



FCC Parts 22 and 24 Test Report

For

850/900/1800/1900 MHz GSM/EDGE PC CARD
WIRELESS MODEM

Model: AIRCARD 775

FCC ID: N7NAC775

**Prepared by
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Test Date(s): May 20, 2004

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1 Introduction and Purpose

This document provides the FCC test data for the AC755 wireless modem. The tests included in this report are limited to all conducted tests required. The radiated tests were performed at an external test facility.

2 Test Summary

| FCC RULE | DESCRIPTION OF TEST | RESULT | PAGE |
|--|---|----------|-------------------|
| 2.1046 | RF Power Output | Complies | 5 |
| 2.1049 | Occupied Bandwidth | Complies | 7 |
| 2.1051, 22.901(d) 22.917, 24.238(a) | Out of Band Emissions at Antenna Terminals | Complies | 20 |
| FCC part 22H/24E | Block Edge Requirements | Complies | 49 |
| 2.1053 | Field Strength of Spurious Radiation | Complies | See CCS Report |
| 2.1055 | Frequency Stability versus Temperature | Complies | 55 |
| 2.1055 | Frequency Stability versus Voltage | Complies | 58 |

The tests described in this report were performed by Mr. Darryl Simpson at:

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3 Description of Equipment Under Test

The Sierra Wireless Inc. model AirCard 775 is a quad-band PCMCIA card wireless modem operating on the GSM/GPRS/EDGE network. In the US and Canada, only cellular and PCS bands are used for GSM/GPRS operation, so this test report only contains data for these two bands (850MHz and 1900MHz). The EUT was tested in both modes of operation: GMSK modulation and 8-PSK modulation. The EUT is a production sample and the serial number is:

S040405000700E3



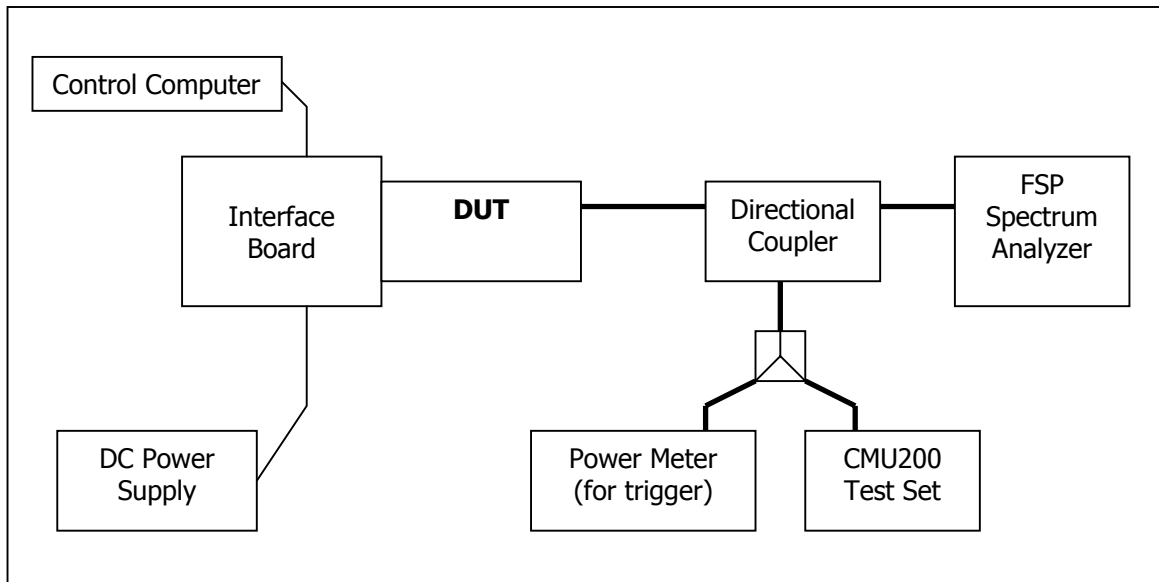
4 RF Power Output

FCC 2.1046

4.1 Test Procedure

The transmitter output was connected to a Rohde & Schwarz CMU200 Test Set and configured to operate at maximum power. The power was measured at three equally spaced operating frequencies in each band and the RBW was set at 300 KHz.

Test Setup



4.2 Test Equipment

Instrument List

| EQUIPMENT | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DATE |
|---------------------|-----------------|------------|------------|----------------|
| Control Computer | TC | Generic PC | 100488 | N/A |
| Wireless Test Set | Rohde & Schwarz | CMU200 | 836766/030 | N/A |
| Spectrum Analyzer | Rohde & Schwarz | FSP 30GHz | US41421268 | Sept. 12, 2003 |
| DC Power Supply | HP | E3631A | 100060 | N/A |
| Interface Board | Shop built | Minnow | N/A | N/A |
| Directional Coupler | Pasternack | PE2209-10 | N/A | N/A |

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4.3 Test Results

| Frequency (MHz) | Channel | Power (dBm) | |
|-----------------|---------|-------------|------------|
| | | GMSK Mode | 8-PSK Mode |
| 824.2 | 128 | 31.43 | 26.84 |
| 836.6 | 190 | 31.44 | 26.89 |
| 848.8 | 251 | 31.38 | 26.79 |
| 1850.2 | 512 | 28.35 | 25.83 |
| 1880.0 | 661 | 28.41 | 25.94 |
| 1909.8 | 810 | 28.37 | 25.81 |

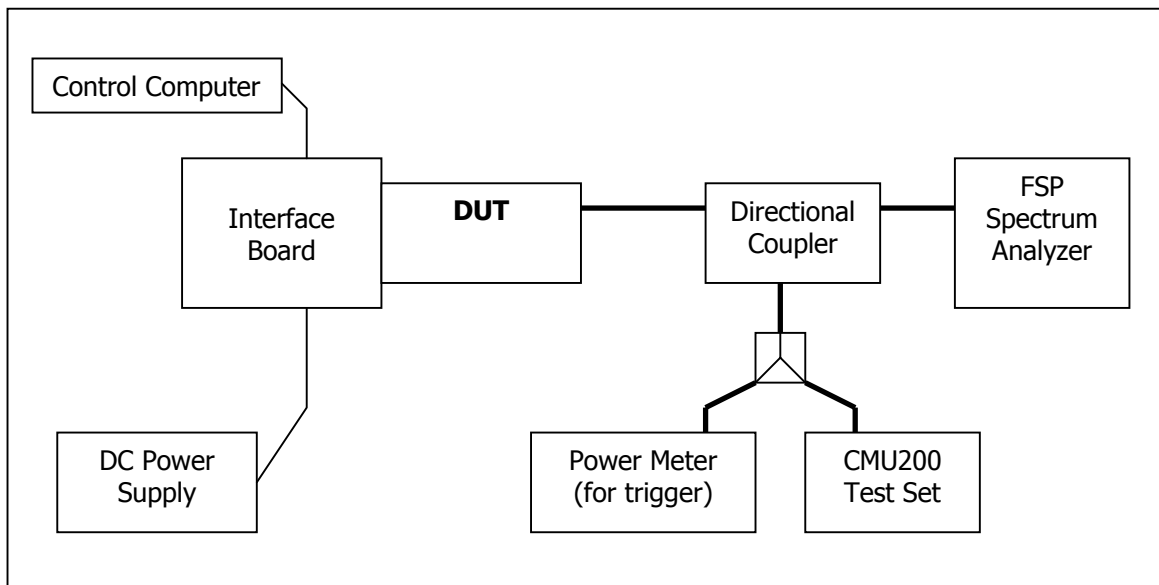
5 Occupied Bandwidth

FCC 2.1049

5.1 Test Procedure

The transmitter output was connected to a calibrated coaxial cable, the other end of which was connected to a spectrum analyzer. The occupied bandwidth (defined as the 99% Power Bandwidth) was measured with the Spectrum Analyzer at the center frequency of each band. The -26dB bandwidth was also measured and recorded.

Test Setup



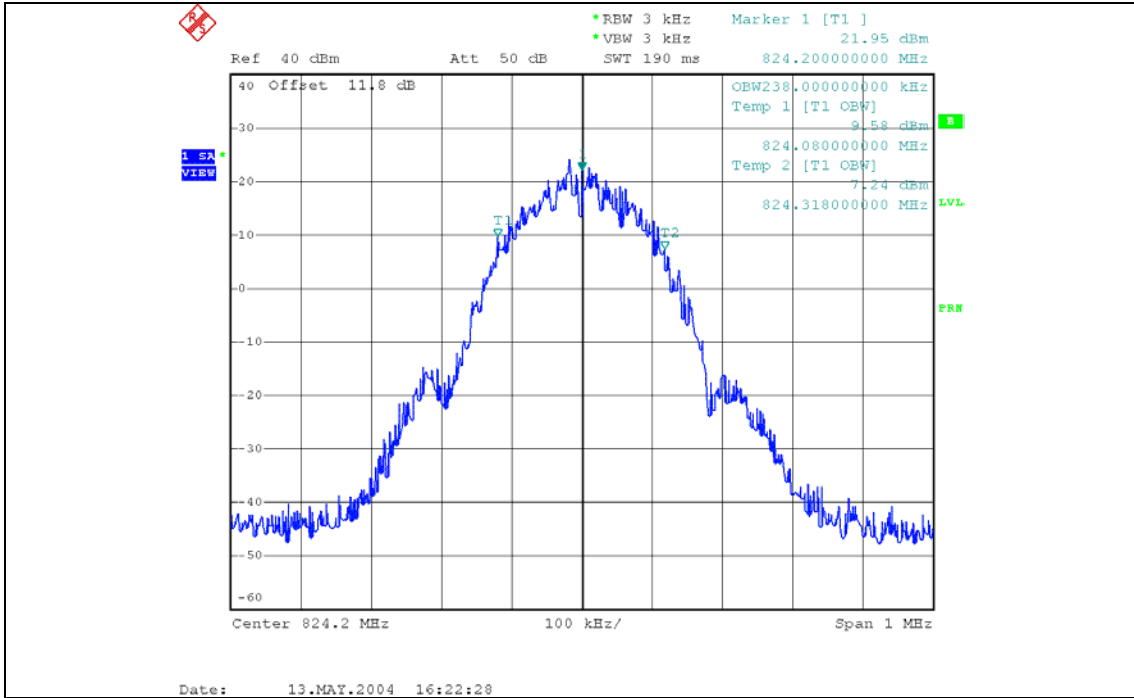
5.2 Test Results

The performance of 800 MHz cellular band is shown in plots 5.3.1 to 5.3.12. Performance of 1900 MHz PCS band is shown in plots 5.3.13 to 5.3.24.

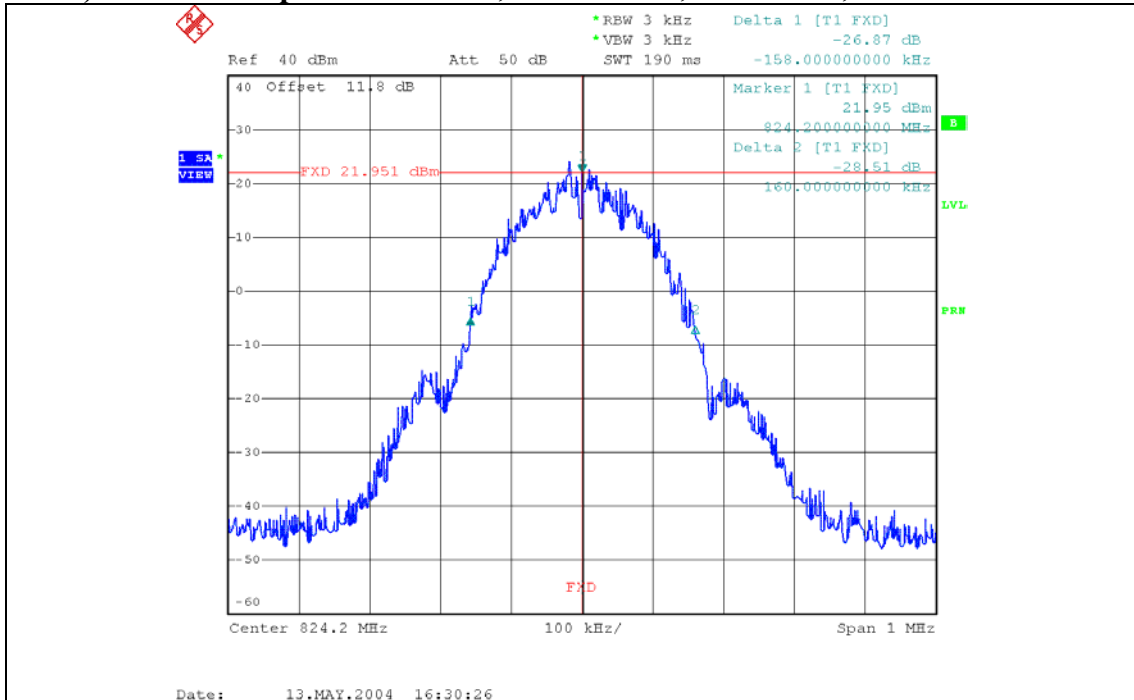
| Frequency (MHz) | Channel | 99% Occupied Bandwidth (kHz) | | -26dBc Occupied Bandwidth (kHz) | |
|-----------------|---------|------------------------------|------------|---------------------------------|------------|
| | | GMSK Mode | 8-PSK Mode | GMSK Mode | 8-PSK Mode |
| 824.2 | 128 | 238 | 232 | 318 | 314 |
| 836.6 | 190 | 242 | 240 | 312 | 298 |
| 848.8 | 251 | 240 | 240 | 324 | 308 |
| 1850.2 | 512 | 238 | 242 | 326 | 310 |
| 1880.0 | 661 | 238 | 238 | 314 | 304 |
| 1909.8 | 810 | 238 | 238 | 318 | 306 |

5.3 Test Plots

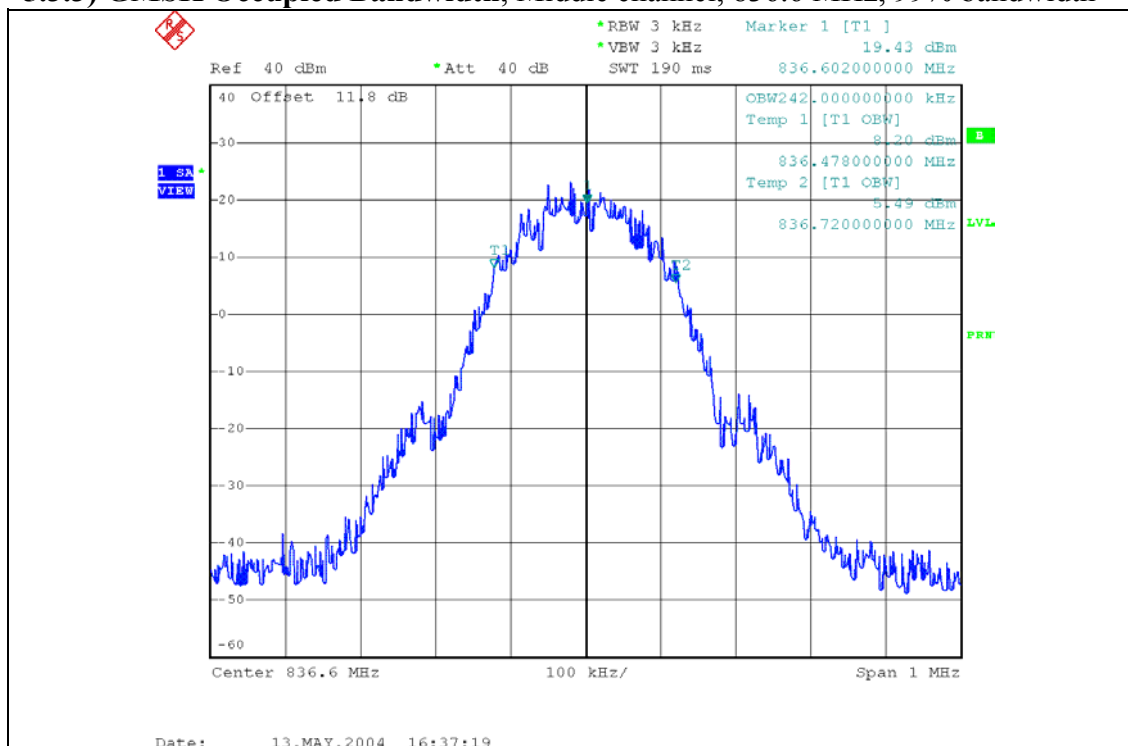
5.3.1) GSMK Occupied Bandwidth, Cellular Low channel, 824.2 MHz, 99% bandwidth



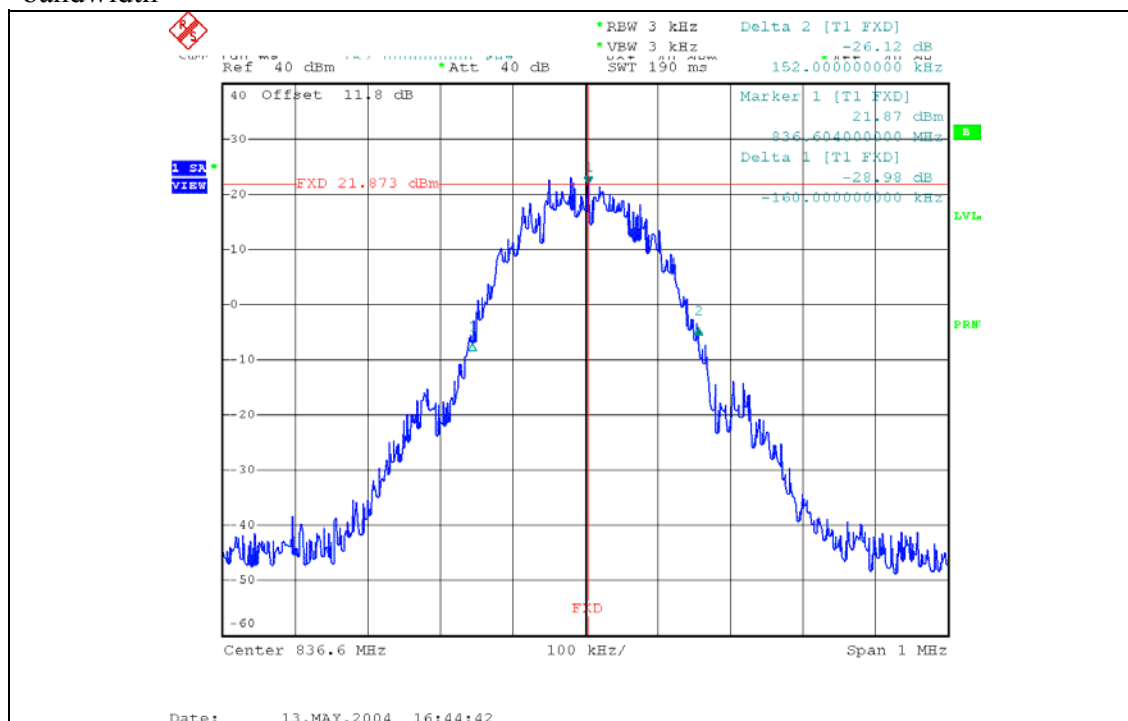
5.3.2) GSMK Occupied Bandwidth, Low channel, 824.2 MHz, -26dBc bandwidth



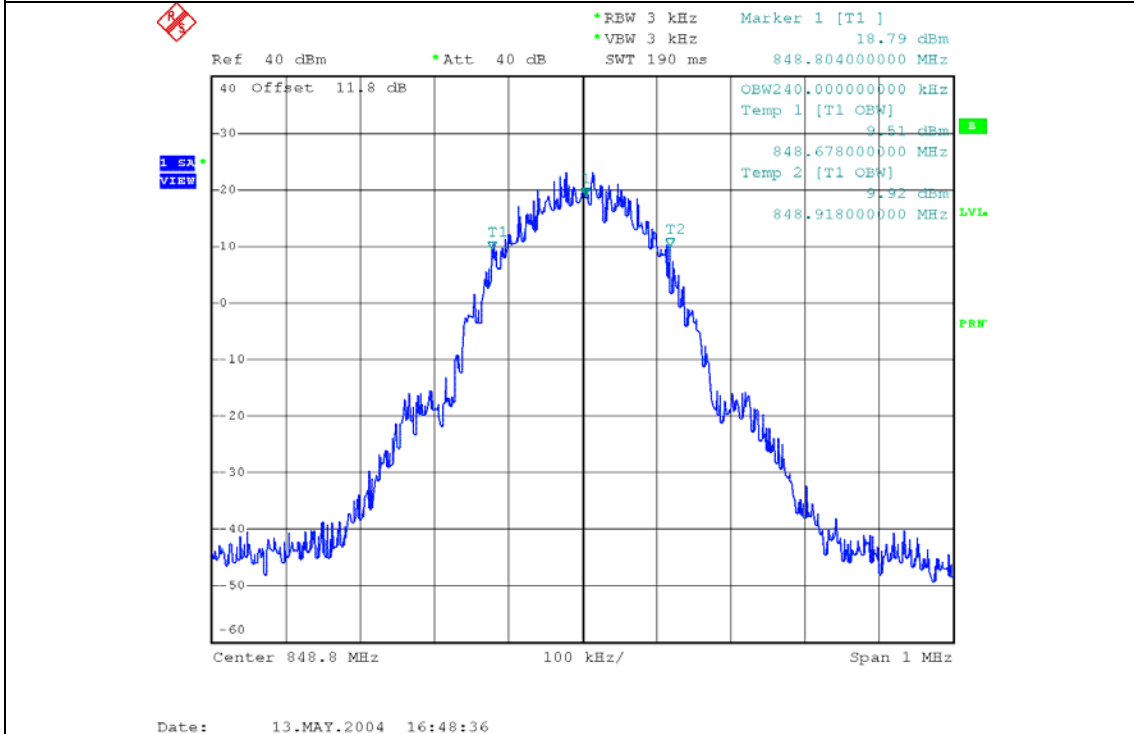
5.3.3) GMSK Occupied Bandwidth, Middle channel, 836.6 MHz, 99% bandwidth



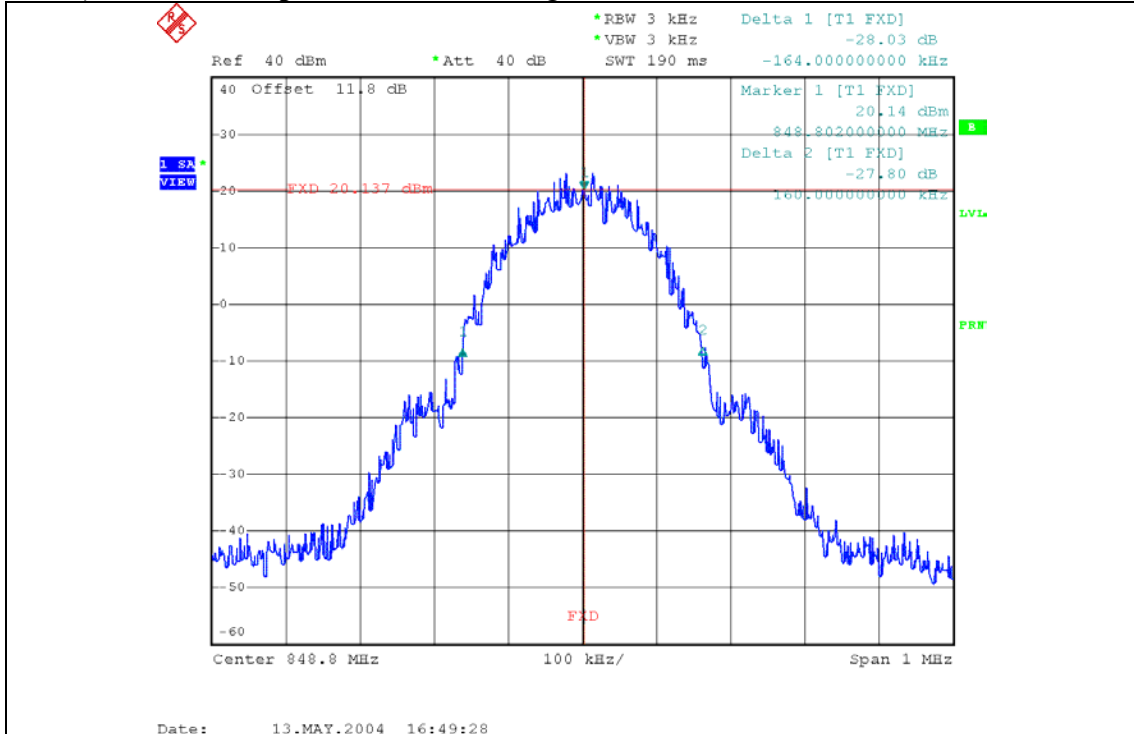
5.3.4) GMSK Occupied Bandwidth, Middle channel, 836.6 MHz, -26dBc bandwidth



5.3.5) GMSK Occupied Bandwidth, High channel, 848.8 MHz, 99% bandwidth

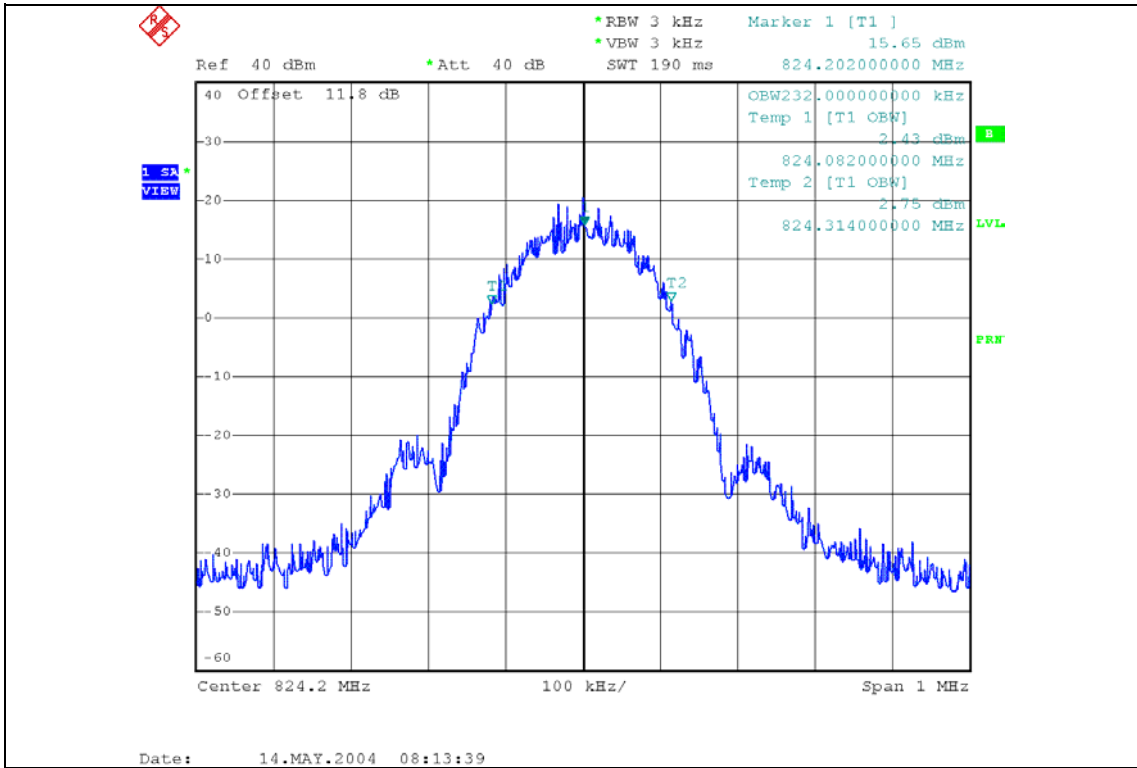


5.3.6) GMSK Occupied Bandwidth, High channel, 848.8 MHz, -26dBc bandwidth

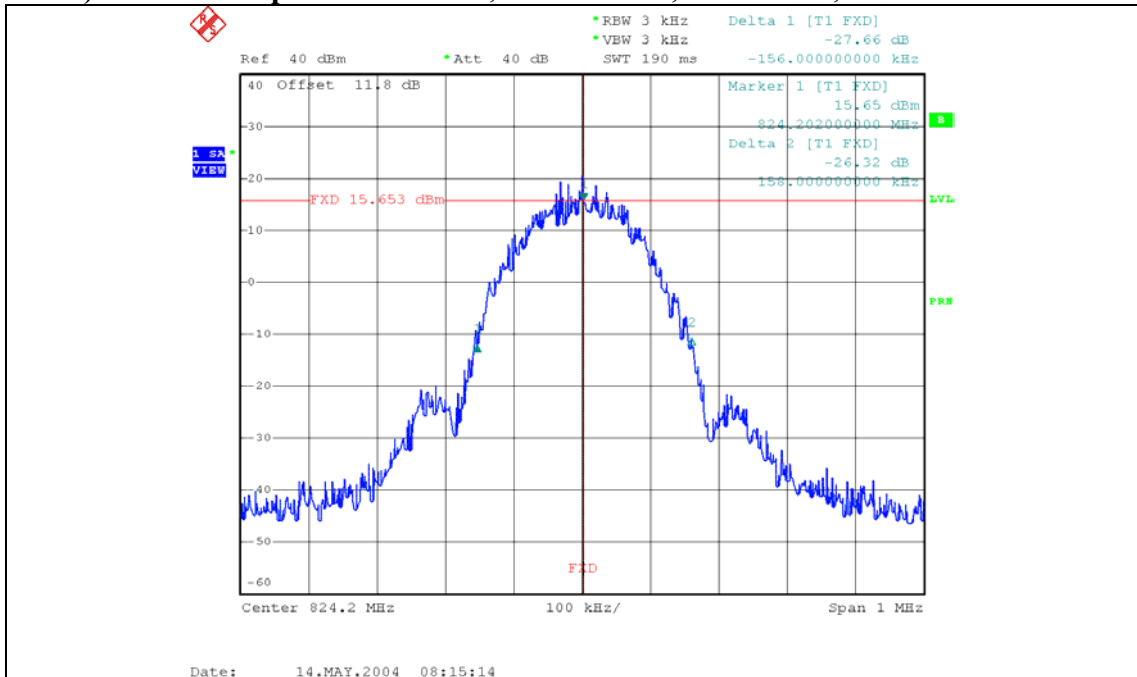


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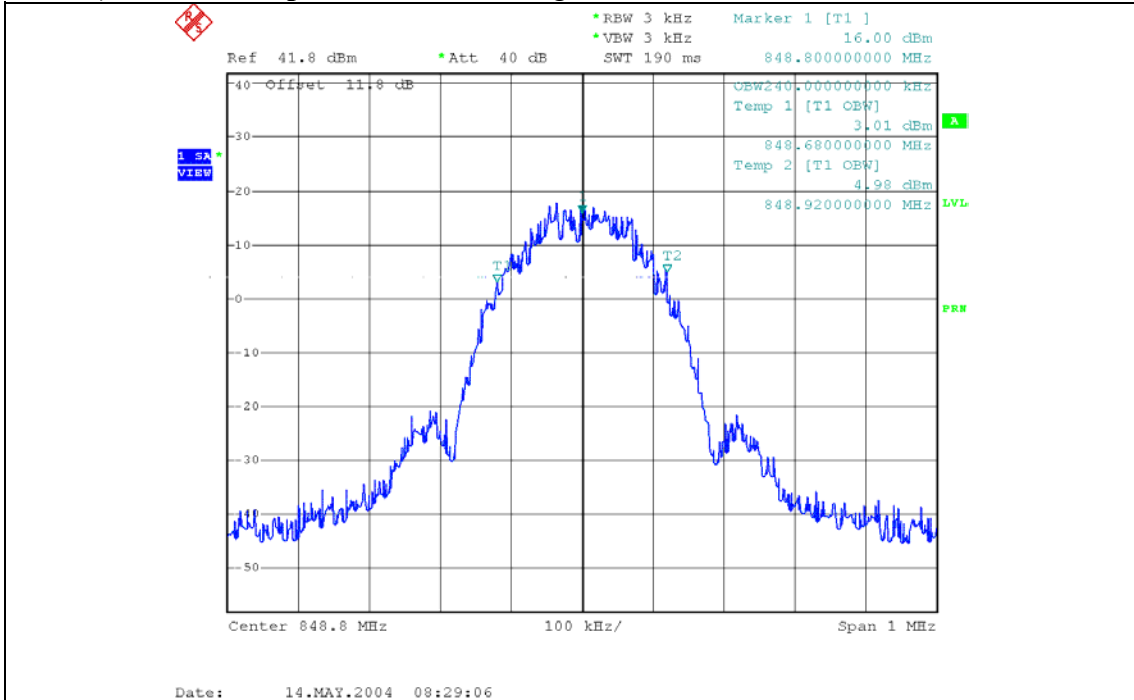
5.3.7) 8-PSK Occupied Bandwidth, Cellular Low channel, 824.2 MHz, 99% bandwidth



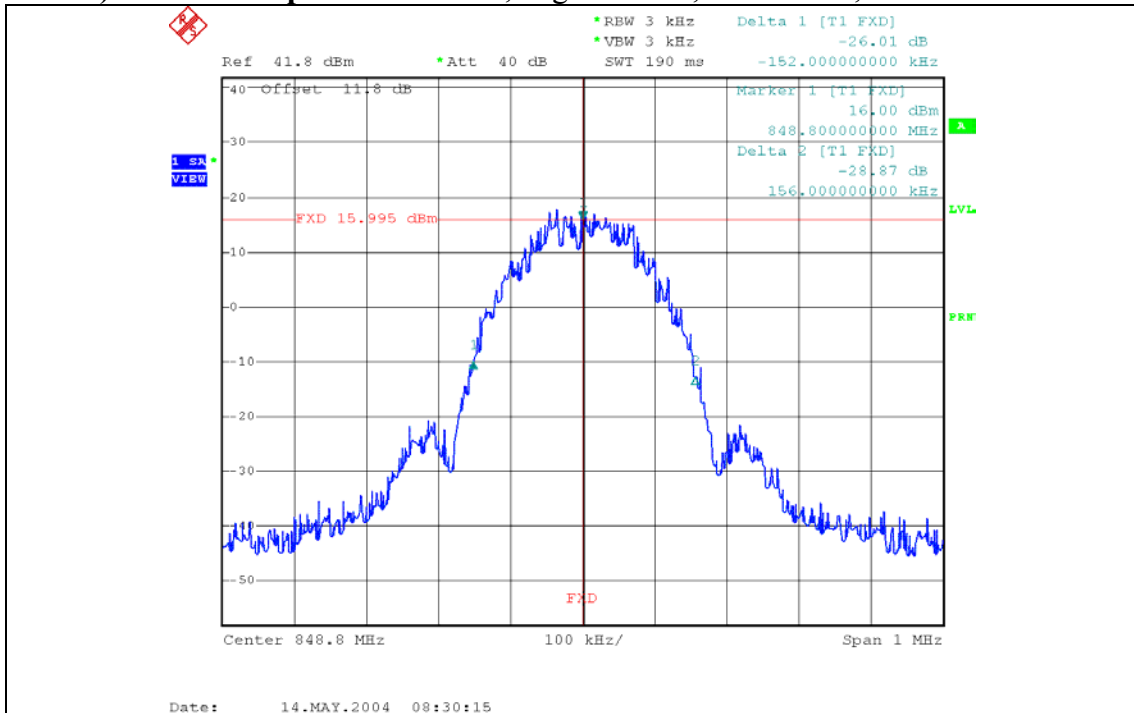
5.3.8) 8-PSK Occupied Bandwidth, Low channel, 824.2 MHz, -26dBc bandwidth



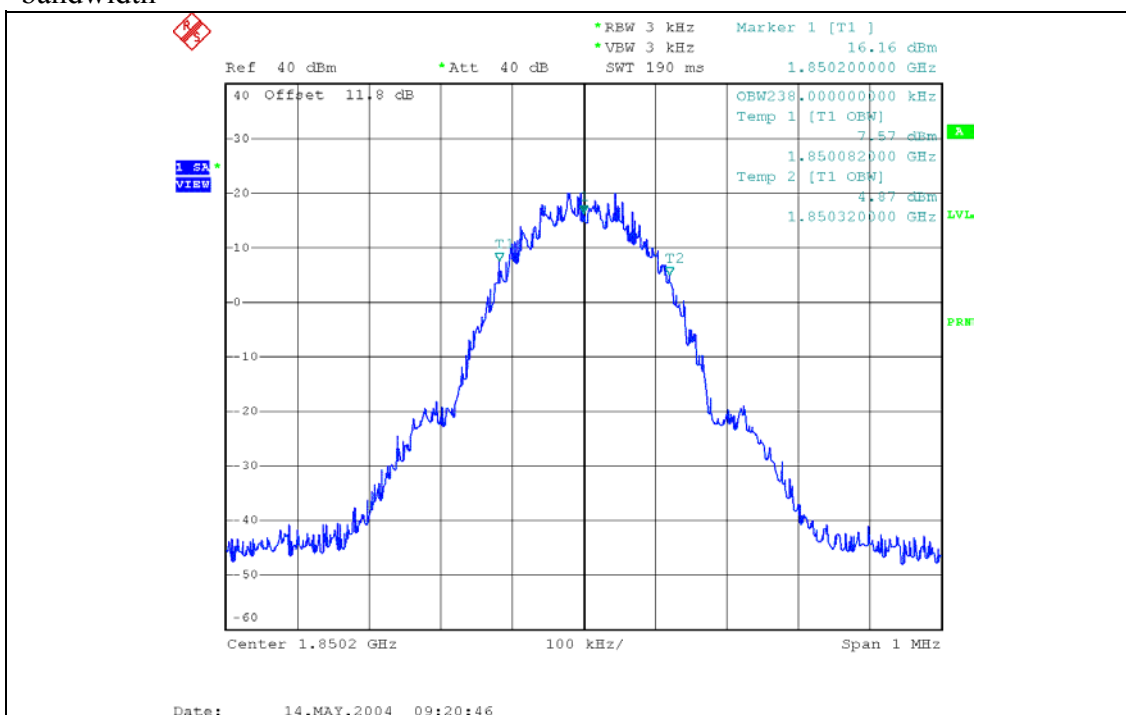
5.3.11) 8-PSK Occupied Bandwidth, High channel, 848.8 MHz, 99% bandwidth



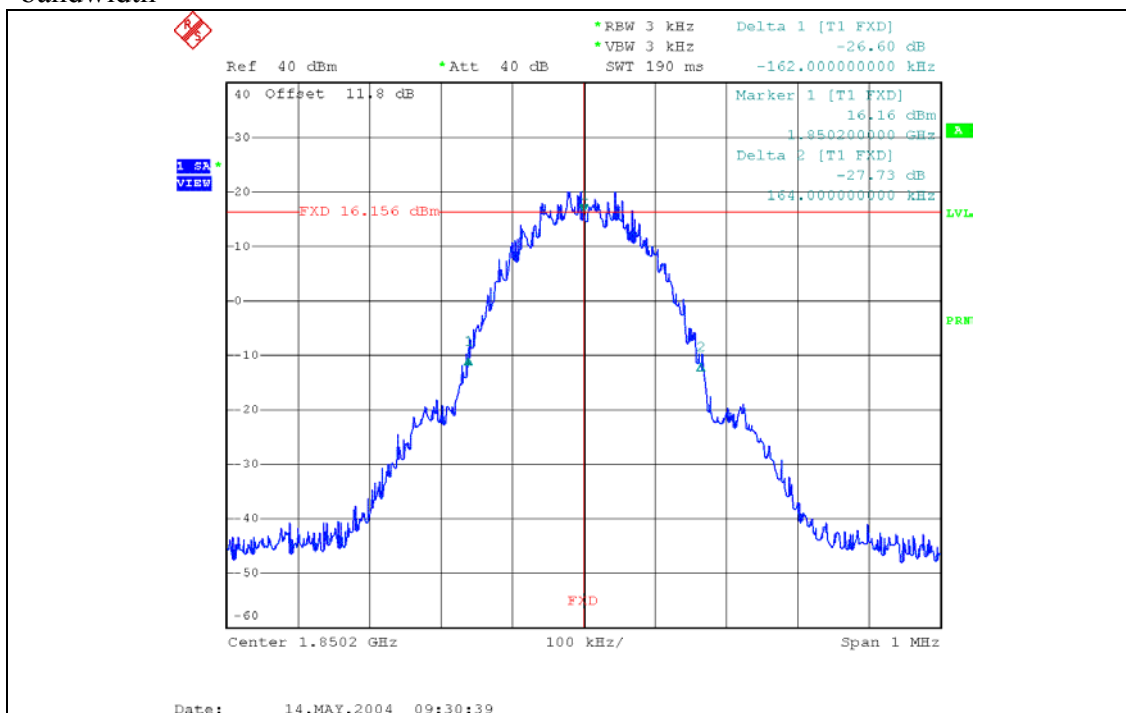
5.3.12) 8-PSK Occupied Bandwidth, High channel, 848.8 MHz, -26dBc bandwidth



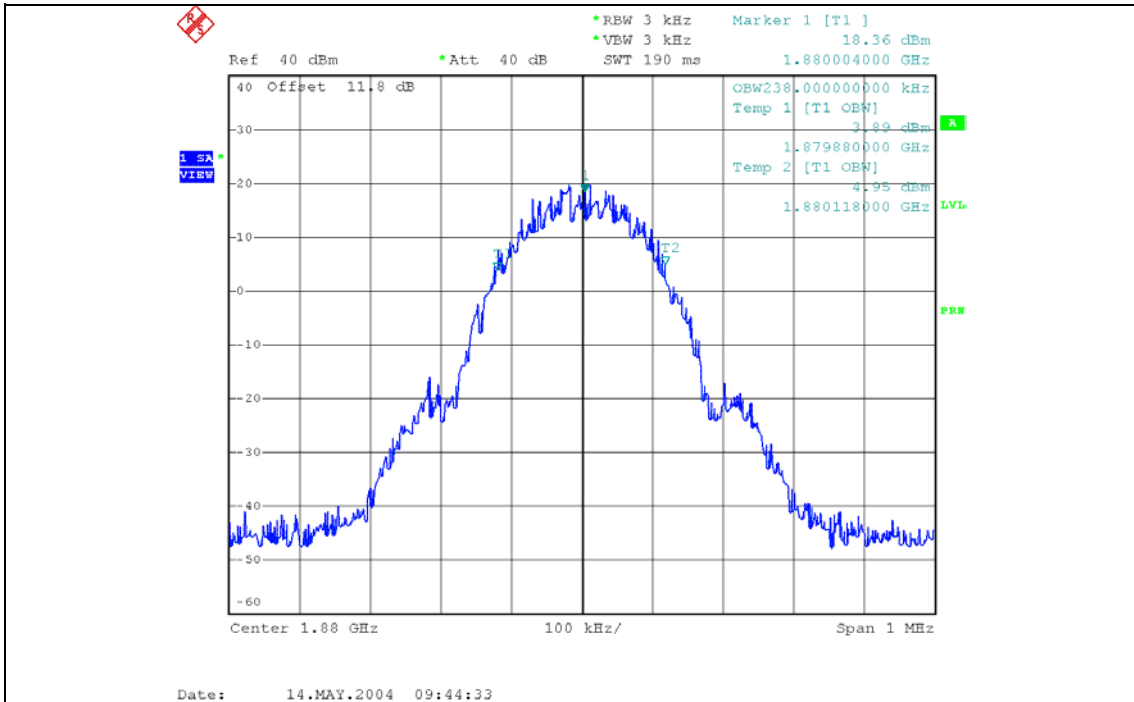
5.3.13) GSMK Occupied Bandwidth, PCS Low channel, 1850.2 MHz, 99% bandwidth



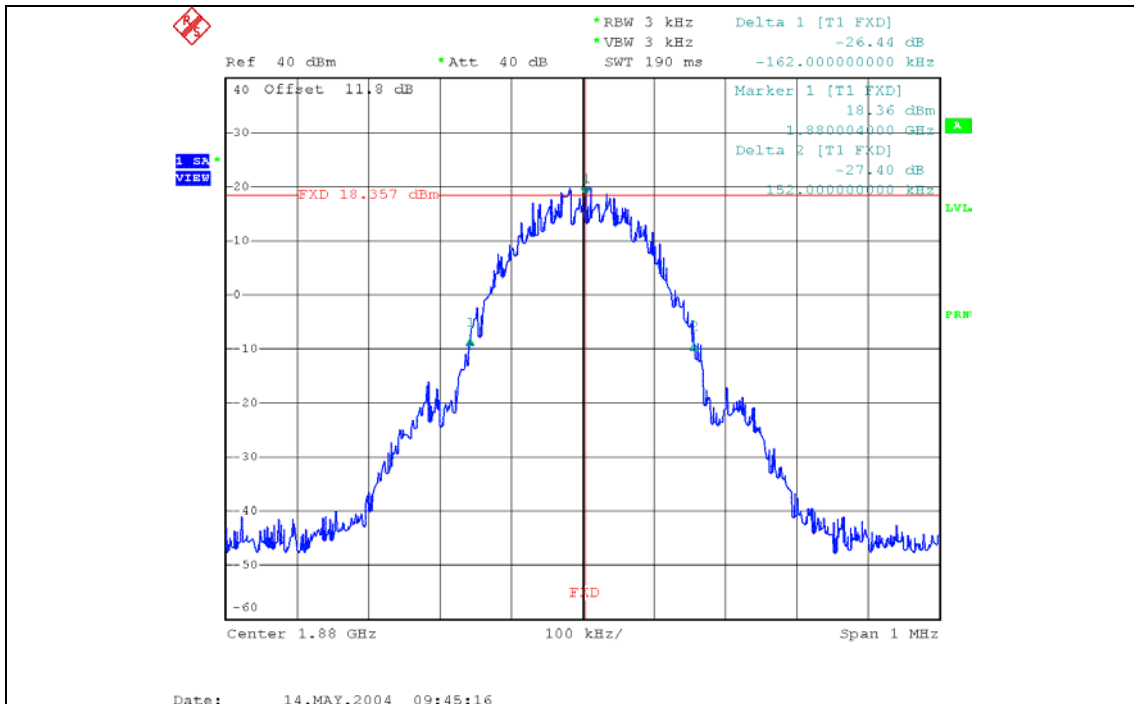
5.3.14) GSMK Occupied Bandwidth, PCS Low channel, 1850.2 MHz, -26dBc bandwidth



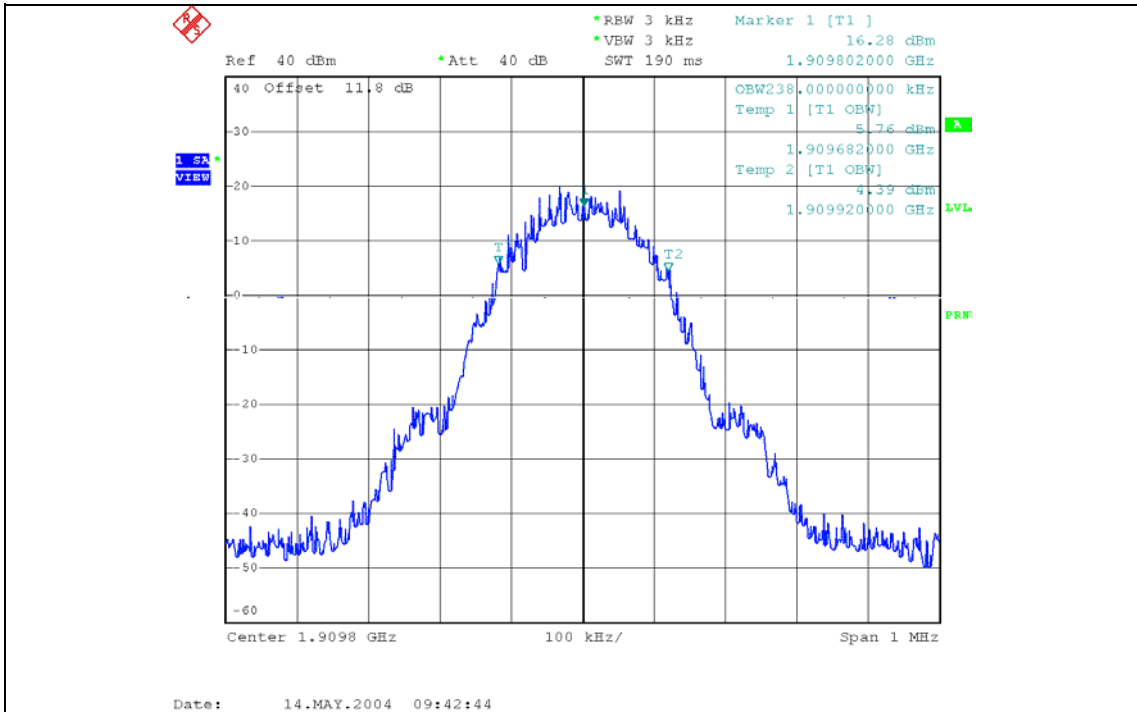
5.3.15) GMSK Occupied Bandwidth, PCS Middle channel, 1880.0 MHz, 99% bandwidth



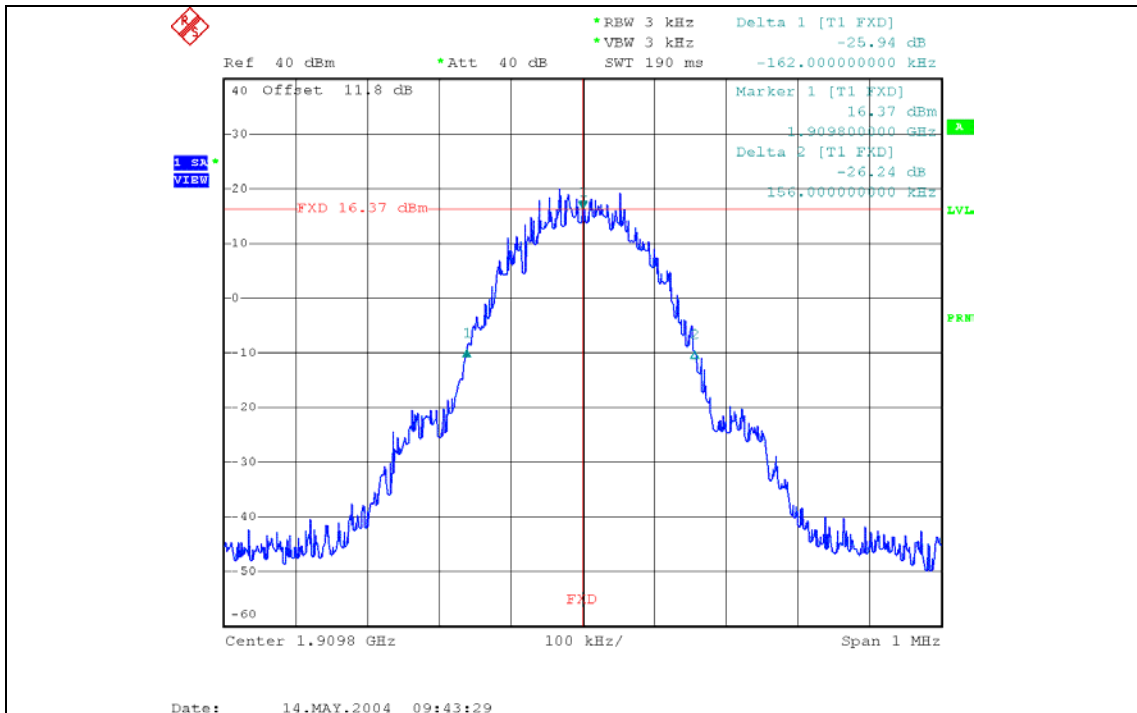
5.3.16) GMSK Occupied Bandwidth, PCS Middle channel, 1880.0 MHz, -26dBc bandwidth



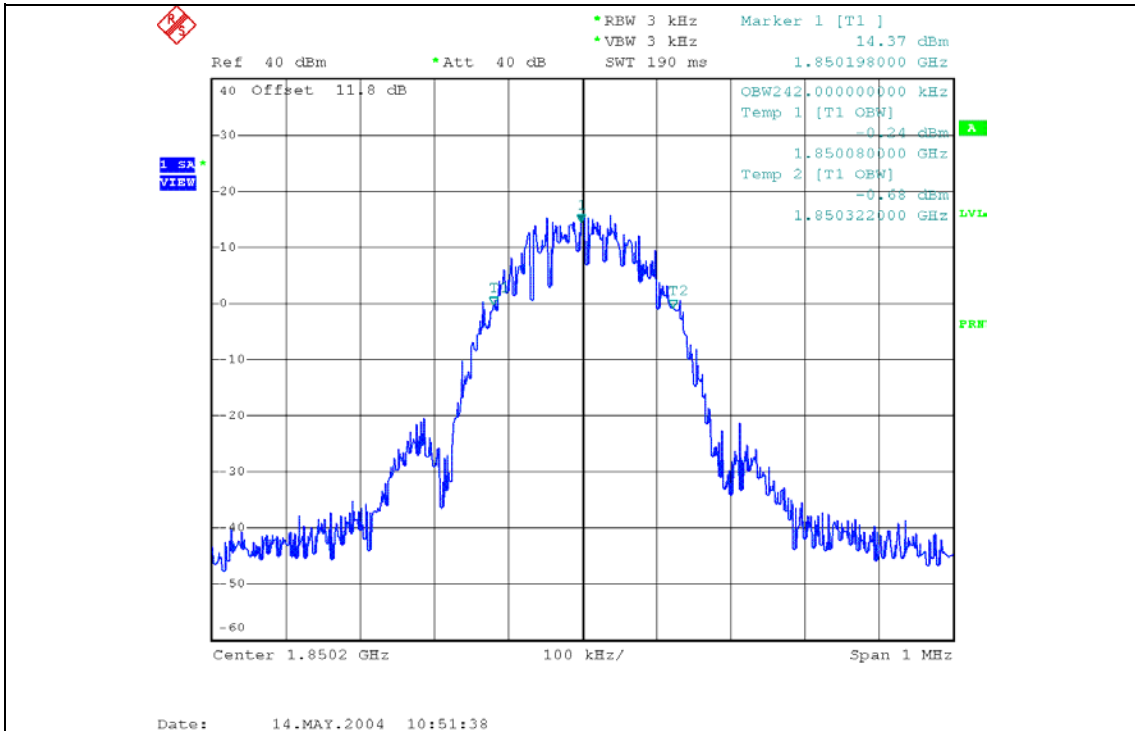
5.3.17) GSMK Occupied Bandwidth, PCS High channel, 1909.8 MHz, 99% bandwidth



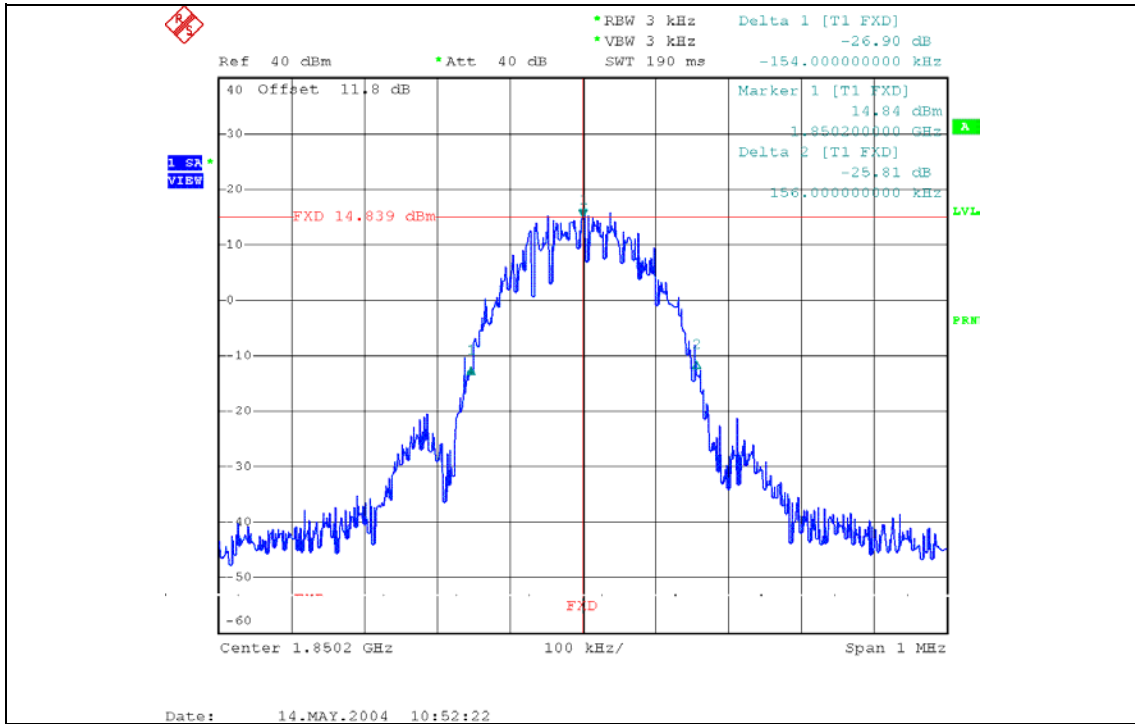
5.3.18) GSMK Occupied Bandwidth, PCS High channel, 1909.8 MHz, -26dBc bandwidth



5.3.19) 8-PSK Occupied Bandwidth, PCS Low channel, 1850.2 MHz, 99% bandwidth

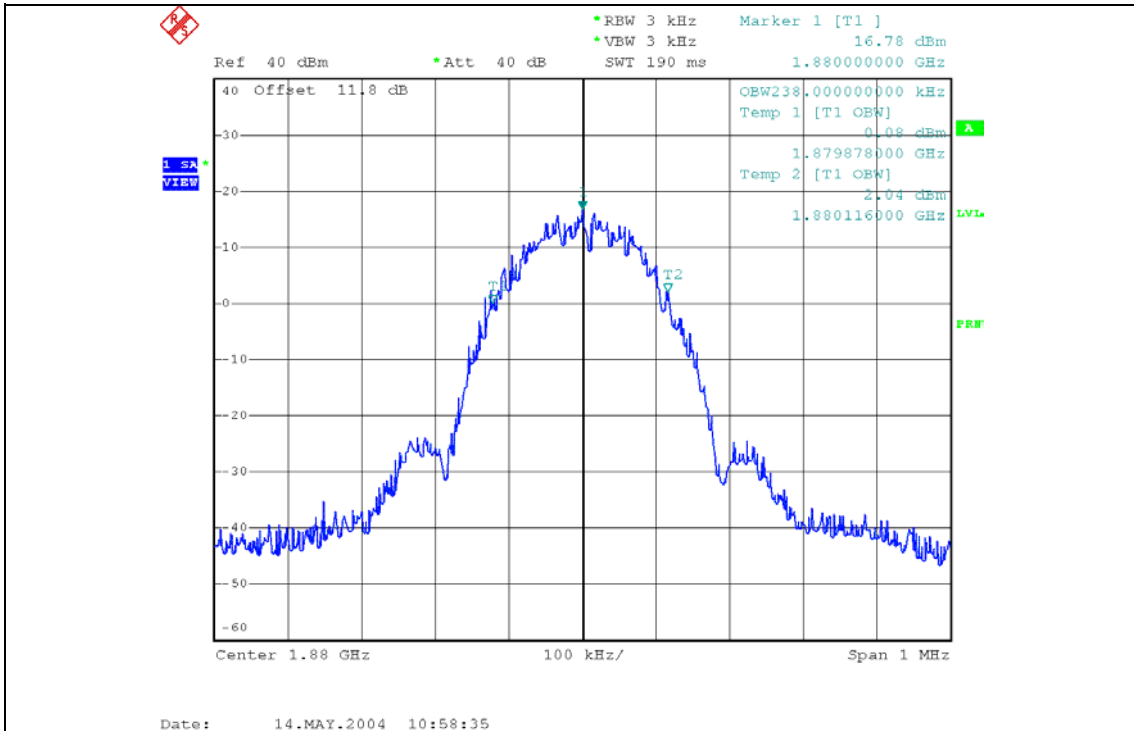


5.3.20) 8-PSK Occupied Bandwidth, PCS Low channel, 1850.2 MHz, -26dBc bandwidth

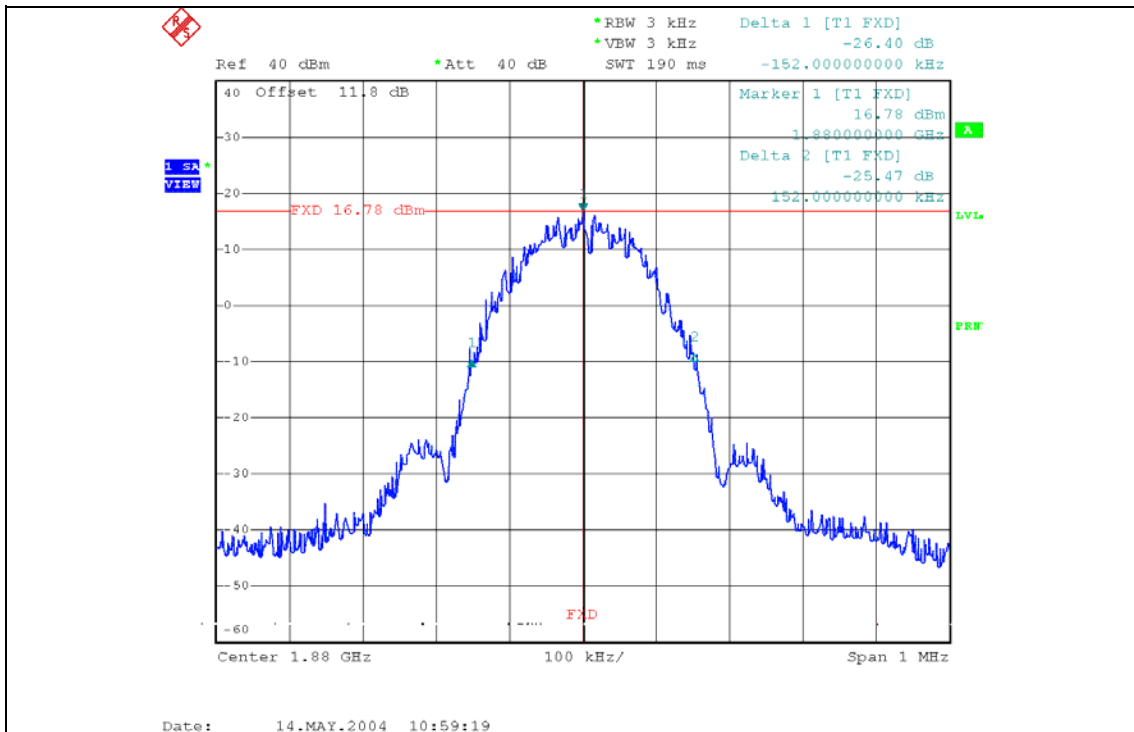


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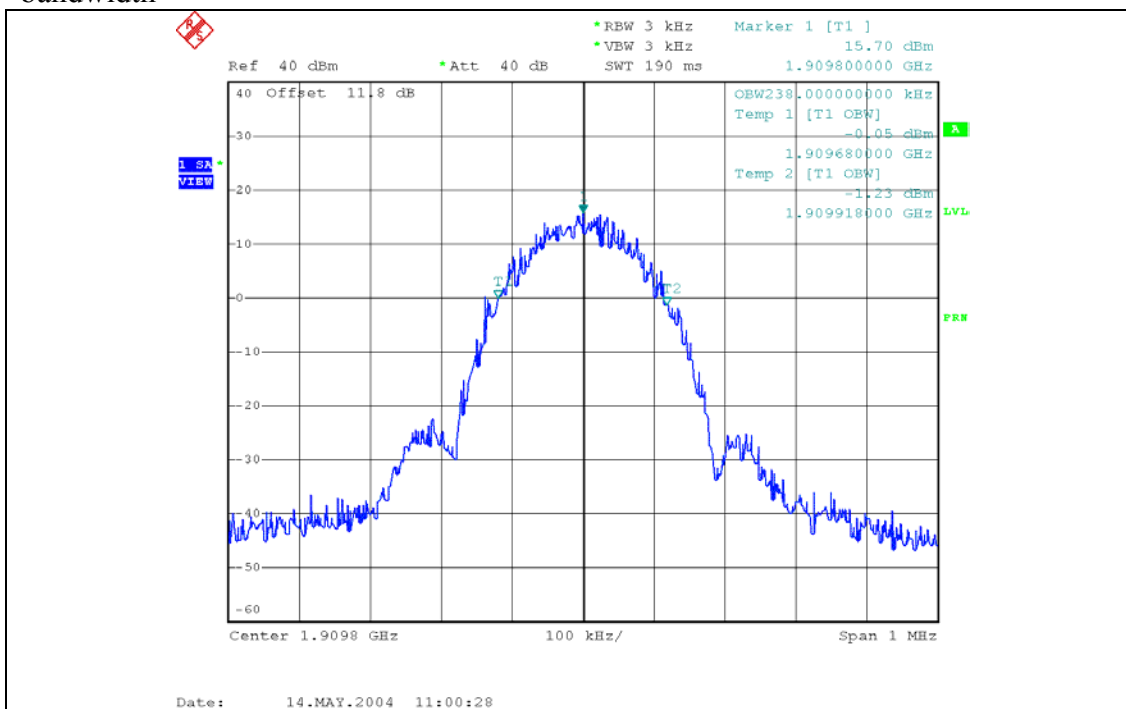
5.3.21) 8-PSK Occupied Bandwidth, PCS Middle channel, 1880.0 MHz, 99% bandwidth



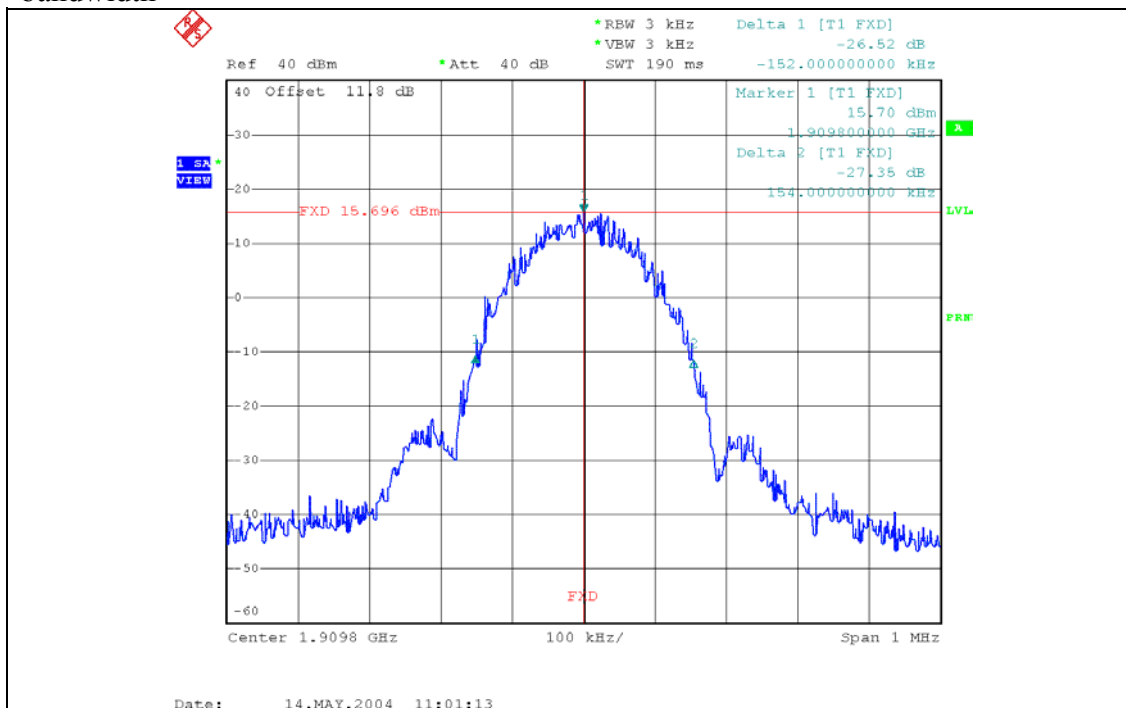
5.3.22) 8-PSK Occupied Bandwidth, PCS Middle channel, 1880.0 MHz, -26dBc bandwidth



5.3.23) 8-PSK Occupied Bandwidth, PCS High channel, 1909.8 MHz, 99% bandwidth



5.3.24) 8-PSK Occupied Bandwidth, PCS High channel, 1909.8 MHz, -26dBc bandwidth



6 Out of Band Emissions at Antenna Terminals

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

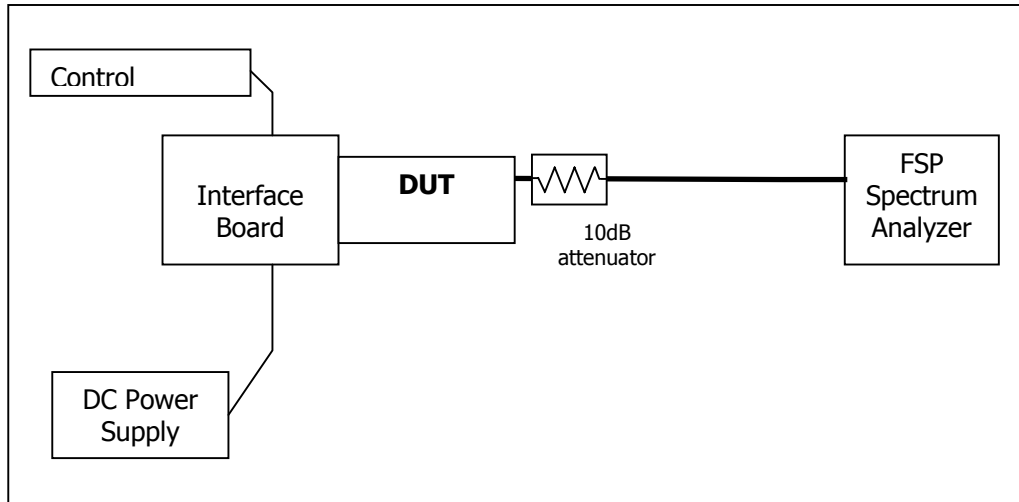
Out of Band Emissions:

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, in this case, -13dBm.

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 10th harmonic. The EUT was scanned for spurious emissions from 1MHz to 20GHz with sufficient bandwidth and video resolution. Data plots are included. The measurement cable path loss at 20GHz (including an attenuator) was 13dB (11dB at lower frequencies). To larger path loss of 13dB was used for all measurements to be conservative.

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 | 836766/030 | N/A |
| Spectrum Analyzer | Rohde & Schwarz | FSP 30GHz | US41421268 | Sept. 12, 2003 |
| DC Power Supply | HP | E3631A | 100060 | N/A |
| Interface Board | Shop built | Minnow | N/A | N/A |
| Directional Coupler | Pasternack | PE2209-10 | N/A | N/A |

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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 |

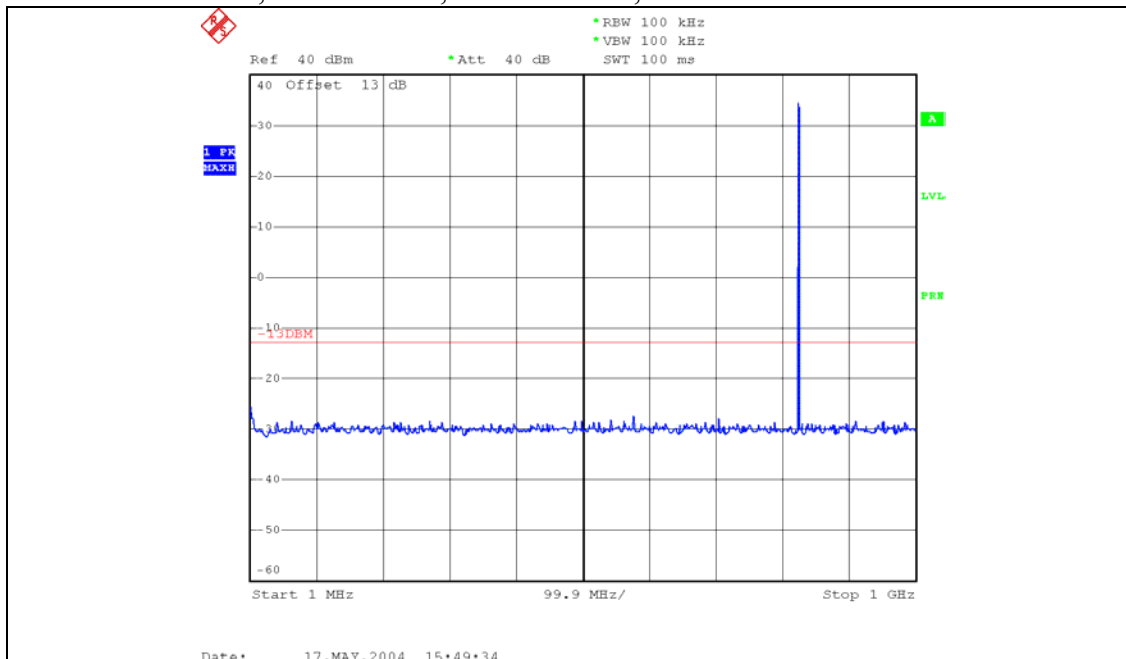
- **Emissions in Base Station Frequency Range, Cellular band**

| Plot Number | Description |
|-------------|----------------------------------|
| 6.4.37 | GMSK, Low channel, 824.20 MHz |
| 6.4.38 | GMSK, Middle Channel, 836.6 MHz |
| 6.4.39 | GMSK, High Channel, 848.8 MHz |
| 6.4.40 | 8-PSK, Low channel, 824.20 MHz |
| 6.4.41 | 8-PSK, Middle Channel, 836.6 MHz |
| 6.4.42 | 8-PSK, High Channel, 848.8 MHz |

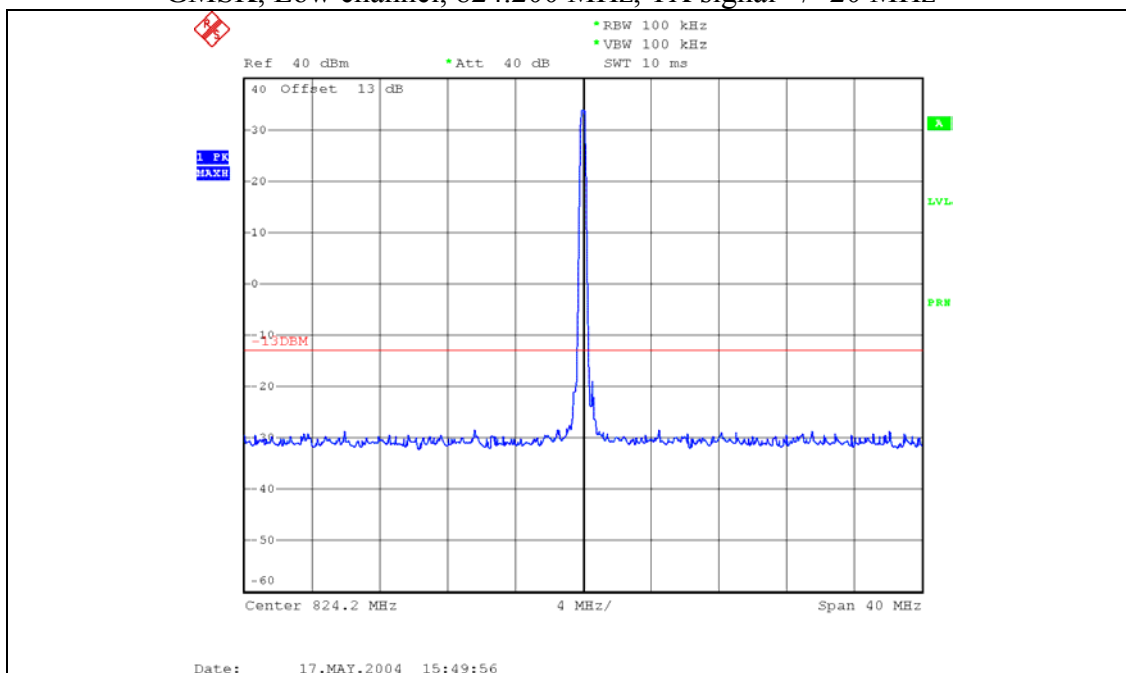
These plots show that the conducted emission limits requirements are met.

6.4 Test Plots

Plot 6.4.1) Out of Band Emissions at Antenna Terminals
 GSMK, Low channel, 824.200 MHz, 1 MHz to 1 GHz



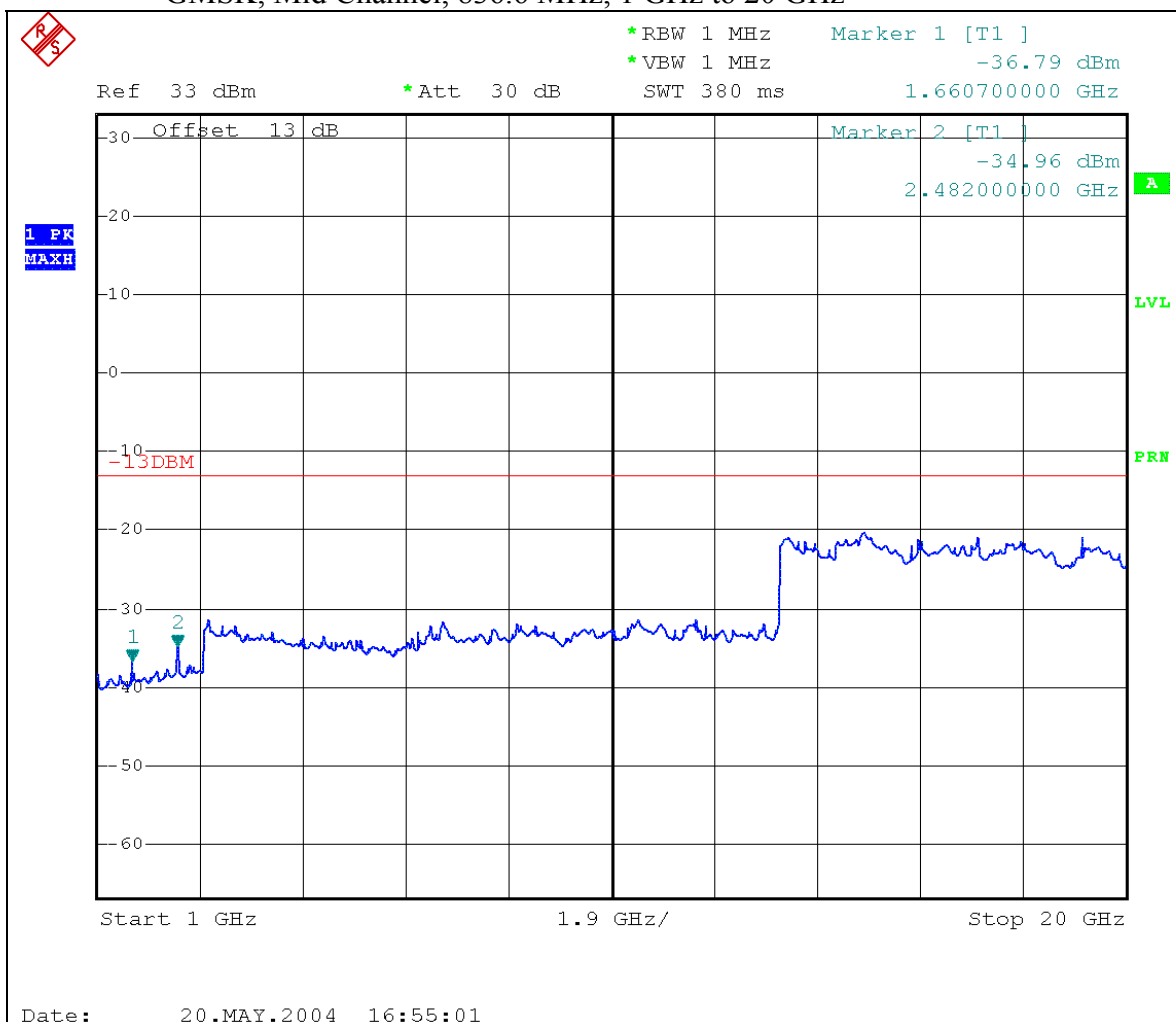
Plot 6.4.2) Out of Band Emissions at Antenna Terminals
 GSMK, Low channel, 824.200 MHz, TX signal +/- 20 MHz



Strong emission shown in each case is the carrier signal.

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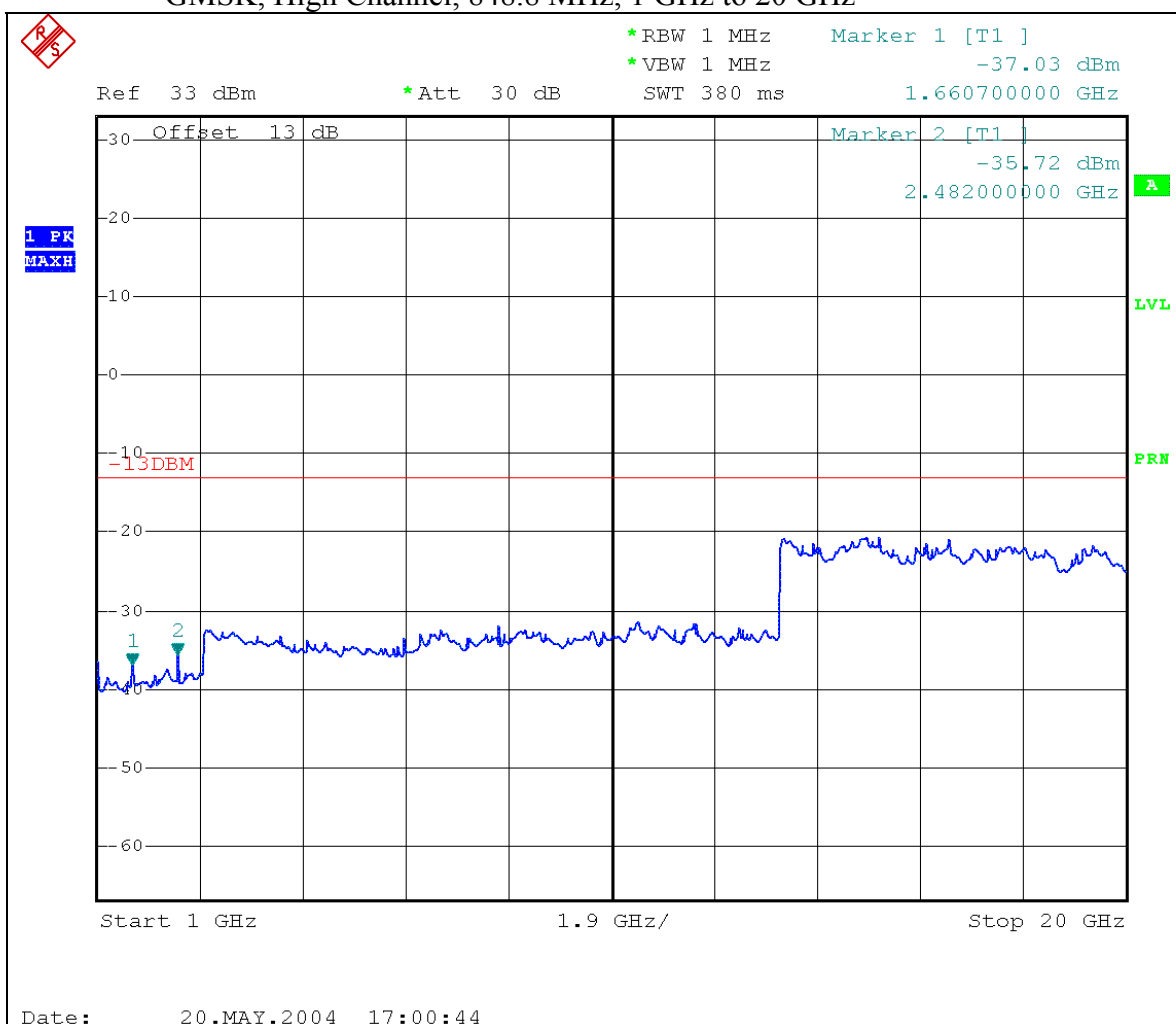
Plot 6.4.6) Out of Band Emissions at Antenna Terminals
 GSMK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz



| Cellular Harmonics for Ch. 190 (836.6 MHz) | Level (dBm) |
|--|----------------------|
| Second | -36 dBm |
| Third | -34 dBm |
| All others | < -30dBm up to 20GHz |

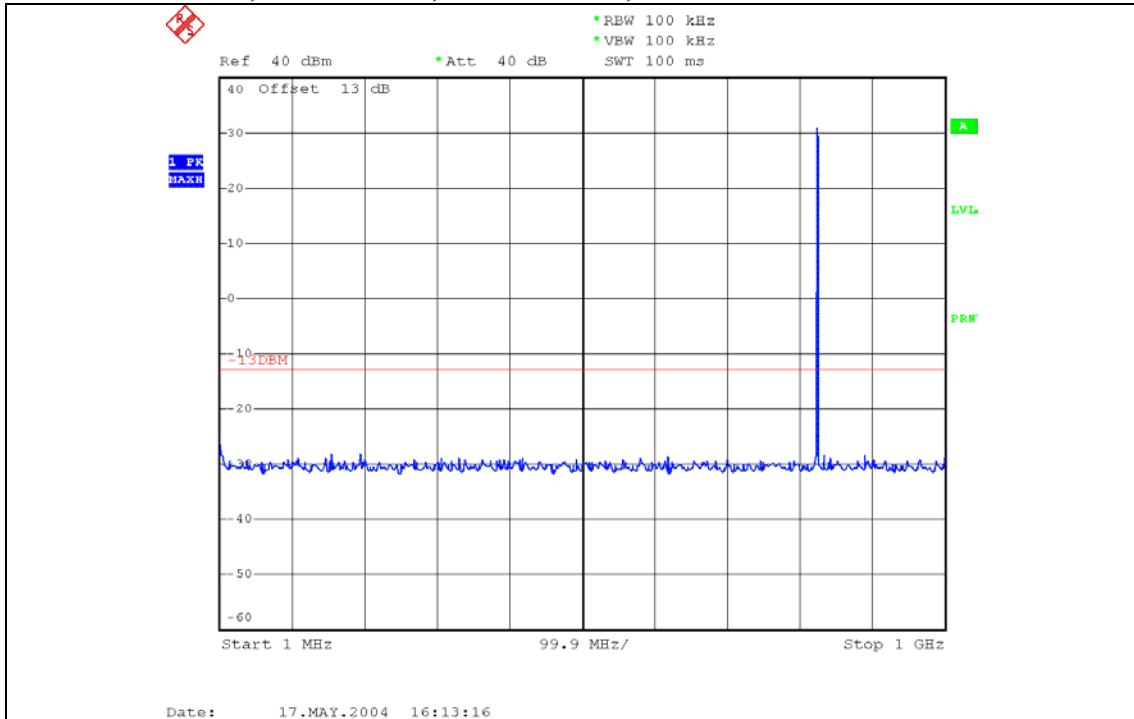
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Plot 6.4.9) Out of Band Emissions at Antenna Terminals GMSK, High Channel, 848.8 MHz, 1 GHz to 20 GHz

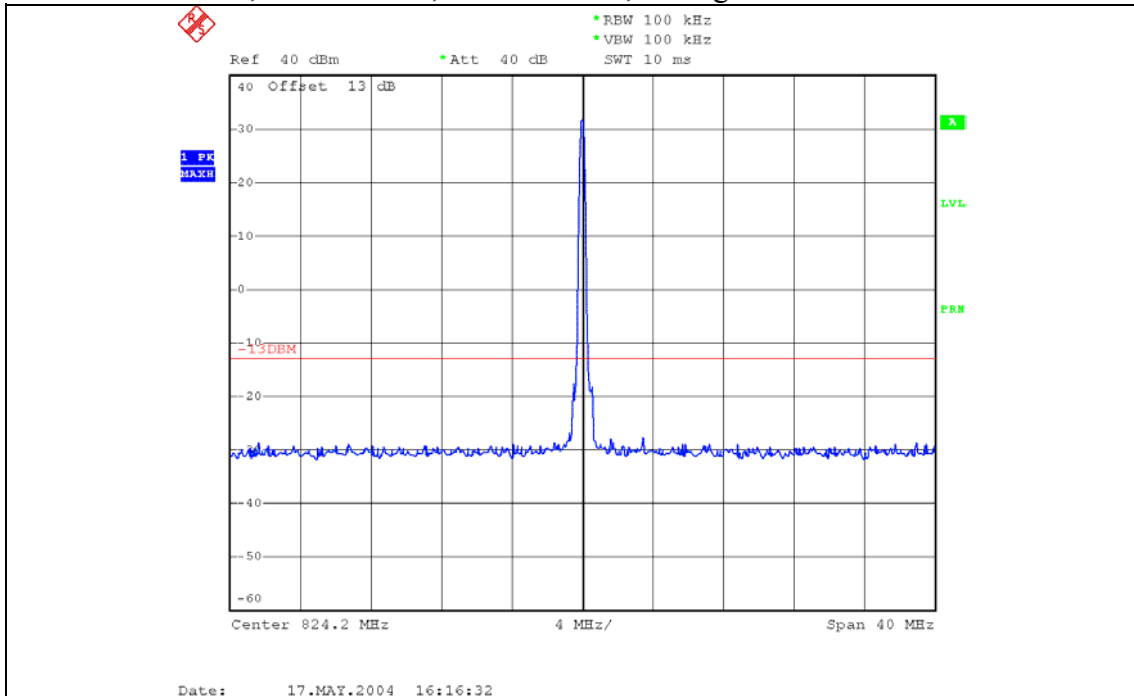


| Cellular Harmonics for Ch. 251 (848.8 MHz) | Level (dBm) |
|--|----------------------|
| Second | -37 dBm |
| Third | -35 dBm |
| All others | < -30dBm up to 20GHz |

Plot 6.4.10) Out of Band Emissions at Antenna Terminals
 8-PSK, Low channel, 824.200 MHz, 1 MHz to 1 GHz



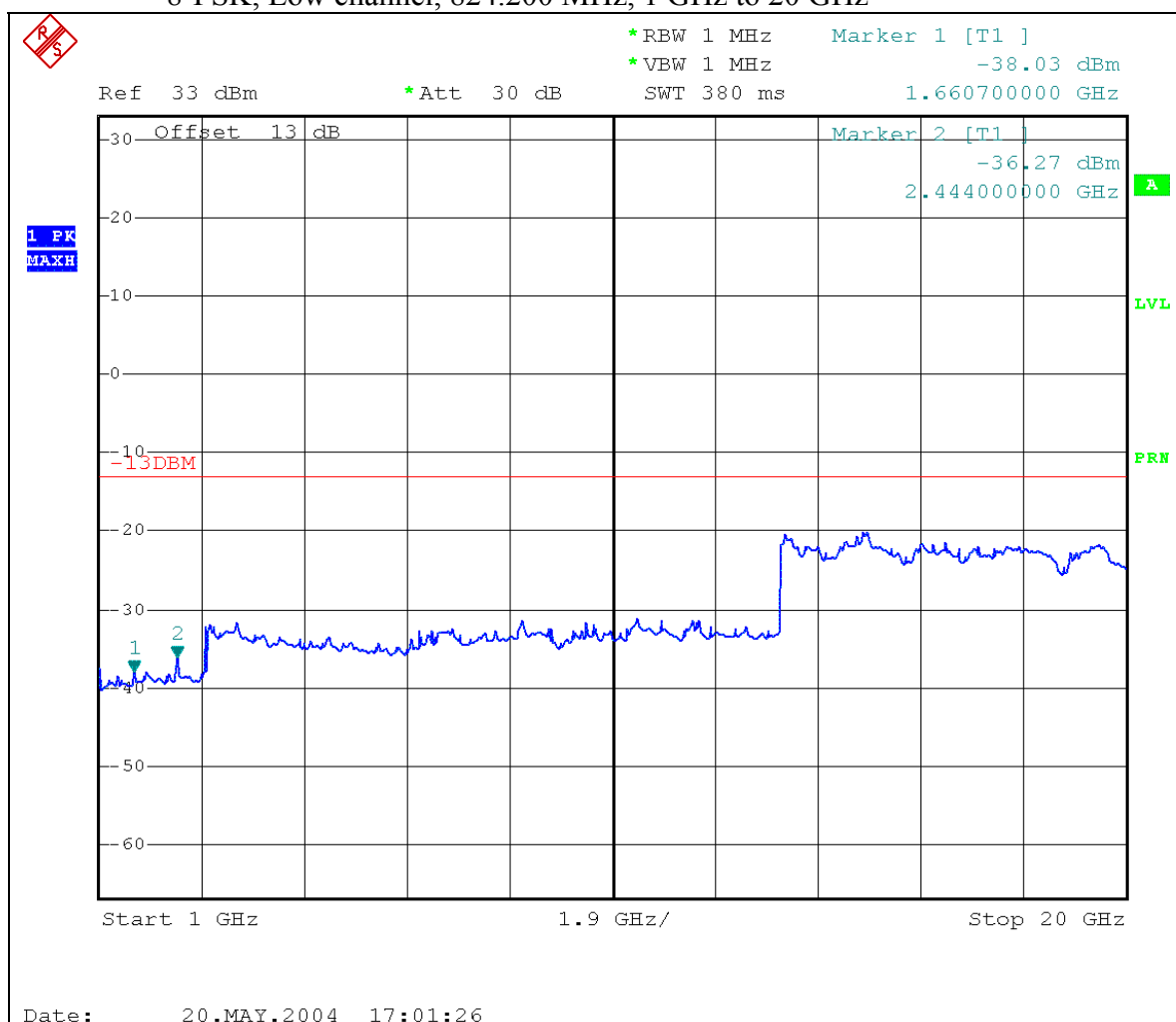
Plot 6.4.11) Out of Band Emissions at Antenna Terminals
 8-PSK, Low channel, 824.200 MHz, TX signal +/- 20 MHz



Strong emission shown in each case is the carrier signal.

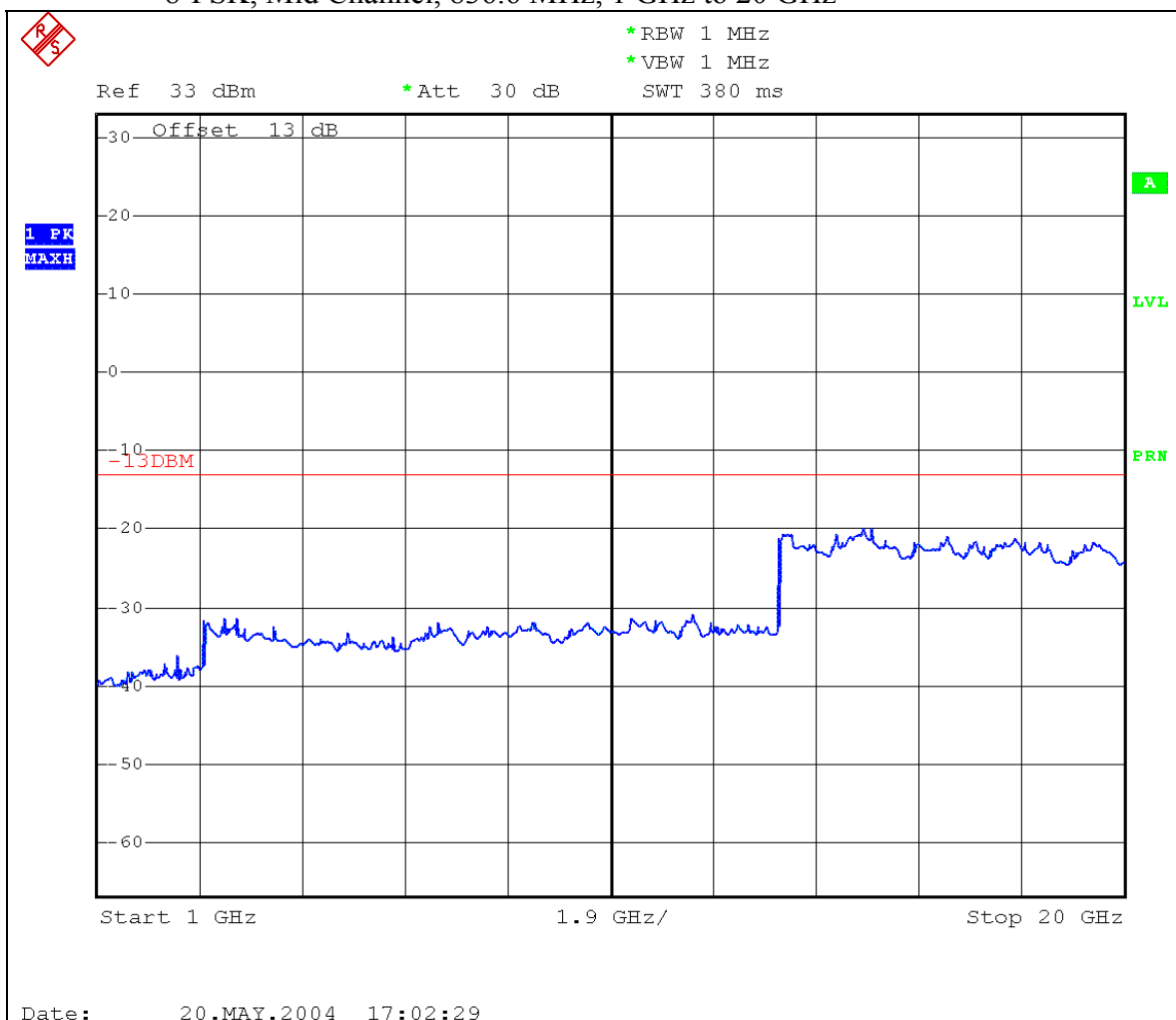
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Plot 6.4.12) Out of Band Emissions at Antenna Terminals
 8-PSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz



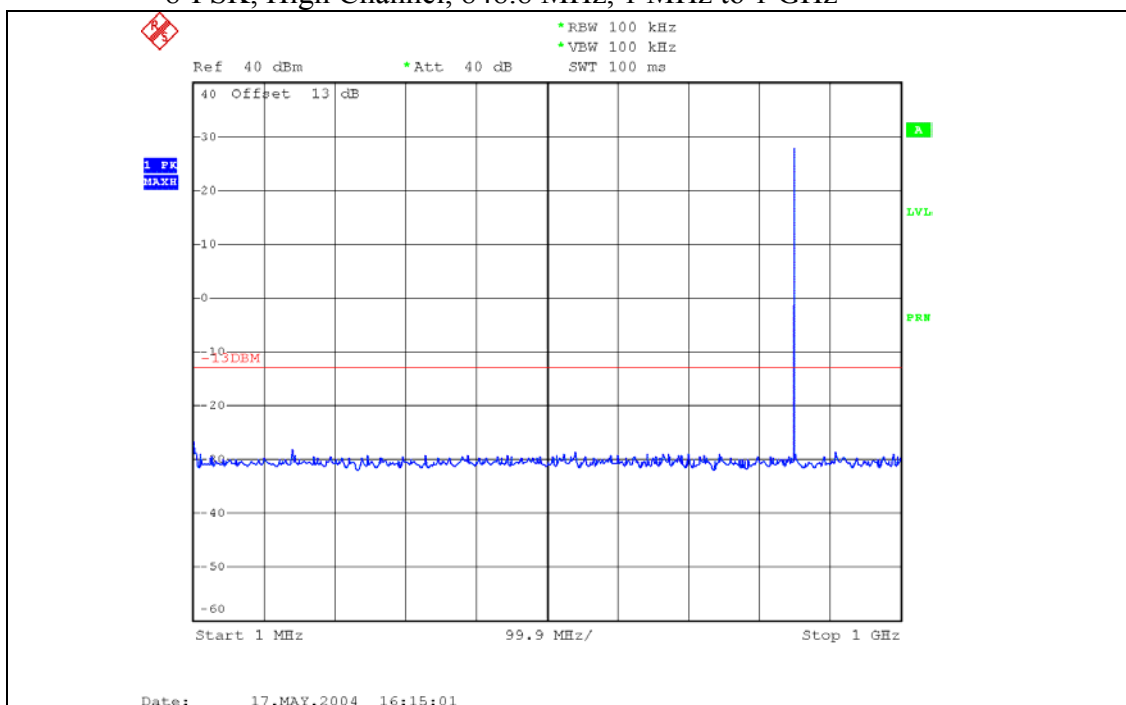
| Cellular Harmonics for Ch. 128 (824.2 MHz) | Level (dBm) |
|--|----------------------|
| Second | -38 dBm |
| Third | -36 dBm |
| All others | < -30dBm up to 20GHz |

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

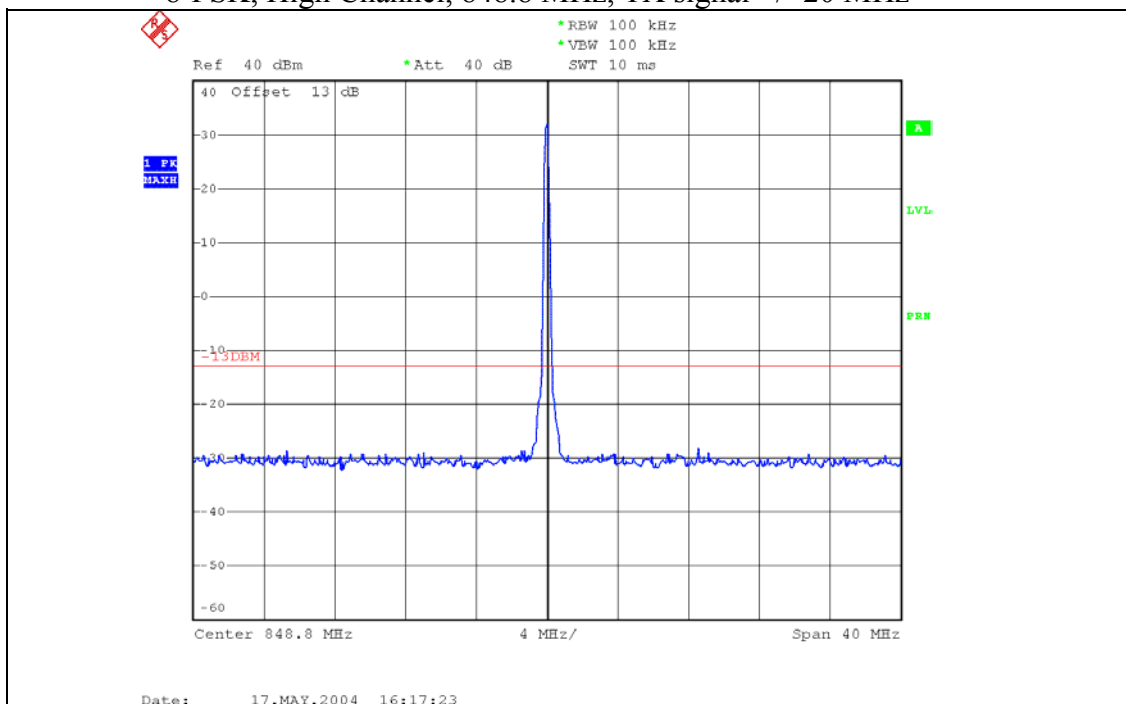


| Cellular Harmonics for Ch. 190 (836.6 MHz) | Level (dBm) |
|--|----------------------|
| Second | -- |
| Third | -- |
| All others | < -30dBm up to 20GHz |

Plot 6.4.16) Out of Band Emissions at Antenna Terminals
 8-PSK, High Channel, 848.8 MHz, 1 MHz to 1 GHz



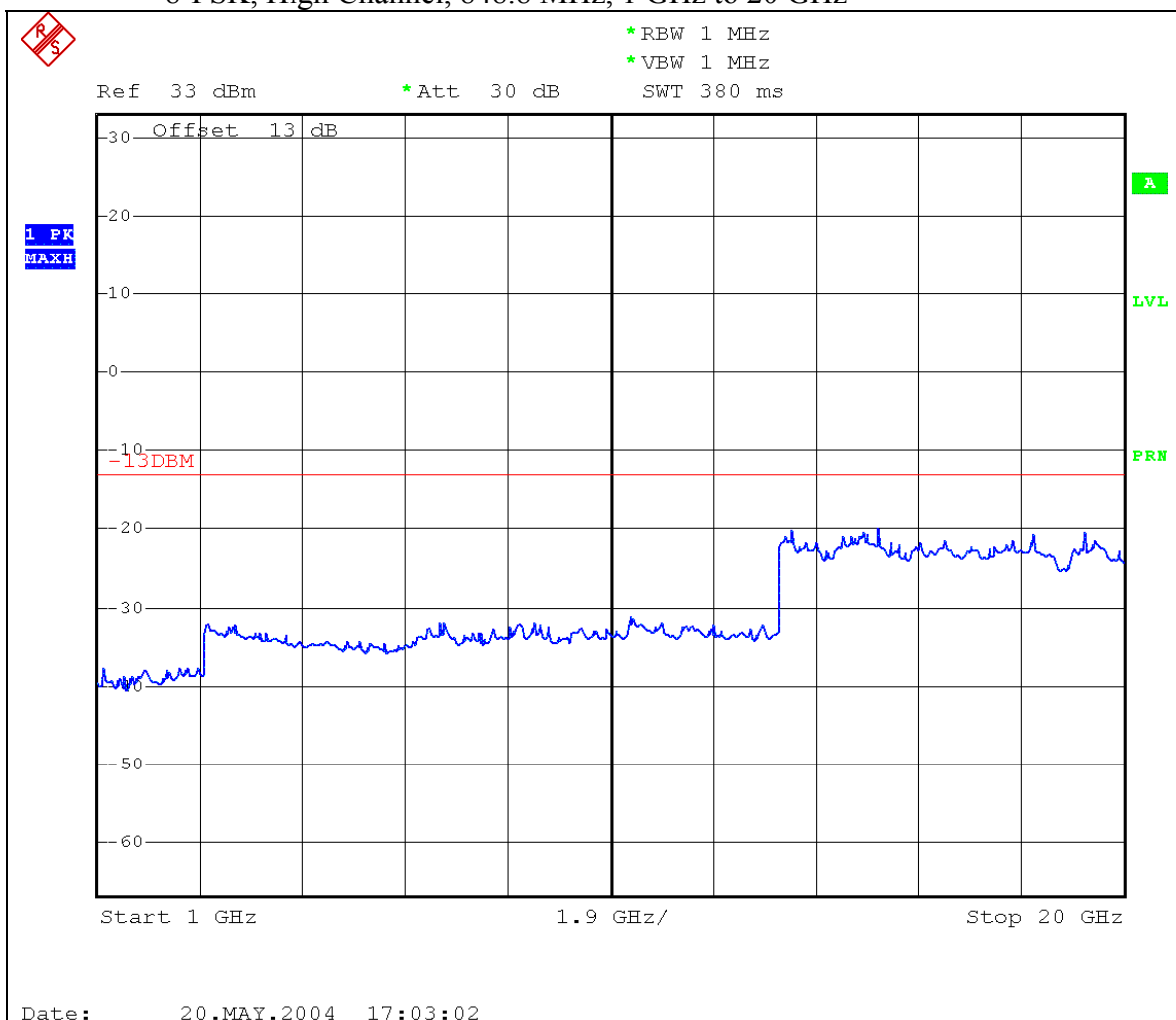
Plot 6.4.17) Out of Band Emissions at Antenna Terminals
 8-PSK, High Channel, 848.8 MHz, TX signal +/- 20 MHz



Strong emission shown in each case is the carrier signal.

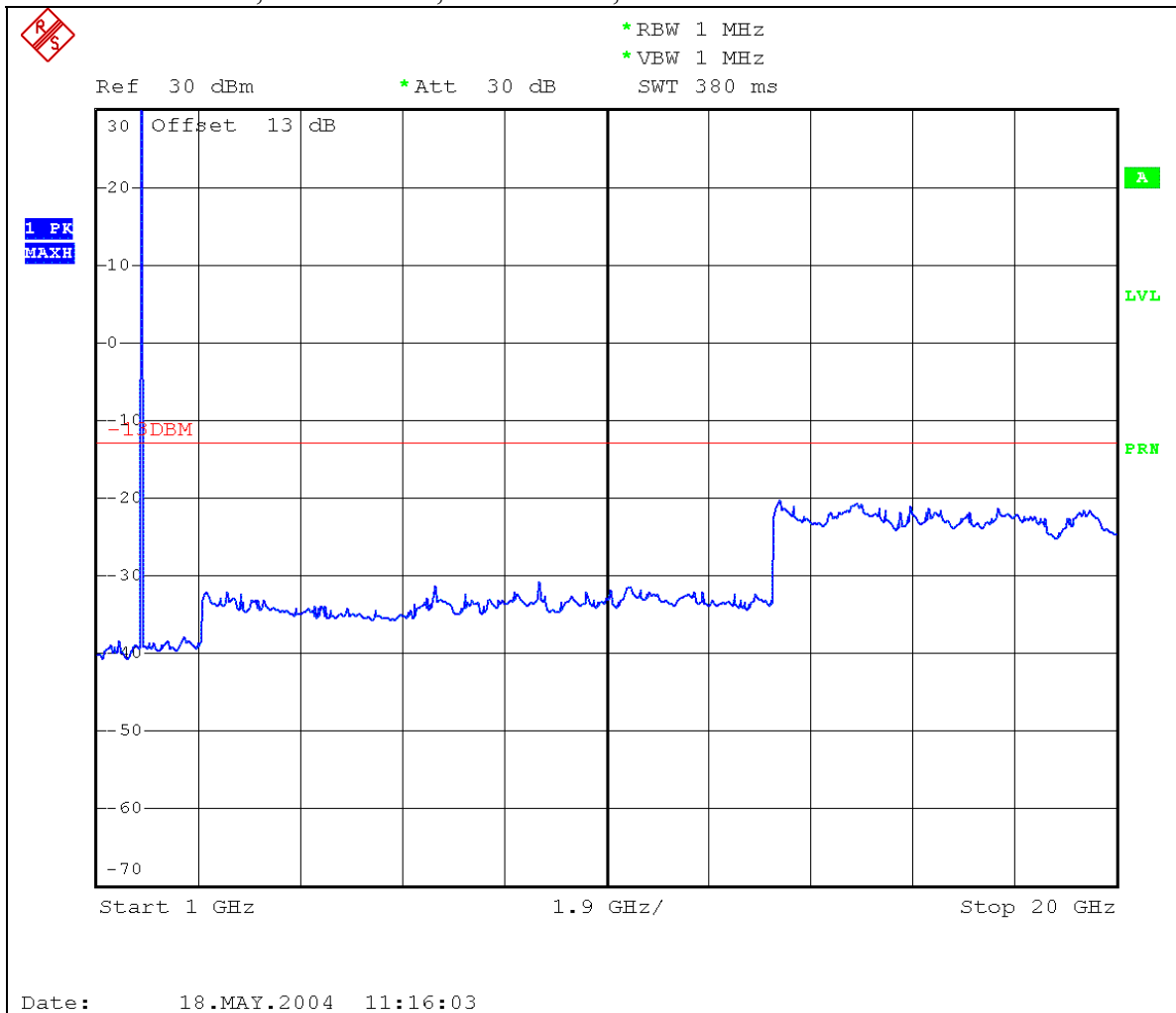
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Plot 6.4.18) Out of Band Emissions at Antenna Terminals
 8-PSK, High Channel, 848.8 MHz, 1 GHz to 20 GHz



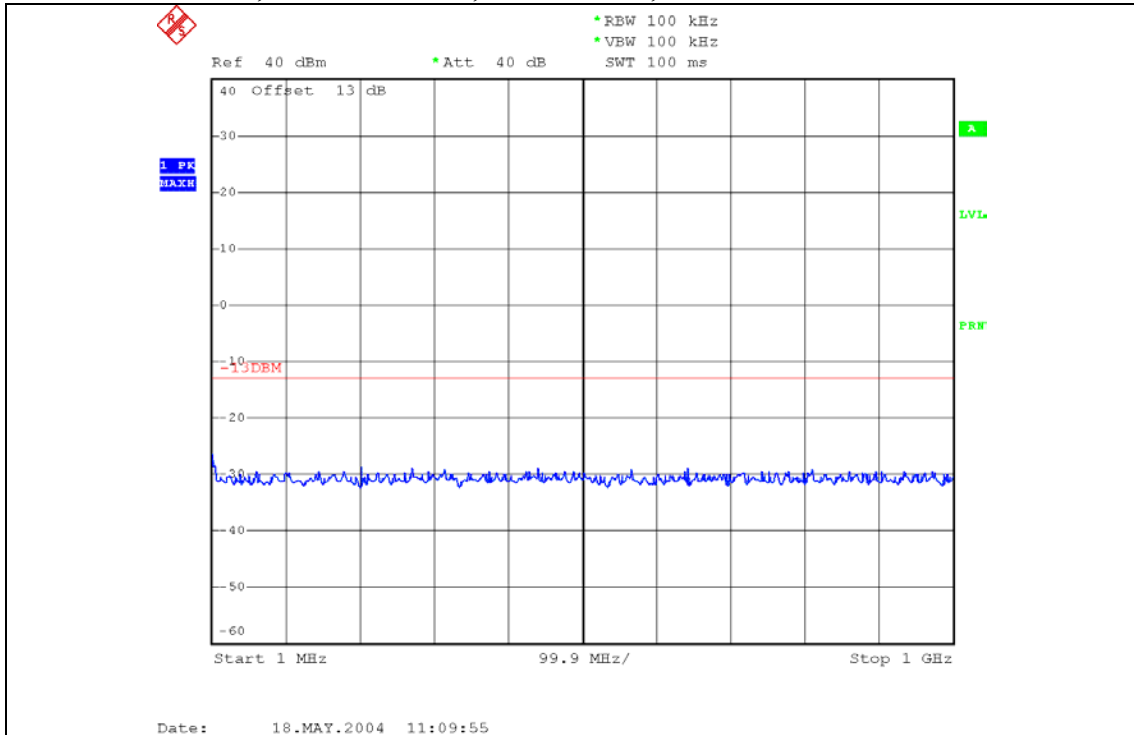
| Cellular Harmonics for Ch. 251 (848.8 MHz) | Level (dBm) |
|---|----------------------|
| Second | -- |
| Third | -- |
| All others | < -30dBm up to 20GHz |

Plot 6.4.21) Out of Band Emissions at Antenna Terminals
GMSK, Low channel, 1850.2 MHz, 1 GHz to 20 GHz

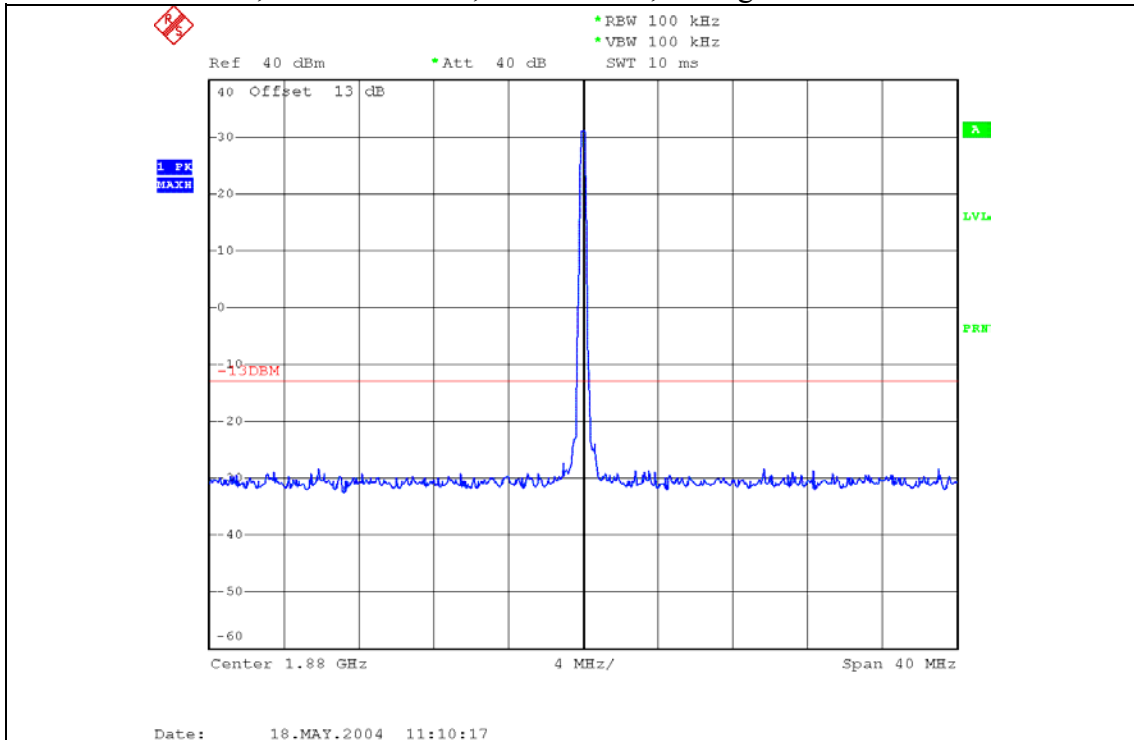


Strong emission shown is the carrier signal.

Plot 6.4.22) Out of Band Emissions at Antenna Terminals
 GMSK, Middle channel, 1880.0 MHz, 1 MHz to 1 GHz

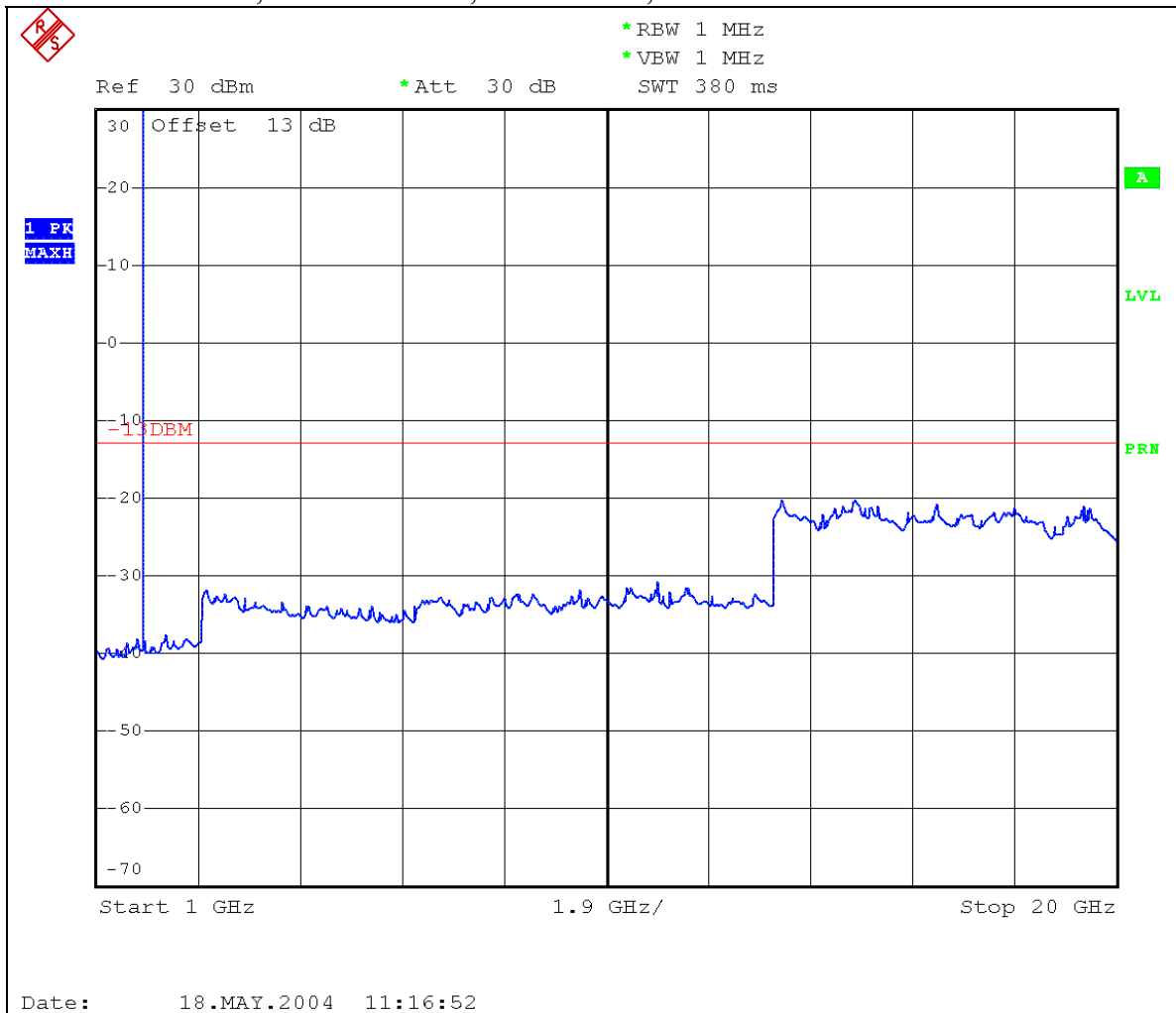


Plot 6.4.23) Out of Band Emissions at Antenna Terminals
 GMSK, Middle channel, 1880.0 MHz, TX signal +/- 20 MHz



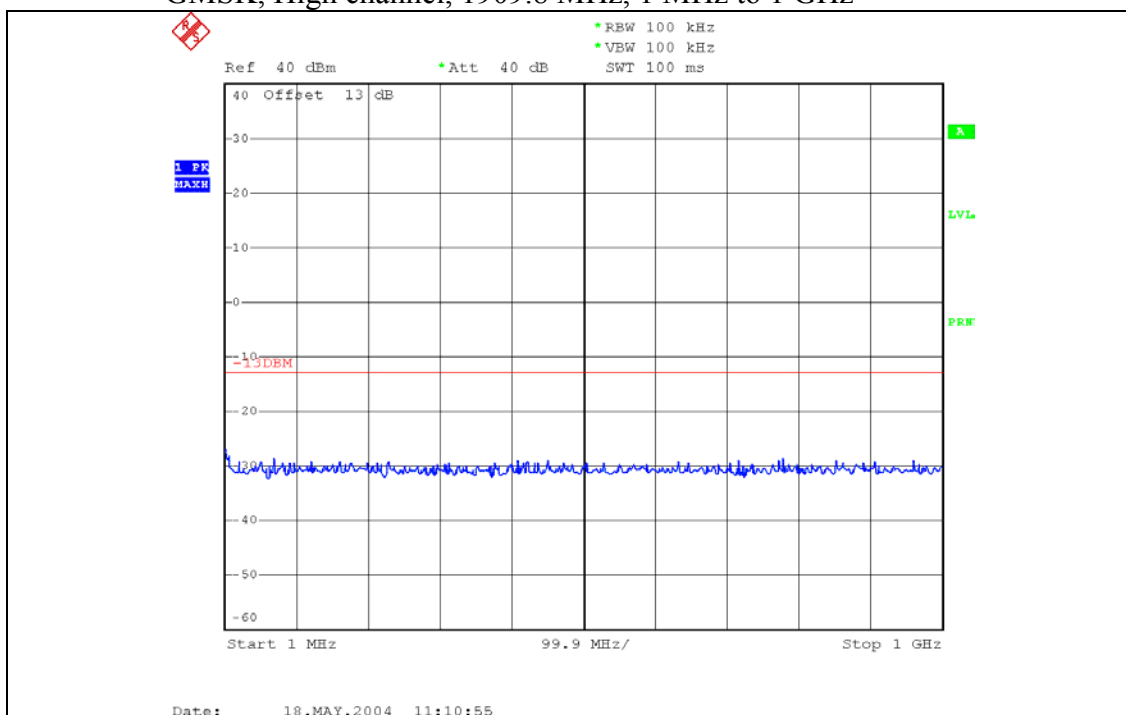
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Plot 6.4.24) Out of Band Emissions at Antenna Terminals
GMSK, Middle channel, 1880.0 MHz, 1 GHz to 20 GHz

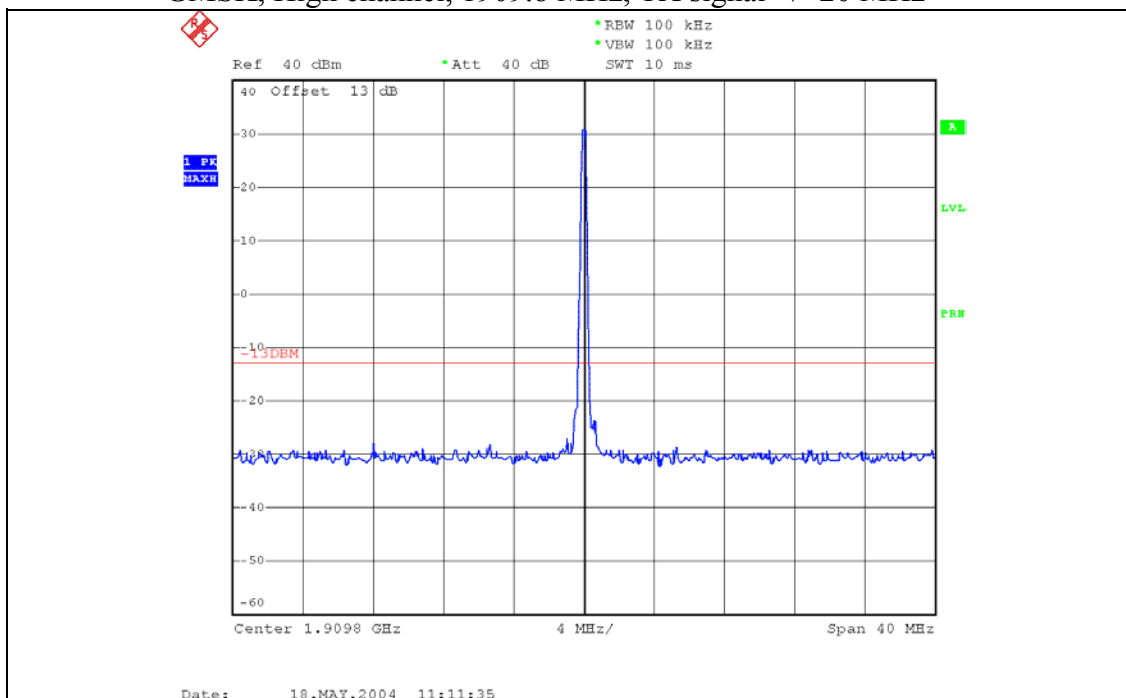


Strong emission shown is the carrier signal.

Plot 6.4.25) Out of Band Emissions at Antenna Terminals
 GSMK, High channel, 1909.8 MHz, 1 MHz to 1 GHz

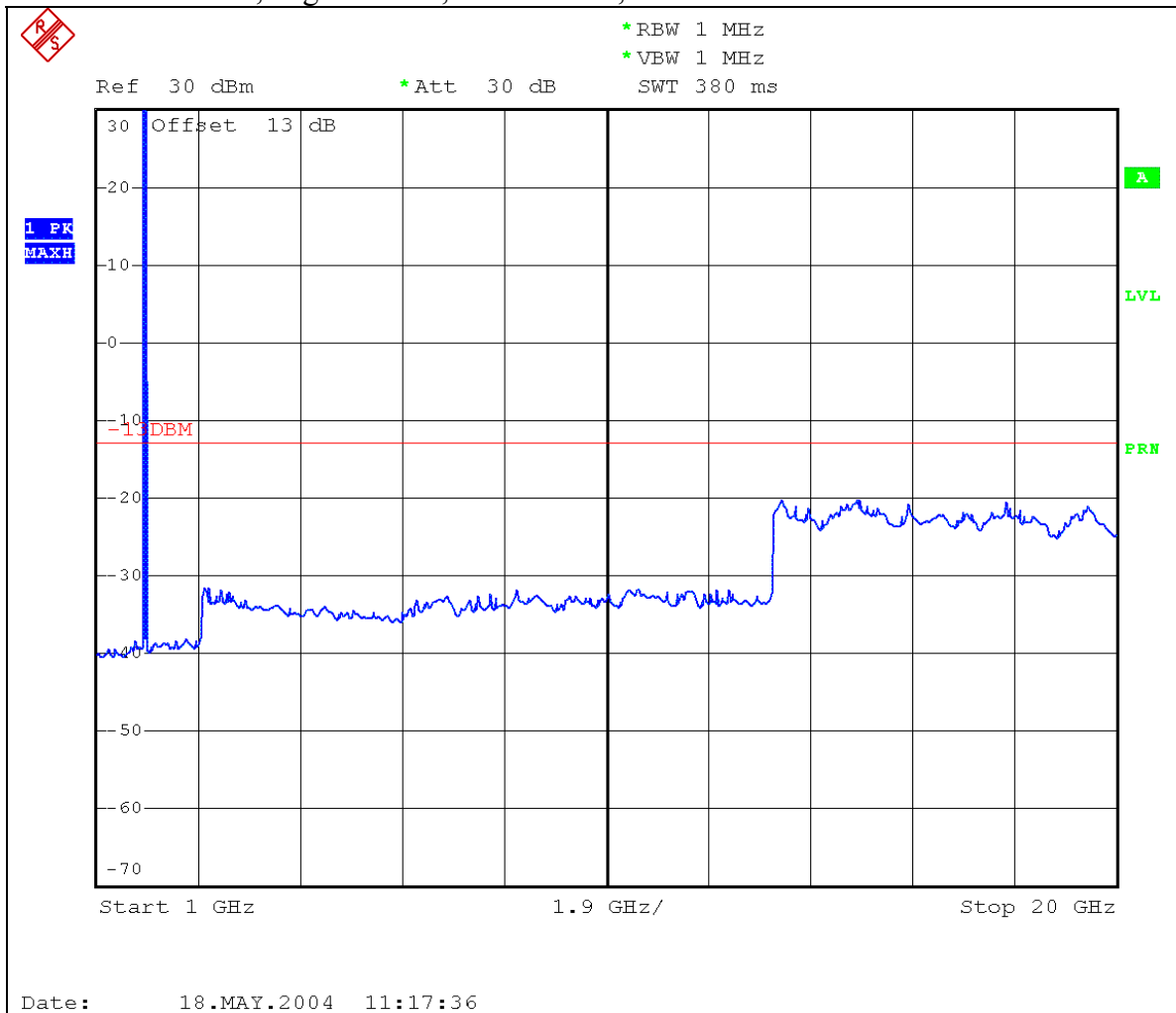


Plot 6.4.26) Out of Band Emissions at Antenna Terminals
 GSMK, High channel, 1909.8 MHz, TX signal +/- 20 MHz



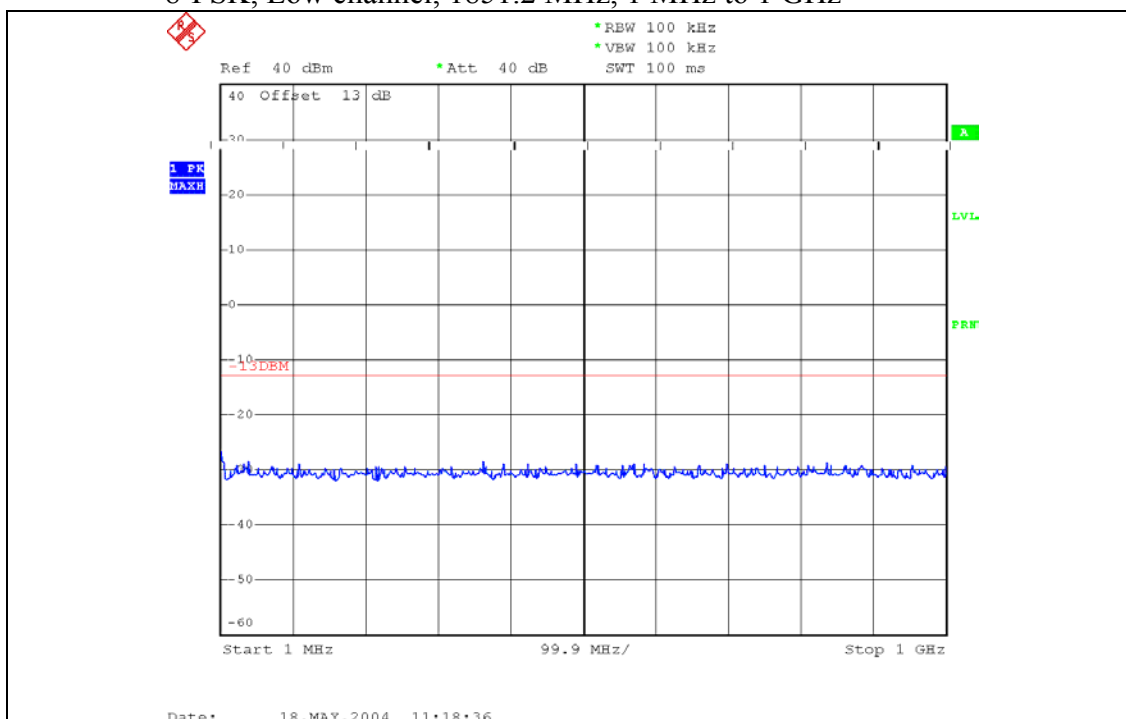
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Plot 6.4.27) Out of Band Emissions at Antenna Terminals
GMSK, High channel, 1909.8 MHz, 1 GHz to 20 GHz

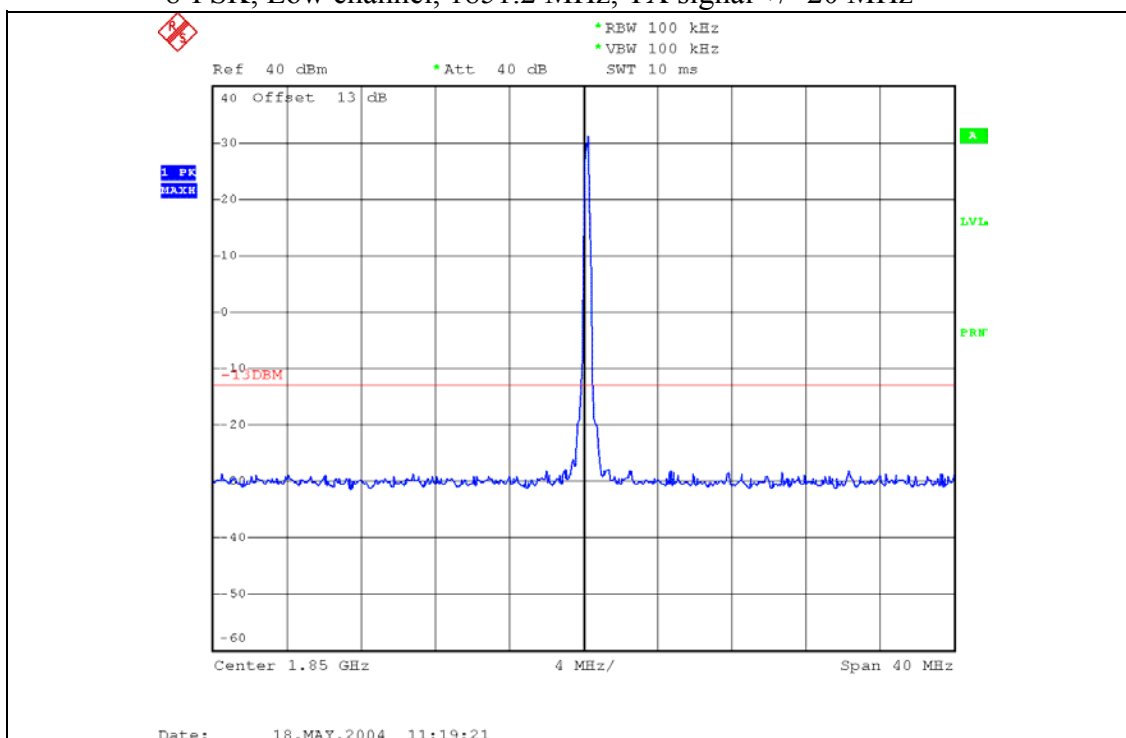


Strong emission shown is the carrier signal.

Plot 6.4.28) Out of Band Emissions at Antenna Terminals
 8-PSK, Low channel, 1851.2 MHz, 1 MHz to 1 GHz

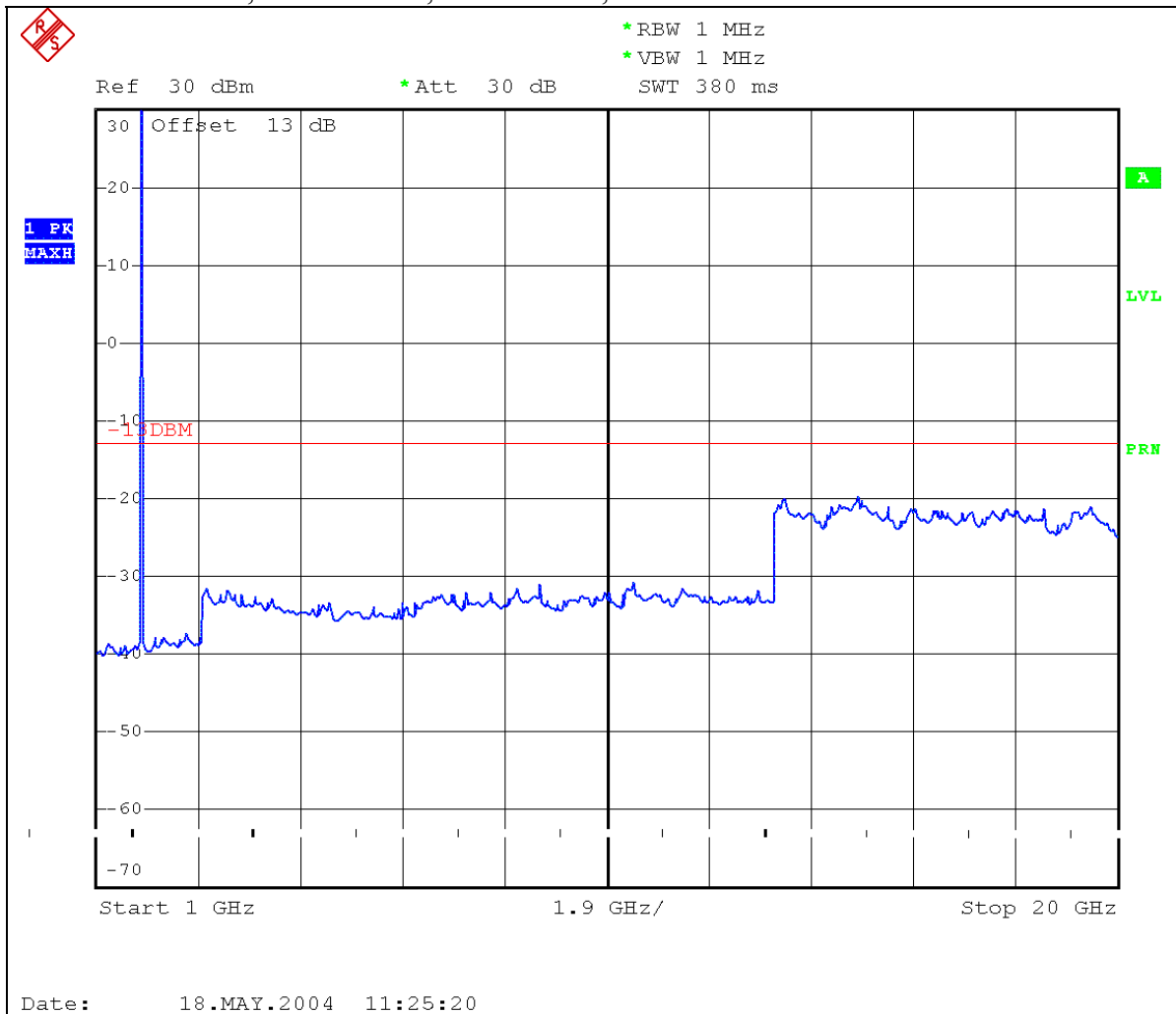


Plot 6.4.29) Out of Band Emissions at Antenna Terminals
 8-PSK, Low channel, 1851.2 MHz, TX signal +/- 20 MHz



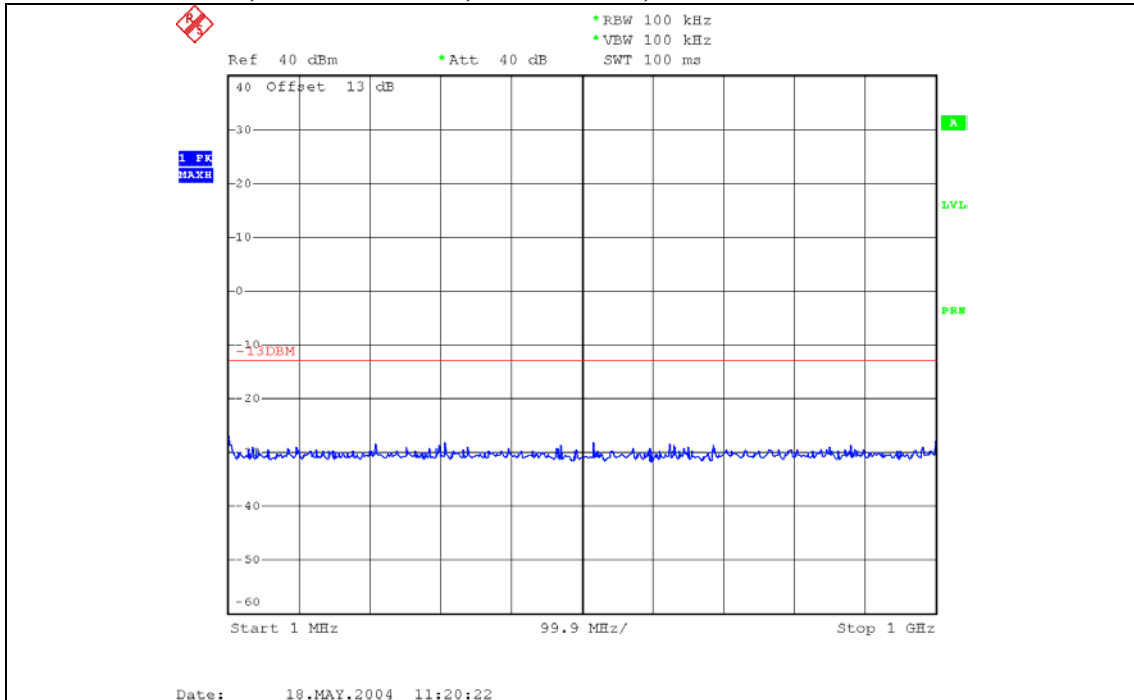
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Plot 6.4.30) Out of Band Emissions at Antenna Terminals
8-PSK, Low channel, 1851.2 MHz, 1 GHz to 20 GHz

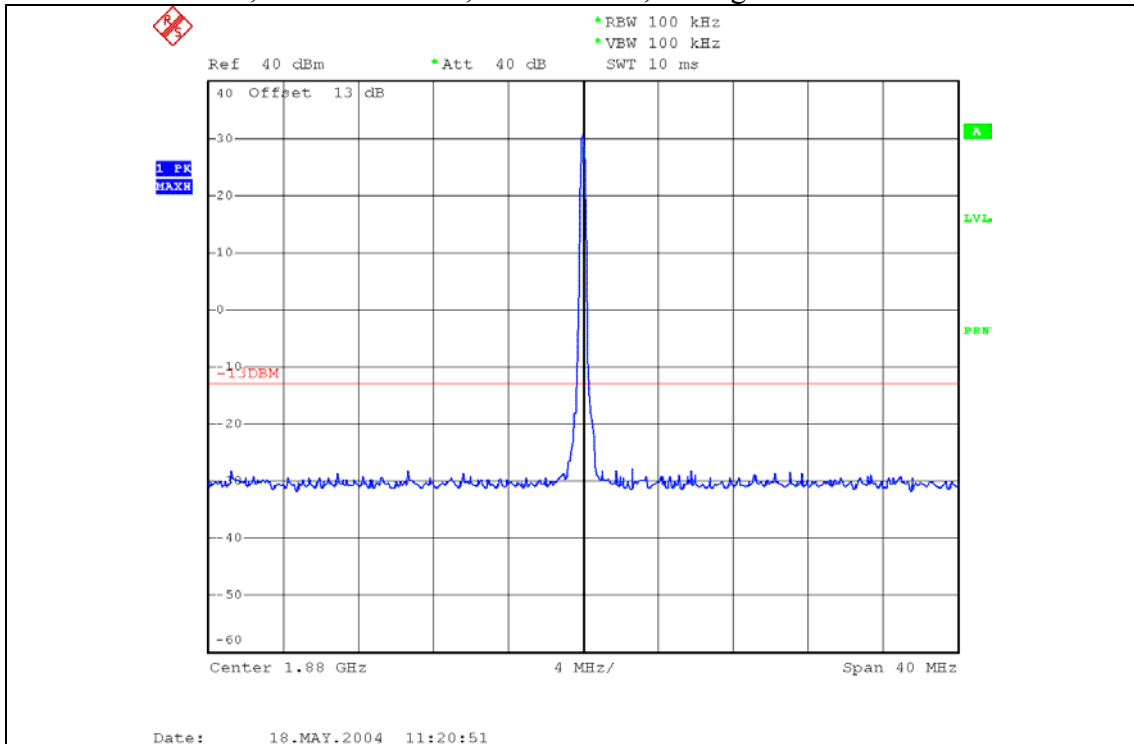


Strong emission shown is the carrier signal.

Plot 6.4.31) Out of Band Emissions at Antenna Terminals
 8-PSK, Middle channel, 1880.0 MHz, 1 MHz to 1 GHz

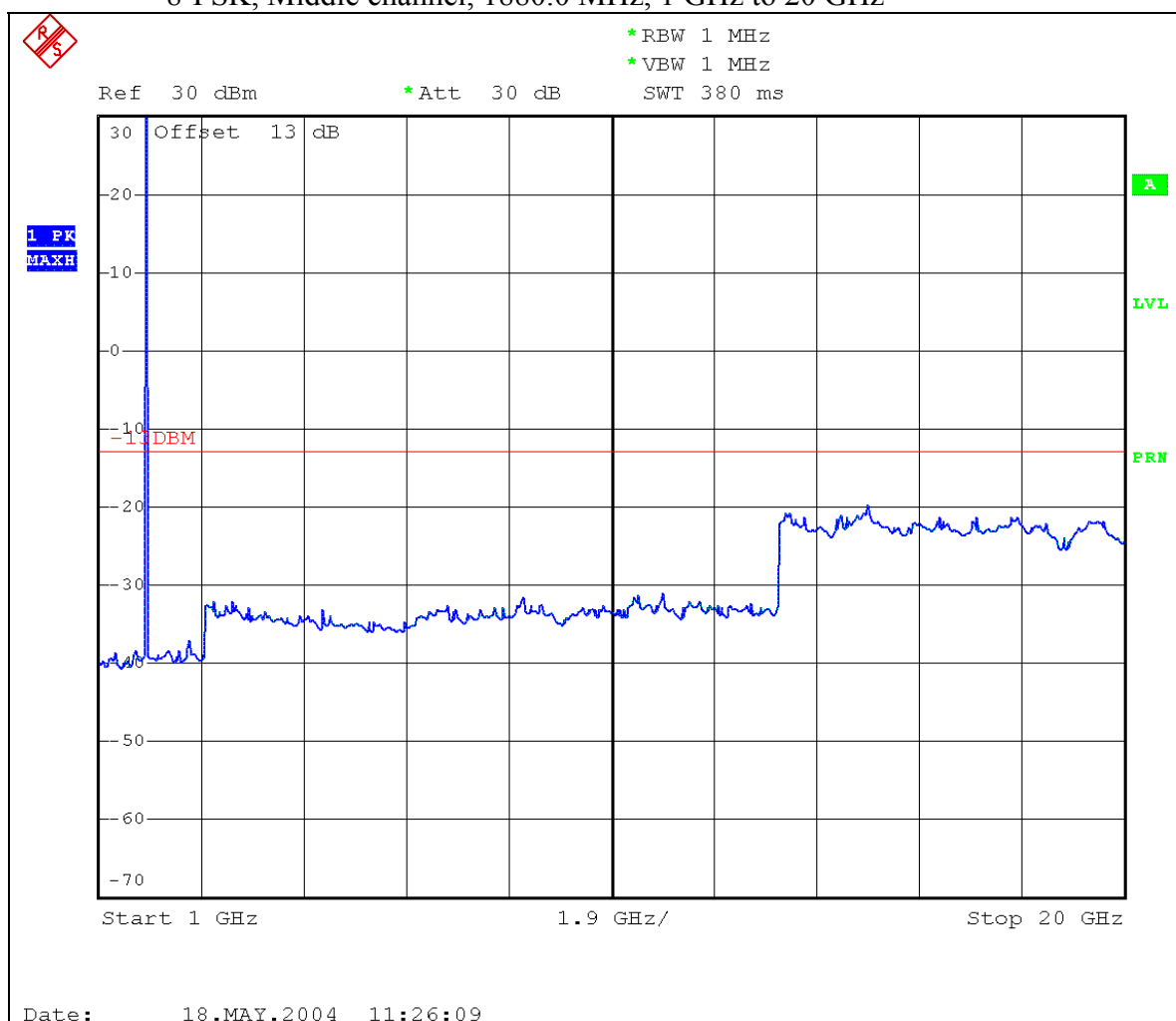


Plot 6.4.32) Out of Band Emissions at Antenna Terminals
 8-PSK, Middle channel, 1880.0 MHz, TX signal +/- 20 MHz



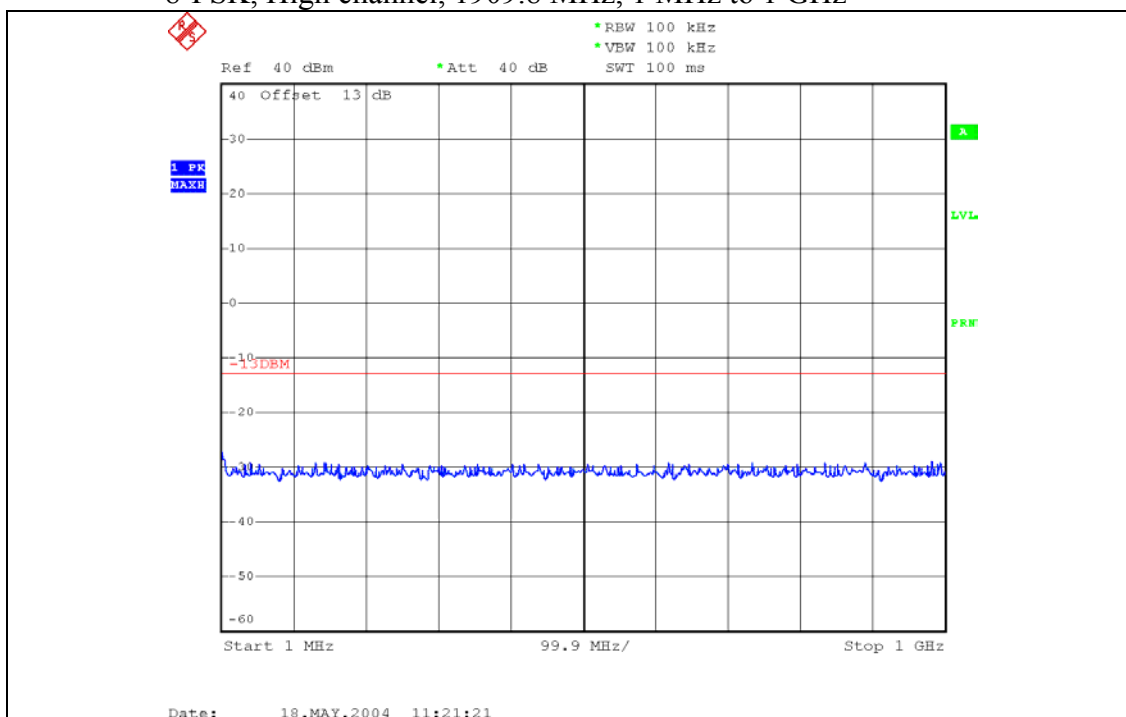
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Plot 6.4.33) Out of Band Emissions at Antenna Terminals
8-PSK, Middle channel, 1880.0 MHz, 1 GHz to 20 GHz

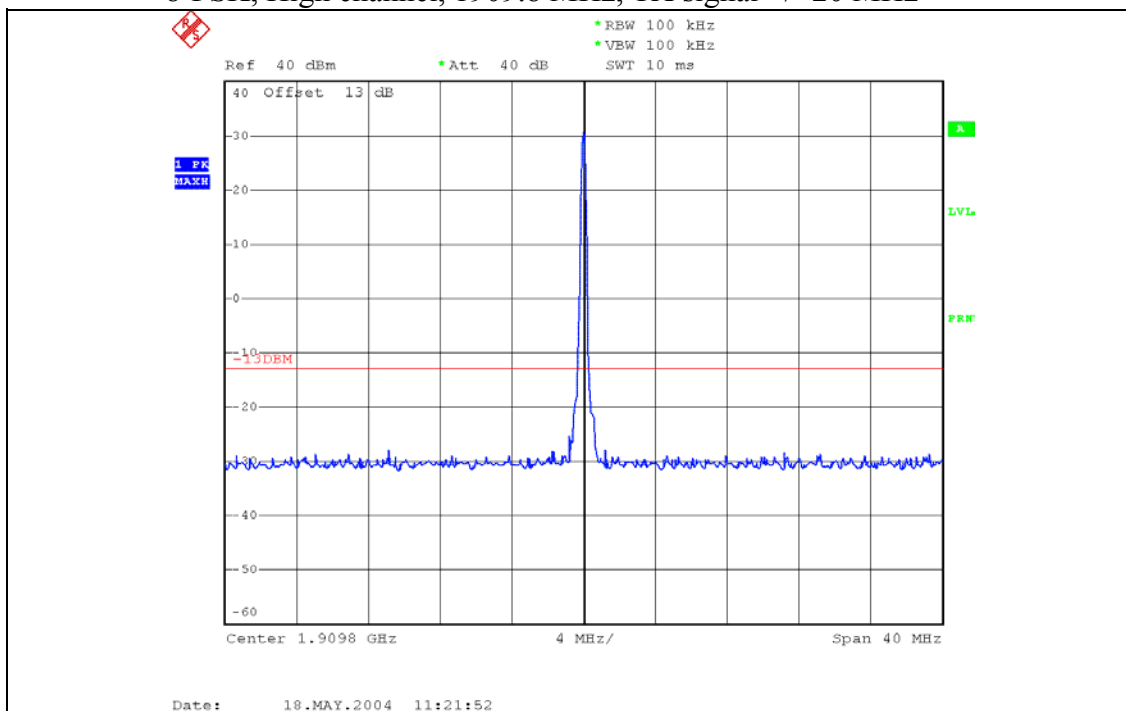


Strong emission shown is the carrier signal.

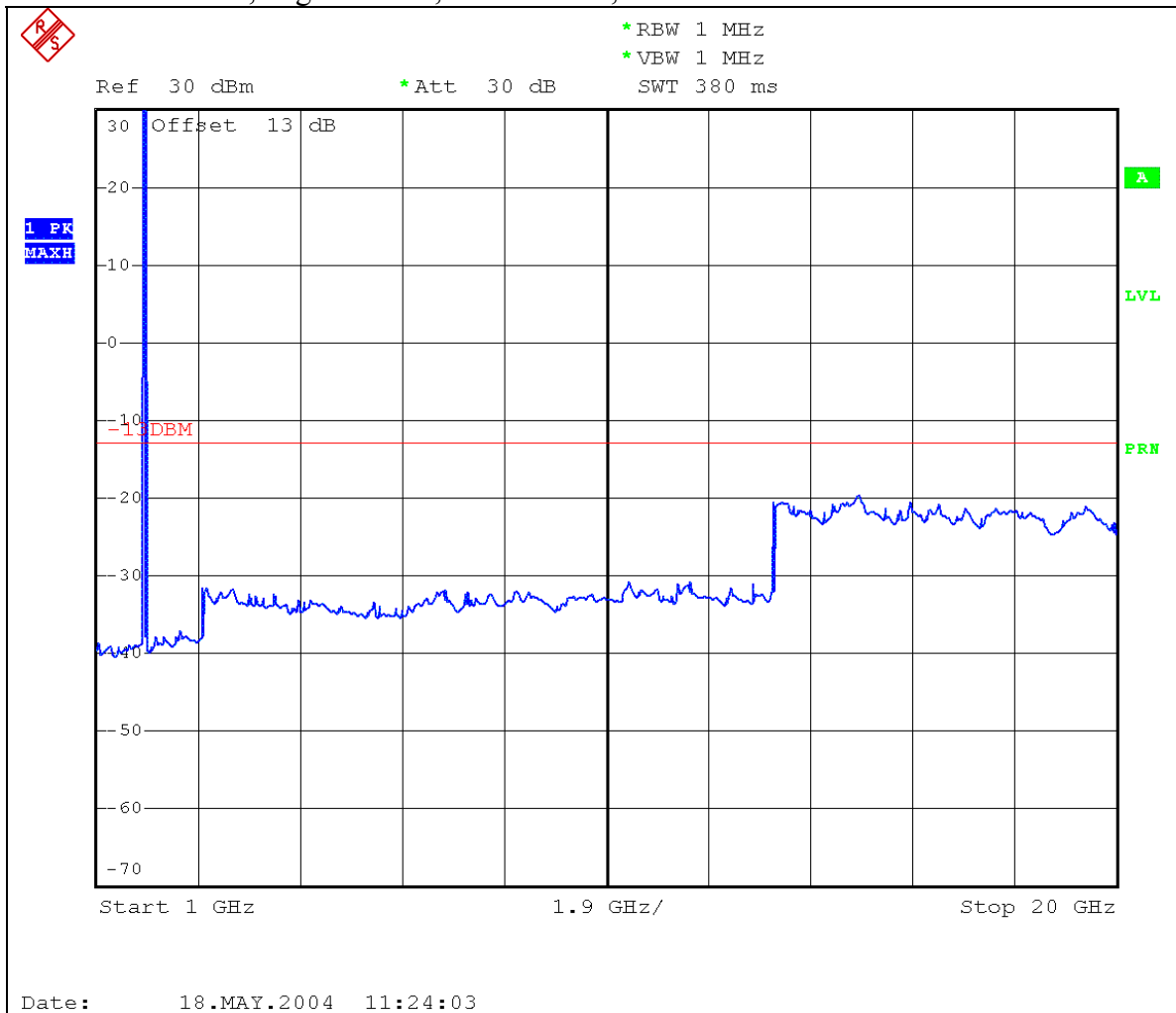
Plot 6.4.34) Out of Band Emissions at Antenna Terminals
 8-PSK, High channel, 1909.8 MHz, 1 MHz to 1 GHz



Plot 6.4.35) Out of Band Emissions at Antenna Terminals
 8-PSK, High channel, 1909.8 MHz, TX signal +/- 20 MHz

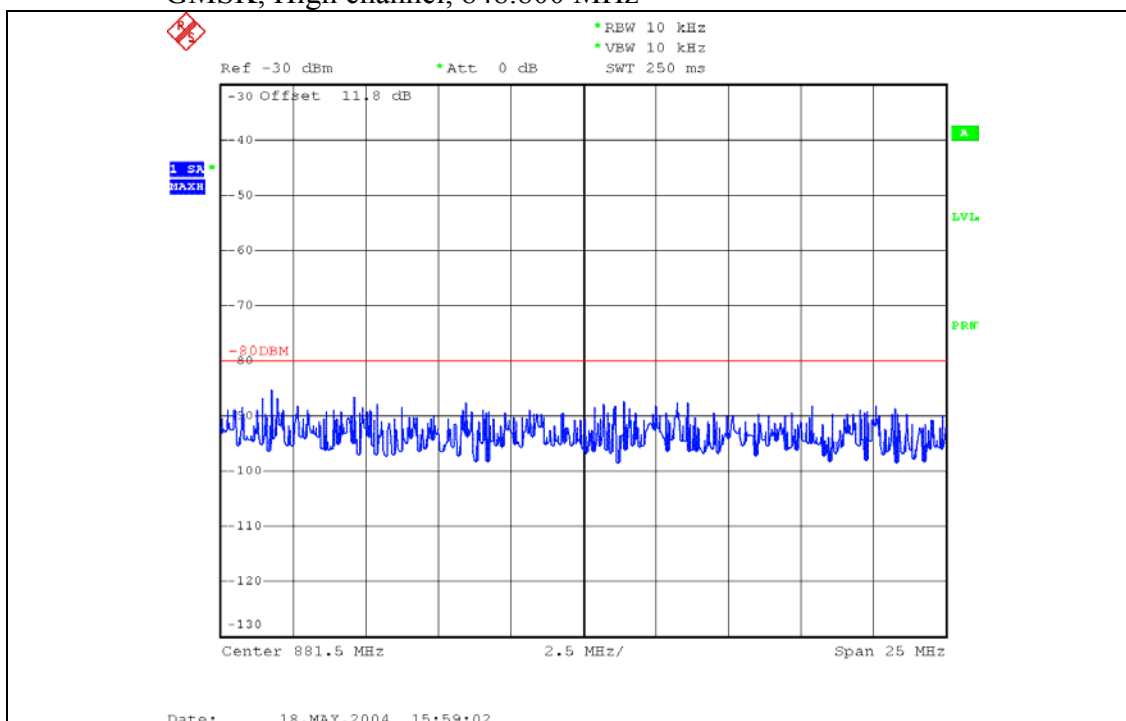


Plot 6.4.36) Out of Band Emissions at Antenna Terminals
8-PSK, High channel, 1909.8 MHz, 1 GHz to 20 GHz

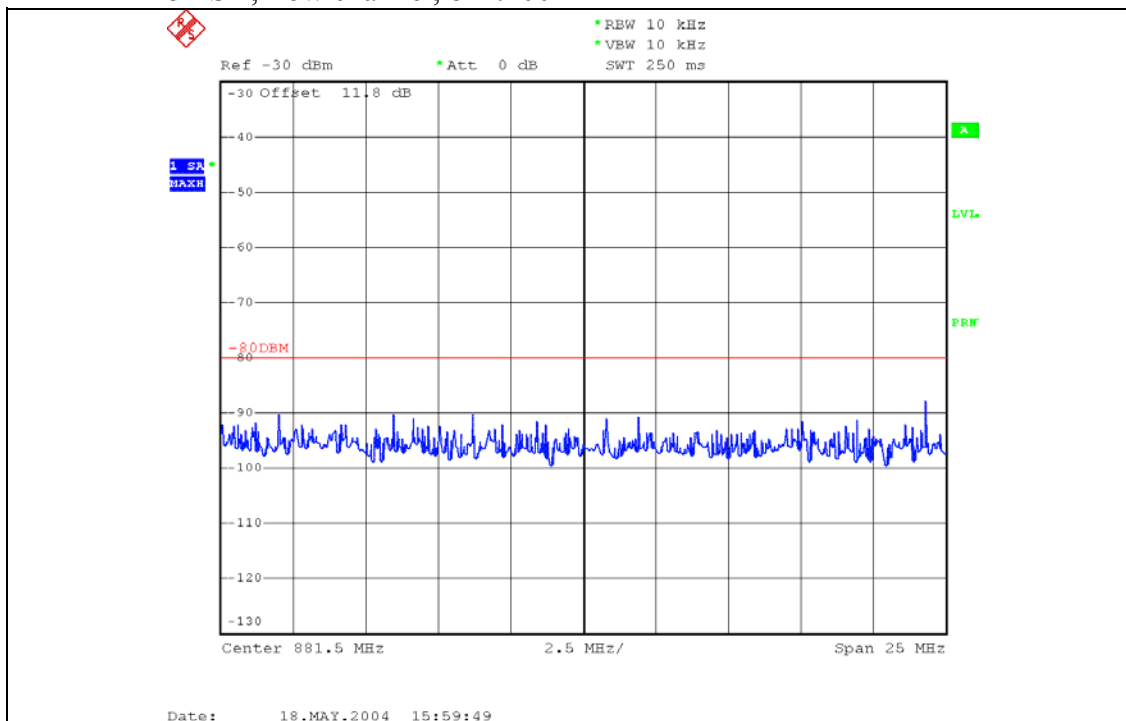


Strong emission shown is the carrier signal.

**Plot 6.4.39) Emissions in Base Station Frequency Range, Cellular band
GMSK, High channel, 848.800 MHz**

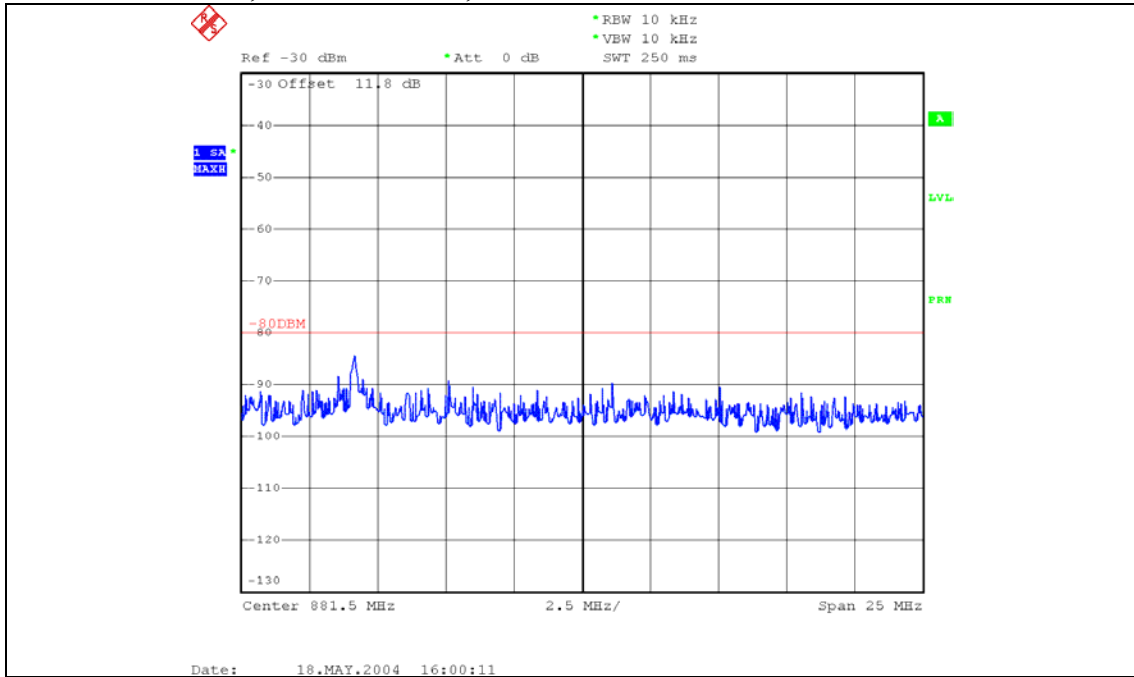


**Plot 6.4.40) Emissions in Base Station Frequency Range, Cellular band
8-PSK, Low channel, 824.200 MHz**

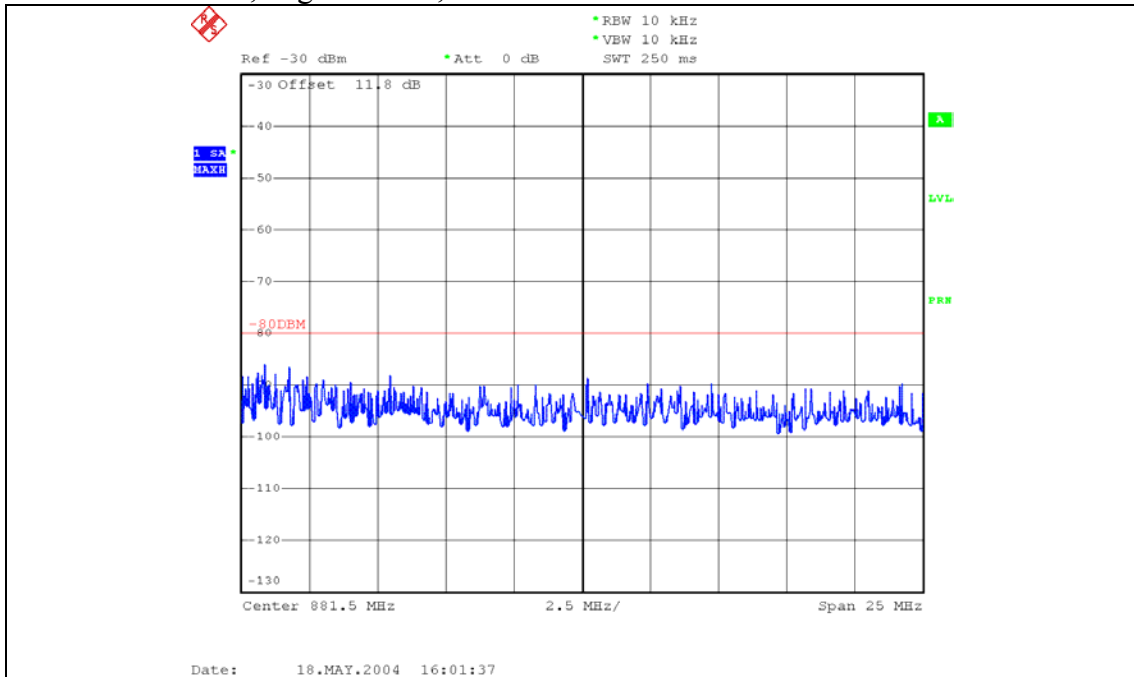


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**Plot 6.4.41) Emissions in Base Station Frequency Range, Cellular band
8-PSK, Middle channel, 836.600 MHz**



**Plot 6.4.42) Emissions in Base Station Frequency Range, Cellular band
8-PSK, High channel, 848.800 MHz**



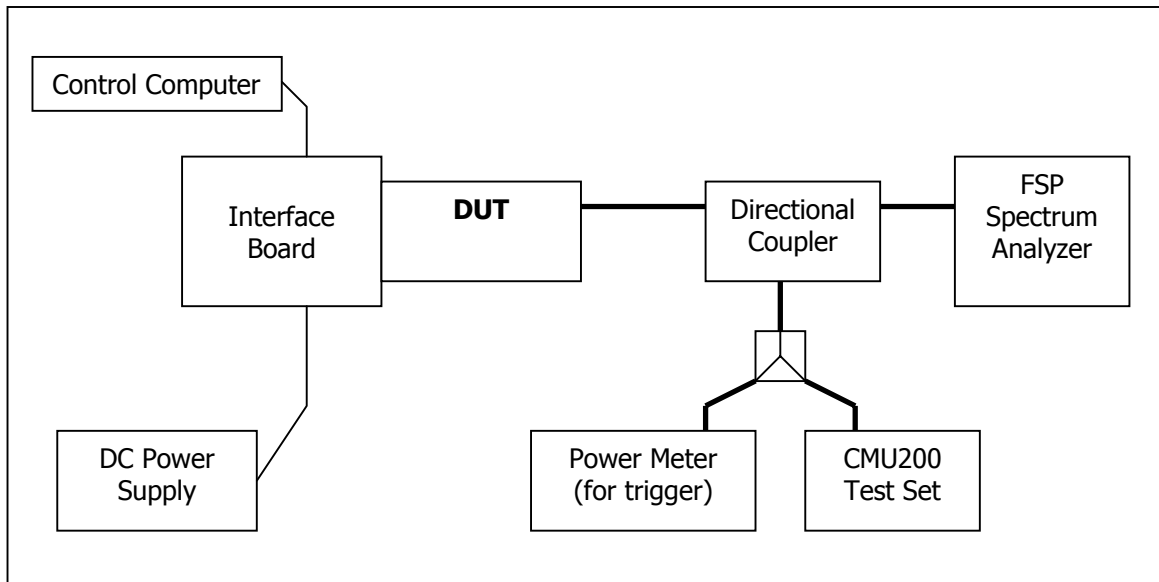
7 Block Edge Compliance

FCC part 22H/24E

7.1 Test Procedure

The transmitter output was connected to a Rohde & Schwarz CMU200 Test Set and configured to operate at maximum power. The block edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

Test Setup



7.2 Test Equipment

Instrument List

| EQUIPMENT | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DATE |
|---------------------|-----------------|------------|------------|----------------|
| Control Computer | TC | Generic PC | 100488 | N/A |
| Wireless Test Set | Rohde & Schwarz | CMU200 | 836766/030 | N/A |
| Spectrum Analyzer | Rohde & Schwarz | FSP 30GHz | US41421268 | Sept. 12, 2003 |
| DC Power Supply | HP | E3631A | 100060 | N/A |
| Interface Board | Shop built | Minnnow | N/A | N/A |
| Directional Coupler | Pasternack | PE2209-10 | N/A | N/A |

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| | | | |
|------------------------------|-------|--------------|---------------|
| FCC Part 22 & 24 Test Report | AC775 | May 20, 2004 | Page 50 of 60 |
|------------------------------|-------|--------------|---------------|

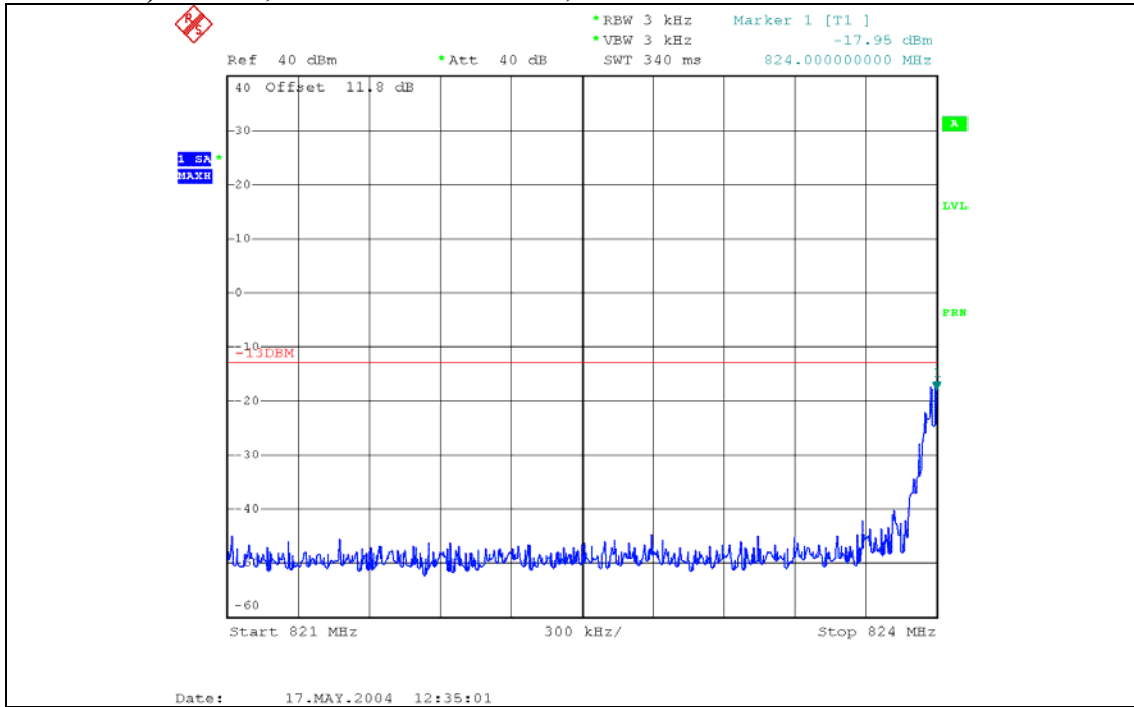
7.3 Test Results

| Block Test | Frequency Boundaries (MHz) | Channels Tested | Corresponding Plots | Result |
|------------|------------------------------------|-----------------|---------------------|----------|
| 1 | GMSK: Below 824 MHz, above 849 MHz | 128, 251 | 7.4.1, 7.4.2 | Complies |
| 2 | 8PSK: Below 824 MHz, above 849 MHz | 128, 251 | 7.4.3, 7.4.4 | Complies |
| 3 | GMSK: Below 1850MHz, above 1910MHz | 512, 810 | 7.4.5, 7.4.6 | Complies |
| 4 | 8PSK: Below 1850MHz, above 1910MHz | 512, 810 | 7.4.7, 7.4.8 | Complies |

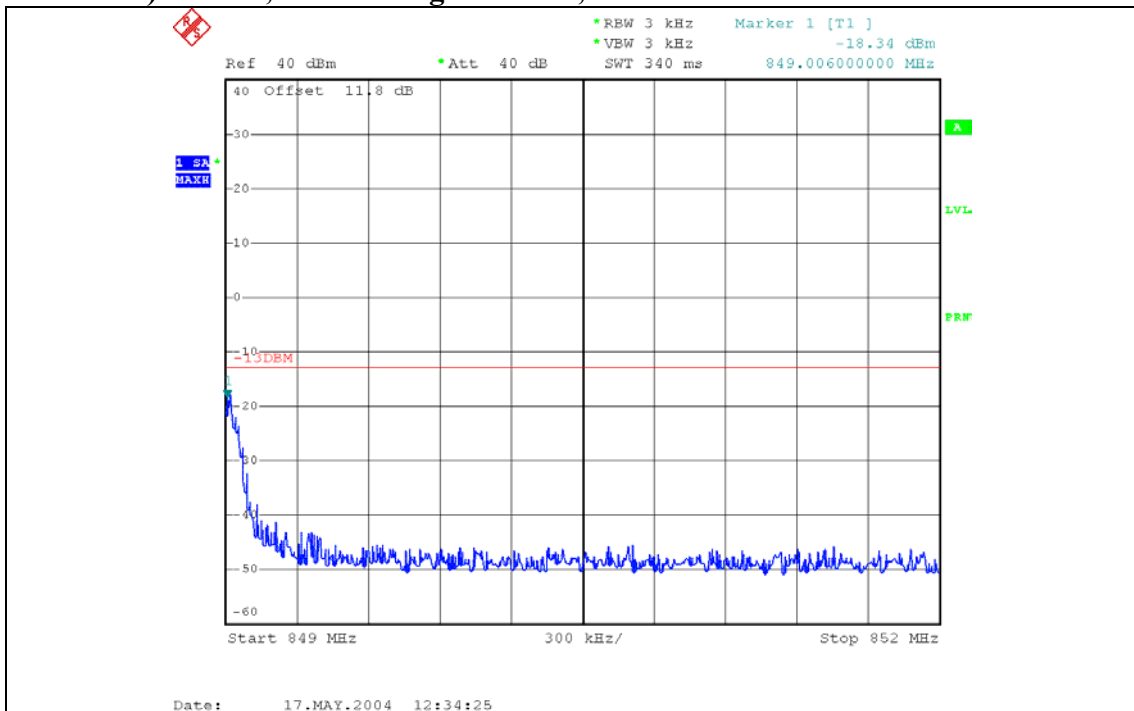
SIERRA WIRELESS, INC.

7.4 Test Plots

Plot 7.4.1) GSMK; Cellular low channel, below 824 MHz

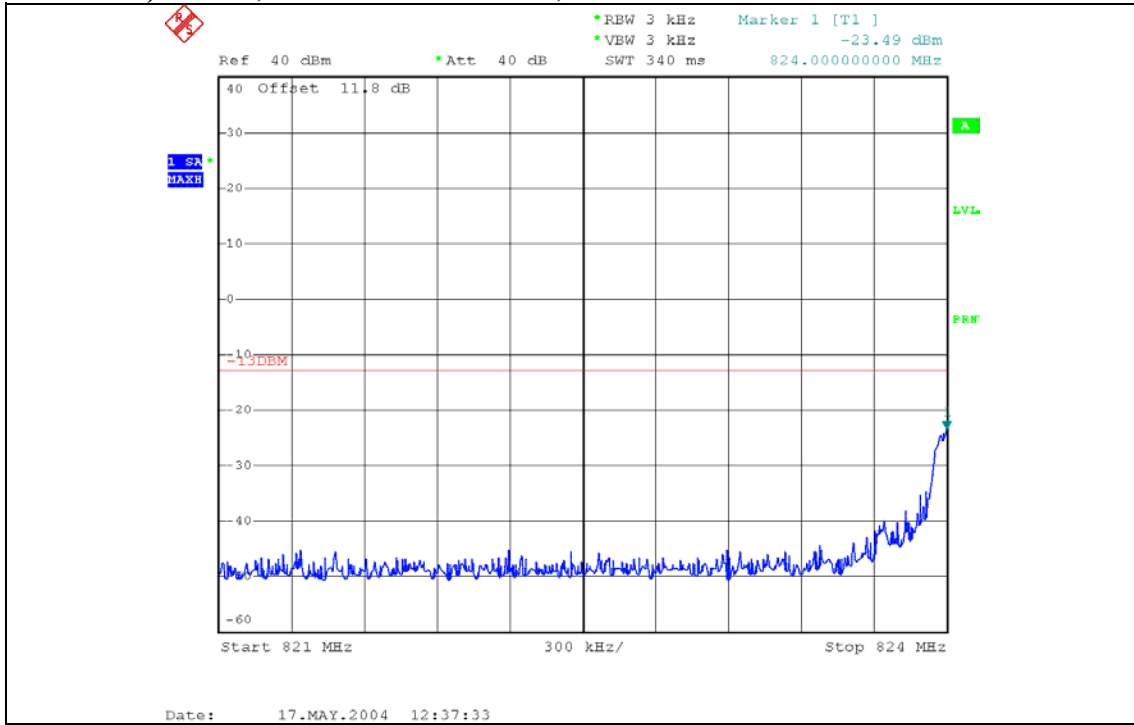


Plot 7.4.2) GSMK; Cellular high channel, above 849 MHz

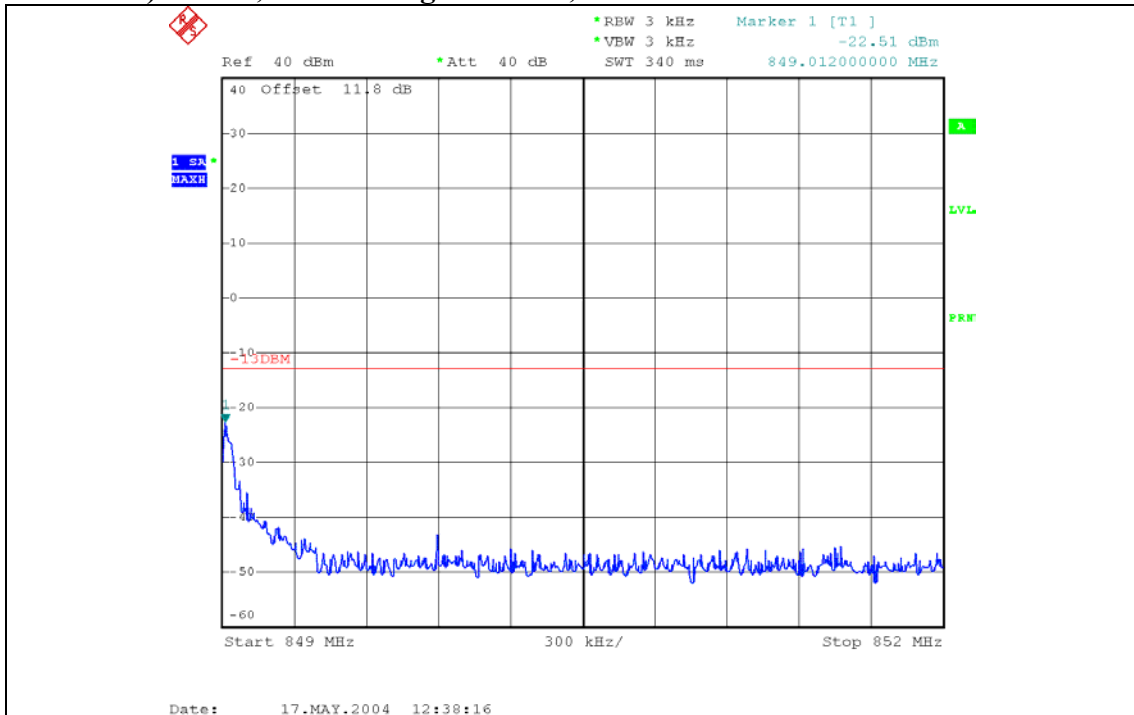


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Plot 7.4.3) 8-PSK; Cellular low channel, below 824 MHz

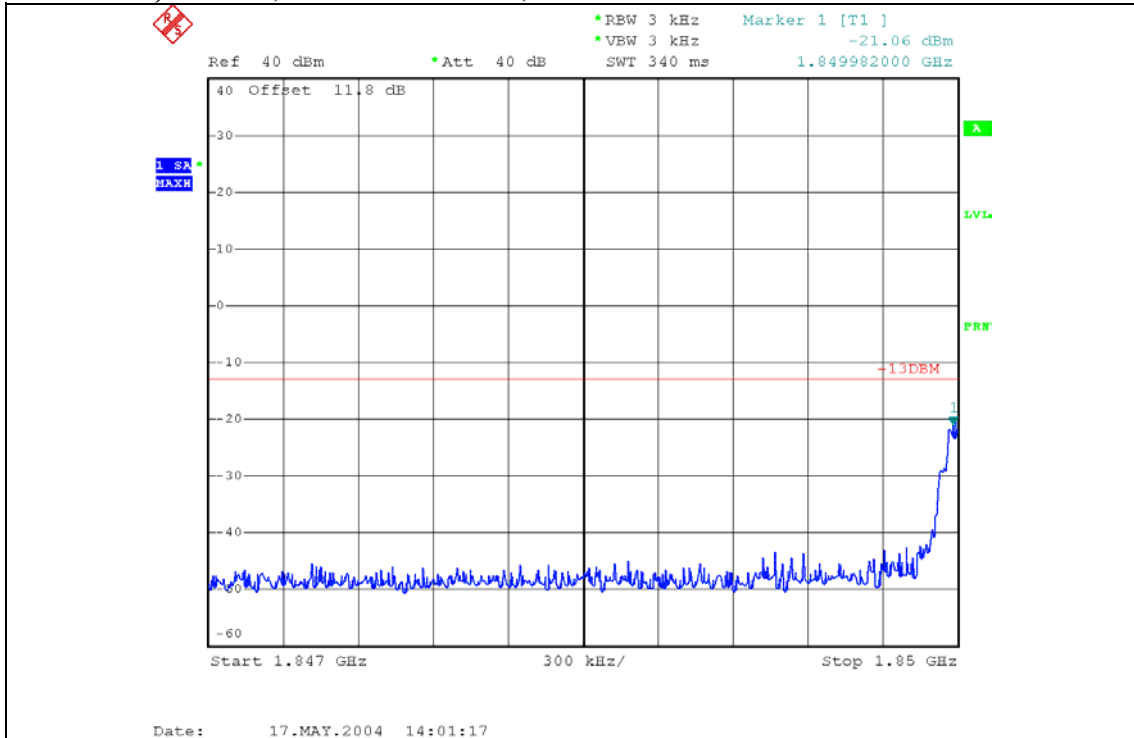


Plot 7.4.4) 8-PSK; Cellular high channel, above 849 MHz

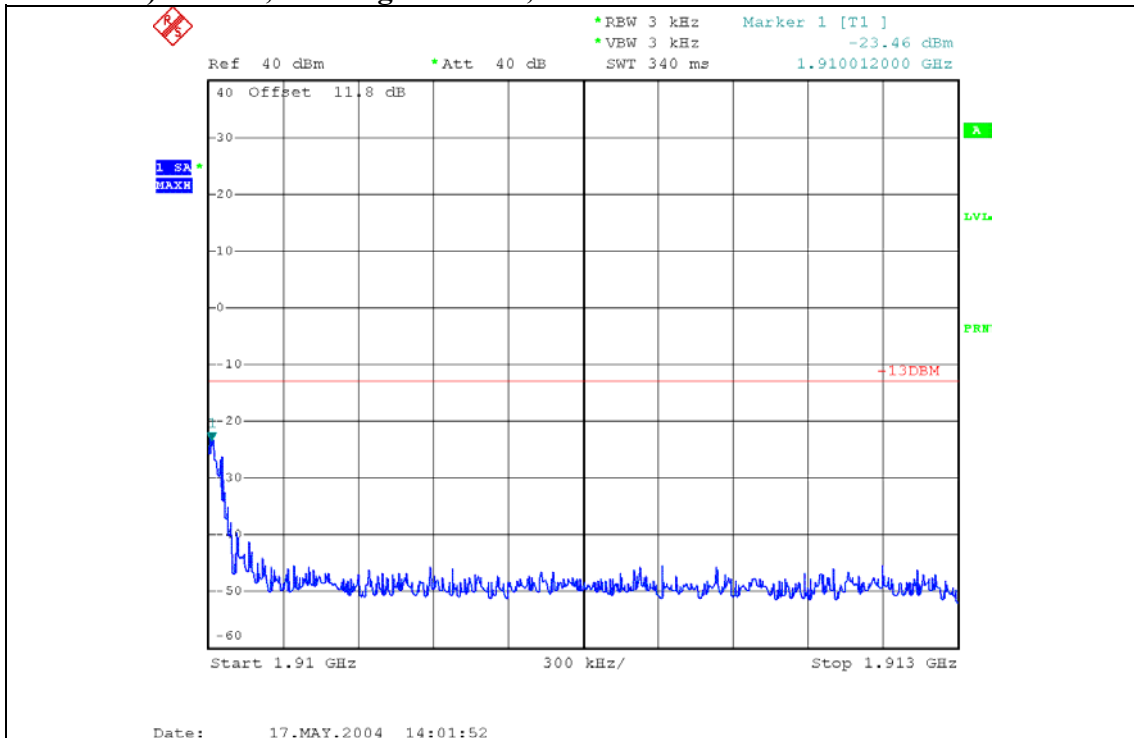


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Plot 7.4.5) GMSK; PCS low channel, below 1850 MHz

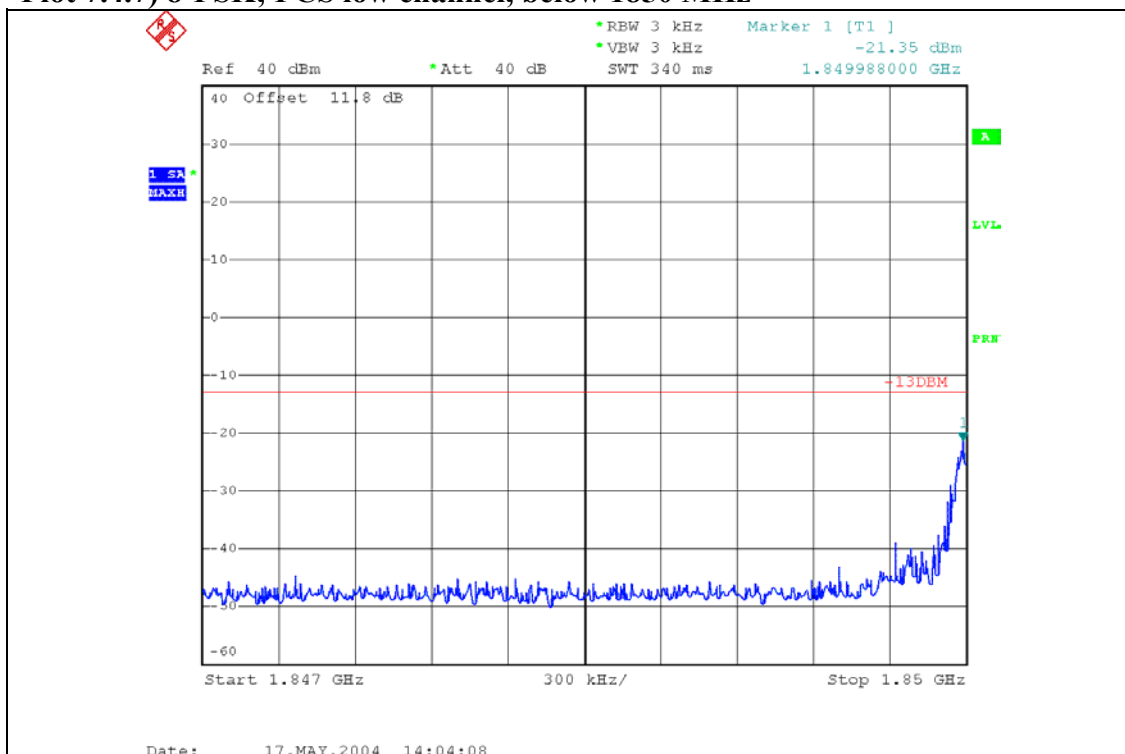


Plot 7.4.6) GMSK; PCS high channel, above 1910 MHz

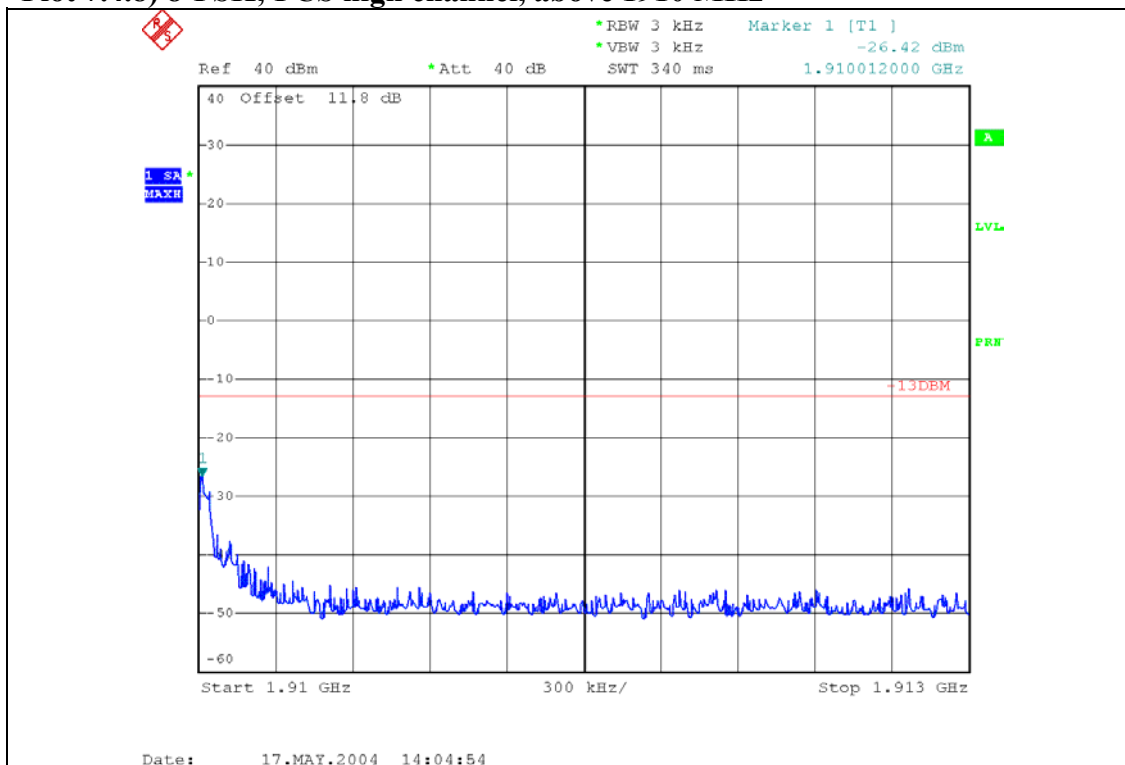


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Plot 7.4.7) 8-PSK; PCS low channel, below 1850 MHz



Plot 7.4.8) 8-PSK; PCS high channel, above 1910 MHz



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The contents of this page are subject to the confidentiality information on page one.

8 Frequency Stability Versus Temperature

FCC 2.1055

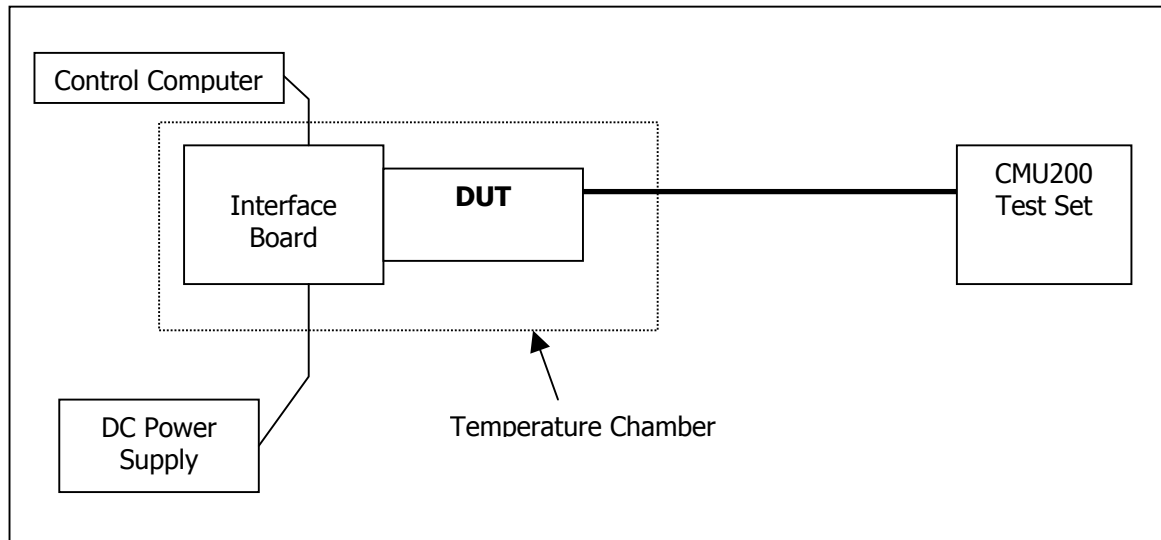
8.1 Summary of Results

The AC755 Frequency Stability versus temperature meets the requirement of being within ± 0.1 ppm of the received base station frequency.

8.2 Test Procedure

The AC755 was placed inside the temperature chamber. The transmitting frequency error is measured at 25 degrees C, then the temperature is set to +60 degrees C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is decreased by 10 degrees, allowed to stabilize and soak, then the measurement is repeated. This is repeated until -20 degrees C is completed. The process is then repeated back up to +60 degrees C. Frequency metering included internal averaging of the CMU200 to stabilize the reading. Reference power supply voltage for these tests is 5.0 volts.

Test Setup

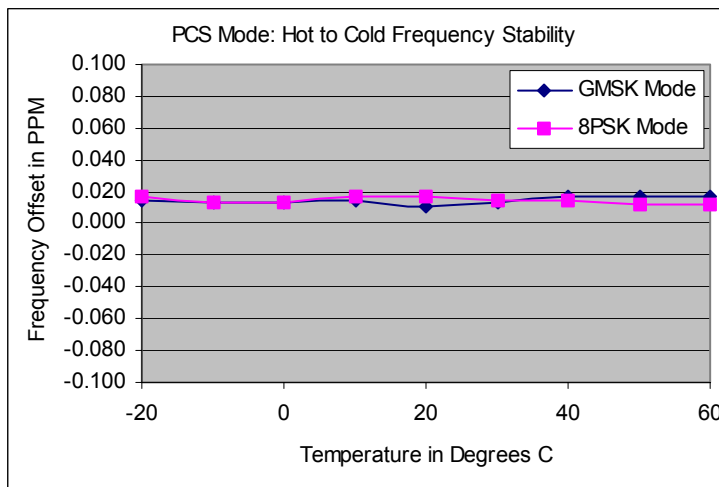
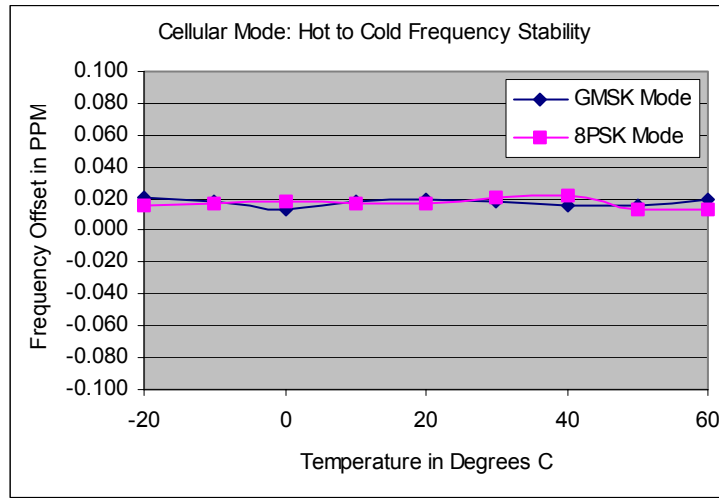


8.3 Test Equipment

| EQUIPMENT | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DATE |
|-------------------|-----------------|------------|------------|----------------|
| Control Computer | TC | Generic PC | 100488 | N/A |
| Wireless Test Set | Rohde & Schwarz | CMU200 | 836766/030 | N/A |
| Spectrum Analyzer | Rohde & Schwarz | FSP 30GHz | US41421268 | Sept. 12, 2003 |
| DC Power Supply | HP | E3631A | 100060 | N/A |
| Interface Board | Shop built | Minnow | N/A | N/A |

8.4 Test Results

High to Low Temperature Frequency Error

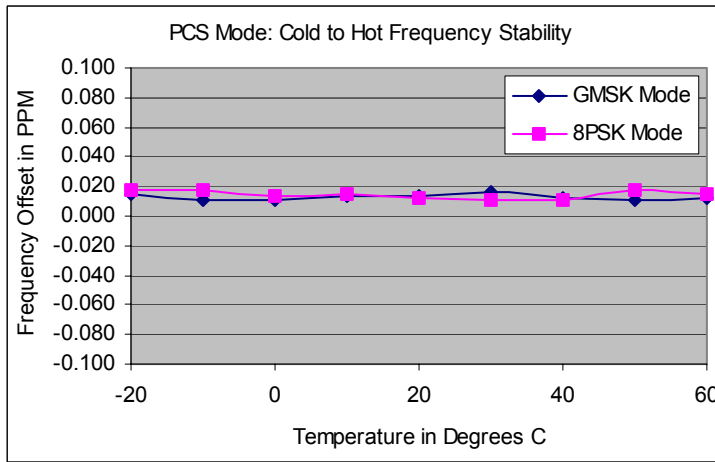
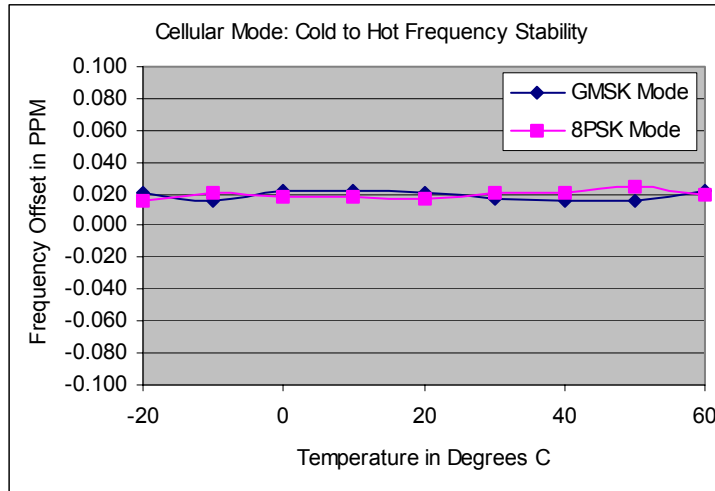


High to Low Temperature Tabular Readings

| Temp.(C) | Cellular Mode: 824MHz to 848MHz | | | | PCS Mode: 1850MHz to 1909MHz | | | |
|----------|---------------------------------|--------------|-------------|--------------|------------------------------|--------------|-------------|--------------|
| | GMSK Mode | | 8-PSK Mode | | GMSK Mode | | 8-PSK Mode | |
| | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) |
| 60 | 16 | 0.019 | 11 | 0.013 | 24 | 0.013 | 27 | 0.014 |
| 50 | 13 | 0.016 | 11 | 0.013 | 21 | 0.011 | 32 | 0.017 |
| 40 | 13 | 0.016 | 18 | 0.022 | 22 | 0.012 | 21 | 0.011 |
| 30 | 15 | 0.018 | 17 | 0.020 | 30 | 0.016 | 21 | 0.011 |
| 20 | 16 | 0.019 | 14 | 0.017 | 25 | 0.013 | 23 | 0.012 |
| 10 | 15 | 0.018 | 14 | 0.017 | 26 | 0.014 | 27 | 0.014 |
| 0 | 11 | 0.013 | 15 | 0.018 | 21 | 0.011 | 26 | 0.014 |
| -10 | 15 | 0.018 | 14 | 0.017 | 21 | 0.011 | 34 | 0.018 |
| -20 | 17 | 0.020 | 13 | 0.016 | 28 | 0.015 | 33 | 0.018 |

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Low to High Temperature Frequency Error



Low to High Temperature Tabular Readings

| Temp.(C) | Cellular Mode: 824MHz to 848MHz | | | | PCS Mode: 1850MHz to 1909MHz | | | |
|----------|---------------------------------|--------------|-------------|--------------|------------------------------|--------------|-------------|--------------|
| | GMSK Mode | | 8-PSK Mode | | GMSK Mode | | 8-PSK Mode | |
| | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) |
| -20 | 17 | 0.020 | 13 | 0.016 | 28 | 0.015 | 33 | 0.018 |
| -10 | 13 | 0.016 | 17 | 0.020 | 25 | 0.013 | 24 | 0.013 |
| 0 | 18 | 0.022 | 15 | 0.018 | 25 | 0.013 | 24 | 0.013 |
| 10 | 18 | 0.022 | 15 | 0.018 | 28 | 0.015 | 33 | 0.018 |
| 20 | 17 | 0.020 | 14 | 0.017 | 20 | 0.011 | 31 | 0.016 |
| 30 | 14 | 0.017 | 17 | 0.020 | 25 | 0.013 | 28 | 0.015 |
| 40 | 13 | 0.016 | 17 | 0.020 | 33 | 0.018 | 28 | 0.015 |
| 50 | 13 | 0.016 | 21 | 0.025 | 33 | 0.018 | 23 | 0.012 |
| 60 | 18 | 0.022 | 16 | 0.019 | 31 | 0.016 | 22 | 0.012 |

9 Frequency Stability Versus Voltage

FCC 2.1055

9.1 Summary of Results

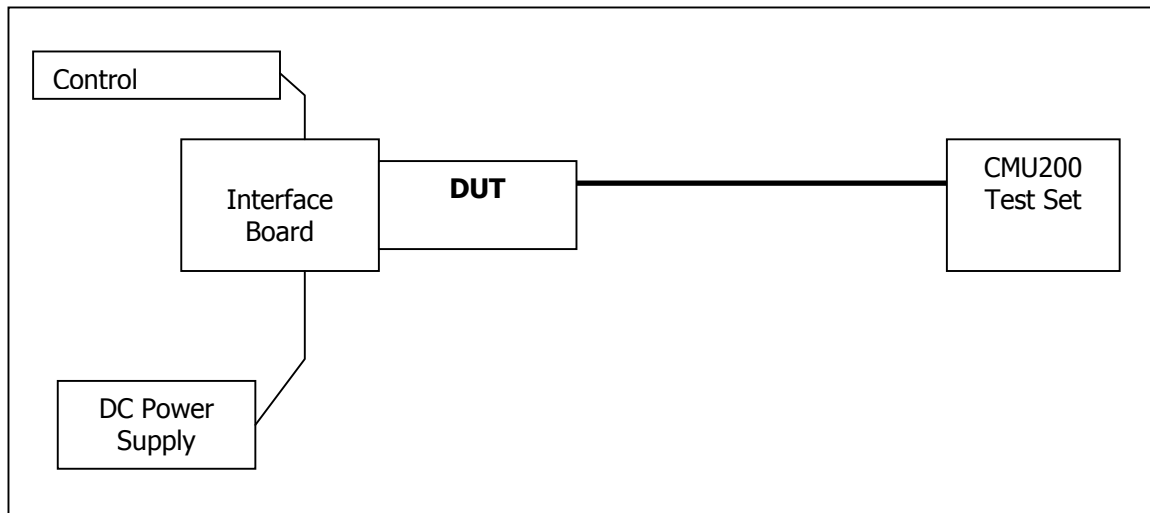
The unit meets the limit of less than 0.1ppm of frequency offset from center for 85% and 115% of the supply voltage for 5.0 volts.

9.2 Test Procedure

The AC755 was connected to a DC Power Supply and a GSM test set (CMU 200) with frequency error measurement capability. The power supply output is adjusted to the test voltage as measured at the input terminals to the module while transmitting. A voltmeter was used to confirm the terminal voltage. The peak frequency error is recorded (worst case).

The test voltages are 4.25 volts to 5.75 volts.

Test Setup

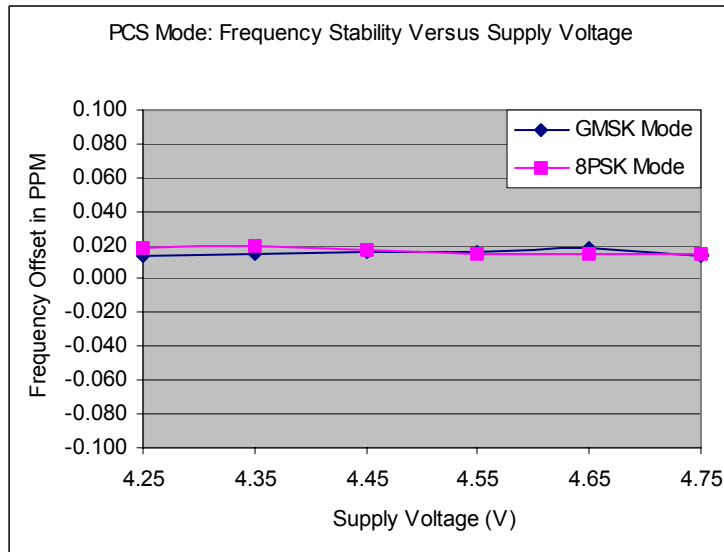
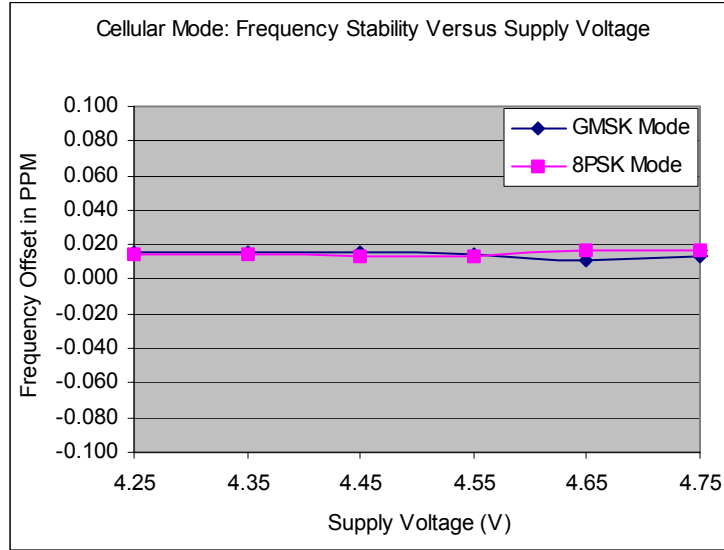


9.3 Test Equipment

| EQUIPMENT | MANUFACTURER | MODEL NO. | SERIAL NO. | CAL. DATE |
|-------------------|-----------------|------------|------------|----------------|
| Control Computer | TC | Generic PC | 100488 | N/A |
| Wireless Test Set | Rohde & Schwarz | CMU200 | 836766/030 | N/A |
| Spectrum Analyzer | Rohde & Schwarz | FSP 30GHz | US41421268 | Sept. 12, 2003 |
| DC Power Supply | HP | E3631A | 100060 | N/A |
| Interface Board | Shop built | Minnow | N/A | N/A |

9.4 Test Results

85% to 115% of 5 Volts Frequency Error



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85% to 115% of 5 Volts Frequency Error, Tabular Data

| Supply (V) | Cellular Mode: 824MHz to 848MHz | | | | PCS Mode: 1850MHz to 1909MHz | | | |
|------------|---------------------------------|--------------|-------------|--------------|------------------------------|--------------|-------------|--------------|
| | GMSK Mode | | 8-PSK Mode | | GMSK Mode | | 8-PSK Mode | |
| | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) | Offset (Hz) | Offset (ppm) |
| 4.25 | 13 | 0.016 | 12 | 0.014 | 26 | 0.014 | 34 | 0.018 |
| 4.35 | 13 | 0.016 | 12 | 0.014 | 28 | 0.015 | 37 | 0.020 |
| 4.45 | 13 | 0.016 | 11 | 0.013 | 31 | 0.016 | 33 | 0.018 |
| 4.55 | 12 | 0.014 | 11 | 0.013 | 31 | 0.016 | 28 | 0.015 |
| 4.65 | 9 | 0.011 | 14 | 0.017 | 34 | 0.018 | 27 | 0.014 |
| 4.75 | 11 | 0.013 | 14 | 0.017 | 26 | 0.014 | 27 | 0.014 |
| 4.85 | 13 | 0.016 | 13 | 0.016 | 25 | 0.013 | 28 | 0.015 |
| 4.95 | 13 | 0.016 | 13 | 0.016 | 24 | 0.013 | 29 | 0.015 |
| 5.05 | 12 | 0.014 | 13 | 0.016 | 27 | 0.014 | 31 | 0.016 |
| 5.15 | 12 | 0.014 | 10 | 0.012 | 28 | 0.015 | 31 | 0.016 |
| 5.25 | 12 | 0.014 | 9 | 0.011 | 27 | 0.014 | 30 | 0.016 |
| 5.35 | 12 | 0.014 | 9 | 0.011 | 29 | 0.015 | 31 | 0.016 |
| 5.45 | 14 | 0.017 | 12 | 0.014 | 31 | 0.016 | 31 | 0.016 |
| 5.55 | 14 | 0.017 | 13 | 0.016 | 31 | 0.016 | 24 | 0.013 |
| 5.65 | 13 | 0.016 | 11 | 0.013 | 28 | 0.015 | 25 | 0.013 |
| 5.75 | 12 | 0.014 | 11 | 0.013 | 24 | 0.013 | 27 | 0.014 |