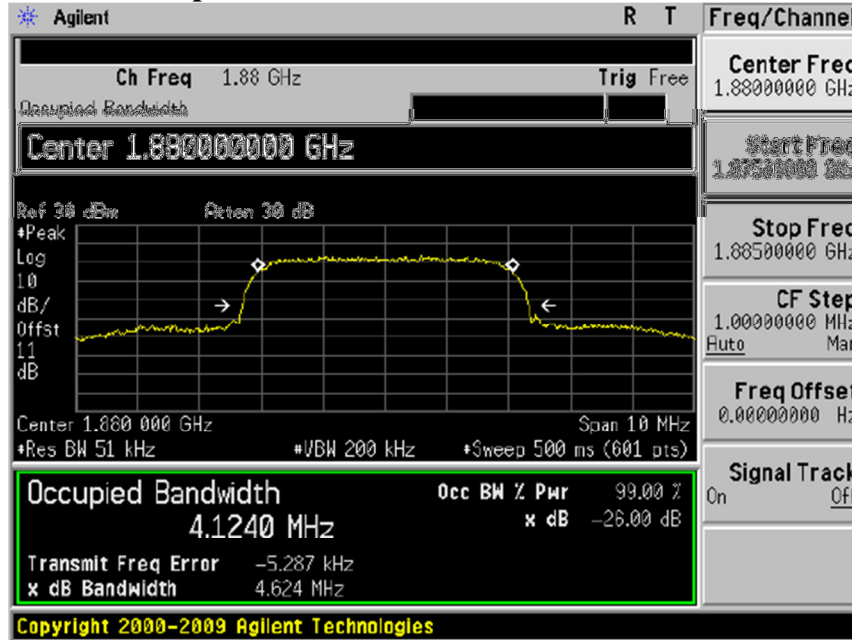
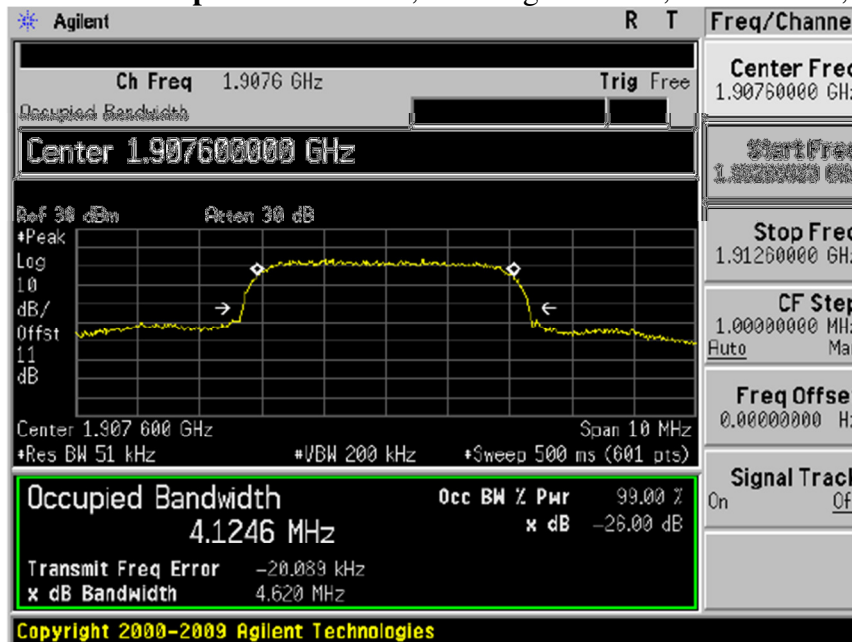


### 5.3.17) WCDMA Occupied Bandwidth, PCS Middle channel, 1880 MHz, 99% BW



### 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)

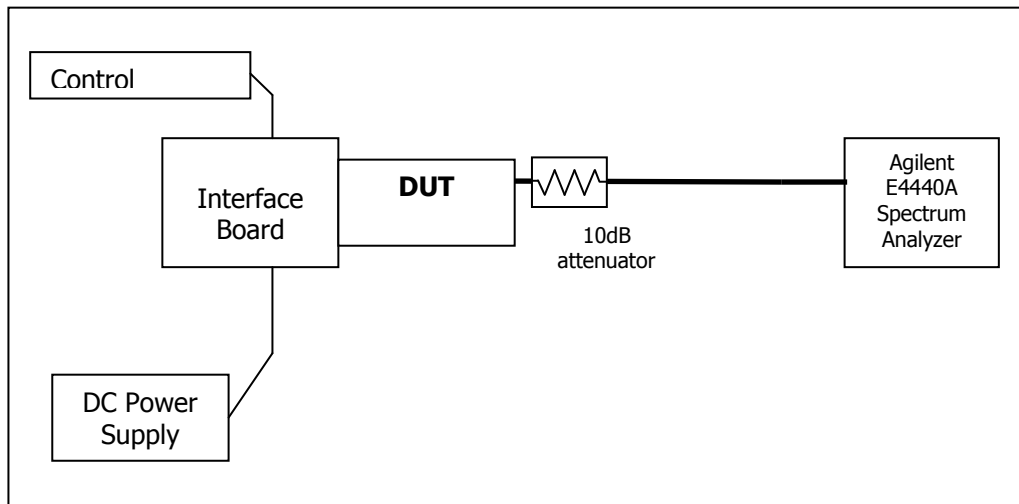
### Out of Band Emissions:

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               |

### 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**

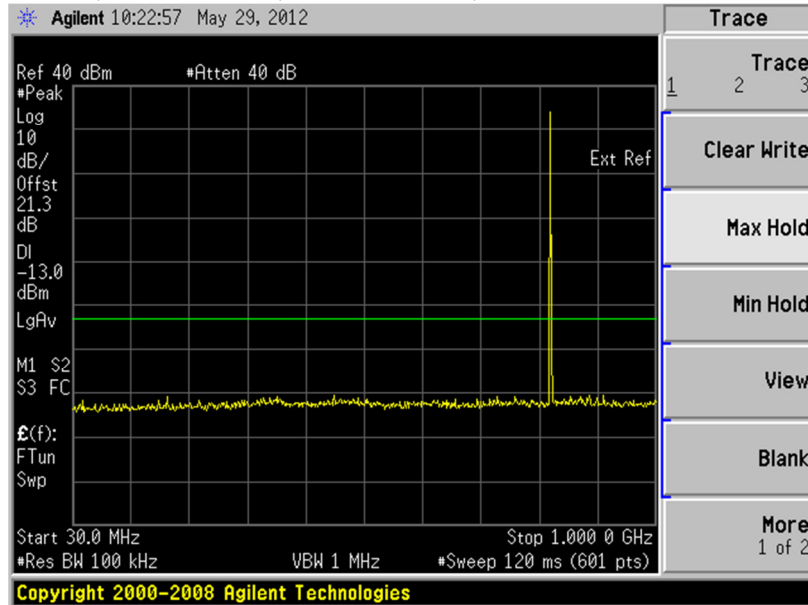
| Plot Number     | Description                            |
|-----------------|----------------------------------------|
| 6.4.46 – 6.4.48 | WCDMA Mode, Low Channel, 1852.4 MHz    |
| 6.4.49 – 6.4.51 | WCDMA Mode, Middle Channel, 1880.0 MHz |
| 6.4.52 – 6.4.54 | WCDMA Mode, High Channel, 1907.6 MHz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

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

#### 6.4 Test Plots

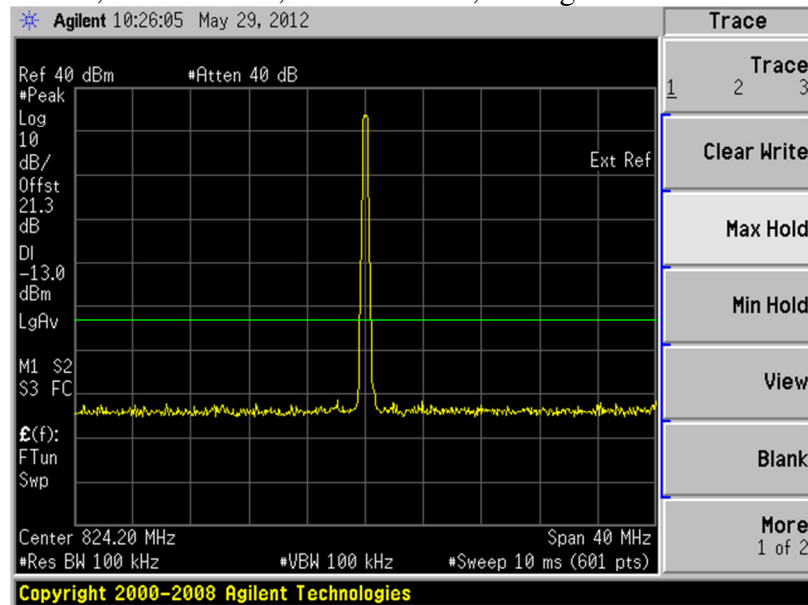
##### Plot 6.4.1) Out of Band Emissions at Antenna Terminals

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



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

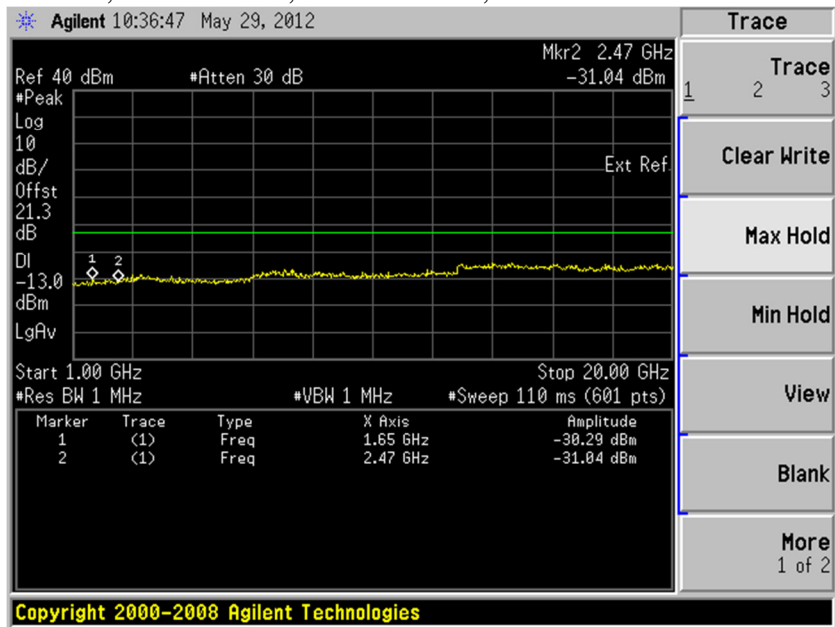
GMSK, Low channel, 824.200 MHz, TX signal +/- 20 MHz



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

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

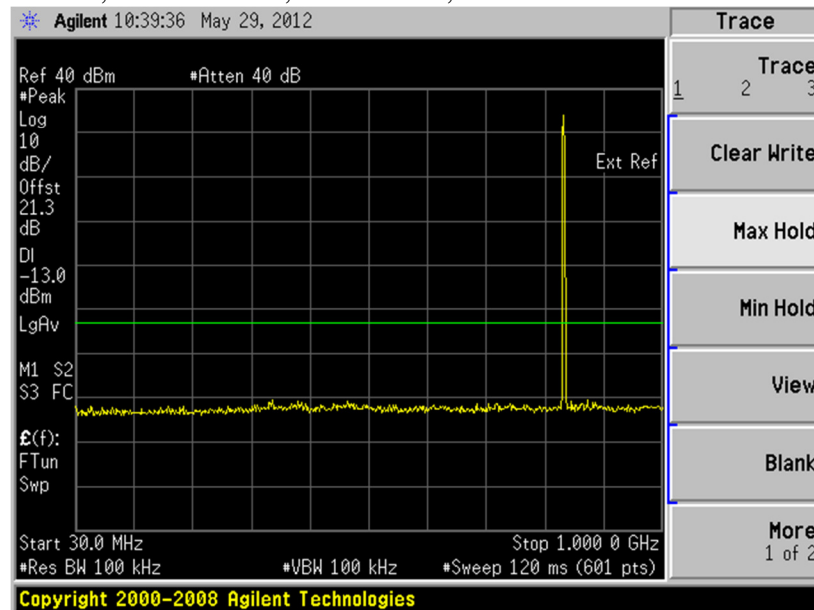
GMSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz



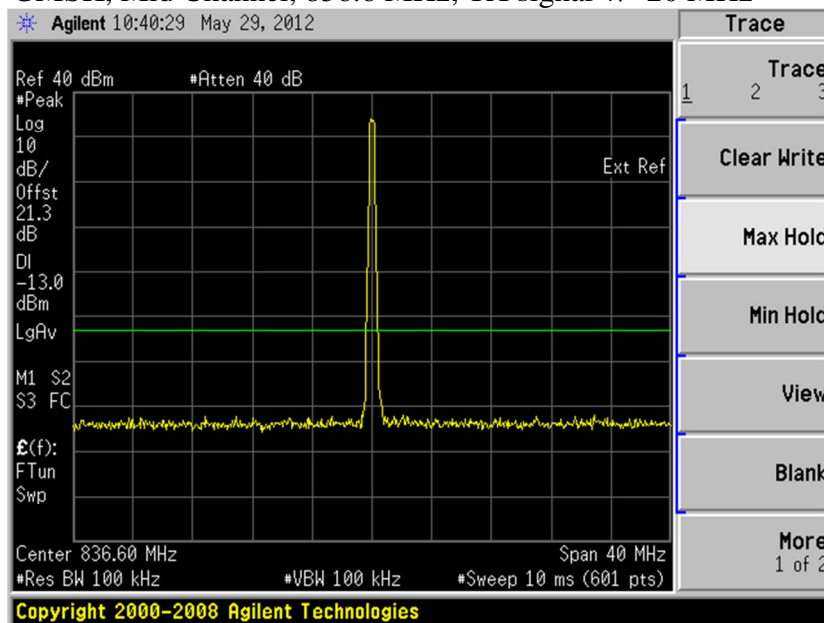
| Cellular Harmonics for Ch. 128 (824.2 MHz) | Level (dBm) |
|--------------------------------------------|-------------|
| Second                                     | -30.29 dBm  |
| Third                                      | -31.04 dBm  |
| Others                                     | ----     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

**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



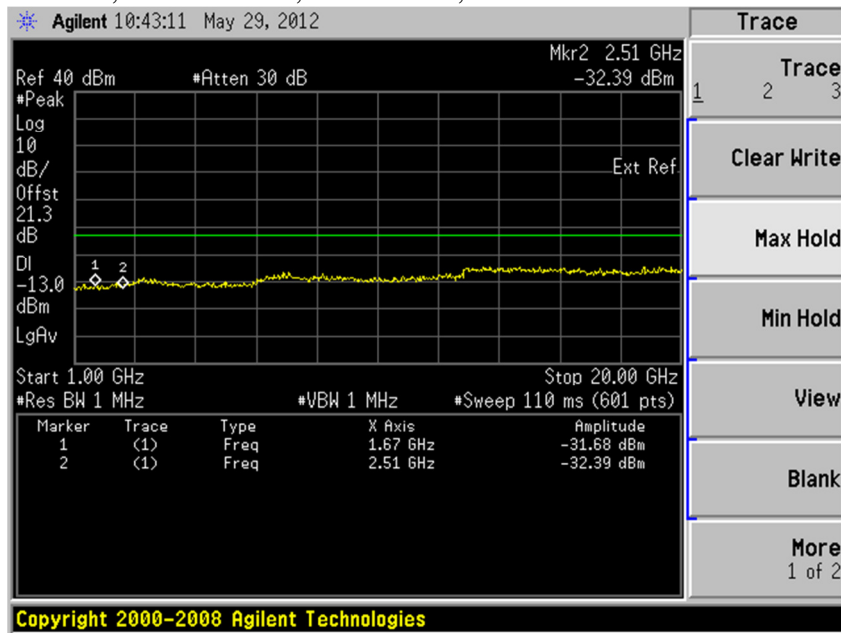
The strong emission shown in each case is the carrier signal.

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|                                |        |             |               |
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## Plot 6.4.6) Out of Band Emissions at Antenna Terminals

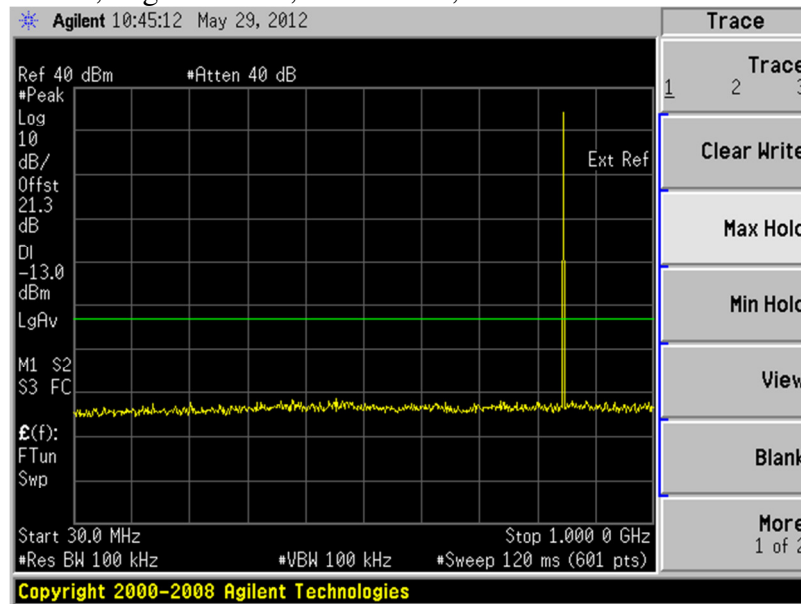
GMSK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz



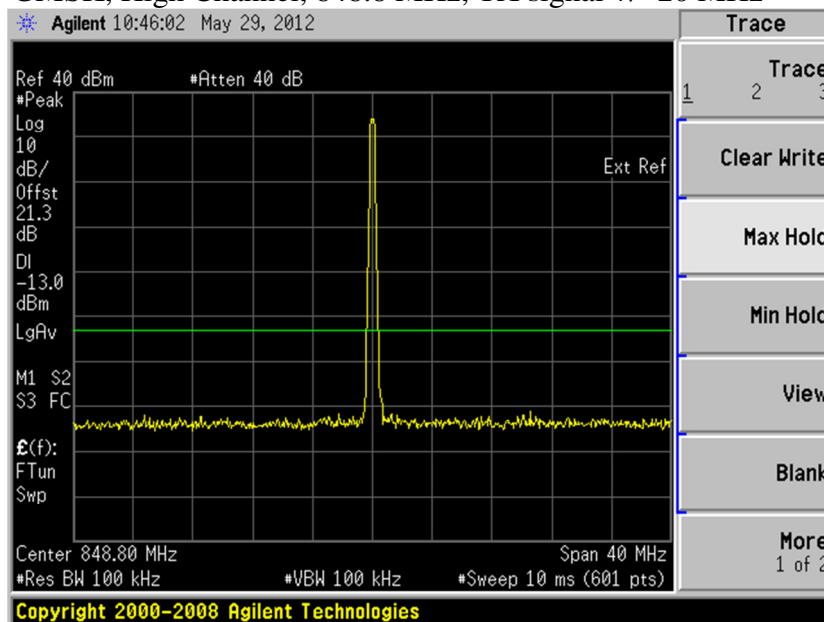
| Cellular Harmonics for Ch. 190 (836.6 MHz) | Level (dBm) |
|--------------------------------------------|-------------|
| Second                                     | -31.68 dBm  |
| Third                                      | -32.39 dBm  |
| Others                                     | ----        |

**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



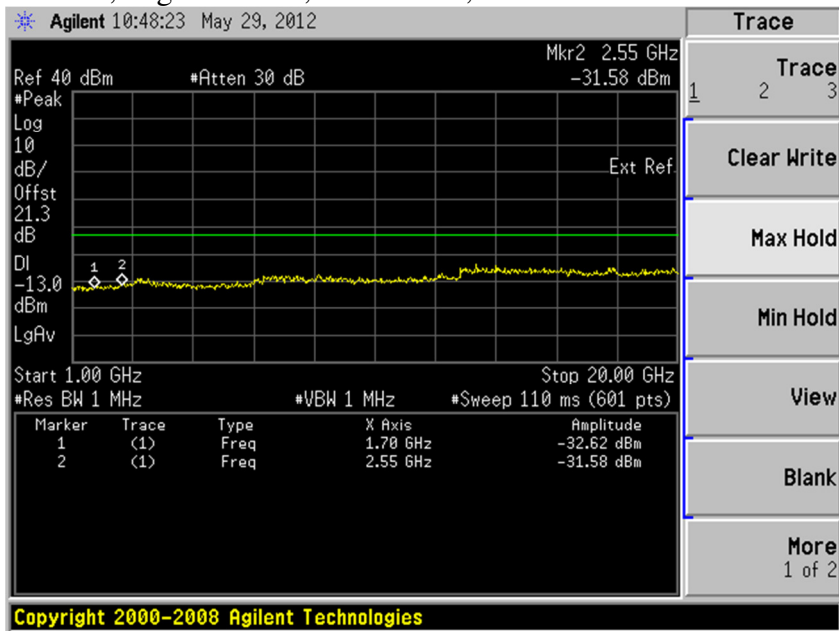
The strong emission shown in each case is the carrier signal.

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

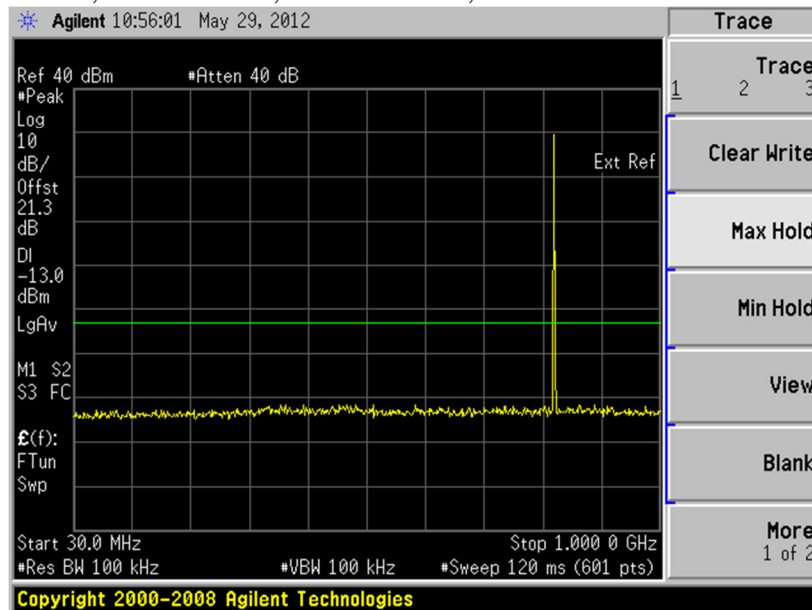
GMSK, High Channel, 848.8 MHz, 1 GHz to 20 GHz



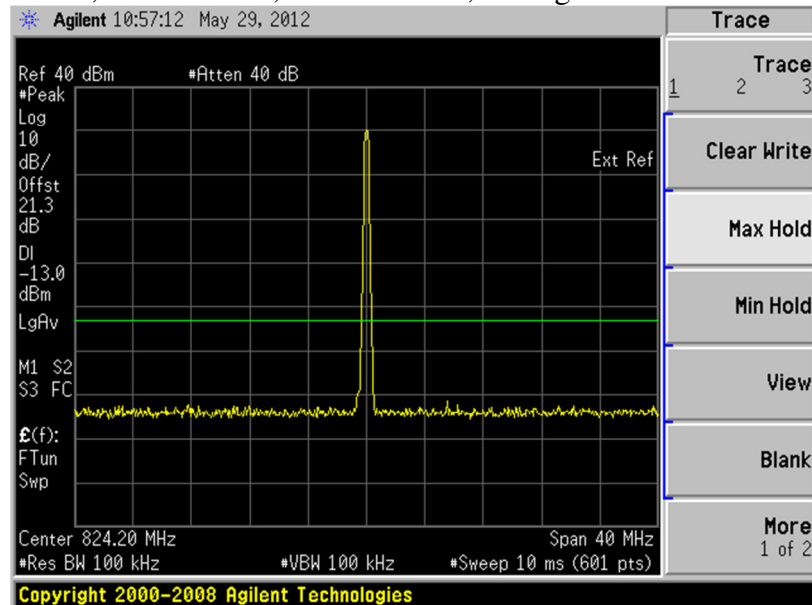
| Cellular Harmonics for Ch. 251 (848.8 MHz) | Level (dBm) |
|--------------------------------------------|-------------|
| Second                                     | -22.62 dBm  |
| Third                                      | -31.58 dBm  |
| Others                                     | ----     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

**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



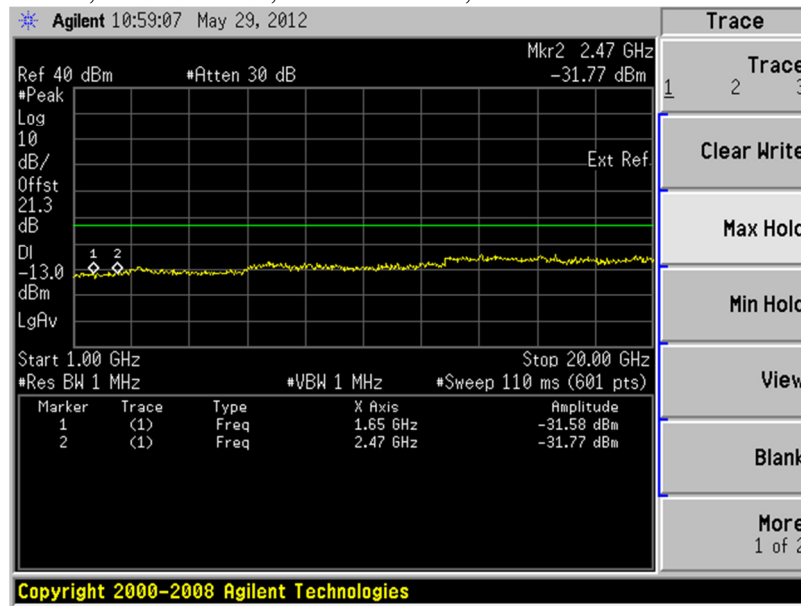
The strong emission shown in each case is the carrier signal.

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

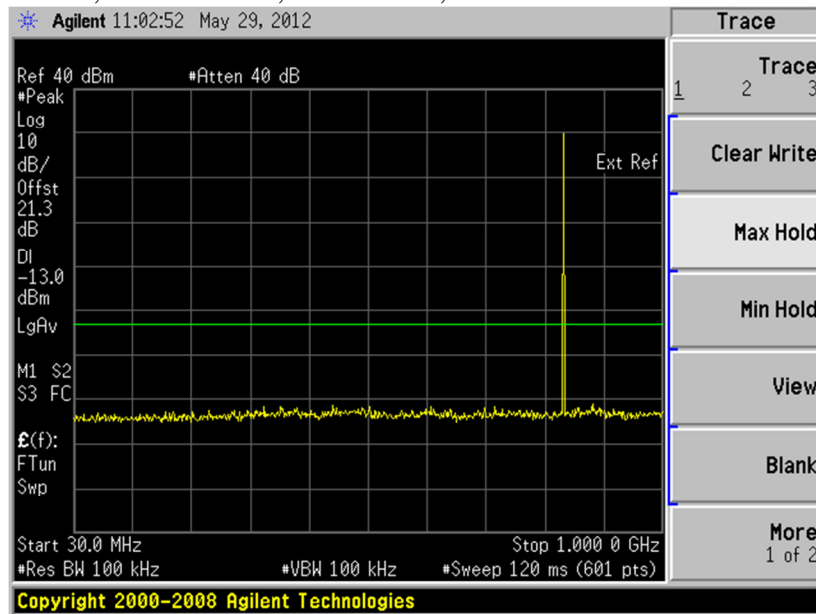
8-PSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz



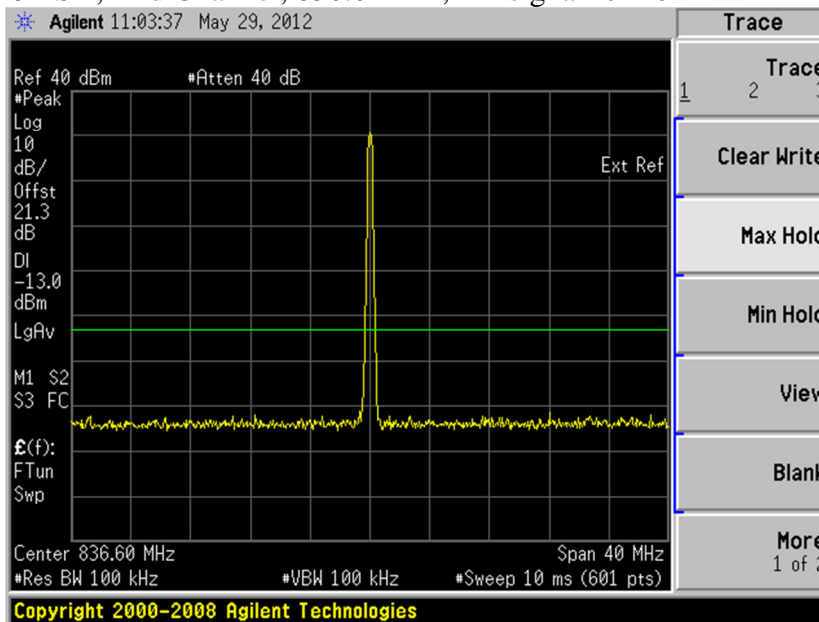
| Cellular Harmonics for Ch. 128 (824.2 MHz) | Level (dBm) |
|--------------------------------------------|-------------|
| Second                                     | -31.58 dBm  |
| Third                                      | -31.77 dBm  |
| Others                                     | ----        |

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

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

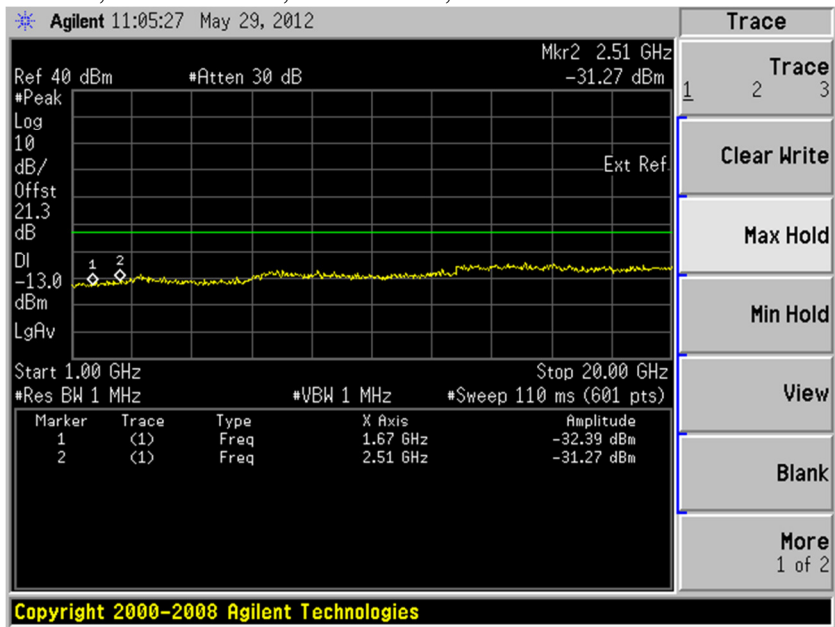
**Plot 6.4.14) Out of Band Emissions at Antenna Terminals**

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



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

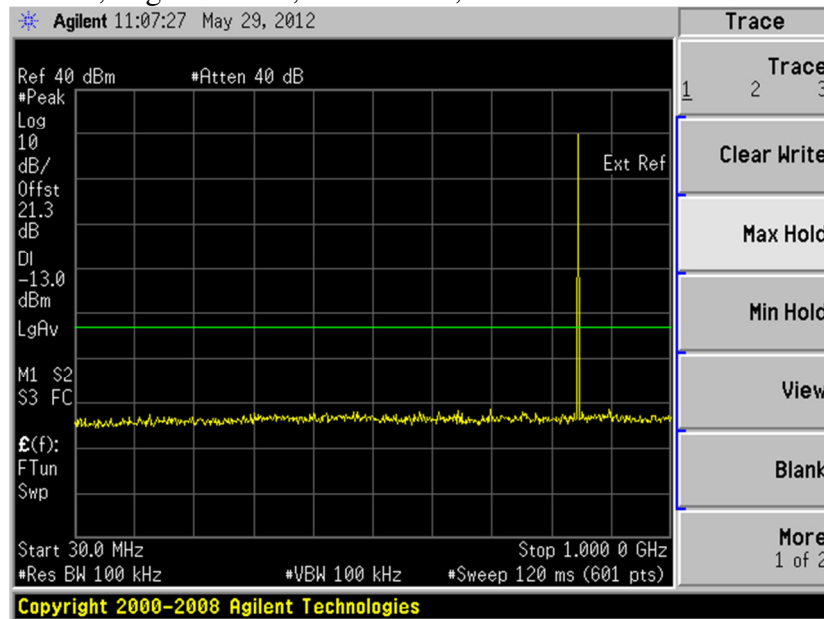
**Plot 6.4.15) Out of Band Emissions at Antenna Terminals**  
8-PSK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz



| Cellular Harmonics for Ch. 190 (836.6 MHz) | Level (dBm) |
|--------------------------------------------|-------------|
| Second                                     | -32.39 dBm  |
| Third                                      | -31.27 dBm  |
| Others                                     | ----        |

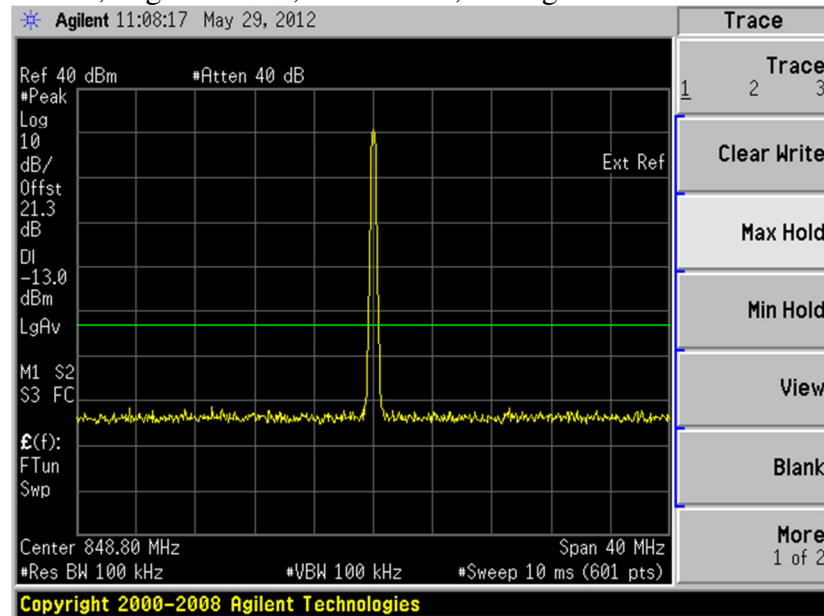
**Plot 6.4.16) Out of Band Emissions at Antenna Terminals**

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.