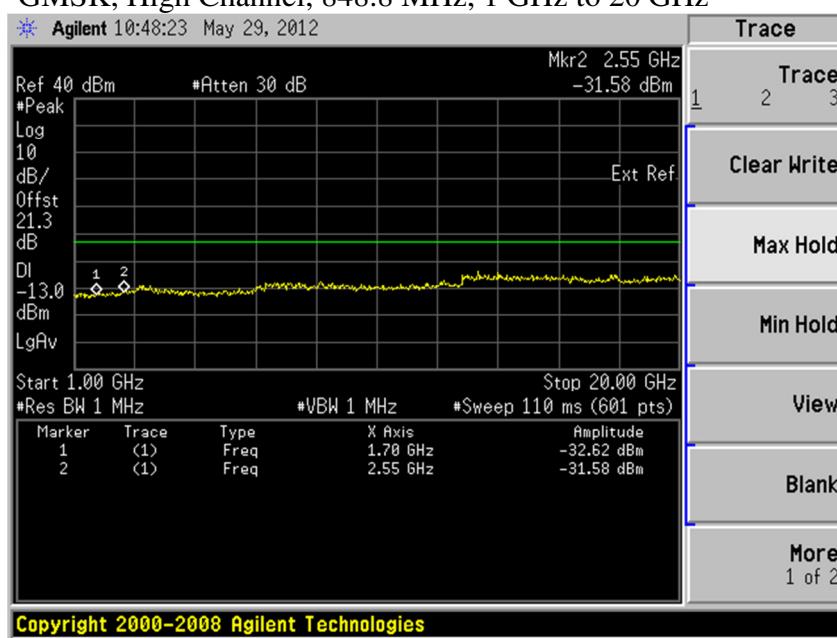
SL9090

May30, 2012

Page 33 of 74

## Plot 6.4.9) Out of Band Emissions at Antenna Terminals

GMSK, High Channel, 848.8 MHz, 1 GHz to 20 GHz



Cellular Harmonics for Ch. 251 (848.8 MHz)	Level (dBm)
Second	-22.62 dBm
Third	-31.58 dBm
Others	----

# SIERRA WIRELESS, INC.

FCC Part 22, 24 / RSS 132, 133

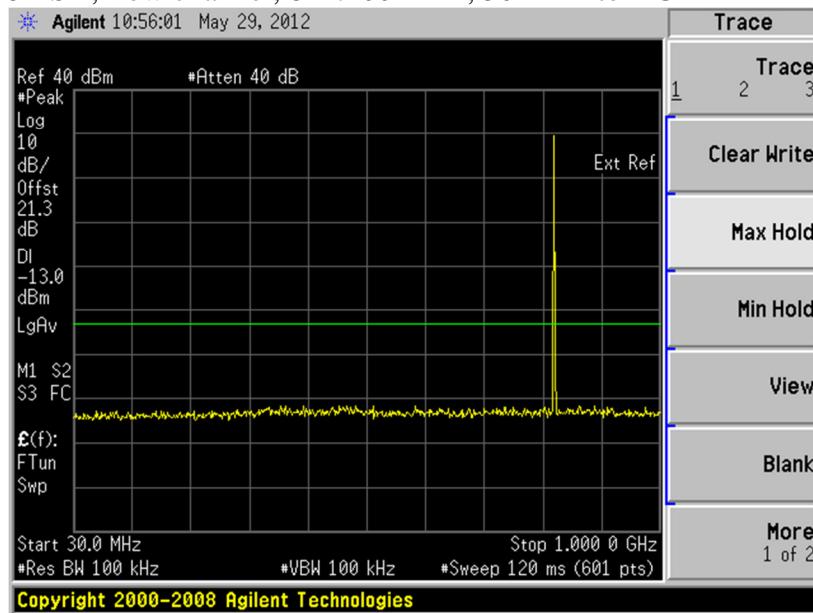
SL9090

May30, 2012

Page 34 of 74

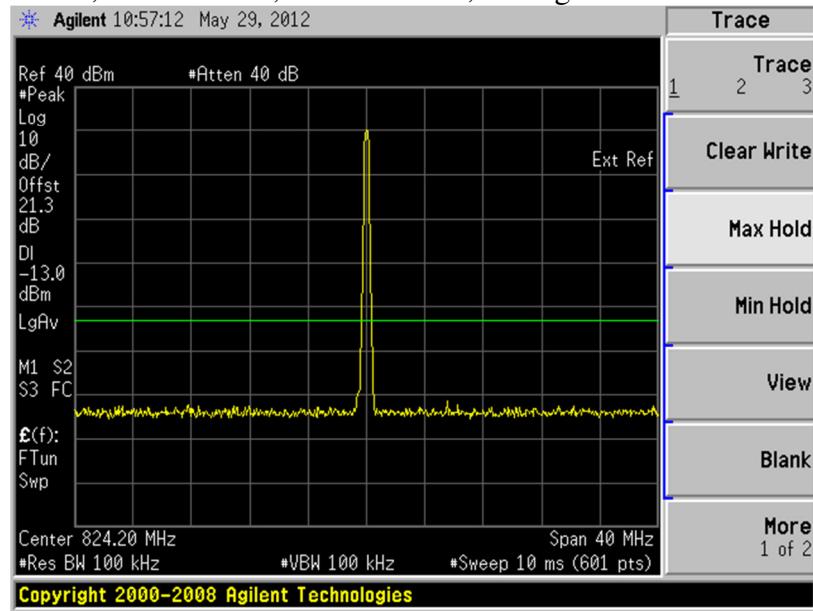
### **Plot 6.4.10) Out of Band Emissions at Antenna Terminals**

8-PSK, Low channel, 824.200 MHz, 30 MHz to 1 GHz



### **Plot 6.4.11) Out of Band Emissions at Antenna Terminals**

8-PSK, Low channel, 824.200 MHz, TX signal +/- 20 MHz



**The strong emission shown in each case is the carrier signal.**

# SIERRA WIRELESS, INC.

FCC Part 22, 24 / RSS 132, 133

SL9090

May30, 2012

Page 35 of 74

## Plot 6.4.12) Out of Band Emissions at Antenna Terminals

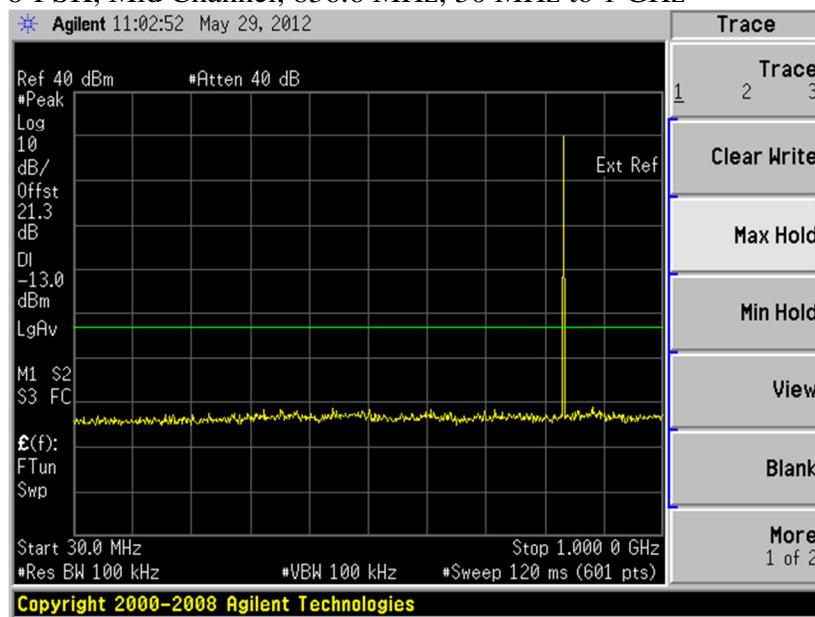
8-PSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz



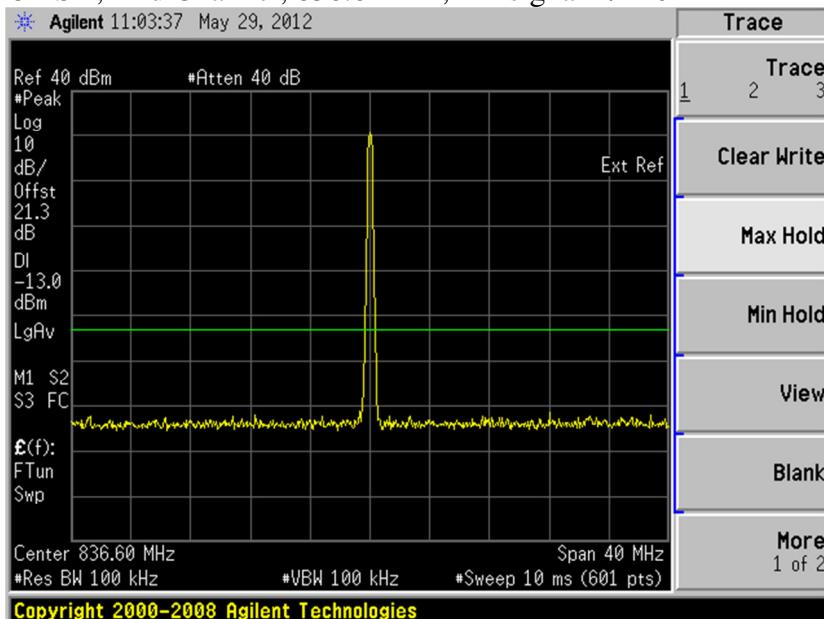
Cellular Harmonics for Ch. 128 (824.2 MHz)	Level (dBm)
Second	<b>-31.58 dBm</b>
Third	<b>-31.77 dBm</b>
Others	----

**Plot 6.4.13) Out of Band Emissions at Antenna Terminals**

8-PSK, Mid Channel, 836.6 MHz, 30 MHz to 1 GHz

**Plot 6.4.14) Out of Band Emissions at Antenna Terminals**

8-PSK, Mid Channel, 836.6 MHz, TX signal +/- 20 MHz

**The strong emission shown in each case is the carrier signal.**

# SIERRA WIRELESS, INC.

FCC Part 22, 24 / RSS 132, 133

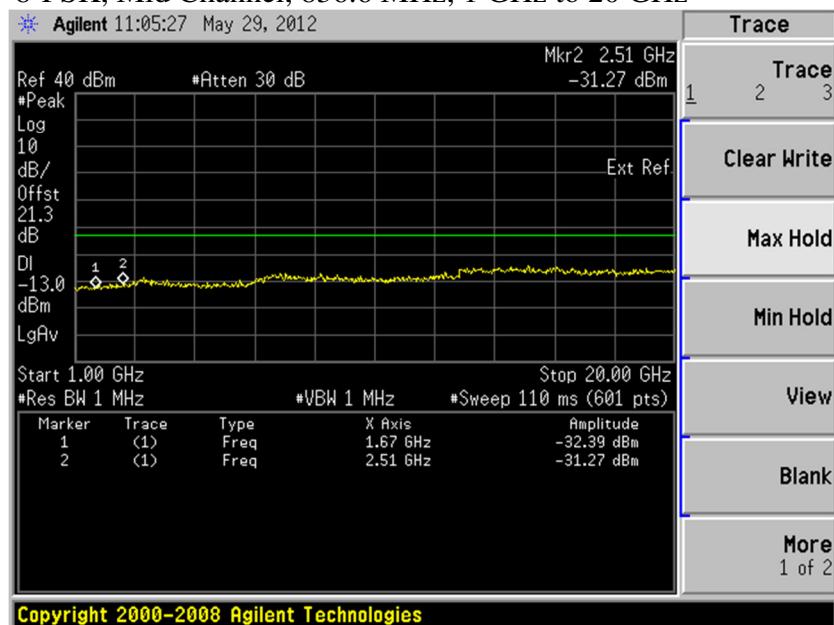
SL9090

May30, 2012

Page 37 of 74

## Plot 6.4.15) Out of Band Emissions at Antenna Terminals

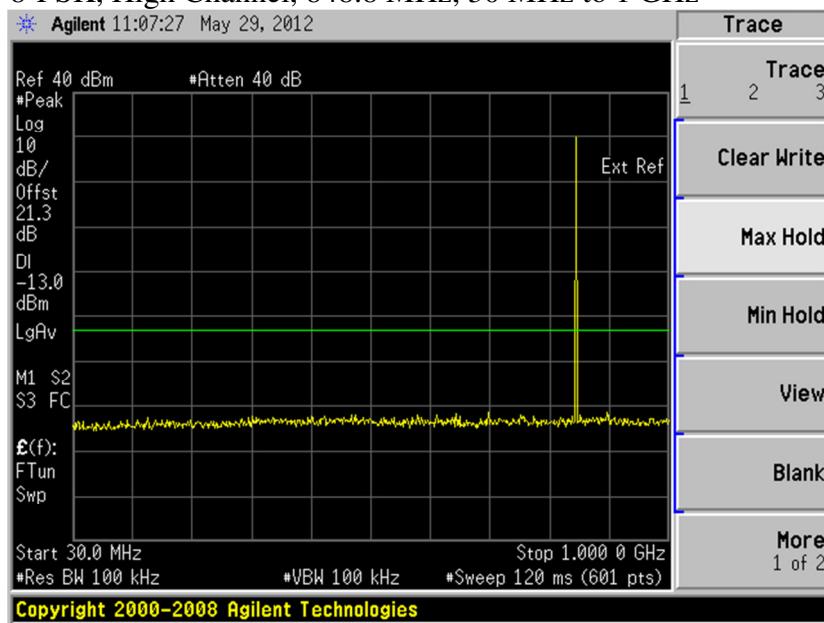
8-PSK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz



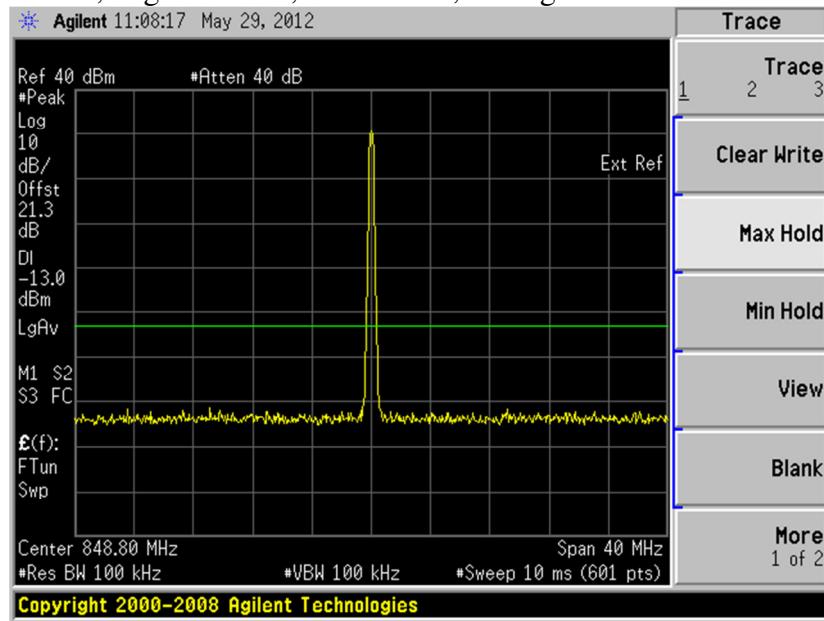
Cellular Harmonics for Ch. 190 (836.6 MHz)	Level (dBm)
Second	<b>-32.39 dBm</b>
Third	<b>-31.27 dBm</b>
Others	----

**Plot 6.4.16) Out of Band Emissions at Antenna Terminals**

8-PSK, High Channel, 848.8 MHz, 30 MHz to 1 GHz

**Plot 6.4.17) Out of Band Emissions at Antenna Terminals**

8-PSK, High Channel, 848.8 MHz, TX signal +/- 20 MHz



The strong emission shown in each case is the carrier signal.