



Gobi3000™ Module FCC Part 22, 24 & 27 Conducted Test Report

80-N2162-203 Rev C

August 16, 2011

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August 16, 2011

Gobi3000™ Module FCC Part 22, 24 & 27 Conducted Test Report
80-N2162-203 Rev C

Gobi3000™ Module FCC Part 22, 24 & 27 Conducted Test Report

| FCC Part 22, 24 & 27 Certification | |
|---|--------------------|
| FCC ID: | J9CGOBI3000 |
| Model: | Gobi3000 |

| STATEMENT OF CERTIFICATION | |
|---|---|
| <i>The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the measurements of the sample's radio frequency interference emissions characteristics as of the dates and at the times of the test under the conditions herein specified.</i> | |
| Test performed by: | QUALCOMM Incorporated 5775 Morehouse Drive San Diego, CA 92121-1714 |
| Report Prepared by: | QUALCOMM Incorporated 5775 Morehouse Drive San Diego, CA 92121-1714 |
| Tests that required an OATS site were performed by Compliance Certification Services. | |

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1. Introduction and Purpose

This document provides FCC test data for the Qualcomm Gobi3000™ module wireless embedded modem. The test results included in this report are limited to conducted test results. Radiated testing was performed at Compliance Certification Services in Fremont, CA, and the test results are contained in the Gobi3000 Module FCC Part 22, 24 & 27 Radiated Test Report.

The original test report was released as 80-N2162-203 Rev B in July 2010. The device has been verified through internal testing to be compliant with FCC and Industry Canada requirements and the 80-N2162-203 Rev C updates the test report issue date.

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2. Description of Device Under Test

The Gobi3000 module is a universal embedded-data-connectivity modem in the form of a PCI Express mini-card and the associated software suite for the notebook PC application. The Gobi3000 module supports the modes and frequency bands shown in the following table.

| Mode | Equipment Category | Band Name | Available in U.S. / Canada | Transmitter Range (MHz) | Receiver Range (MHz) |
|------------|-----------------------------------|------------------------|----------------------------|-------------------------|----------------------|
| GPRS/EDGE | GPRS/EDGE Cat 10 | 850 MHz - US Cellular | Yes | 824-849 | 869-894 |
| | | 900 MHz - EGSM | No | 880-915 | 925-960 |
| | | 1800 MHz - DCS | No | 1710-1785 | 1805-1880 |
| | | 1900 MHz - US PCS | Yes | 1850-1910 | 1930-1990 |
| UMTS/HSPA+ | R7 HSDPA Cat 10 R6 HSUPA Cat 6 | Band 1 2.1 GHz | No | 1920-1980 | 2110-2170 |
| | | Band 2 1900 MHz | Yes | 1850-1910 | 1930-1990 |
| | | Band 4 AWS | Yes | 1710-1755 | 2110-2155 |
| | | Band 5 850 MHz | Yes | 824-849 | 869-894 |
| | | Band 6 800 MHz (Japan) | No | 830-840 | 875-885 |
| | | Band 8 900 MHz | No | 880-915 | 925-960 |
| | | BC0 850 MHz | Yes | 824-849 | 869-894 |
| CDMA2000 | EVDO Release 0 EVDO Revision A | BC1 1900 MHz | Yes | 1850-1910 | 1930-1990 |
| GPS | 1x | GPS L1 | Yes | N/A | 1570-1590 |

The module contains two RF ports. The first port is the primary transmit/receive and the 2nd RF port is used for the RX diversity and GPS receivers. For conducted compliance testing, the module was tested inside a test fixture that provides power via an external cable. A RF cable was connected to the primary antenna port for RF measurements.

For FCC and IC compliance testing, the Gobi3000 module was only tested in bands used in the regions as noted in the table.

The DUT is a pre-production sample intentionally calibrated with transmit power higher than the nominal factory set points to represent worst case data for manufactured modules.

3. Test Summary

| FCC/IC Rule | Description of Test | Result | Page |
|-----------------------------------|---|----------|--------------------------|
| §2.1046 | RF Power Output | Complies | 12 |
| §2.1049 | Occupied Bandwidth | Complies | 14 |
| §22.359, 24.238, 27.53(g) | Band Edge Requirement | Complies | 29 |
| §2.1051, 22.917, 24.238(a), 27.53 | Out of Band Emission at Antenna Terminals | Complies | 41 |
| §2.1055, 22.355, 24.235, 27.54 | Frequency Stability vs. Temperature vs. Voltage | Complies | 57 |
| §1.1310, 2.1091 | RF Exposure | Complies | See MPE Report |
| §2.1053, 22.917, 24.238(a), 27.55 | Field Strength of Spurious Radiation | Complies | See Radiated Test Report |

4. RF Power Output Verification

| | |
|---------------|-----------|
| FCC: | § 2.1046 |
| Limit: | n/a |
| DUT SN | N10F6XTXR |

4.1 Base Station Emulator Settings and Measurement Procedures

As shown in the figure below, connect the transmitter output of the Gobi3000 module to the communication test set (Agilent 8960) and configure it to operate at maximum power in a call.

Measure the power at three equally spaced operating frequencies for each band.

Use the build-in power measurement capability in the 8960 box to measure CDMA 1x/1xEVDO and GPRS/EGPRS/UMTS conducted power output.

The relevant cable loss is measured for the specific frequencies under test and added as a correction factor for all the tests.



4.1.1 CDMA2000 1xEV-DO Max Power setup

Measure the power at Ch1013, 384 and 777 for US cell; Ch25, 600 and 1175 for US PCS band.

1xRTT

Use CDMA2000 Rev 6 protocol in the call box 8960.

- 1) Test for Reverse/Forward TCH RC1, Reverse/Forward TCH RC2, and RC3 Reverse FCH and demodulation of RC 3, 4 and 5.
 - a. Set up a call using Fundamental Channel Test Mode 1 (RC1, SO 2) with 9600 bps data rate only.
 - b. As per C.S0011 or TIA/EIA-98-F Table 4.4.5.2-1, set the test parameters as shown in Table 4-1.
 - c. Send continuously '0' power control bits to the Gobi3000 module.
 - d. Measure the output power at Gobi3000 module antenna connector as recorded on the power meter with values corrected for cables losses.
 - e. Repeat step b through d for Fundamental Channel Test Mode:
 - i. RC1, SO55
 - ii. RC2, SO9
 - iii. RC2, SO55
 - iv. RC3, SO55
- 2) Test for RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3, 4 and 5.
 - a. Set up a call using Supplemental Channel Test Mode 3 (RC 3, SO 32) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.

- b. As per C.S0011 or TIA/EIA-98-F Table 4.4.5.2-2, set the test parameters as shown in Table 4-2.
- c. Send alternating ‘0’ and ‘1’ power control bit to the Gobi3000 module
- d. Determine the active channel configuration. If the desired channel configuration is not the active channel configuration, increase \hat{I}_{or} by 1 dB and repeat the verification. Repeat this step until the desired channel configuration becomes active.
- e. Measure the output power at the Gobi3000 module antenna connector.
- f. Decrease \hat{I}_{or} by 0.5 dB.
- g. Determine the active channel configuration. If the active channel configuration is the desired channel configuration, measure the output power at the Gobi3000 module antenna connector.
- h. Repeat step f and g until the output power no longer increases or the desired channel configuration is no longer active. Record the highest output power achieved with the desired channel configuration active.
- i. Repeat step a through h ten times and average the result.

Table 4-1 Parameters for Max. Power with a single traffic code channel, SR1

| Parameter | Units | Value |
|--------------------------------------|--------------|-------|
| \hat{I}_{or} | dBm/1.23 MHz | -104 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

Table 4-2 Parameters for Max. Power with multiple traffic code channel, SR1

| Parameter | Units | Value |
|--------------------------------------|-------|-------|
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

1xEV-DO

1) Use 1xEV-DO Rel 0 protocol in the call box 8960.

- a. FTAP

- Select Test Application Protocol to FTAP
- Set FTAP Rate to 307.2 kbps (2 Slot, QPSK)
- Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
- Set \hat{I}_{or} to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at Gobi3000 module antenna connector

b. RTAP

- Select Test Application Protocol to RTAP
- Set RTAP Rate to 9.6 kbps
- Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
- Set \hat{I}_{or} to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at Gobi3000 module antenna connector
- Repeat above steps for RTAP Rate = 19.2 kbps, 38.4 kbps, 76.8 kbps and 153.6 kbps respectively

2) Use 1xEV-DO Rev A protocol in the call box 8960

a. FETAP

- Select Test Application Protocol to FETAP
- Set FETAP Rate to 307.2 kbps (2 Slot, QPSK)
- Generator Info -> Termination Parameters -> Max Forward Packet Duration -> 16 Slots
- Set \hat{I}_{or} to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at Gobi3000 module antenna connector

b. RETAP

- Select Test Application Protocol to RETAP
- F-Traffic Format -> 4 (1024, 2, 128) Canonical (307.2k, QPSK)
- Set R-Data Pkt Size to 128
- Protocol Subtype Config -> Release A Physical Layer Subtype -> Subtype 2

->PL Subtype 2 Access Channel MAC Subtype -> Default
(Subtype 0)

- Generator Info -> Termination Parameters -> Max Forward Packet Duration
-> 16 Slots

->ACK R-Data After -> Subpacket 0 (All ACK)

- Set \hat{I}_{or} to -60 dBm/1.23 MHz
- Send continuously '0' power control bits
- Measure the power at Gobi3000 module antenna connector
- Repeat above steps for R-Data Pkt Size = 256, 512, 768, 1024, 1536, 2048, 3072, 4096, 6144, 8192, 12288 respectively.

4.1.2 WCDMA/HSDPA/HSUPA Max Power setup

Configure the call box to support all WCDMA tests in respect to the 3GPP 34.121 (listed in Table 4-3). Measure the power at Ch4132, 4182 and 4233 for US cell; Ch9262, 9400 and 9538 for US PCS band.

For Rel99 per 3GPP 35.121 5.2

- Set a Test Mode 1 loop back with a 12.2kbps Reference Measurement Channel (RMC)
- Set and send continuously Up power control commands to the Gobi3000 module.
- Measure the power at the Gobi3000 module antenna connector using the power meter with average detector

For HSDPA Rel 7 3 per GPP 35.121 5.2AA

- Establish a Test Mode 1 loop back with both 1 12.2kbps RMC channel and an H-Set1 Fixed Reference Channel (FRC). With the 8820 this is accomplished by setting the signal Channel Coding to "Fixed Reference Channel" and configuring for HSET-1 QKSP.
- Set beta values and HSDPA settings for HSDPA Subtest1 according to Table 4-3
- Send continuously Up power control commands to the Gobi3000 module
- Measure the power at the Gobi3000 module antenna connector using the power meter with modulated average detector
- Repeat the measurement for the HSDPA Subtest2, 3 and 4 as given in Table 4-3

For HSUPA Rel 6 per 3GPP 35.121 5.2B

- Use UL RMC 12.2kbps and FRC H-Set1 QPSK, Test Mode 1 loop back. With the 8820 this is accomplished by setting the signal Channel Coding to "E-DCH Test Channel" and configuring the equipment category to Cat5_10ms.
- Set the Absolute Grant for HSUPA Subtest1 according to Table 4-3
- Set the Gobi3000 module power to be at least 5dB lower than the Maximum output power

- Send power control bits to give one TPC_cmd = +1 command to the UNDP. If UNDP doesn't send any E-DPCH data with decreased E-TFCI within 500ms, then repeat this process until the decreased E-TFCI is reported.
- Confirm that the E-TFCI transmitted by the Gobi3000 module is equal to the target E-TFCI in Table 4-3. If the E-TFCI transmitted by the Gobi3000 module is not equal to the target E-TFCI, then send power control bits to give one TPC_cmd = -1 command to the UE. If UE sends any E-DPCH data with decreased E-TFCI within 500 ms, send new power control bits to give one TPC_cmd = -1 command to the UE. Then confirm that the E-TFCI transmitted by the UE is equal to the target E-TFCI in Table 4-3. If the E-TFCI transmitted by the UE is not equal to the target E-TFCI, then fail the UE
- Measure the power using the power meter with an average detector
- Repeat the measurement for the HSUPA Subtest2, 3 and 4 as given in Table 4-3
- Test case 5 is tested using all up bits for maximum output power per 34.521.

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Table 4-3 3GPP Rel99/HSPA Subtest Settings

| Subtest | Mode | Loopback Mode | Rel99 RMC | HSDPA FRC | HSUPA Test | Common Settings | | CM | MPR | Power Class 3 limit | HSDPA Specific Settings | | | | | | HSUPA Specific Settings | | | HSUPA Additional Info | | | | |
|---------|------------|---------------|-----------|-----------|----------------|-----------------|-----------|----|-----|---------------------|-------------------------|--------------|--------------|----------------------------|-----------------------------|--------------------------------------|----------------------------|------------------|---------------|-----------------------|------------------------------------|----------------------------------|--|-------|
| | | | | | | β_e | β_d | | | | Δ ACK | Δ NAK | Δ CQI | Ack-Nack repetition factor | CQI Feedback [Table 5.2B.4] | CQI Repetition Factor [Table 5.2B.4] | Ahs = β_{hs}/β_e | Δ E-DPCCH | Δ HARQ | AG Index | ETFCI (from 34.121 Table C.11.1.3) | Associated Max UL Data Rate kbps | | |
| 1 | Rel99 | Test Mode1 | 12.2kbps | - | - | | | - | | 24 (+1.7/-3.7 dB) | | | | | | | | | | | | | | |
| 1 | Rel6 HSDPA | Test Mode1 | 12.2kbps | H-Set1 | - | 2/15 | 15/15 | 0 | 0 | 24 (+1.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | | | | | | | - |
| 2 | Rel6 HSDPA | Test Mode1 | 12.2kbps | H-Set1 | - | 12/15 | 15/15 | 1 | 0 | 24 (+1.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | | | | | | | - |
| 3 | Rel6 HSDPA | Test Mode1 | 12.2kbps | H-Set1 | - | 15/15 | 8/15 | 15 | 0.5 | 23.5 (+2.2/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | | | | | | | - |
| 4 | Rel6 HSDPA | Test Mode1 | 12.2kbps | H-Set1 | - | 15/15 | 4/15 | 15 | 0.5 | 23.5 (+2.2/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | | | | | | | - |
| 1 | Rel6 HSUPA | Test Mode1 | 12.2kbps | H-Set1 | HSUPA Loopback | 11/15 | 15/15 | 1 | 0 | 24 (+1.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | 6 | 0 | 20 | 75 | | | 242.1 |
| 2 | Rel6 HSUPA | Test Mode1 | 12.2kbps | H-Set1 | HSUPA Loopback | 6/15 | 15/15 | 3 | 2 | 22 (+3.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | 8 | 0 | 12 | 67 | | | 174.9 |
| 3 | Rel6 HSUPA | Test Mode1 | 12.2kbps | H-Set1 | HSUPA Loopback | 15/15 | 9/15 | 2 | 1 | 23 (+2.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | 8 | 0 | 15 | 92 | | | 482.8 |
| 4 | Rel6 HSUPA | Test Mode1 | 12.2kbps | H-Set1 | HSUPA Loopback | 2/15 | 15/15 | 3 | 2 | 22 (+3.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | 5 | 0 | 17 | 71 | | | 205.8 |
| 5 | Rel6 HSUPA | Test Mode1 | 12.2kbps | H-Set1 | HSUPA Loopback | 15/15 | 15/15 | 1 | 0 | 24 (+1.7/-3.7 dB) | 8 | 8 | 8 | 3 | 4ms | 2 | 30/15 | 7 | 0 | 21 | 81 | | | 308.9 |

HSUPA Subtest 1,2,4,5

| | |
|-----------------------|-----------|
| - Reference E-TFCIs | 5 E-TFCIs |
| - Reference E-TFCI | 11 |
| - Reference E-TFCI PO | 4 |
| - Reference E-TFCI | 67 |
| - Reference E-TFCI PO | 18 |
| - Reference E-TFCI | 71 |
| - Reference E-TFCI PO | 23 |
| - Reference E-TFCI | 75 |
| - Reference E-TFCI PO | 26 |
| - Reference E-TFCI | 81 |
| - Reference E-TFCI PO | 27 |

HSUPA Subtest 3

| | |
|-----------------------|-----------|
| - Reference E-TFCIs | 2 E-TFCIs |
| - Reference E-TFCI | 11 |
| - Reference E-TFCI PO | 4 |
| - Reference E-TFCI | 92 |
| - Reference E-TFCI PO | 18 |

4.1.3 GSM/GPRS/EDGE Max Power setup

Configure the 8820B box to support GMSK and 8PSK call respectively, and set one timeslot transmission for GMSK GSM/GPRS and 8PSK EDGE. Measure and record power outputs for both modulations.

4.2 Maximum Transmit Power Test Results

4.2.1 CDMA2000 1xEV-DO Maximum Transmit power

| Mode | Test Case | | | BC0 (850MHz) Channel Power (dBm) | | | BC1 (1900MHz) Channel (dBm) | | |
|----------------|-----------|---|------------------------------------|-------------------------------------|--------------|--------------|--------------------------------|--------------|--------------|
| | # | FWD RC/TAP | REV RC/TAP | 1013 | 384 | 777 | 25 | 600 | 1175 |
| 1x | 1 | RC1 | RC1 (SO2) | 24.46 | 24.46 | 24.29 | 24.52 | 24.44 | 24.32 |
| | 2 | RC1 | RC1 (SO55) | 24.52 | 24.49 | 24.34 | 24.48 | 24.48 | 24.43 |
| | 3 | RC2 | RC2 (SO9) | 24.55 | 24.37 | 24.26 | 24.51 | 24.33 | 24.46 |
| | 4 | RC2 | RC2 (SO55) | 24.57 | 24.57 | 24.35 | 24.30 | 24.38 | 24.49 |
| | 5 | RC3 | RC3 (SO55) | 24.56 | 24.62 | 24.57 | 24.64 | 24.57 | 24.52 |
| | 6 | RC3 | RC3 (SO32) | 24.22 | 24.35 | 24.45 | 24.40 | 24.36 | 24.48 |
| 1xEVDO Rel0 | 7a | FTAP Rate = 307kbps (2 slot, QPSK) | RTAP rate = 9.6kbps | 24.44 | 24.29 | 24.22 | 24.46 | 24.29 | 24.47 |
| | 7b | | RTAP rate = 19.2kbps | 24.43 | 24.43 | 24.19 | 24.39 | 24.44 | 24.49 |
| | 7c | | RTAP rate = 38.4kbps | 24.38 | 24.46 | 24.29 | 24.36 | 24.27 | 24.38 |
| | 7d | | RTAP rate = 76.8kbps | 24.46 | 24.29 | 24.22 | 24.41 | 24.11 | 24.32 |
| | 7e | | RTAP rate = 153.6kbps | 24.49 | 24.54 | 24.59 | 24.48 | 24.37 | 24.46 |
| 1xEVDO RevA | 8a | FETAP rate = 307kbps (2 slot, ACK channel is transmitted at all the slots) | RETAP - payload size = 128 | 24.34 | 24.51 | 24.36 | 24.37 | 24.42 | 24.31 |
| | 8b | | RETAP - payload size = 256 | 24.46 | 24.51 | 24.38 | 24.41 | 24.47 | 24.54 |
| | 8c | | RETAP - payload size = 512 | 24.33 | 24.48 | 24.36 | 24.37 | 24.38 | 24.29 |
| | 8d | | RETAP - payload size = 768 | 24.42 | 24.49 | 24.39 | 24.37 | 24.41 | 24.44 |
| | 8e | | RETAP - payload size = 1024 | 24.29 | 24.35 | 24.28 | 24.44 | 24.41 | 24.27 |
| | 8f | | RETAP - payload size = 1536 | 24.36 | 24.37 | 24.47 | 24.45 | 24.31 | 24.27 |
| | 8g | | RETAP - payload size = 2048 | 24.48 | 24.52 | 24.51 | 24.47 | 24.53 | 24.34 |
| | 8h | | RETAP - payload size = 3072 | 24.39 | 24.45 | 24.44 | 24.39 | 24.48 | 24.28 |
| | 8i | | RETAP - payload size = 4096 | 24.54 | 24.47 | 24.42 | 24.44 | 24.39 | 24.27 |
| | 8j | | RETAP - payload size = 6144 | 24.46 | 24.43 | 24.39 | 24.52 | 24.42 | 24.25 |
| | 8k | | RETAP - payload size = 8192 | 24.45 | 24.48 | 24.39 | 24.36 | 24.46 | 24.24 |
| | 8l | | RETAP - payload size = 12288 | 24.37 | 24.49 | 24.36 | 24.47 | 24.51 | 24.22 |

Note: All measurements are based on an average detector

4.2.2 WCDMA/HSDPA/HSUPA Maximum Transmit Power

| Mode | 3GPP Subtest | Band V (800 MHz) Channel Power (dBm) | | | Band IV (1700 MHz) Channel Power (dBm) | | | Band II (1900MHz) Channel Power (dBm) | | | MPR |
|---------------|--------------|---|-------|-------|---|-------|-------|--|-------|-------|------------|
| | | 4132 | 4182 | 4233 | 1312 | 1427 | 1513 | 9262 | 9400 | 9538 | |
| Rel99 | 1 | 24.36 | 24.23 | 24.48 | 24.58 | 24.34 | 24.56 | 23.08 | 24.32 | 24.52 | |
| Rel6 HSDPA | 1 | 23.48 | 23.63 | 23.75 | 23.66 | 23.57 | 23.62 | 23.32 | 23.75 | 24.47 | 0 |
| | 2 | 23.43 | 23.32 | 23.52 | 24.26 | 24.32 | 24.38 | 22.92 | 23.68 | 24.36 | 0 |
| | 3 | 23.42 | 23.36 | 24.26 | 23.96 | 24.22 | 24.00 | 20.01 | 22.54 | 23.65 | 0.5 |
| | 4 | 23.45 | 23.59 | 23.50 | 24.05 | 24.21 | 24.24 | 19.55 | 22.14 | 23.65 | 0.5 |
| Rel6 HSUPA | 1 | 24.08 | 24.31 | 23.75 | 23.71 | 23.38 | 24.04 | 24.42 | 24.68 | 24.27 | 0 |
| | 2 | 23.89 | 23.77 | 23.69 | 22.70 | 22.98 | 23.07 | 23.44 | 23.77 | 24.31 | 2 |
| | 3 | 23.93 | 23.82 | 23.41 | 23.20 | 23.08 | 23.10 | 23.67 | 24.09 | 23.98 | 1 |
| | 4 | 23.87 | 23.9 | 23.99 | 23.39 | 23.48 | 23.32 | 24.21 | 24.19 | 24.43 | 2 |
| | 5 | 24.44 | 24.45 | 23.55 | 23.21 | 23.26 | 23.36 | 24.09 | 24.33 | 24.51 | 0 |

Note: All measurements are based on an average detector

Note: The MPR has been implemented into the Gobi3000 module per the 3GPP standard.

4.2.3 GSM/GPRS/EDGE Maximum Transmit Power

| Mode | GSM850 Channel Peak Power (dBm) | | | GSM1900 Channel Peak Power (dBm) | | | Modulation |
|------------------|------------------------------------|-------|-------|-------------------------------------|-------|-------|-------------|
| | 128 | 190 | 251 | 512 | 661 | 810 | |
| GPRS (1 UL slot) | 32.73 | 32.88 | 33.04 | 30.18 | 30.12 | 30.12 | GMSK |
| GPRS (2 UL slot) | 32.50 | 32.62 | 32.79 | 28.49 | 29.91 | 30.79 | GMSK |
| EGPRS | 27.25 | 27.18 | 27.21 | 26.23 | 27.12 | 27.30 | 8PSK |

Note: All measurements are based on a peak detector

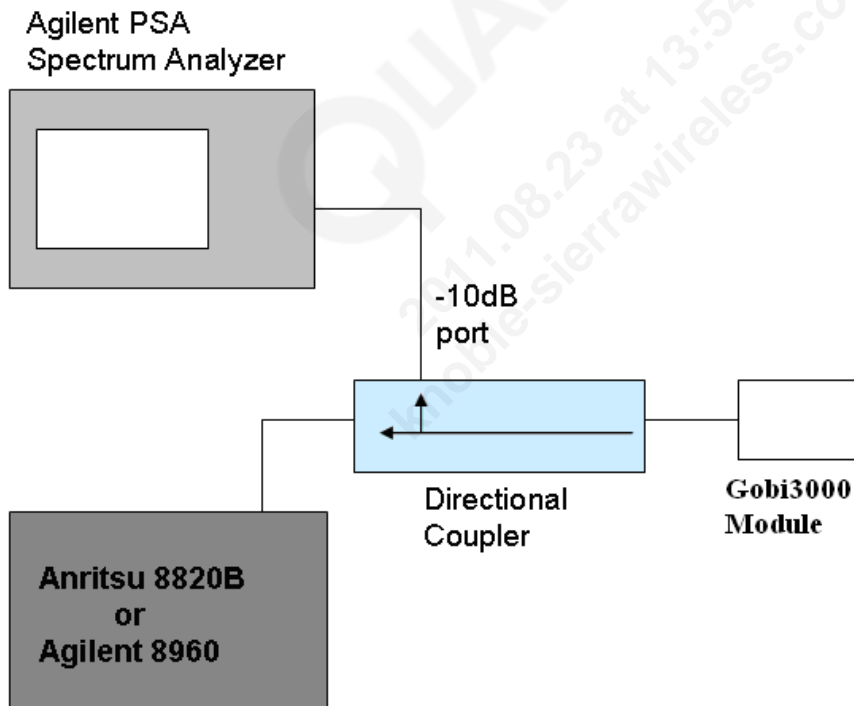
5. Occupied Bandwidth

| | | | |
|---------------------|---|----------------------------------|---------------|
| FCC: | §2.1049 | | |
| Limit: | n/a | | |
| DUT SN | N10F6XTXR | | |
| Modes Tested | CDMA 1x / 1x-EVDO | WCDMA/HSPA | GSM/GPRS/EDGE |
| | RC3 SO55 Rel 0, RTAP rate = 153.6kbps Rev A, RETAP payload = 4096 | Rel 99 Rel 6 HSUPA, Subtest 5 | GSM EDGE |

5.1 Occupied Bandwidth Test Procedure

As the figure below indicates, the transmitter output is connected to a calibrated coaxial cable and coupler. The other end of coupler was connected to the spectrum analyzer. Measured the occupied bandwidth (defined as the 99% power bandwidth) with the appropriate personality features integrated in the PSA.

An 8960 call box was used for CDMA 1x/1x-EVDO and UMTS measurements.



5.2 Occupied Bandwidth Test Results

The occupied bandwidth was measured at low, mid and high channel in each band.

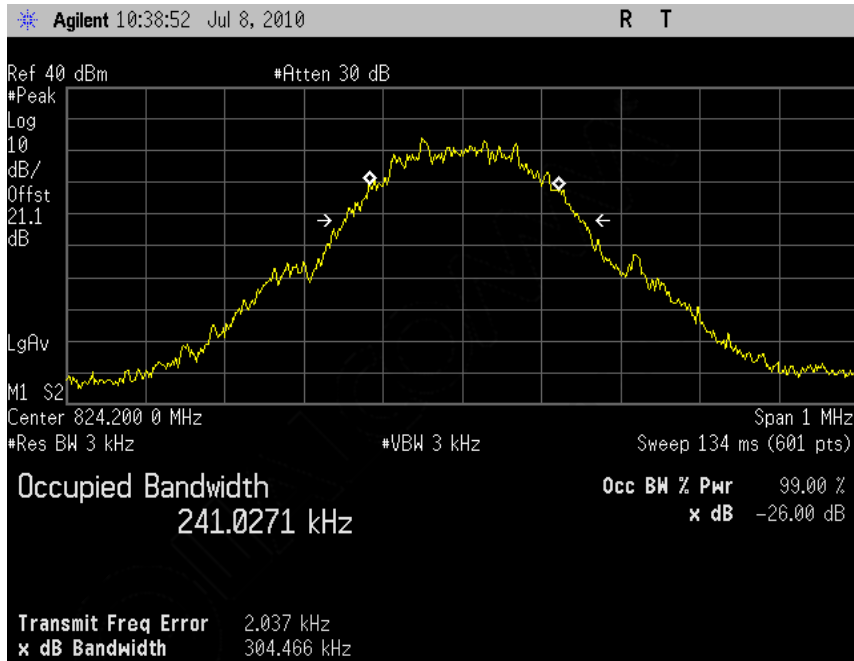
| Mode | | Frequency (MHz) | Channel | 99% Occupied Bandwidth (kHz) | Corresponding Plot number |
|-----------------|------|-----------------|------------|------------------------------|---------------------------|
| GSM/ GPRS/ EDGE | GMSK | 824.2 | 128 (low) | 241.03 | Plot 5.2 - 1 |
| | | 836.6 | 190 (mid) | 243.49 | Plot 5.2 - 2 |
| | | 848.8 | 251 (high) | 242.18 | Plot 5.2 - 3 |
| | | 1850.2 | 512 (low) | 240.56 | Plot 5.2 - 4 |
| | | 1880 | 661 (mid) | 241.63 | Plot 5.2 - 5 |
| | | 1909.8 | 810 (high) | 238.09 | Plot 5.2 - 6 |
| | 8PSK | 824.2 | 128 (low) | 246.87 | Plot 5.2 - 7 |
| | | 836.6 | 190 (mid) | 243.80 | Plot 5.2 - 8 |
| | | 848.8 | 251 (high) | 244.71 | Plot 5.2 - 9 |
| | | 1850.2 | 512 (low) | 242.91 | Plot 5.2 - 10 |
| | | 1880 | 661 (mid) | 243.31 | Plot 5.2 - 11 |
| | | 1909.8 | 810 (high) | 243.50 | Plot 5.2 - 12 |

| Mode | | Frequency (MHz) | Channel | 99% Occupied Bandwidth (MHz) | Plot number |
|---------------------------|-----------------------------|-----------------|-------------|------------------------------|---------------|
| WCDMA/ HSDPA/ HSUPA | Rel 99 | 1712.4 | 1312 (low) | 4.1286 | Plot 5.2 - 13 |
| | | 1735.4 | 1427 (mid) | 4.1348 | Plot 5.2 - 14 |
| | | 1752.6 | 1513 (high) | 4.1457 | Plot 5.2 - 15 |
| | | 826.4 | 4132 (low) | 4.1369 | Plot 5.2 - 16 |
| | | 836.4 | 4182 (mid) | 4.1362 | Plot 5.2 - 17 |
| | | 846.6 | 4233 (high) | 4.1300 | Plot 5.2 - 18 |
| | | 1852.4 | 9262 (low) | 4.1352 | Plot 5.2 - 19 |
| | | 1880 | 9400 (mid) | 4.1405 | Plot 5.2 - 20 |
| | | 1907.5 | 9538 (high) | 4.1595 | Plot 5.2 - 21 |
| | HSUPA Rel 6 Subtest 5 | 1712.4 | 1312 (low) | 4.1403 | Plot 5.2 - 22 |
| | | 1735.4 | 1427 (mid) | 4.1417 | Plot 5.2 - 23 |
| | | 1752.6 | 1513 (high) | 4.1434 | Plot 5.2 - 24 |
| | | 826.4 | 4132 (low) | 4.1219 | Plot 5.2 - 25 |
| | | 836.4 | 4182 (mid) | 4.1376 | Plot 5.2 - 26 |
| | | 846.6 | 4233 (high) | 4.1301 | Plot 5.2 - 27 |
| | | 1852.4 | 9262 (low) | 4.1400 | Plot 5.2 - 28 |
| | | 1880 | 9400 (mid) | 4.1502 | Plot 5.2 - 29 |
| | | 1907.5 | 9538 (high) | 4.1496 | Plot 5.2 - 30 |

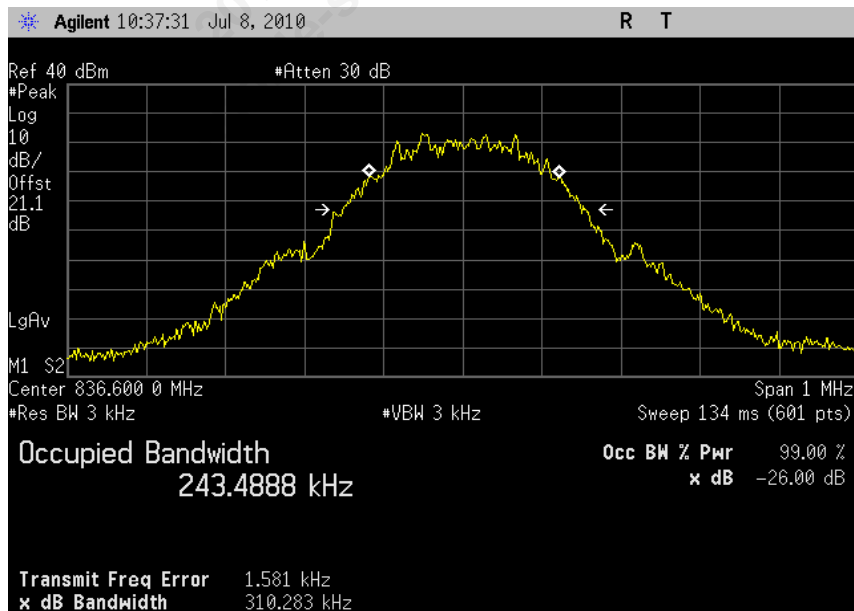
| Mode | | Frequency (MHz) | Channel | 99% Occupied Bandwidth (MHz) | Plot number |
|--------------------|---|-----------------|-------------|------------------------------|---------------|
| CDMA1x/ 1x-EVDO | RC3 SO55 | 824.7 | 1013 (low) | 1.2701 | Plot 5.2 - 31 |
| | | 836.52 | 384 (mid) | 1.2743 | Plot 5.2 - 32 |
| | | 848.31 | 777 (high) | 1.2727 | Plot 5.2 - 33 |
| | | 1851.25 | 25 (low) | 1.2769 | Plot 5.2 - 34 |
| | | 1880 | 600 (mid) | 1.2650 | Plot 5.2 - 35 |
| | | 1908.75 | 1175 (high) | 1.2826 | Plot 5.2 - 36 |
| | Rel 0 RTAP rate = 153.6kbps | 824.7 | 1013 (low) | 1.2709 | Plot 5.2 - 37 |
| | | 836.52 | 384 (mid) | 1.2713 | Plot 5.2 - 38 |
| | | 848.31 | 777 (high) | 1.2675 | Plot 5.2 - 39 |
| | | 1851.25 | 25 (low) | 1.2702 | Plot 5.2 - 40 |
| | | 1880 | 600 (mid) | 1.2770 | Plot 5.2 - 41 |
| | | 1908.75 | 1175 (high) | 1.2715 | Plot 5.2 - 42 |
| | Rev A RETAP Payload size = 4096 | 824.7 | 1013 (low) | 1.2769 | Plot 5.2 - 43 |
| | | 836.52 | 384 (mid) | 1.2736 | Plot 5.2 - 44 |
| | | 848.31 | 777 (high) | 1.2724 | Plot 5.2 - 45 |
| | | 1851.25 | 25 (low) | 1.2738 | Plot 5.2 - 46 |
| | | 1880 | 600 (mid) | 1.2719 | Plot 5.2 - 47 |
| | | 1908.75 | 1175 (high) | 1.2744 | Plot 5.2 - 48 |

5.2.1 GSM Occupied Bandwidth Plots

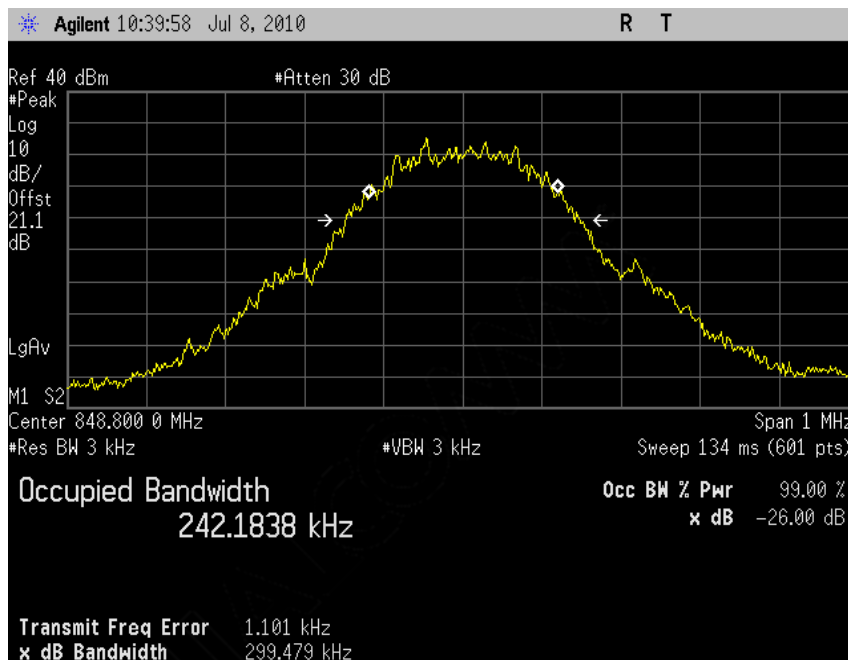
Plot 5.2 -1 (Ch128, GSM GMSK)



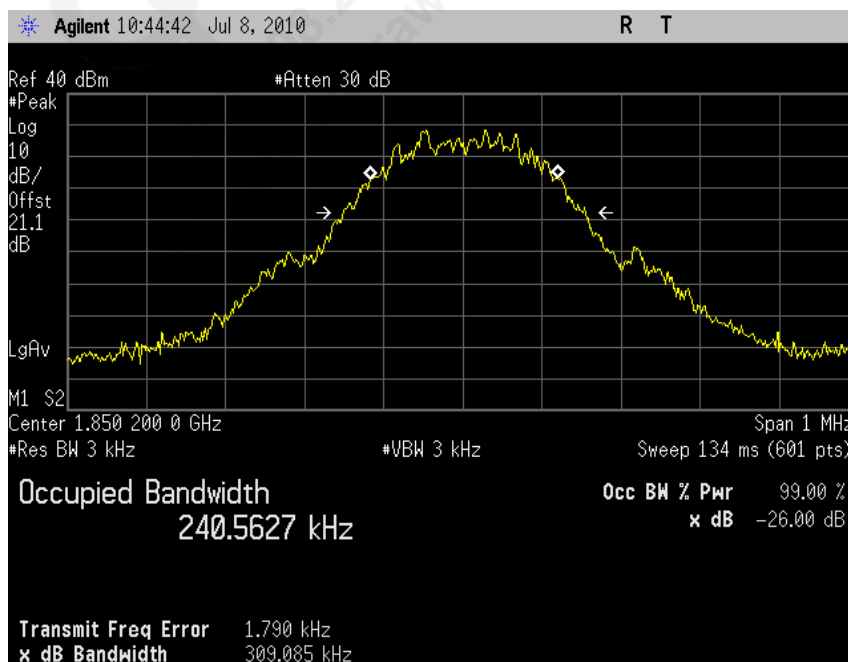
Plot 5.2-2 (Ch. 190, GSM GMSK)



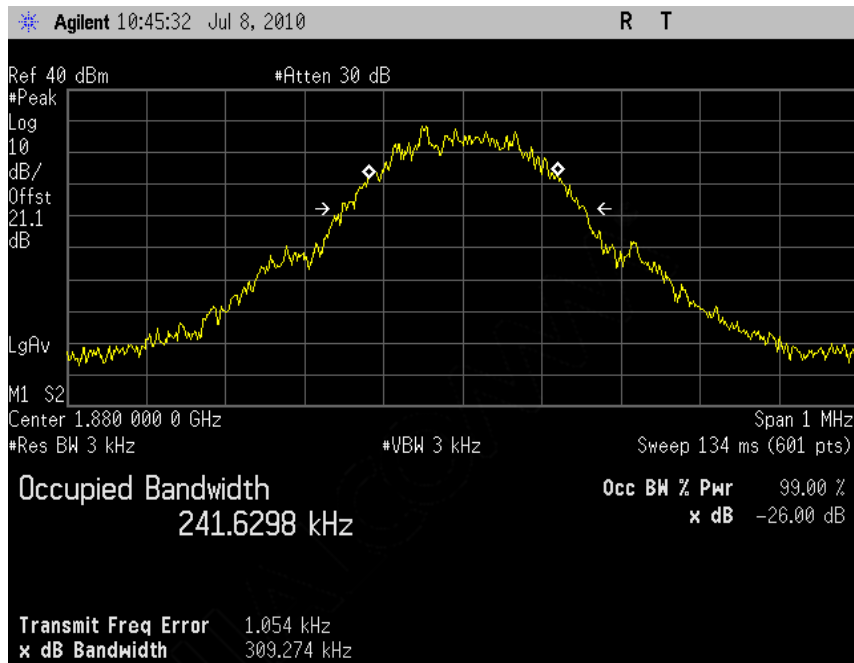
Plot 5.2-3 (Ch. 251, GSM GMSK)



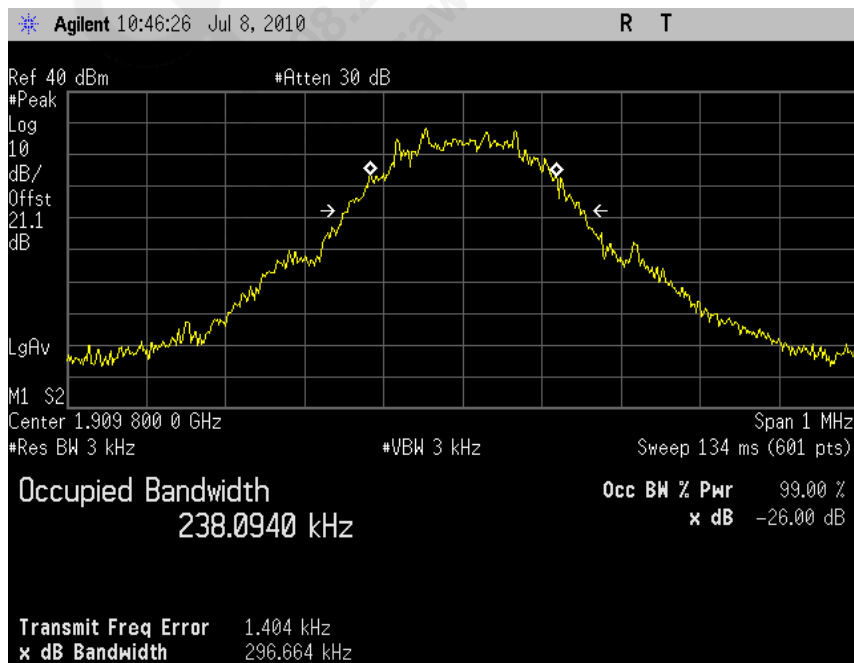
Plot 5.2-4 (Ch. 512, GSM GMSK)



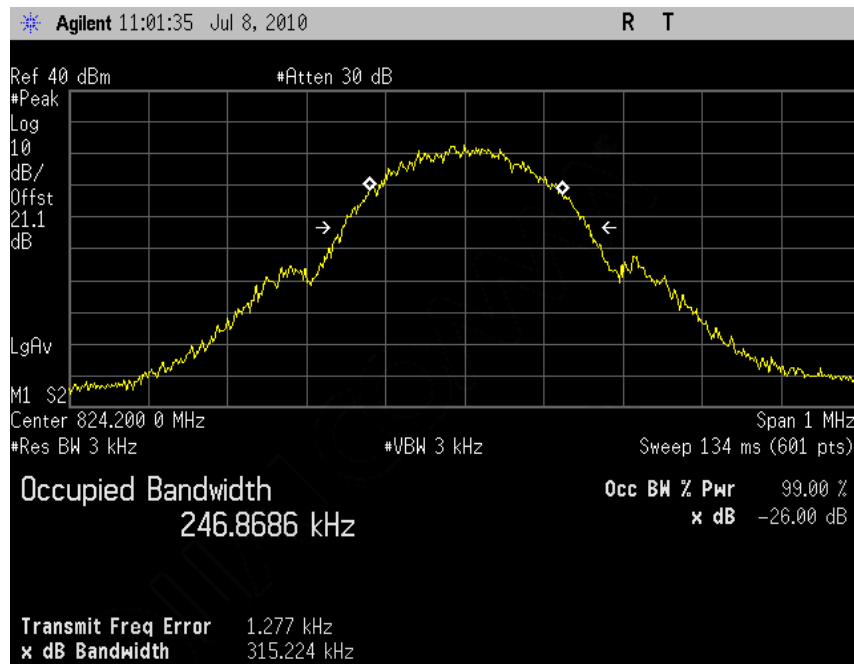
Plot 5.2-5 (Ch. 661, GSM GMSK)



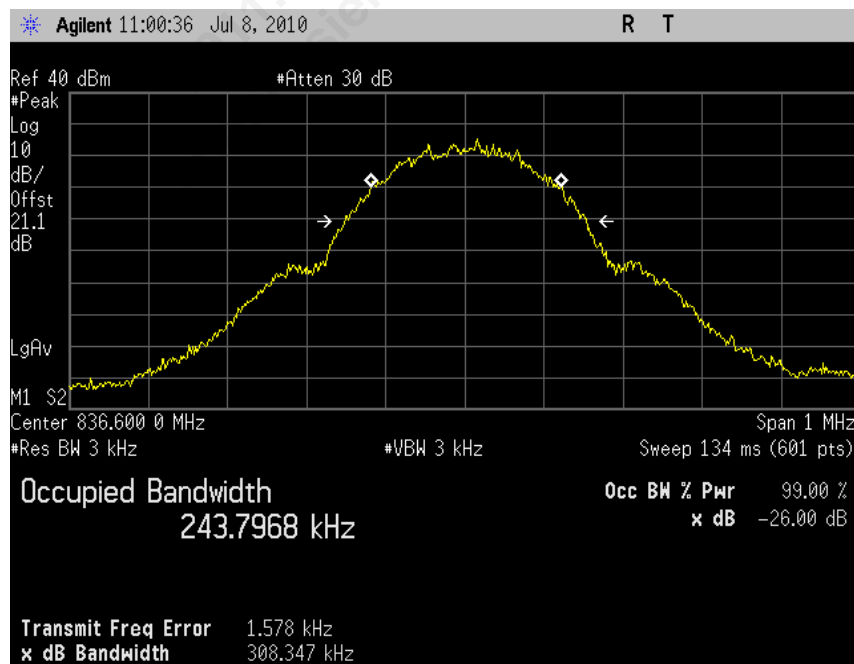
Plot 5.2-6 (Ch. 810, GSM GMSK)



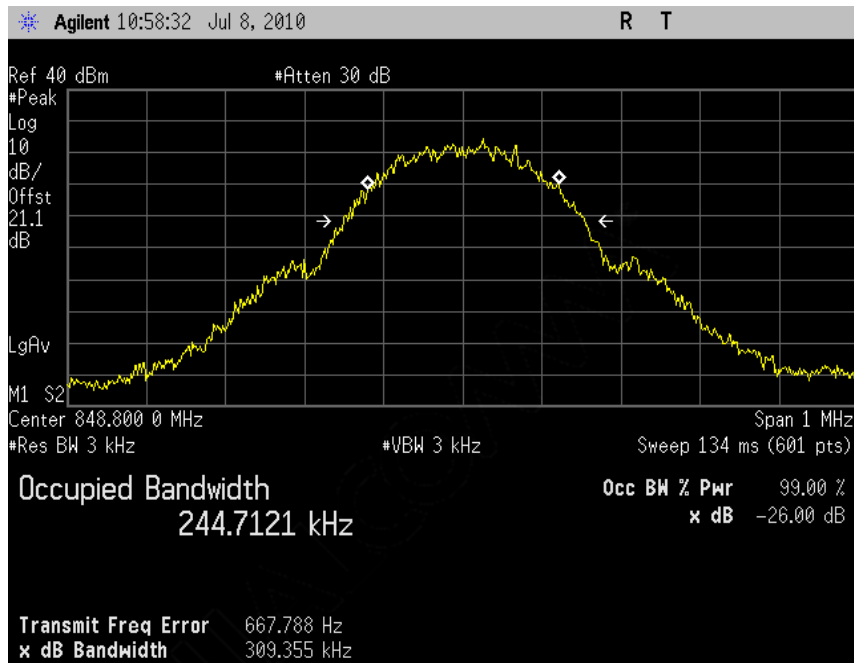
Plot 5.2-7 (Ch. 128, GSM 8PSK)



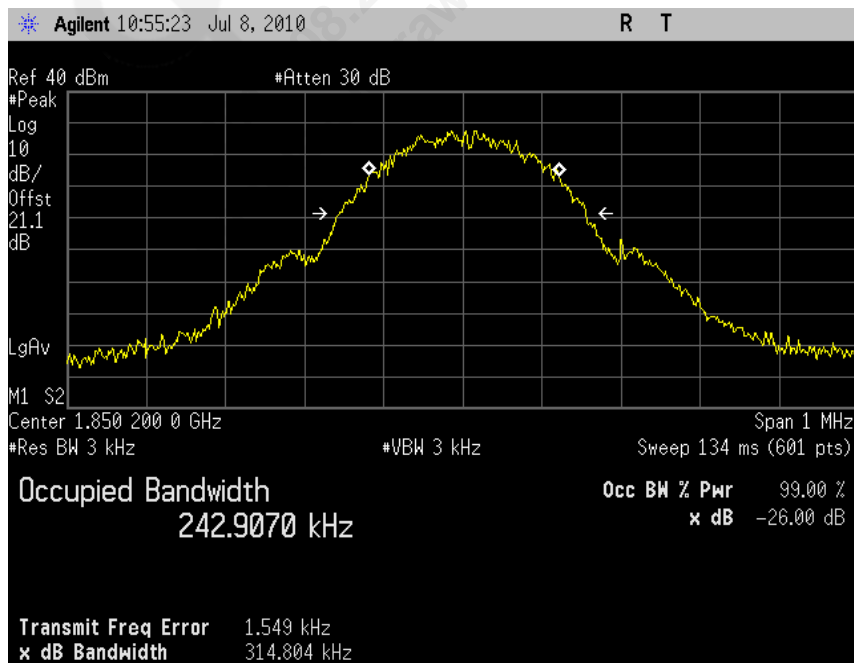
Plot 5.2-8 (Ch. 190, GSM 8PSK)



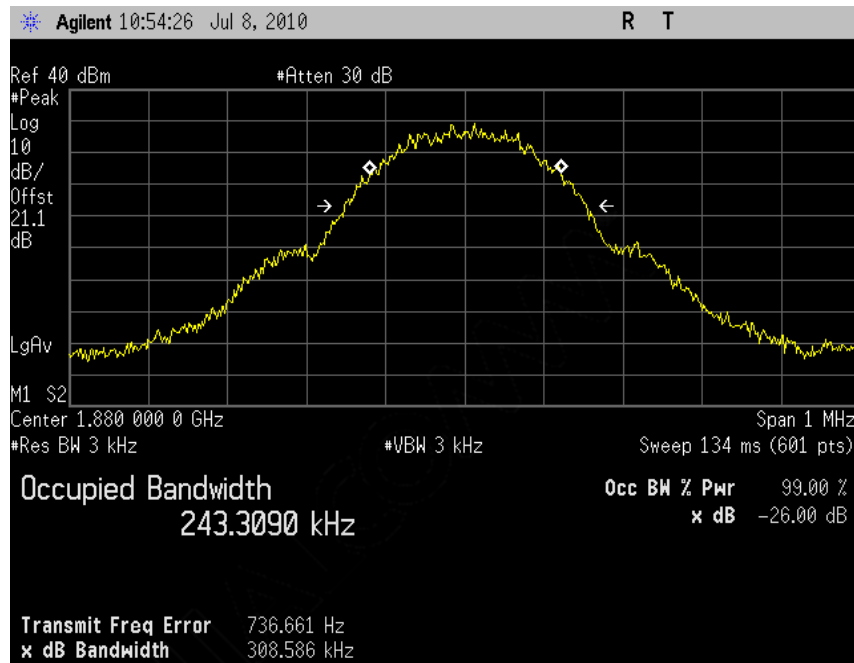
Plot 5.2-9 (Ch. 251, GSM 8PSK)



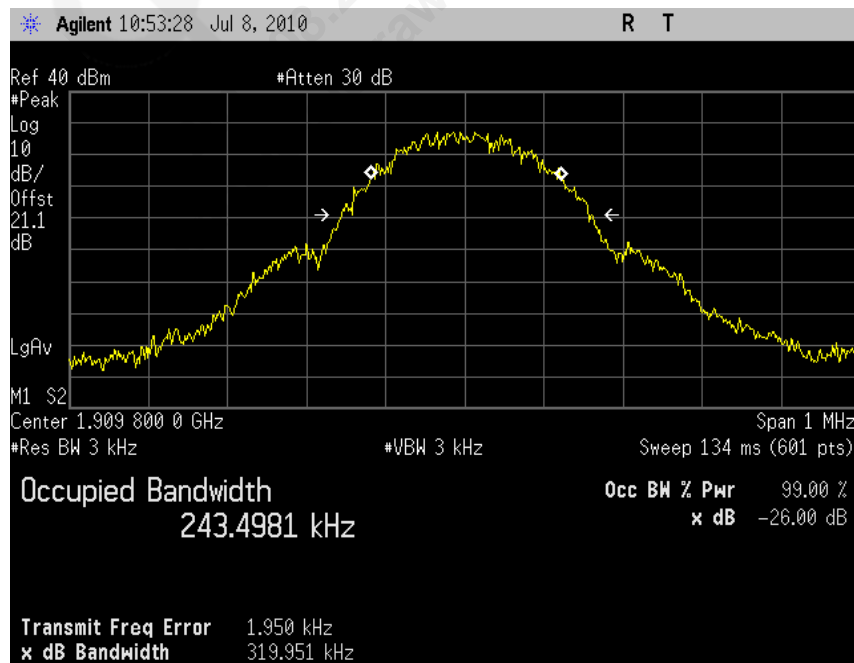
Plot 5.2-10 (Ch. 512, GSM 8PSK)



Plot 5.2-11 (Ch. 661, GSM 8PSK)

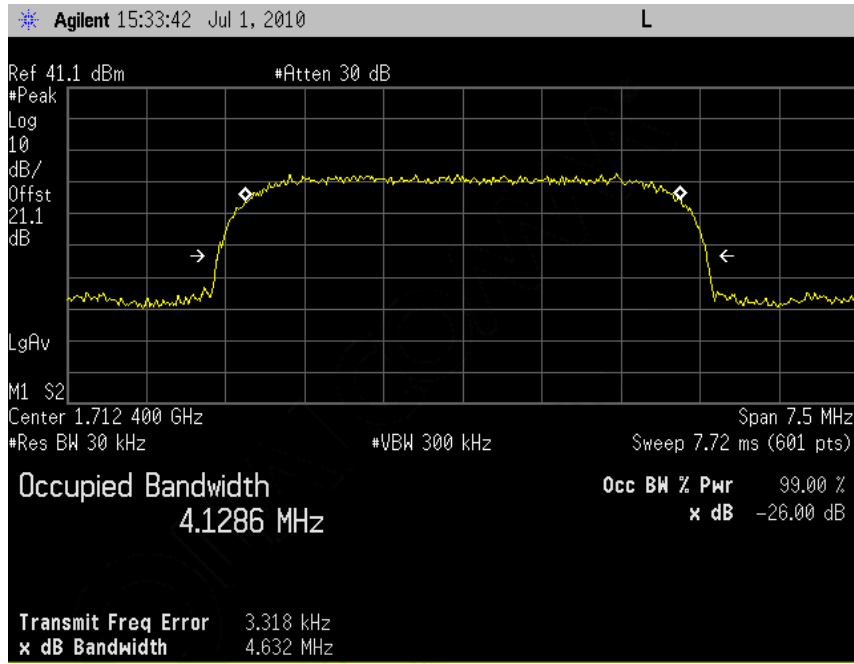


Plot 5.2-12 (Ch. 810, GSM 8PSK)

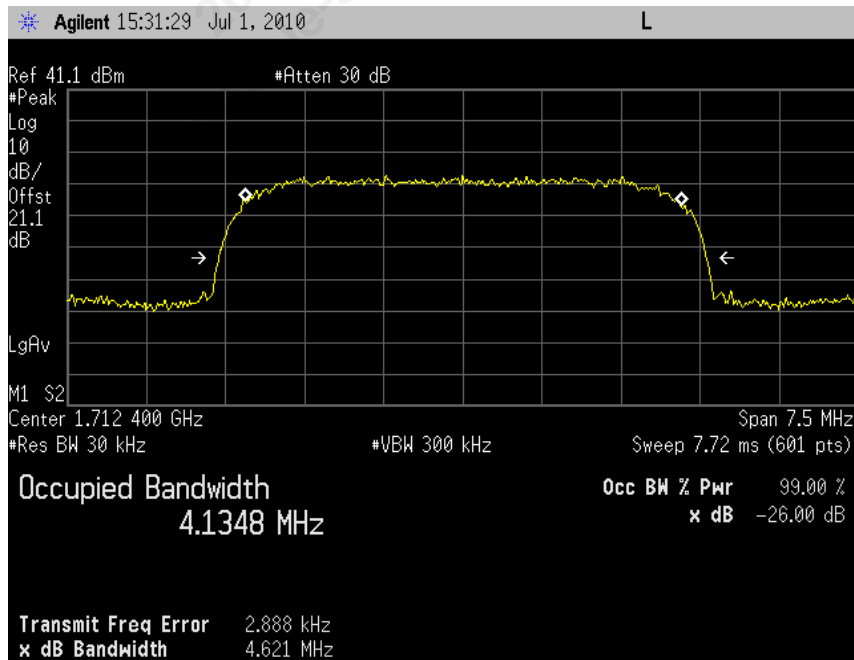


5.2.2 UMTS Occupied Bandwidth Plots

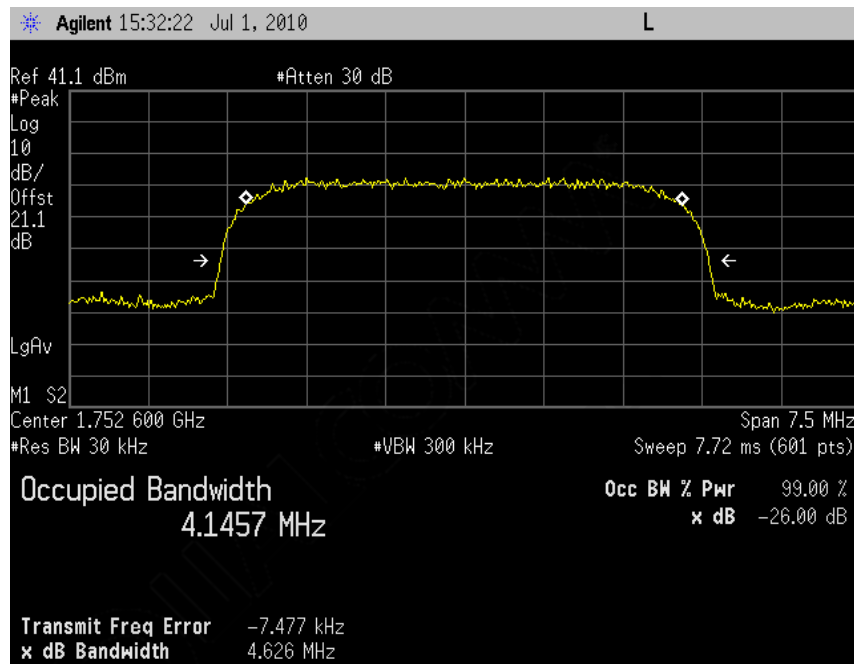
Plot 5.2-13 (Ch. 1312, Rel 99)



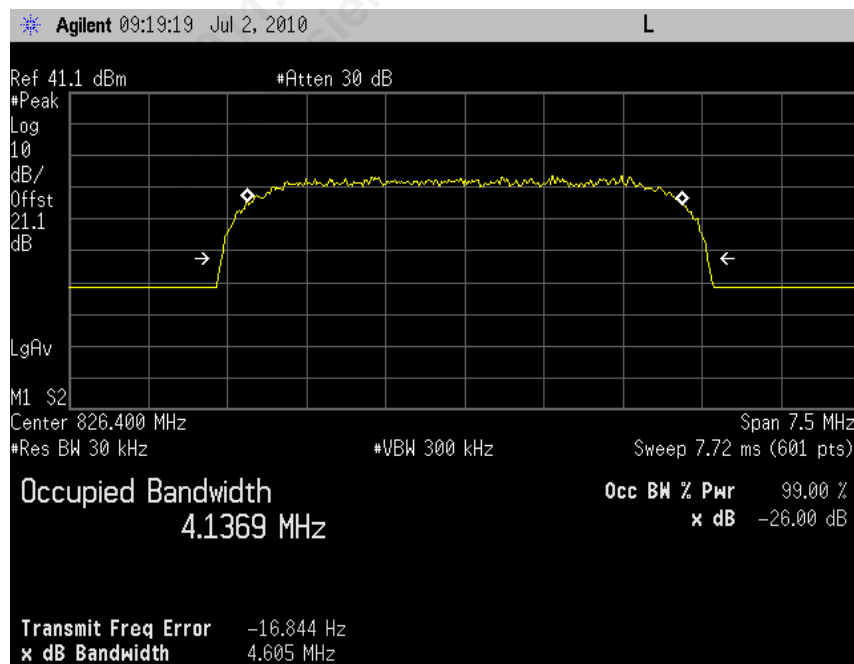
Plot 5.2-14 (Ch. 1427, Rel 99)



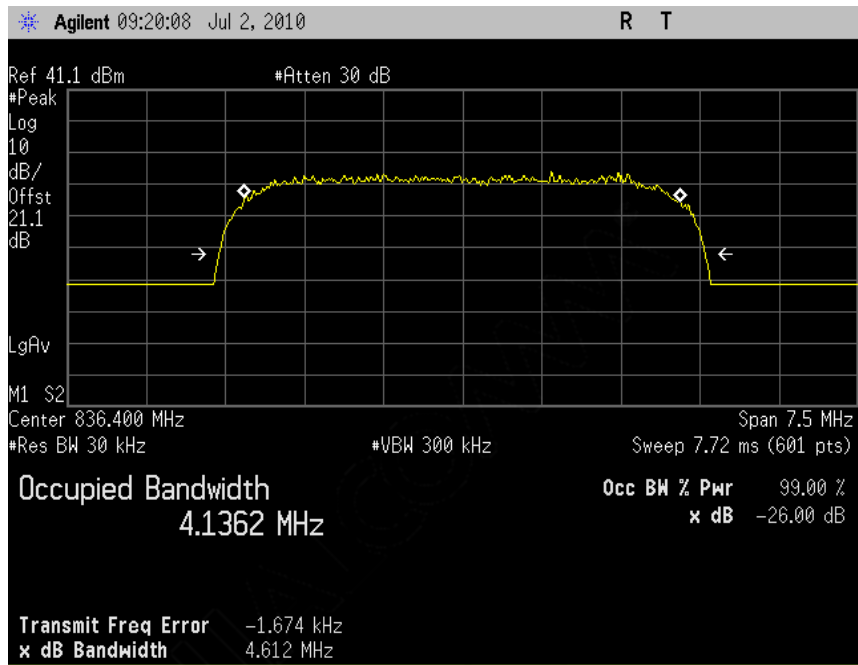
Plot 5.2-15 (Ch. 1513, Rel 99)



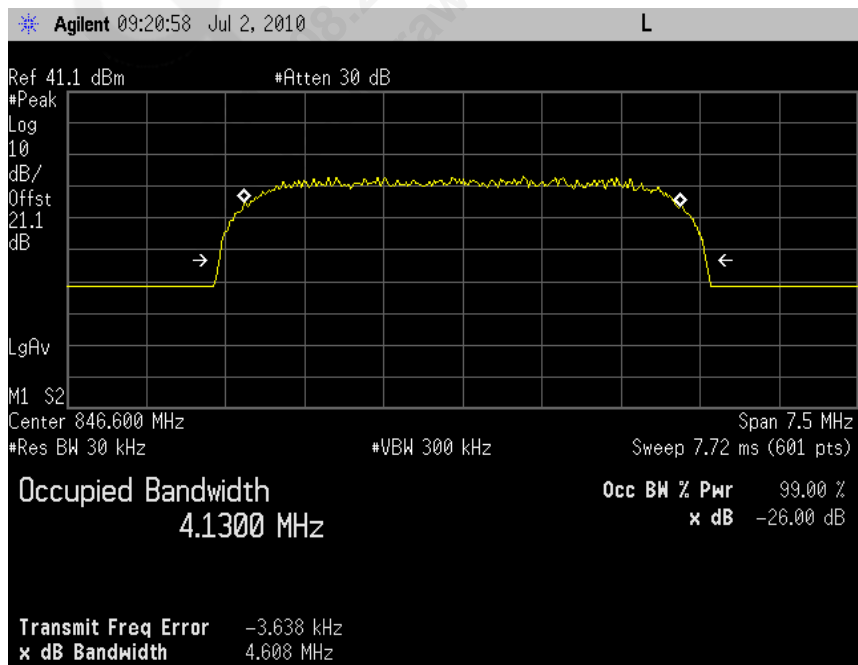
Plot 5.2-16 (Ch. 4132, Rel 99)



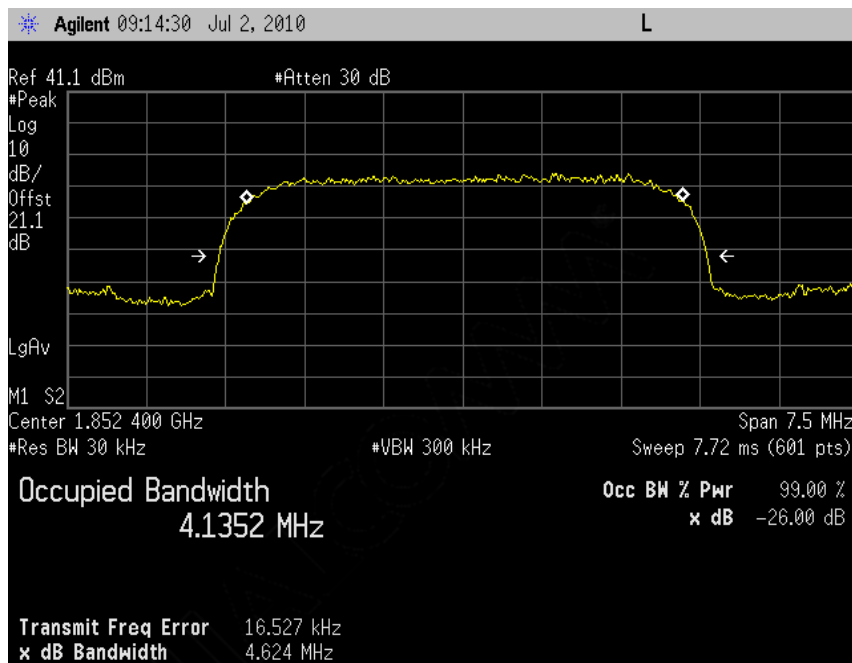
Plot 5.2-17 (Ch. 4182, Rel 99)



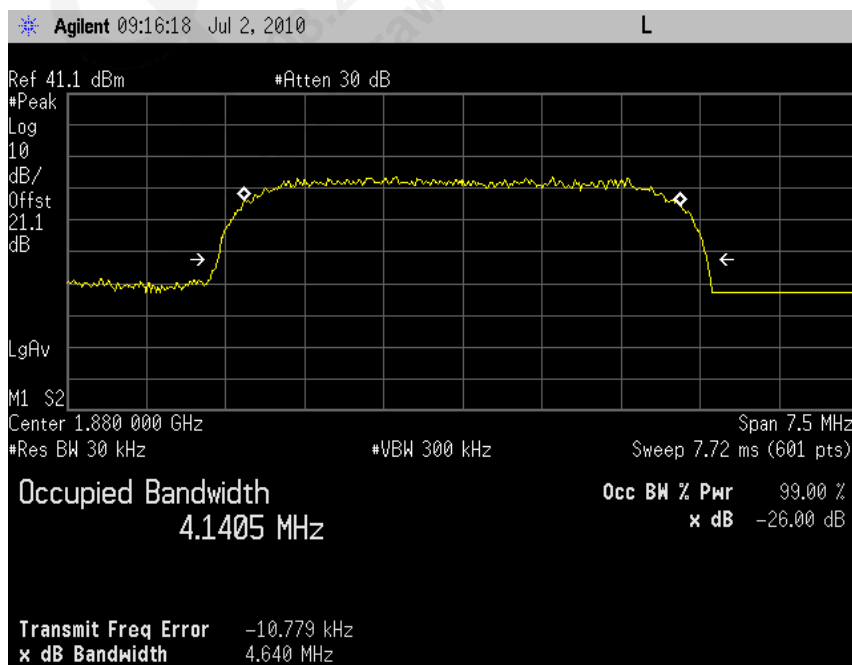
Plot 5.2-18 (Ch. 4233, Rel 99)



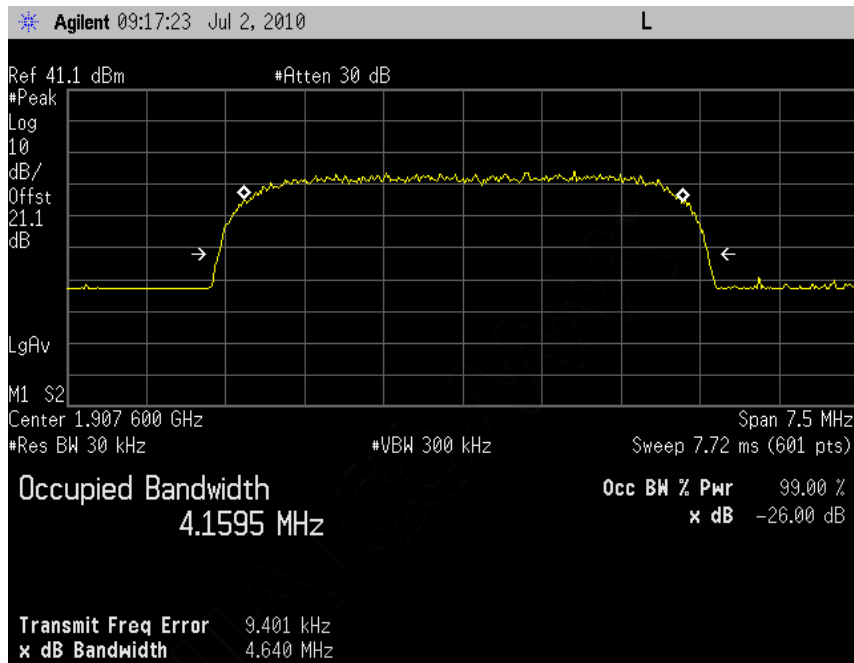
Plot 5.2-19 (Ch. 9262, Rel 99)



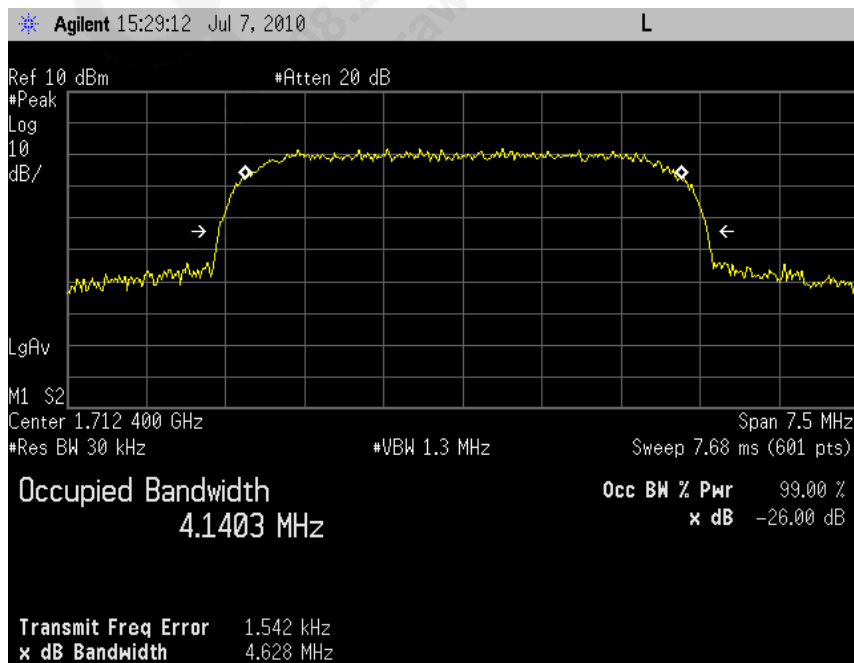
Plot 5.2-20 (Ch. 9400, Rel 99)



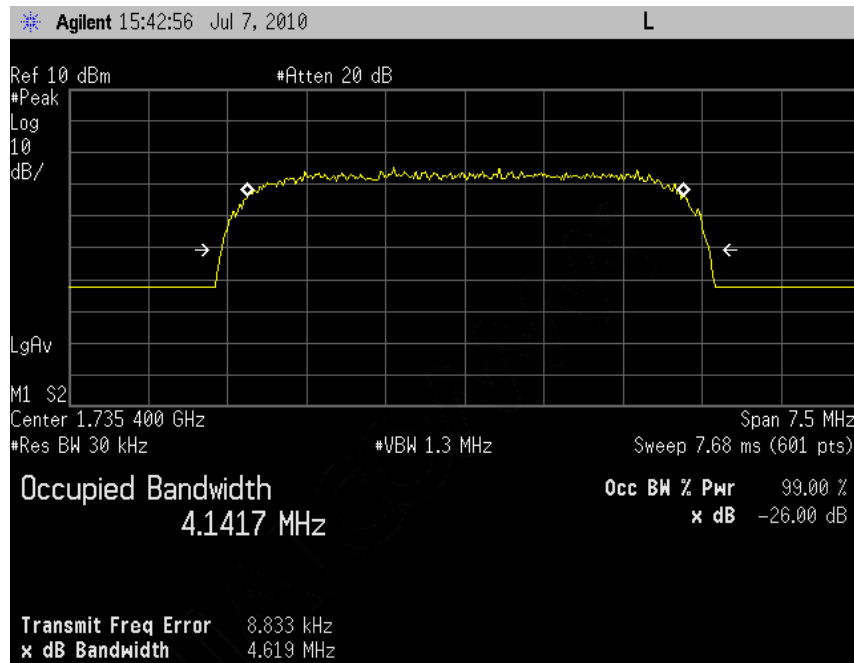
Plot 5.2-21 (Ch. 9538, Rel 99)



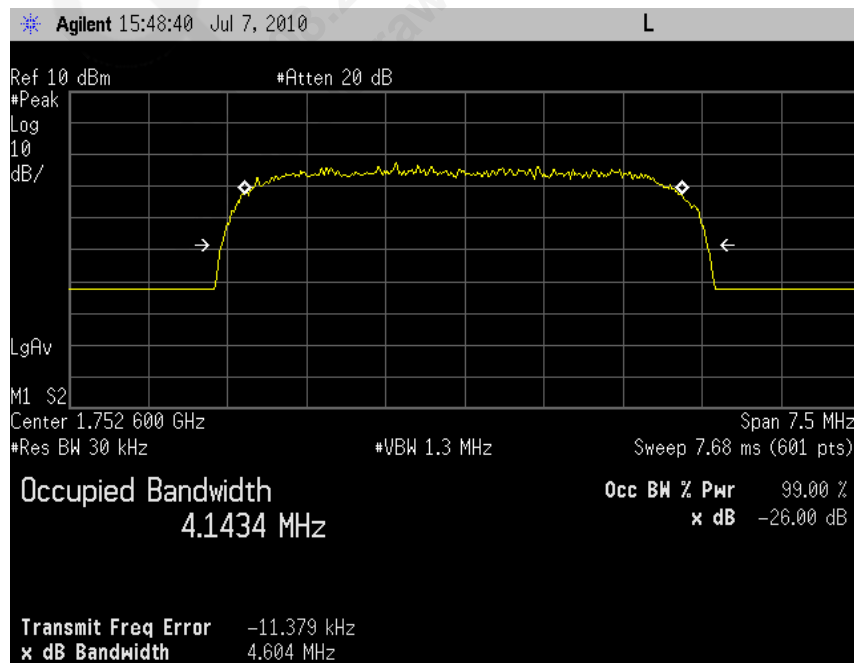
Plot 5.2-22 (Ch. 1312, HSUPA Subtest 5)



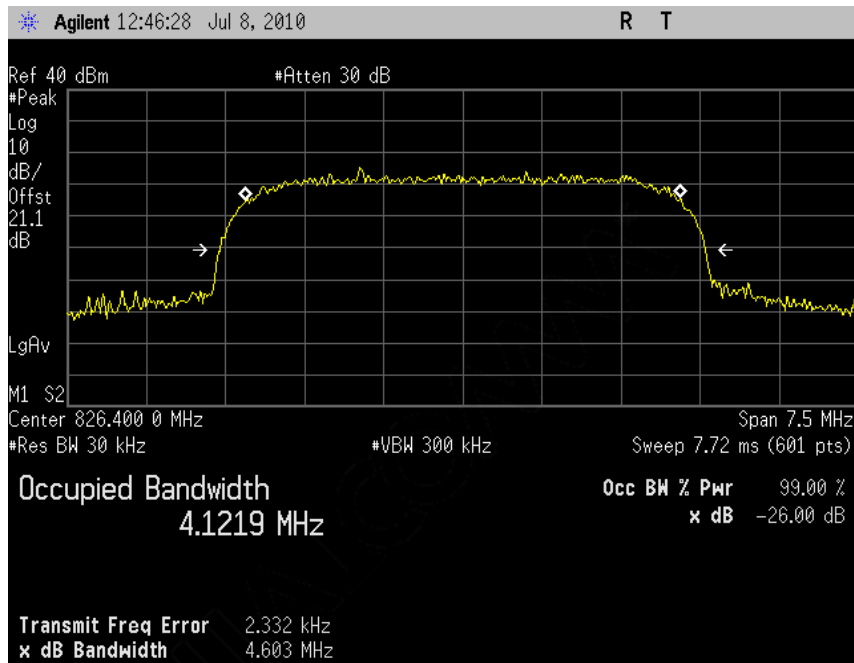
Plot 5.2-23 (Ch. 1427, HSUPA Subtest 5)



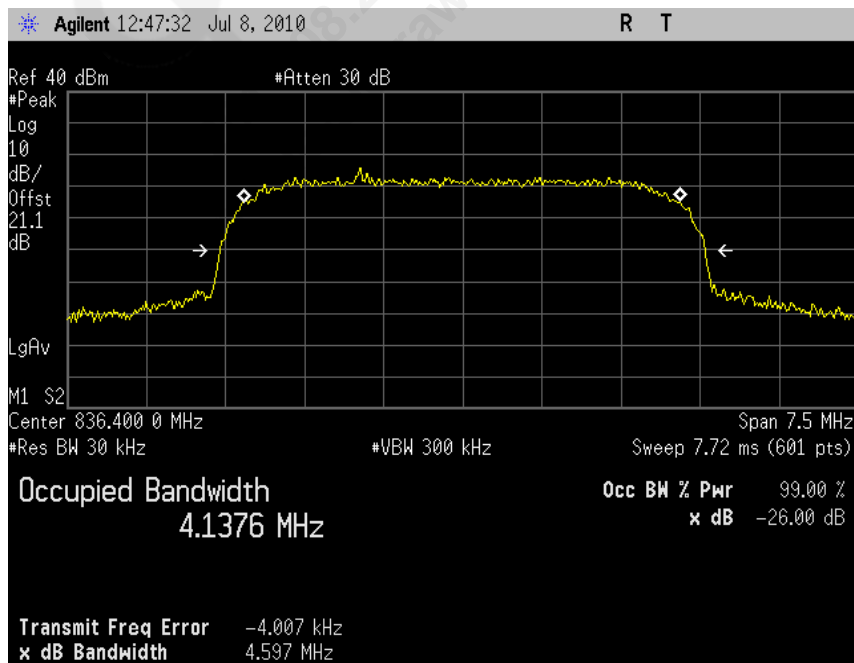
Plot 5.2-24 (Ch. 1513, HSUPA Subtest 5)



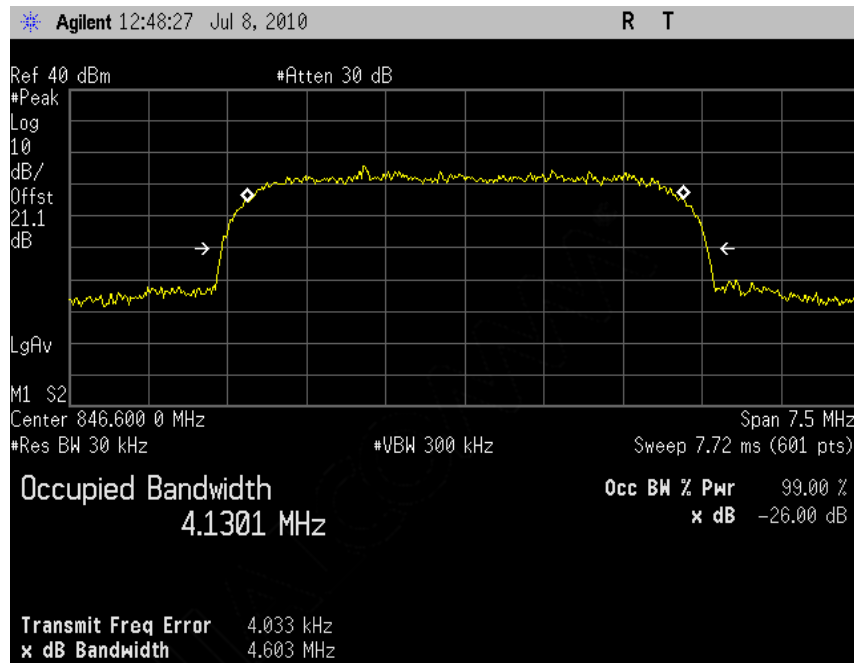
Plot 5.2-25 (Ch. 4132, HSUPA Subtest 5)



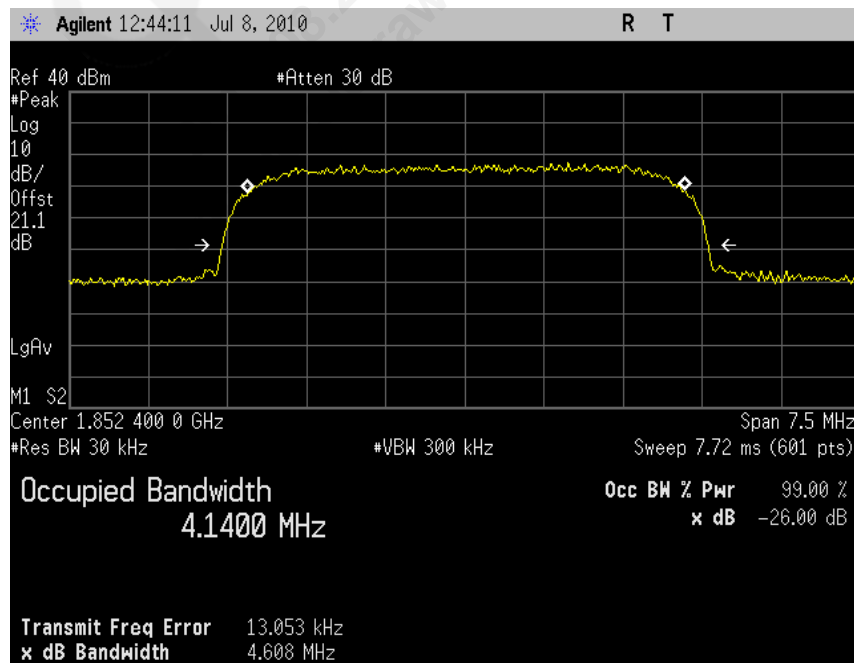
Plot 5.2-26 (Ch. 4182, HSUPA Subtest 5)



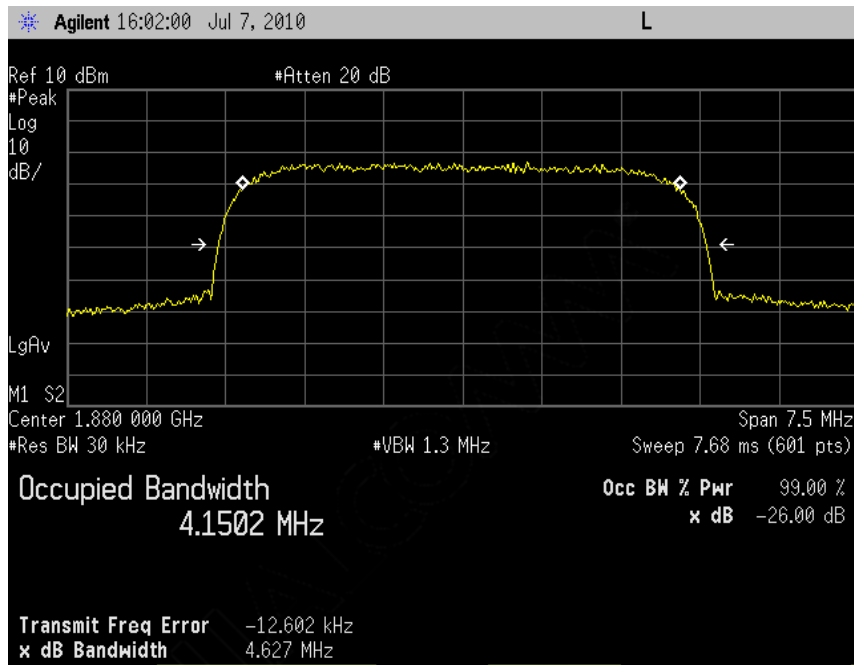
Plot 5.2-27 (Ch. 4233, HSUPA Subtest 5)



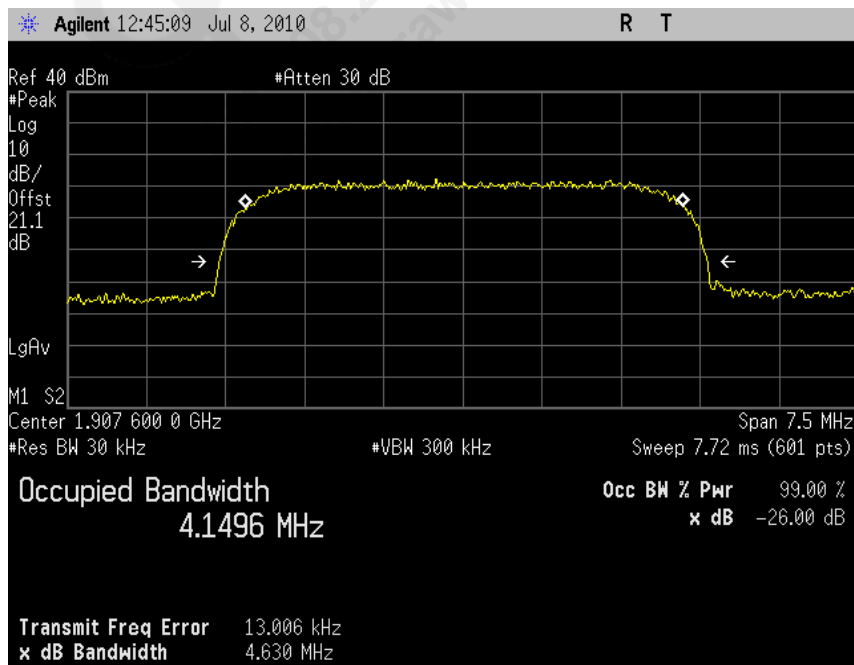
Plot 5.2-28 (Ch. 9262, HSUPA Subtest 5)



Plot 5.2-29 (Ch. 9400, HSUPA Subtest 5)

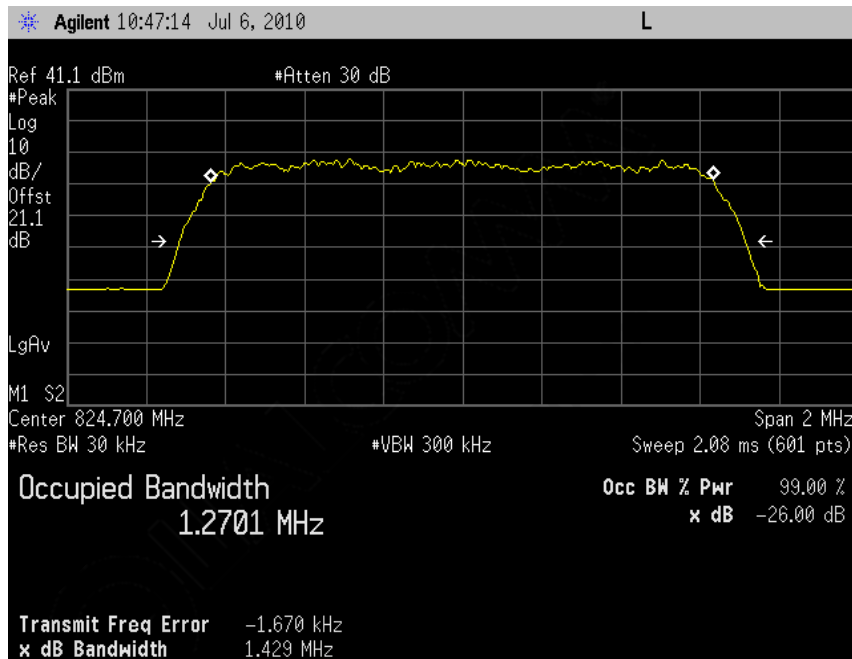


Plot 5.2-30 (Ch. 9538, HSUPA Subtest 5)

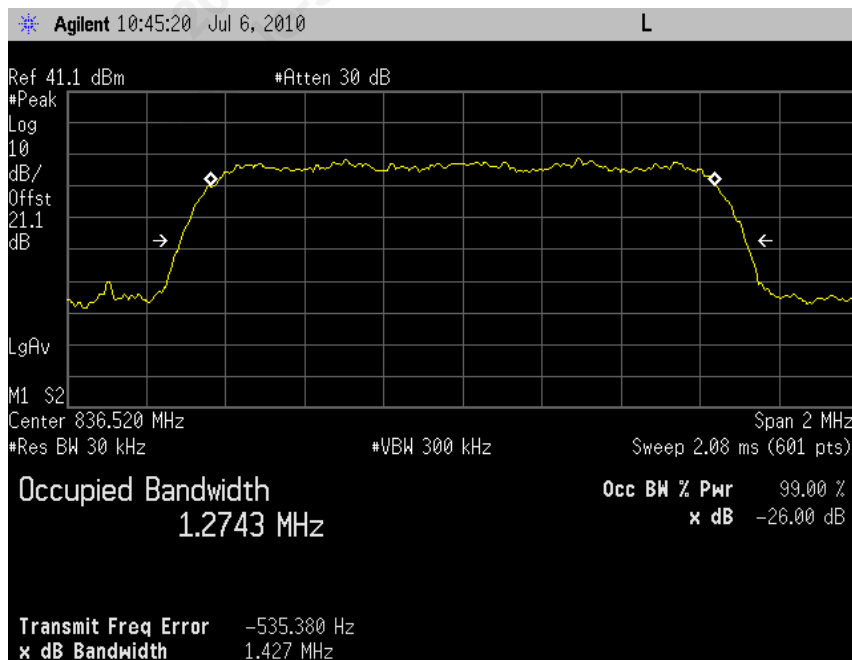


5.2.3 CDMA2000 Occupied Bandwidth Plots

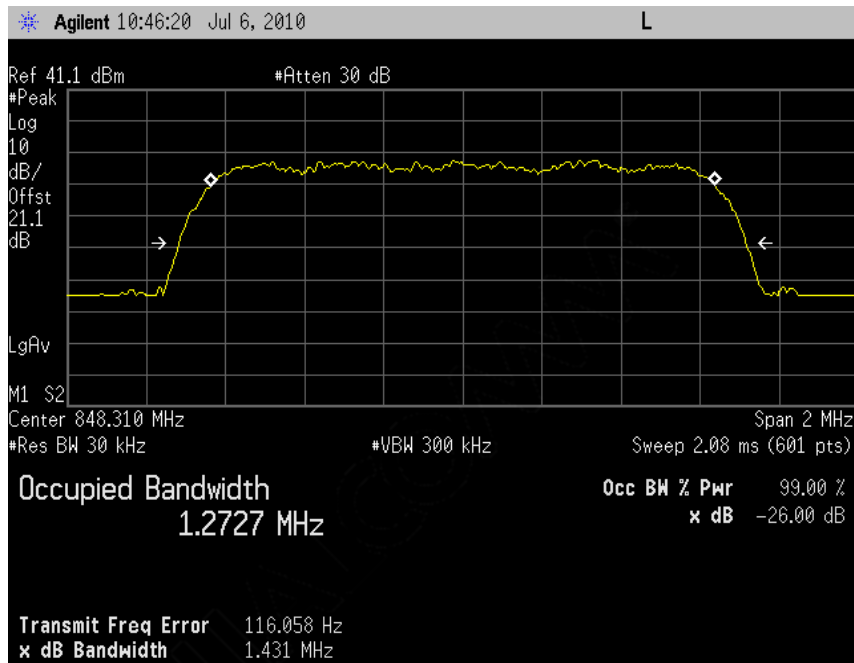
Plot 5.2-31 (Ch. 1013, RC3 SO55)



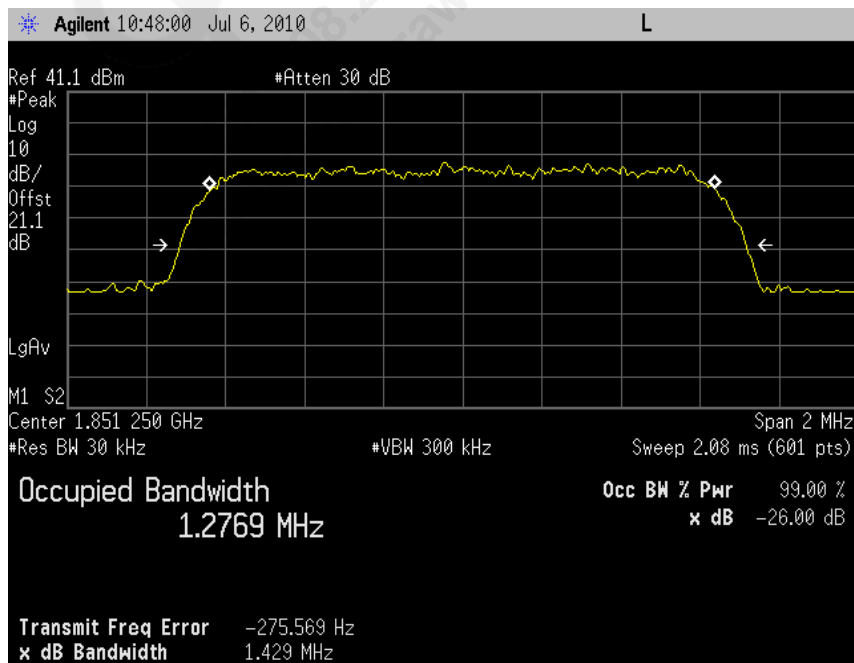
Plot 5.2-32 (Ch. 384, RC3 SO55)



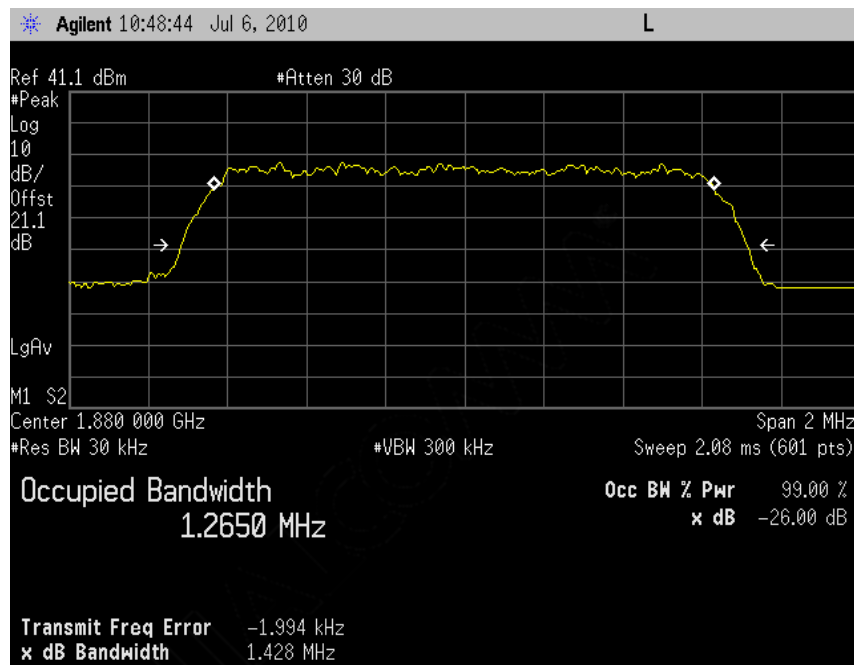
Plot 5.2-33 (Ch. 777, RC3 SO55)



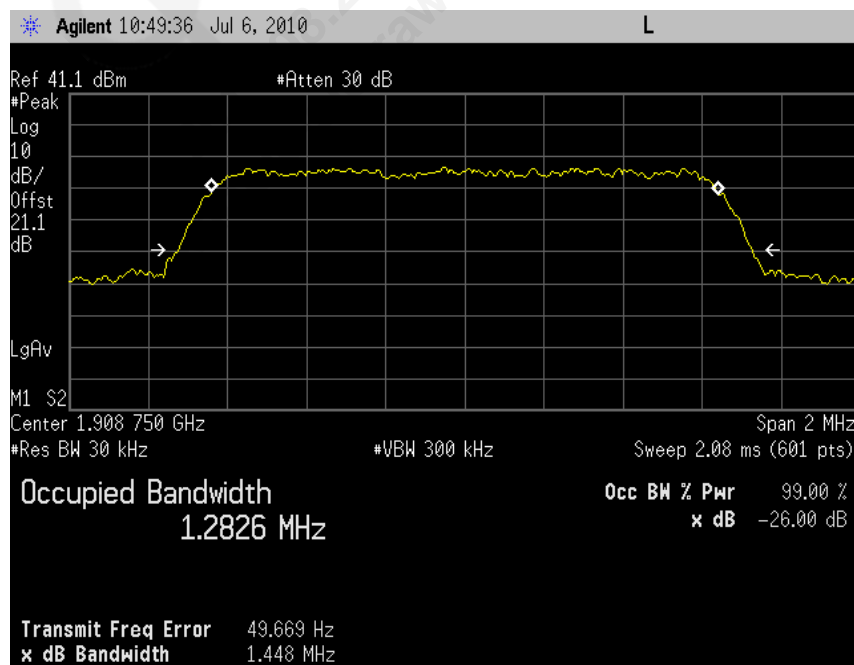
Plot 5.2-34 (Ch. 25, RC3 SO55)



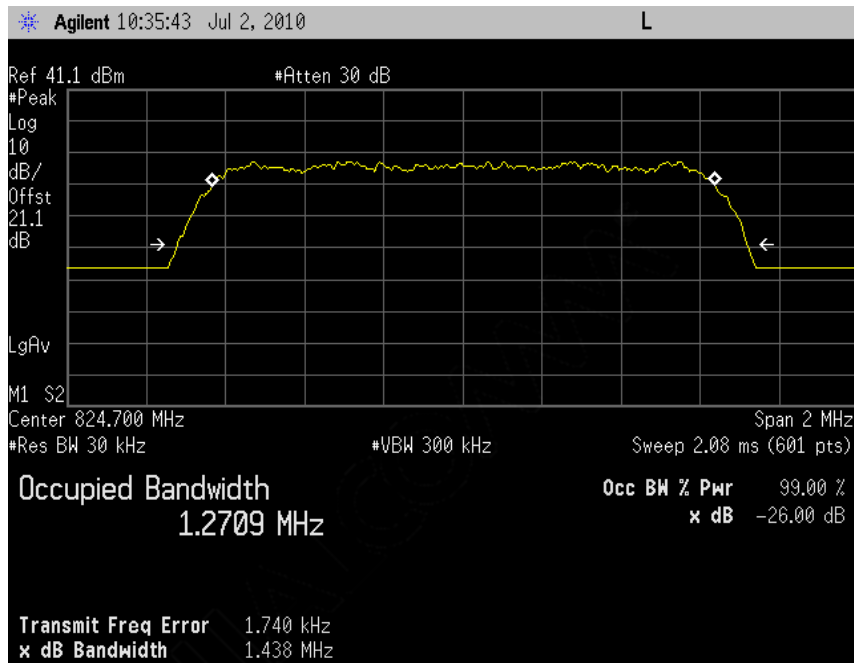
Plot 5.2-35 (Ch. 600, RC3 SO55)



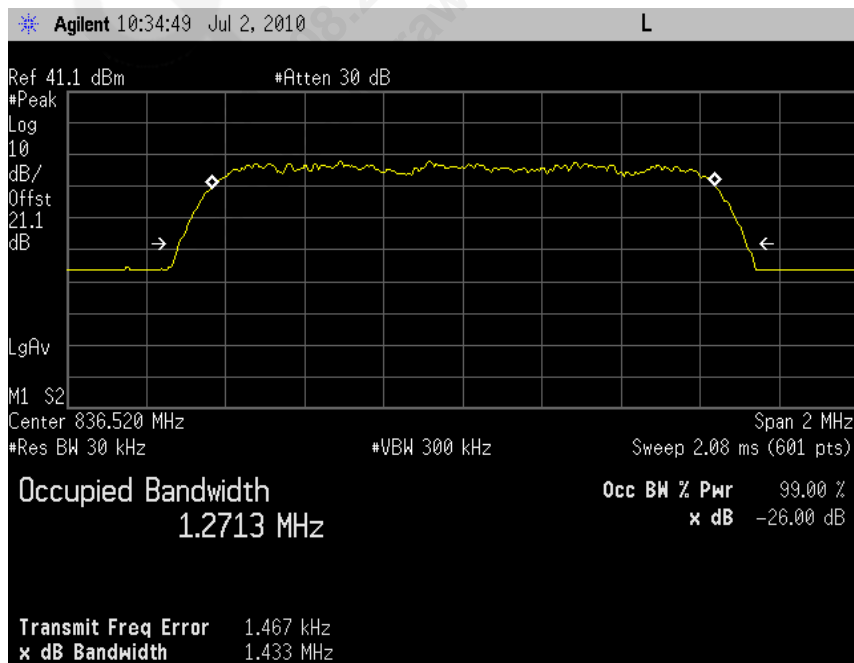
Plot 5.2-36 (Ch. 1175, RC3 SO55)



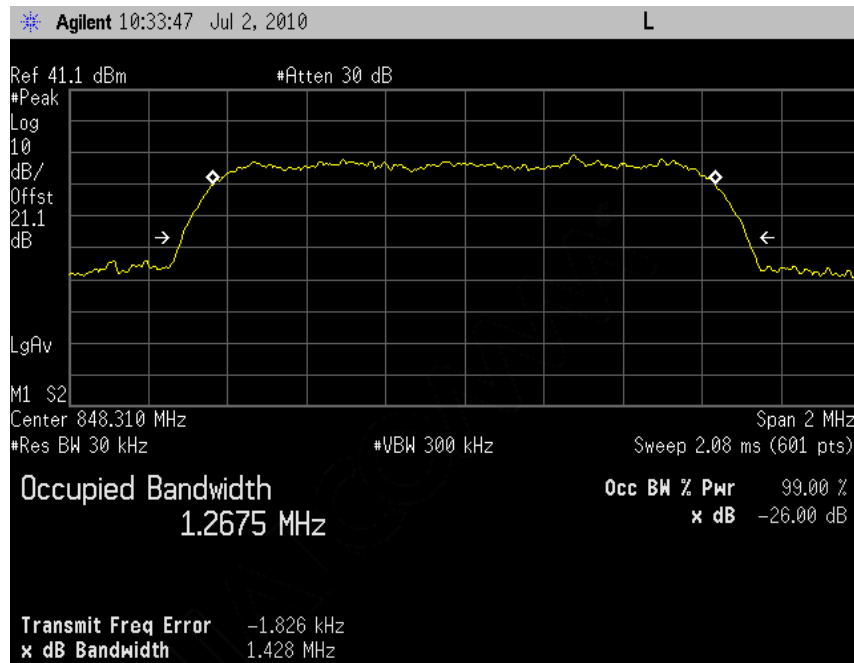
Plot 5.2-37 (Ch. 1013, Rel 0, 153.6 kbps)



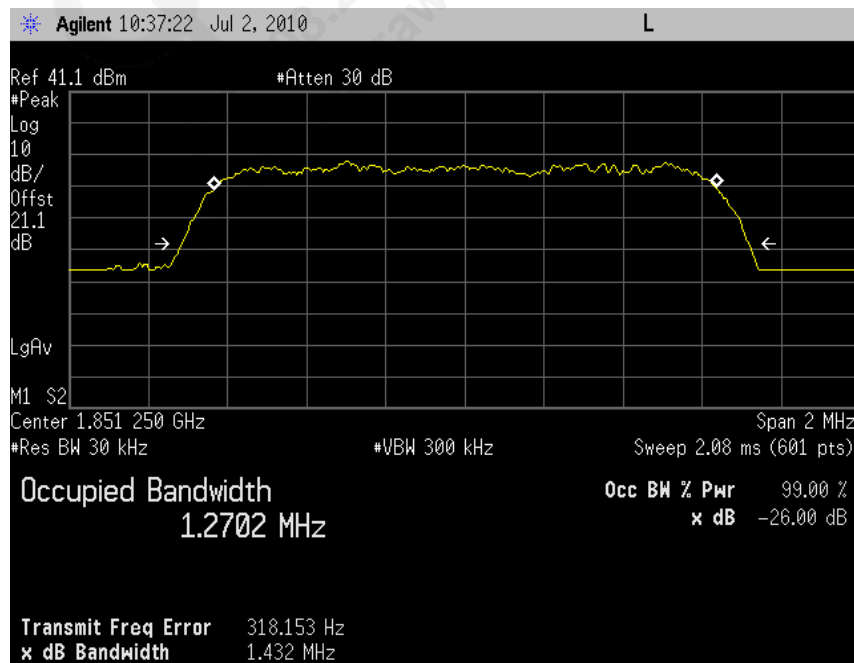
Plot 5.2-38 (Ch. 384, Rel 0, 153.6 kbps)



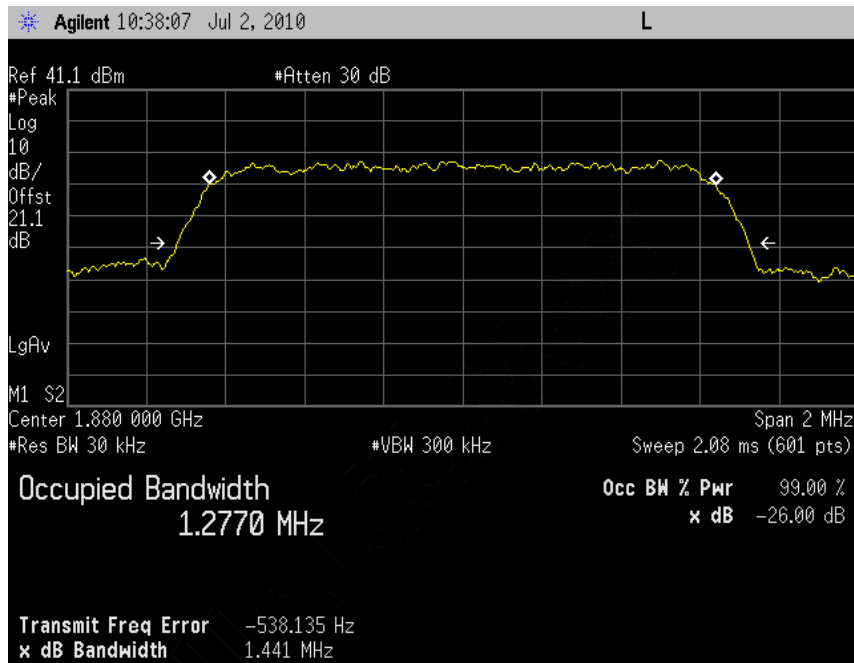
Plot 5.2-39 (Ch. 777, Rel 0, 153.6 kbps)



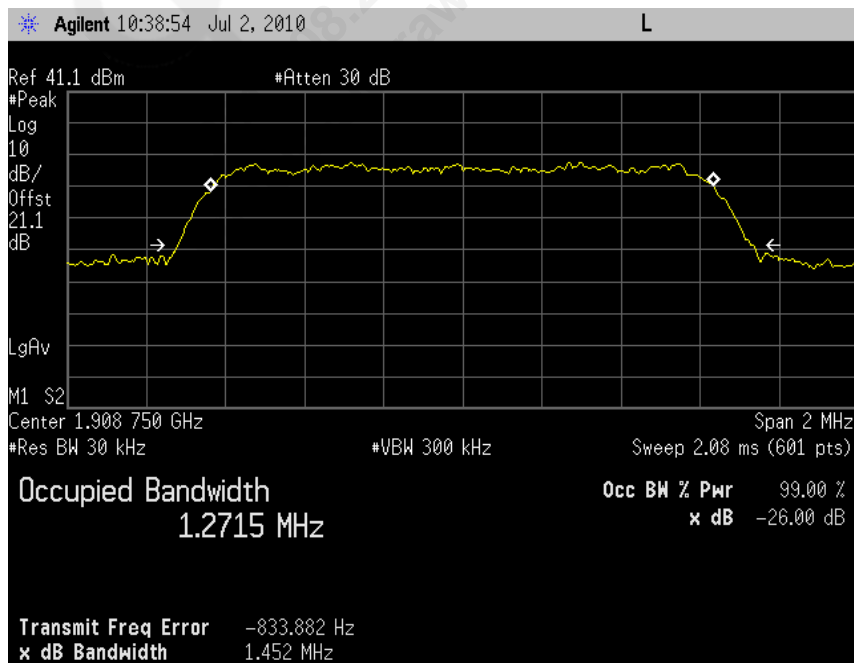
Plot 5.2-40 (Ch. 25, Rel 0, 153.6 kbps)



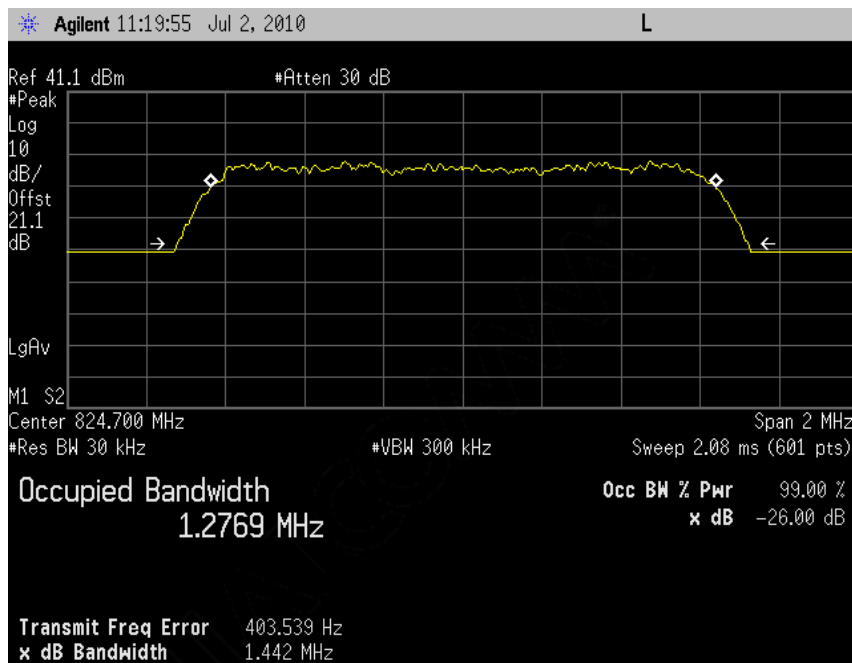
Plot 5.2-41 (Ch. 600, Rel 0, 153.6 kbps)



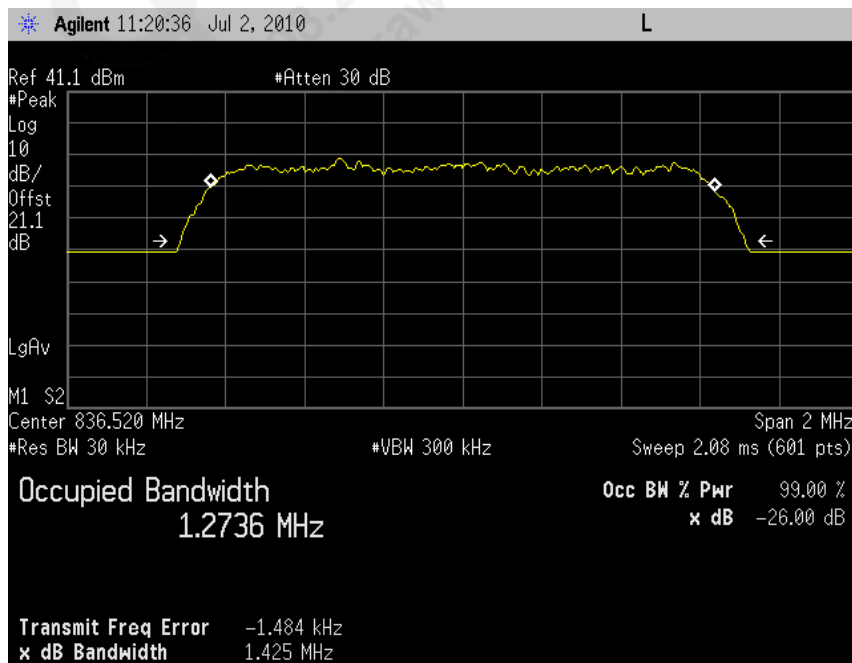
Plot 5.2-42 (Ch. 1175, Rel 0, 153.6 kbps)



Plot 5.2-43 (Ch. 1013, Rev A, 4096 payload size)



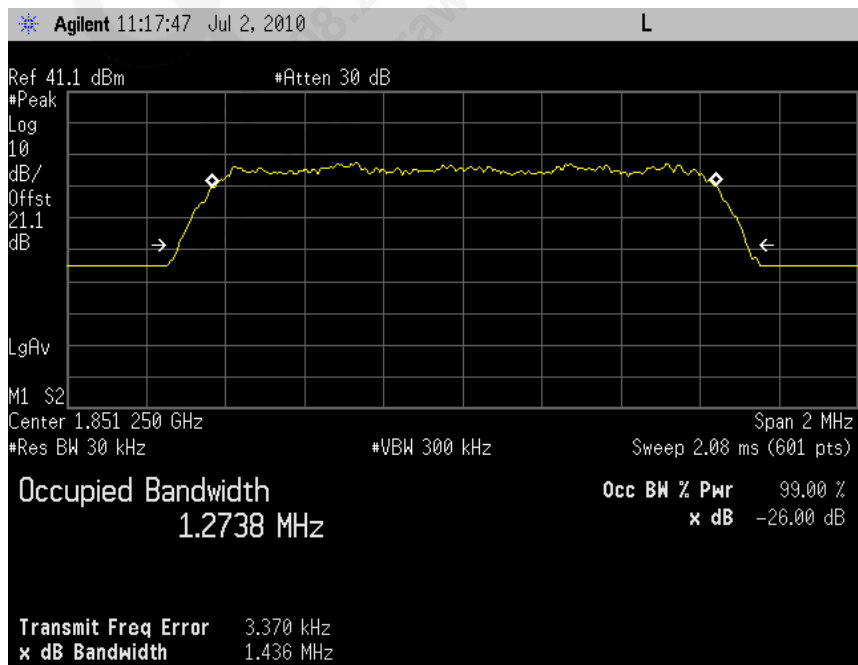
Plot 5.2-44 (Ch. 384, Rev A, 4096 payload size)



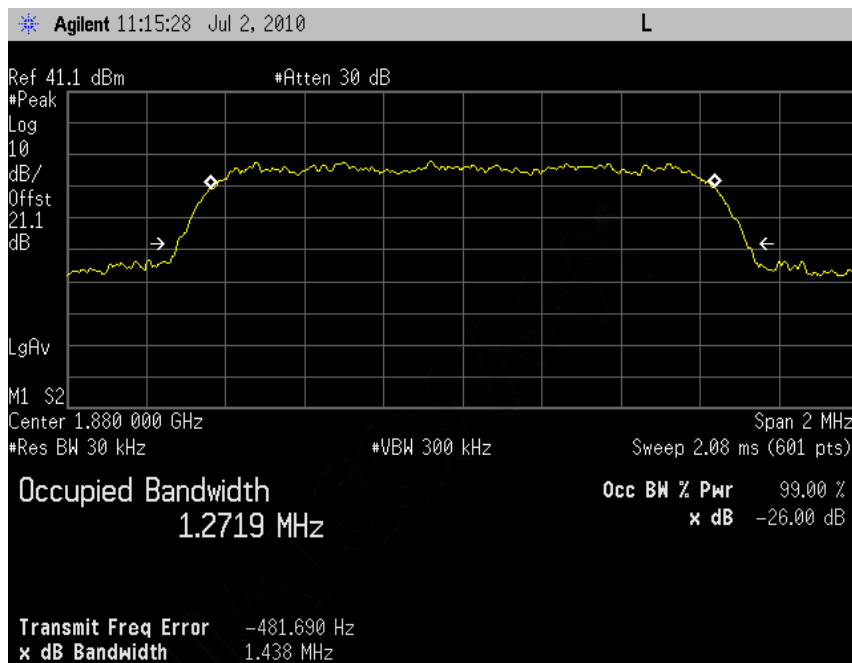
Plot 5.2-45 (Ch. 777, Rev A, 4096 payload size)



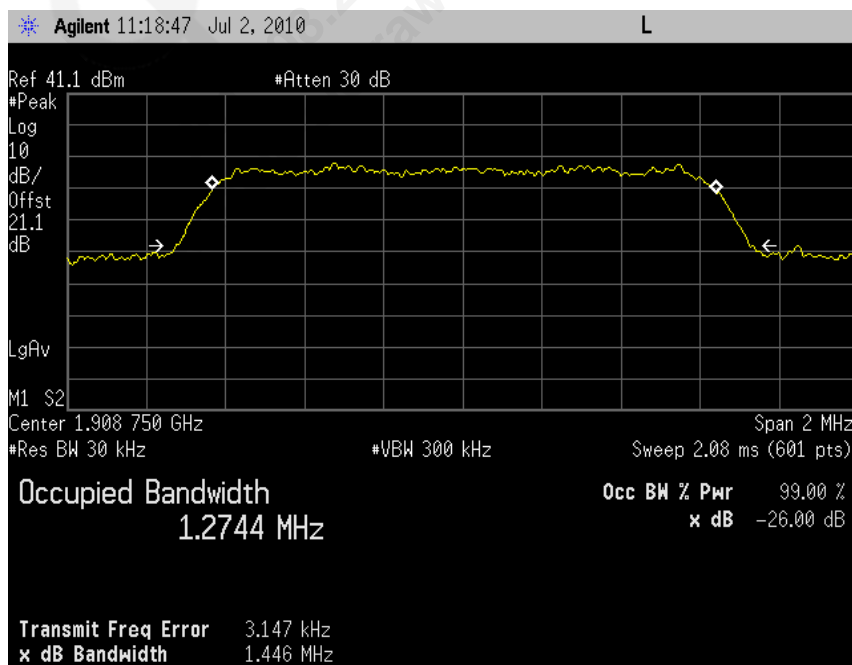
Plot 5.2-46 (Ch. 25, Rev A, 4096 payload size)



Plot 5.2-47 (Ch. 600, Rev A, 4096 payload size)



Plot 5.2-48 (Ch. 1175, Rev A, 4096 payload size)



6. Band Edge Compliance

| | | | |
|---------------------|---|----------------------------------|---------------|
| FCC: | §22.359, 24.238, 27.53(g) | | |
| Limit: | -13dBm | | |
| DUT SN | N10F6XTXR | | |
| Modes Tested | CDMA 1x / 1x-EVDO | WCDMA/HSPA | GSM/GPRS/EDGE |
| | RC3 SO55 Rel 0, RTAP rate = 153.6kbps Rev A, RETAP payload = 4096 | Rel 99 Rel 6 HSUPA, Subtest 5 | GSM EDGE |

Test Procedures

As shown in Figure below, connected the RF output to 8960 or 8820B, configured the UPDP-1 to operate at maximum power. The block edge emissions are measured at the required operating frequencies in each band on the spectrum analyzer.

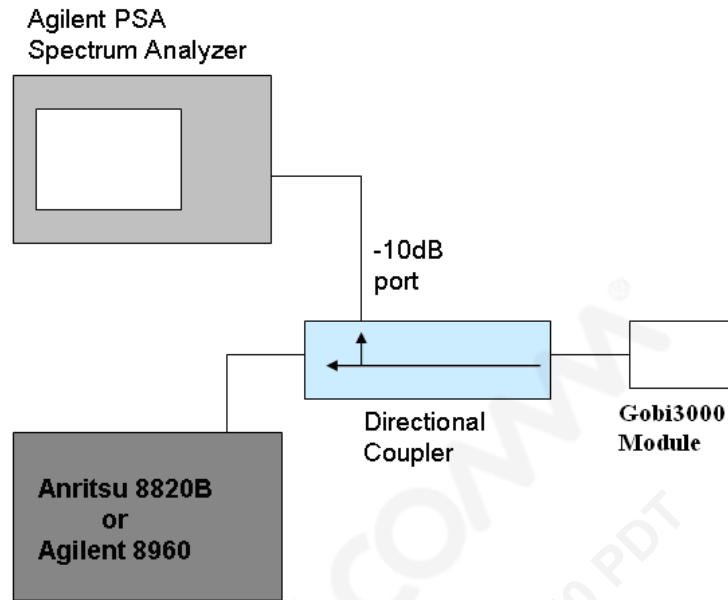
For each block edge measurement:

- Set the spectrum analyzer span to include the block edge frequency (824, 848, 1710, 1755, 1850, 1910 MHz)
- Set a marker to point the corresponding block edge frequency in each test case
- Set display line at -13dBm
- Set resolution bandwidth to at least 1% of emission BW
- For CDMA/WCDMA measurement, set video averaging to 10 samples

The following table lists the 1% emission BW for each technology:

| | |
|----------------------|----------|
| GMSK/8PSK | 3 kHz |
| CDMA2000 1x/1EVDO | 12.5 kHz |
| WCDMA/HSPA | 38.5 kHz |

The 8960 call box was used for CDMA 1x/1x-EVDO and UMTS measurements.



6.1 Band Edge Compliance Test Results

The test was conducted at block edges in each band.

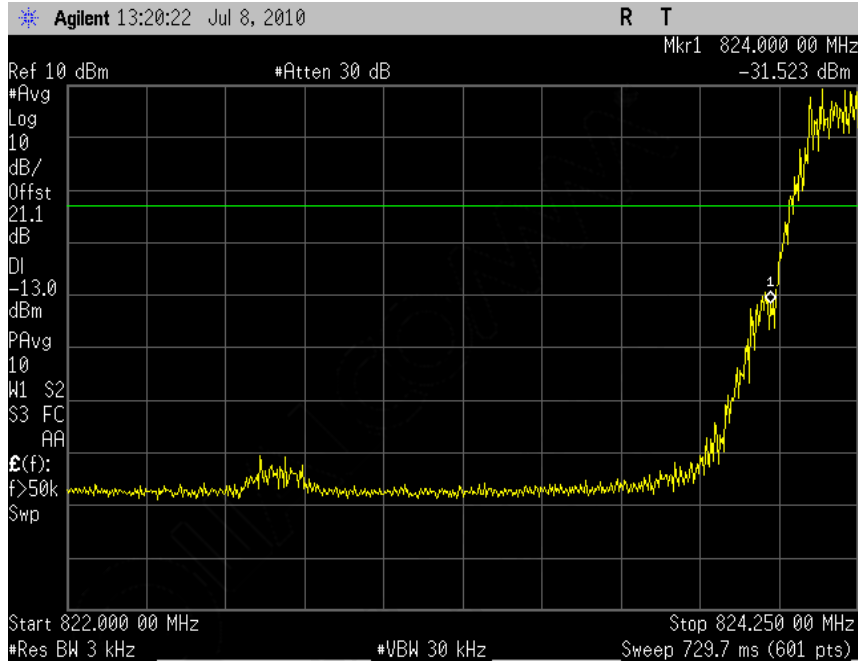
| Mode | Frequency (MHz) | Channel Tested | Corresponding Plot number | Test Result | |
|-----------------------|-----------------|----------------|---------------------------|--------------|----------|
| GSM/ GPRS/ EDGE | GMSK | 824 | 128 (low) | Plot 6.2 - 1 | Complies |
| | | 849 | 251 (high) | Plot 6.2 - 2 | Complies |
| | | 1850 | 512 (low) | Plot 6.2 - 3 | Complies |
| | | 1910 | 810 (high) | Plot 6.2 - 4 | Complies |
| | 8PSK | 824 | 128 (low) | Plot 6.2 - 5 | Complies |
| | | 849 | 251 (high) | Plot 6.2 - 6 | Complies |
| | | 1850 | 512 (low) | Plot 6.2 - 7 | Complies |
| | | 1910 | 810 (high) | Plot 6.2 - 8 | Complies |

| Mode | | Frequency (MHz) | Channel Tested | Corresponding Plot number | Test Result |
|---------------------------|-----------------------------|-----------------|----------------|---------------------------|-------------|
| WCDMA/ HSDPA/ HSUPA | Rel 99 | 824 | 4132 (low) | Plot 6.2 - 9 | Complies |
| | | 849 | 4233 (high) | Plot 6.2 - 10 | Complies |
| | | 1710 | 1312 (low) | Plot 6.2 - 11 | Complies |
| | | 1755 | 1513 (high) | Plot 6.2 - 12 | Complies |
| | | 1850 | 9262 (low) | Plot 6.2 - 13 | Complies |
| | | 1910 | 9538 (high) | Plot 6.2 - 14 | Complies |
| | HSUPA Rel 6 Subtest 5 | 824 | 4132 (low) | Plot 6.2 - 15 | Complies |
| | | 849 | 4233 (high) | Plot 6.2 - 16 | Complies |
| | | 1710 | 1312 (low) | Plot 6.2 - 17 | Complies |
| | | 1755 | 1513 (high) | Plot 6.2 - 18 | Complies |
| | | 1850 | 9262 (low) | Plot 6.2 - 19 | Complies |
| | | 1910 | 9538 (high) | Plot 6.2 - 20 | Complies |

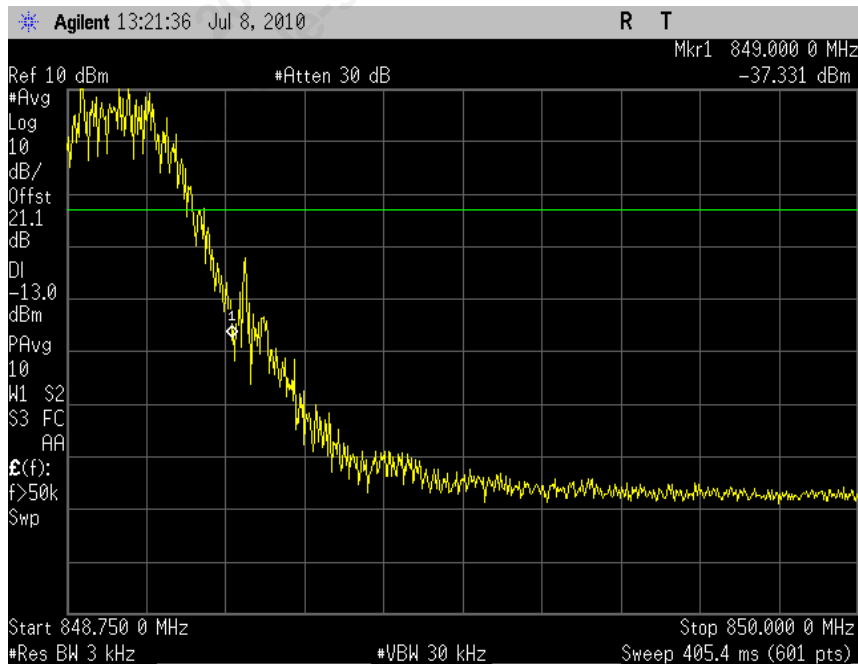
| Mode | | Frequency (MHz) | Channel Tested | Corresponding Plot number | Test Result |
|--------------------|--|-----------------|----------------|---------------------------|-------------|
| CDMA1x/ 1x-EVDO | RC3 SO55 | 824 | 1013 (low) | Plot 6.2 - 21 | Complies |
| | | 849 | 777 (high) | Plot 6.2 - 22 | Complies |
| | | 1850 | 25 (low) | Plot 6.2 - 23 | Complies |
| | | 1910 | 1175 (high) | Plot 6.2 - 24 | Complies |
| | Rel 0 RTAP rate = 153.6kbps | 824 | 1013 (low) | Plot 6.2 - 25 | Complies |
| | | 849 | 777 (high) | Plot 6.2 - 26 | Complies |
| | | 1850 | 25 (low) | Plot 6.2 - 27 | Complies |
| | | 1910 | 1175 (high) | Plot 6.2 - 28 | Complies |
| | Rev A RETAP Payload size = 4096 | 824 | 1013 (low) | Plot 6.2 - 29 | Complies |
| | | 849 | 777 (high) | Plot 6.2 - 30 | Complies |
| | | 1850 | 25 (low) | Plot 6.2 - 31 | Complies |
| | | 1910 | 1175 (high) | Plot 6.2 - 32 | Complies |

6.1.1 GSM Band Edge Plots

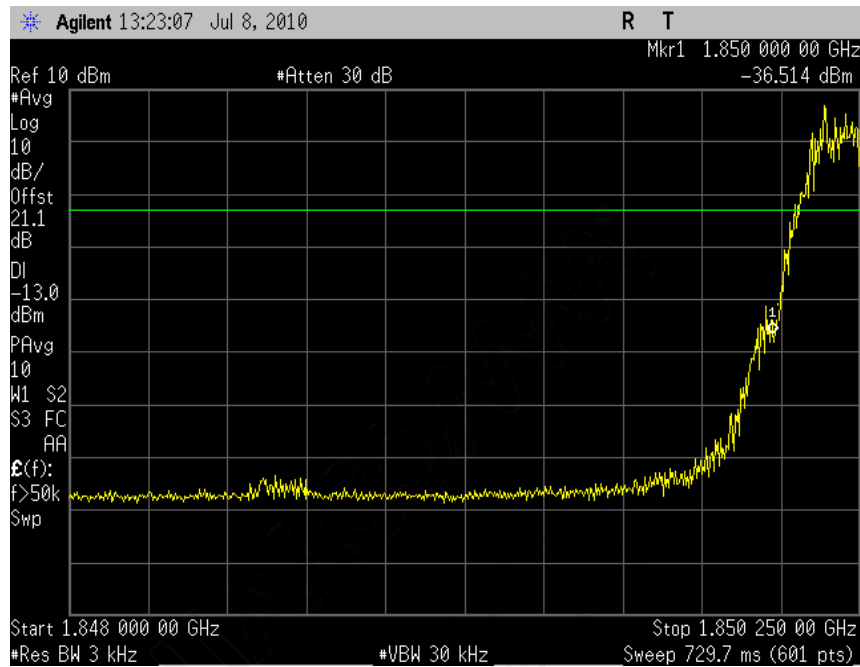
Plot 6.2 - 1 (Ch128, GMSK)



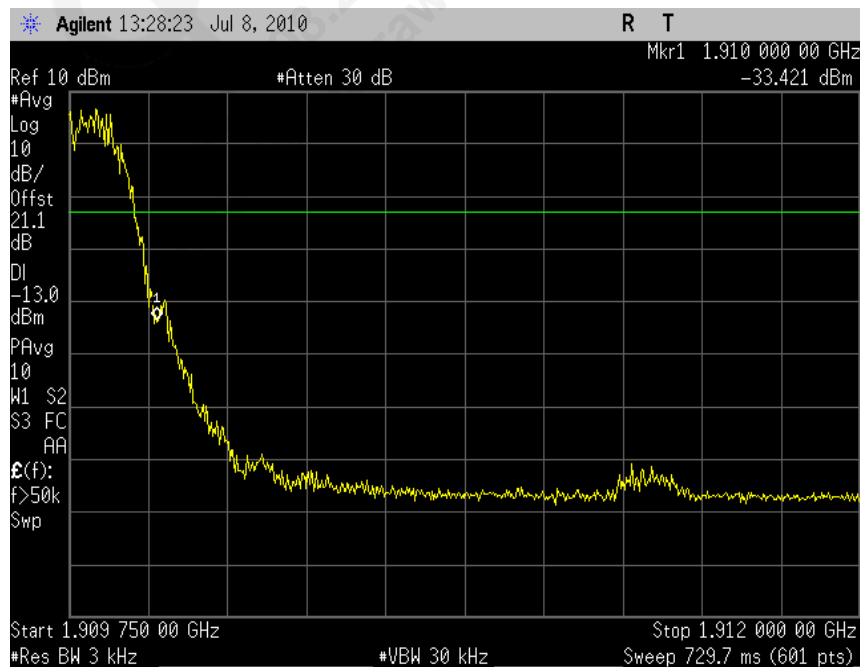
Plot 6.2 - 2 (Ch251, GMSK)



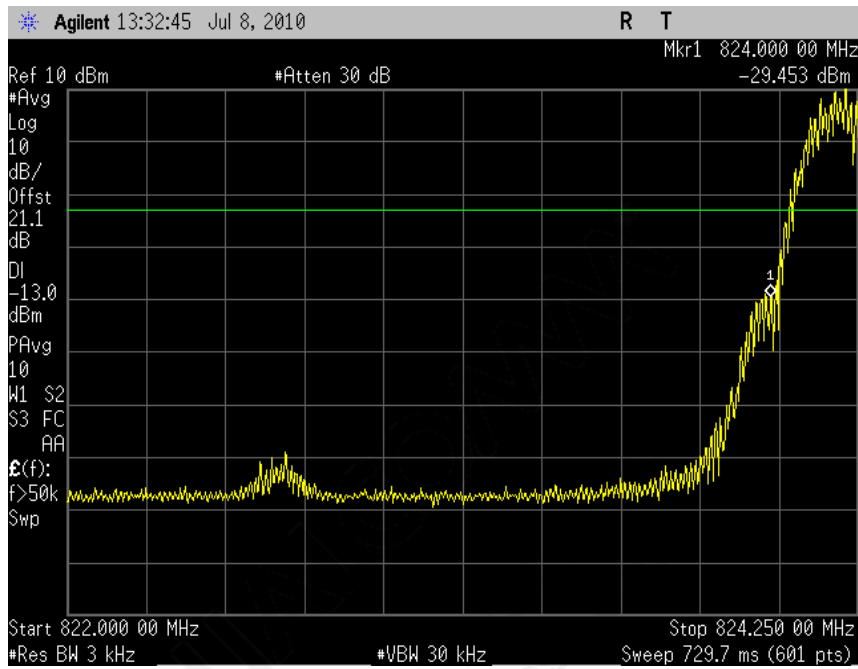
Plot 6.2 - 3 (Ch512, GMSK)



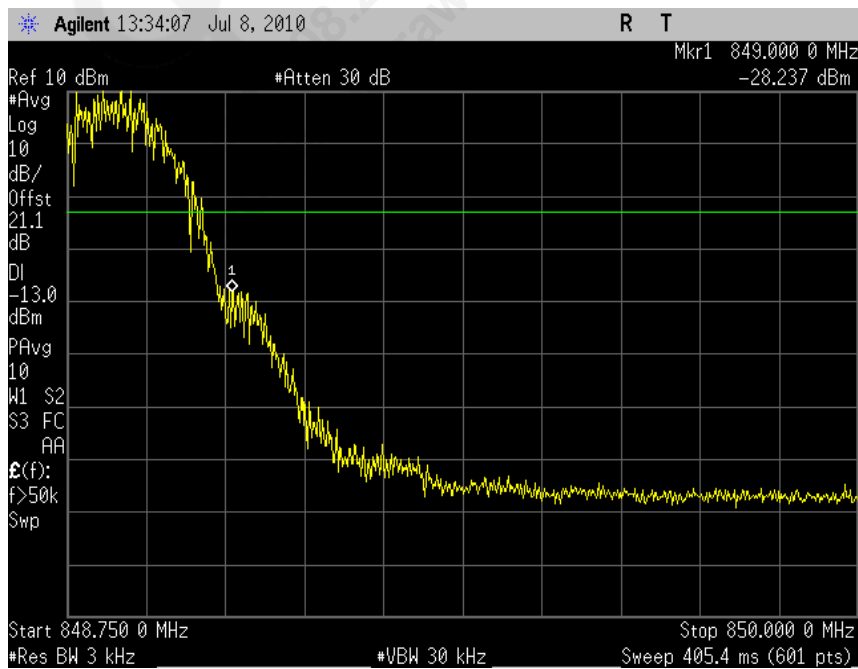
Plot 6.2 - 4 (Ch810, GMSK)



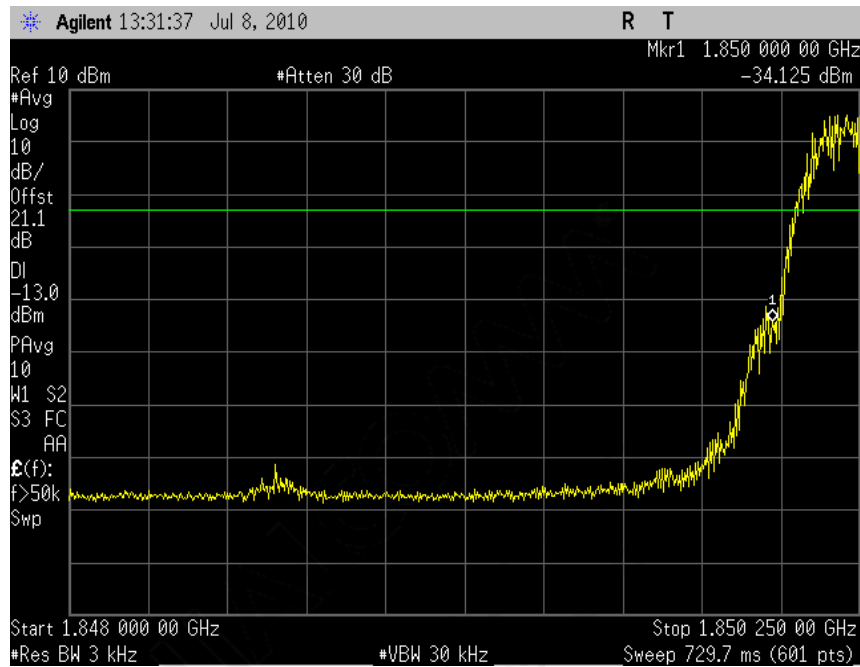
Plot 6.2 - 5 (Ch128, 8PSK)



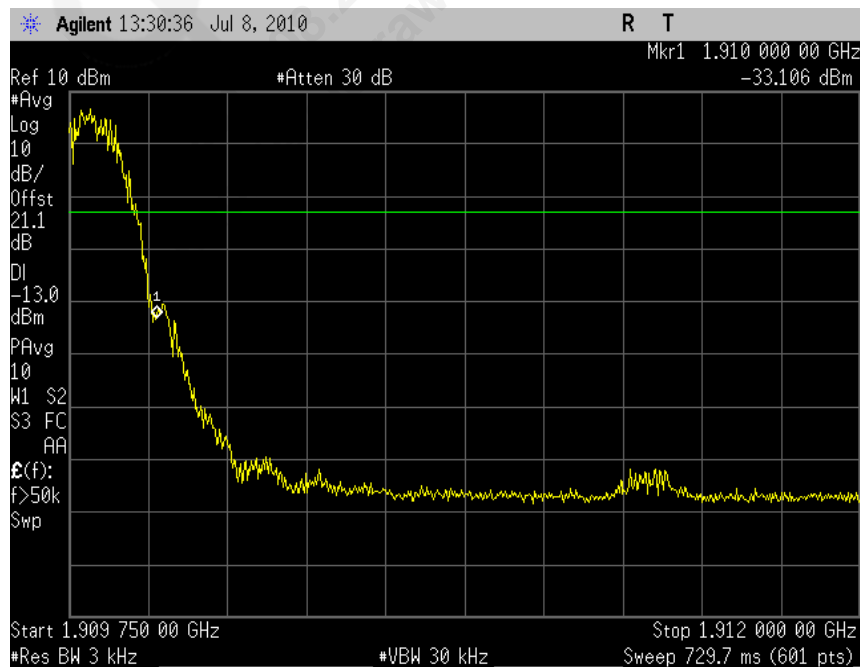
Plot 6.2 - 6 (Ch251, 8PSK)



Plot 6.2 - 7 (Ch512, 8PSK)

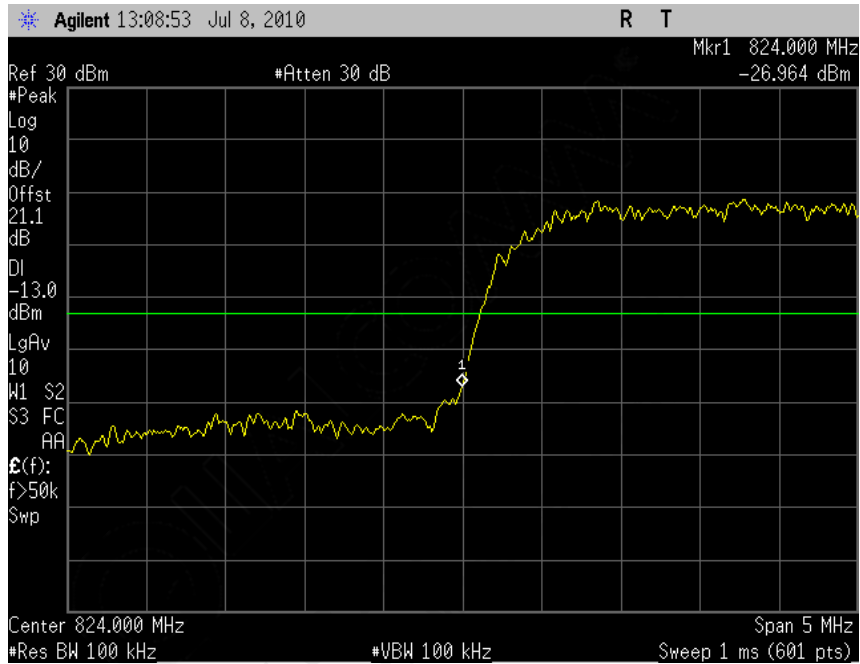


Plot 6.2 - 8 (Ch810, 8PSK)

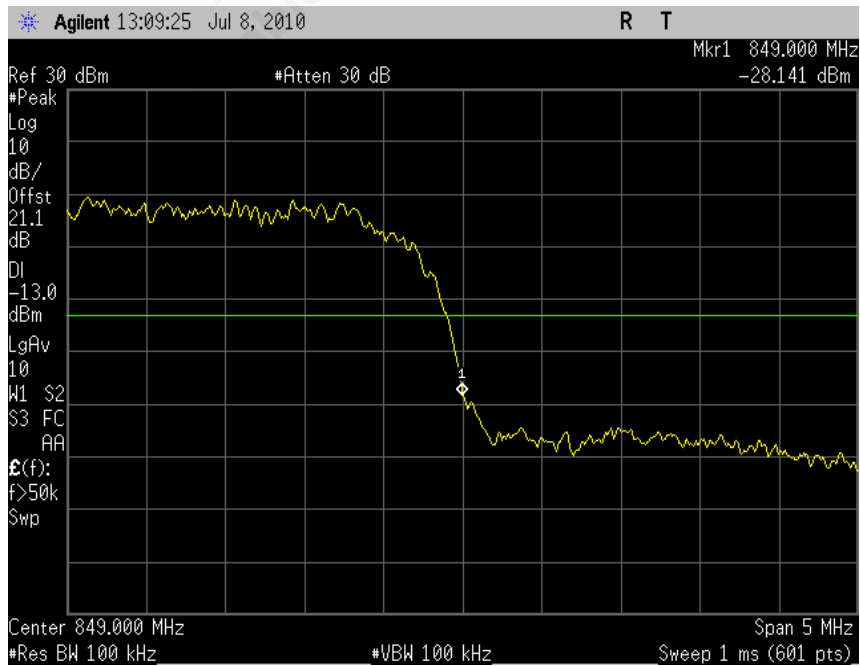


6.1.2 UMTS Band Edge Plots

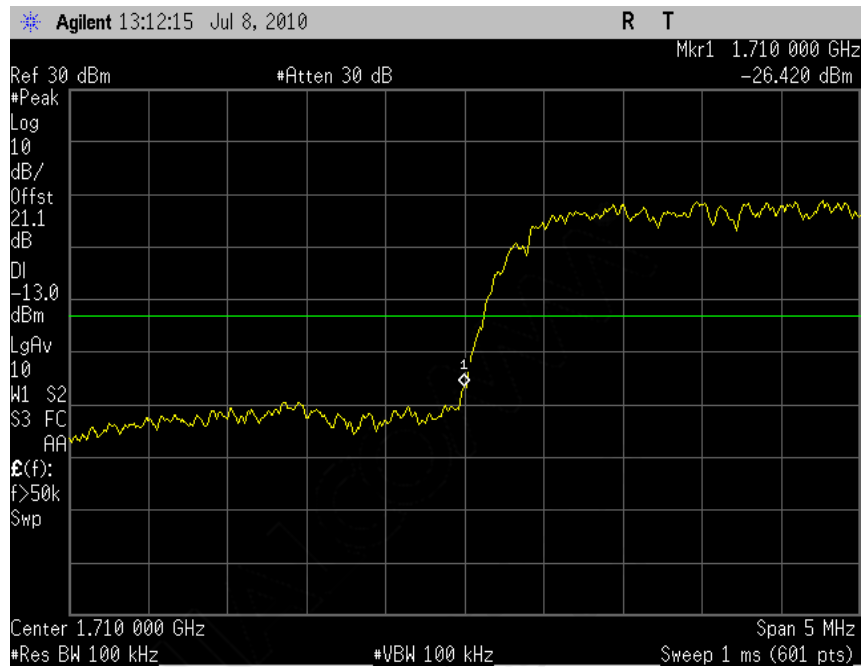
Plot 6.2-9 (Ch. 4132, Rel. 99)



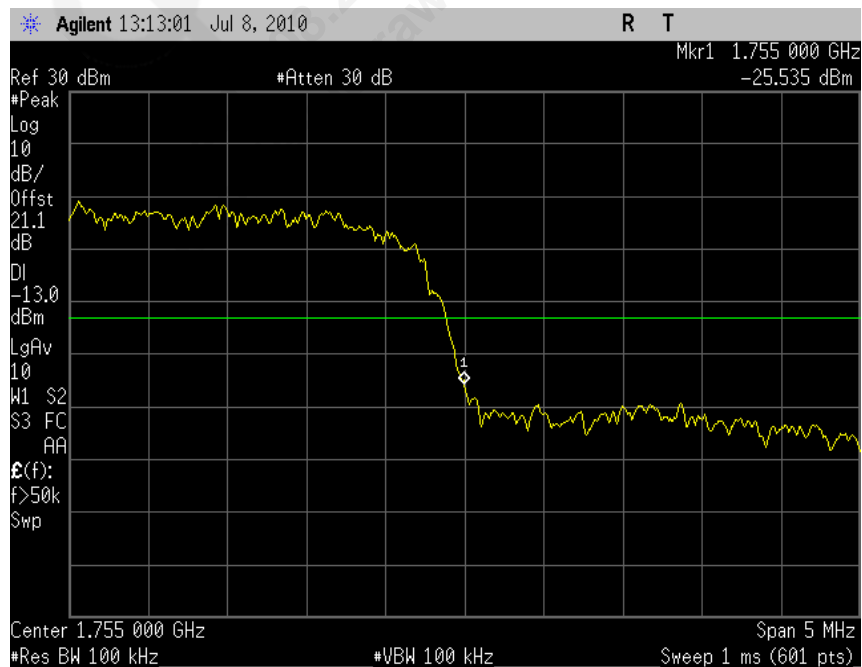
Plot 6.2-10 (Ch. 4233, Rel. 99)



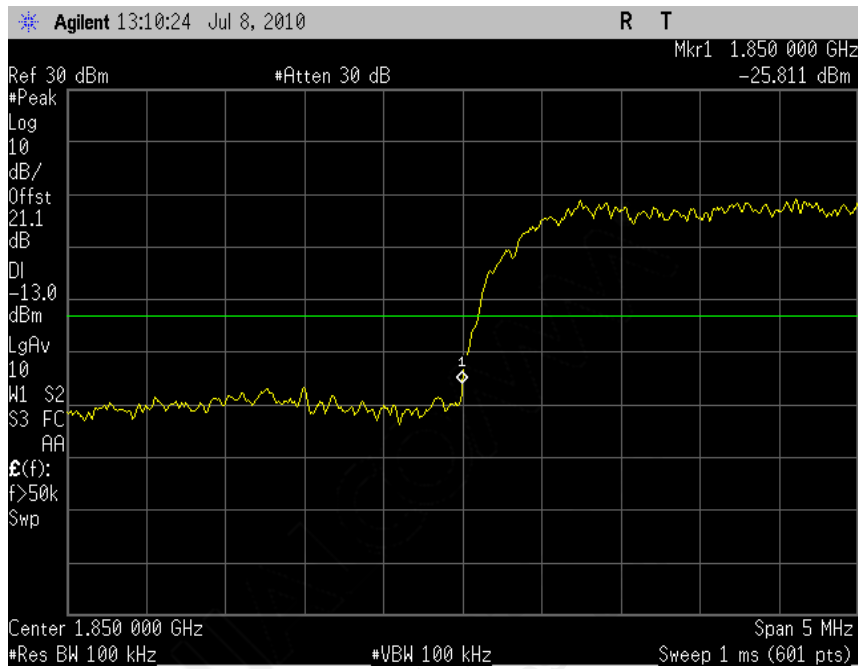
Plot 6.2-11 (Ch. 1312, Rel. 99)



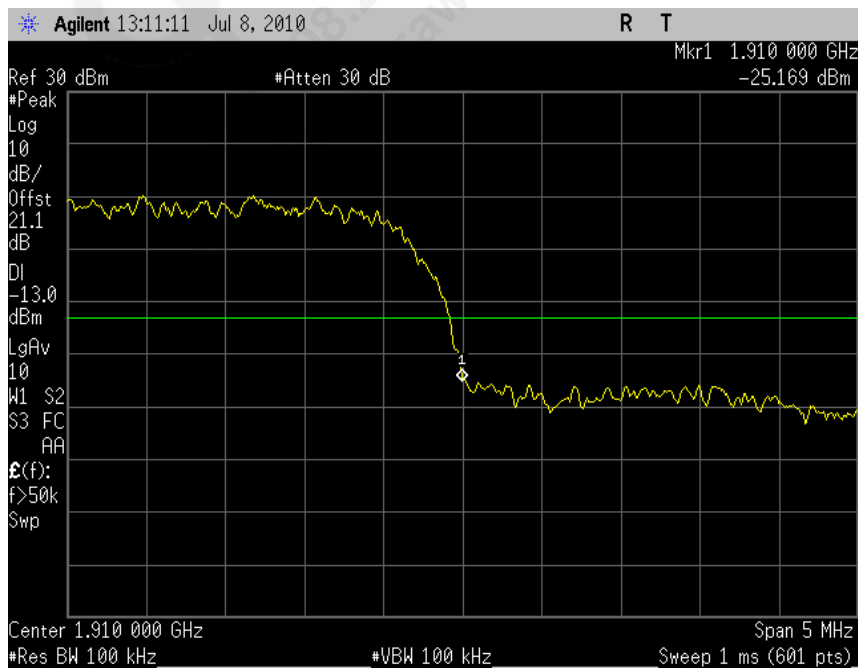
Plot 6.2-12 (Ch. 1513, Rel. 99)



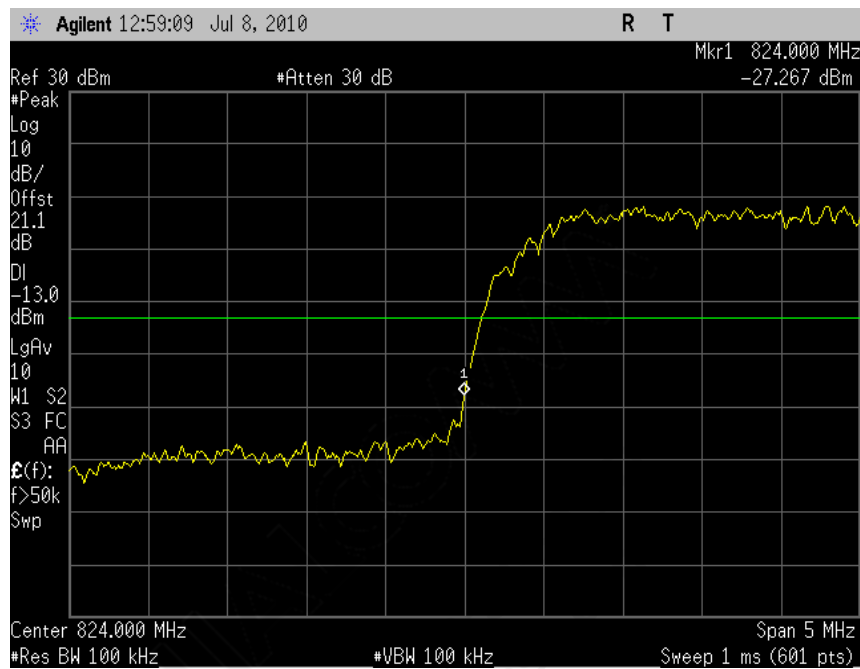
Plot 6.2-13 (Ch. 9262, Rel. 99)



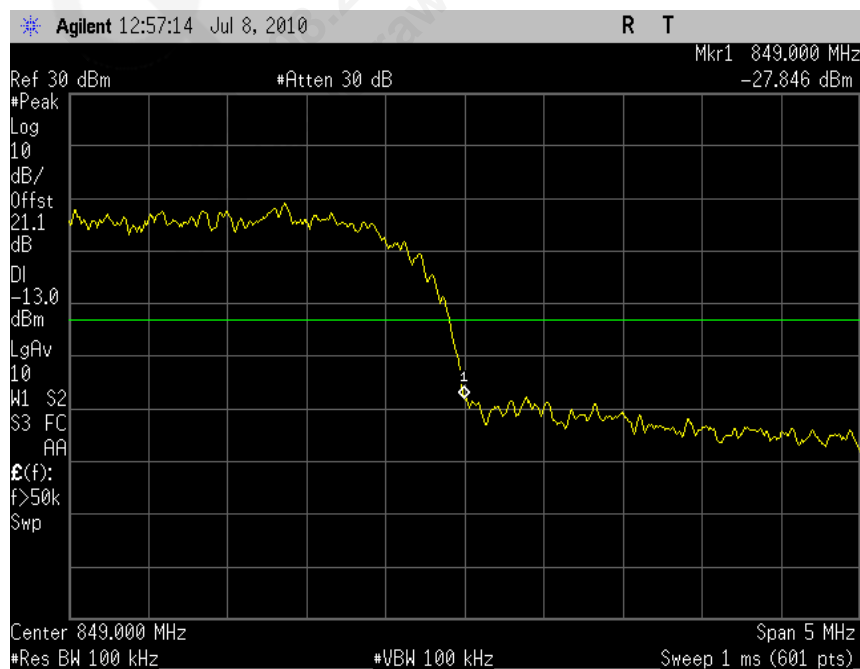
Plot 6.2-14 (Ch. 9538, Rel. 99)



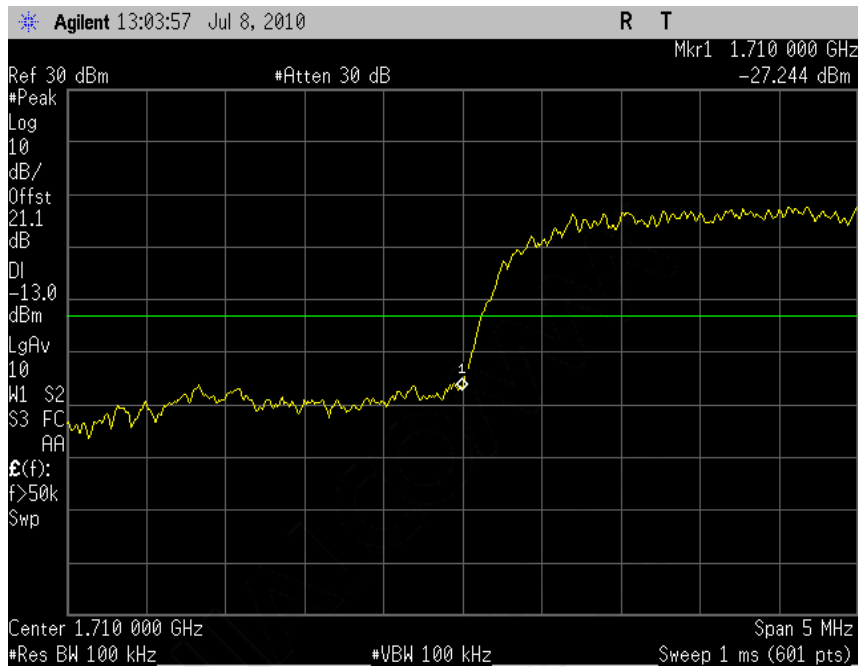
Plot 6.2-15 (Ch. 4132, HSUPA Subtest 5)



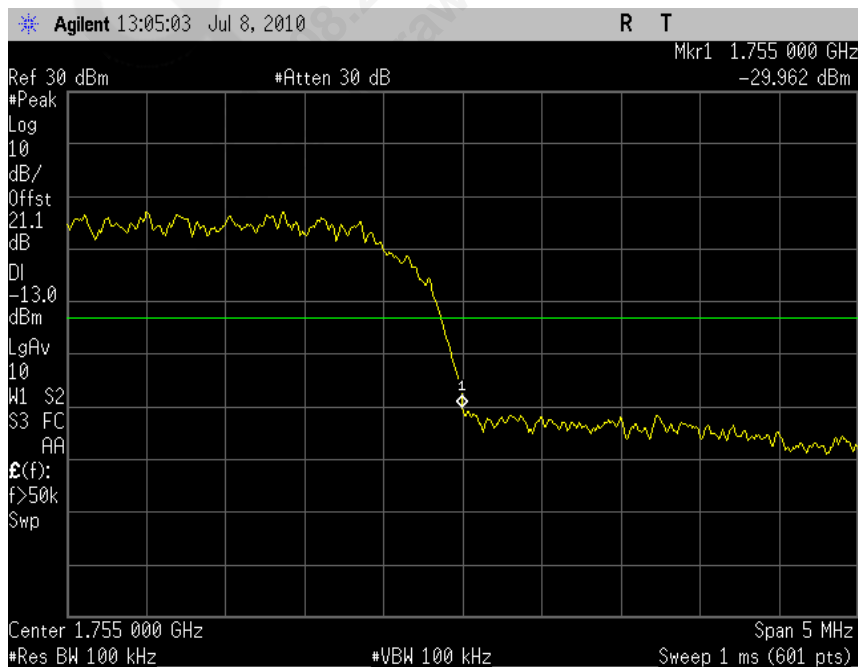
Plot 6.2-16 (Ch. 4233, HSUPA Subtest 5)



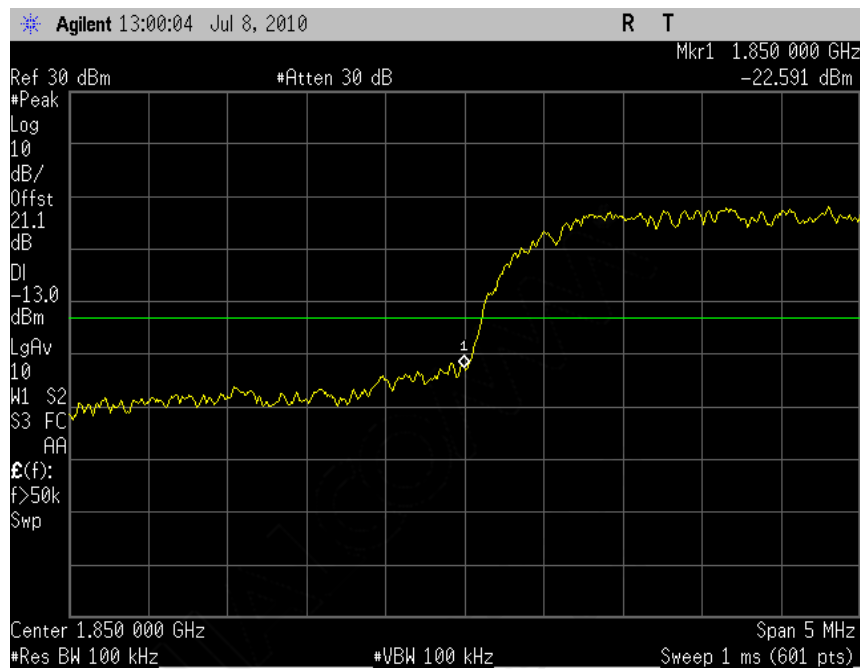
Plot 6.2-17 (Ch. 1312, HSUPA Subtest 5)



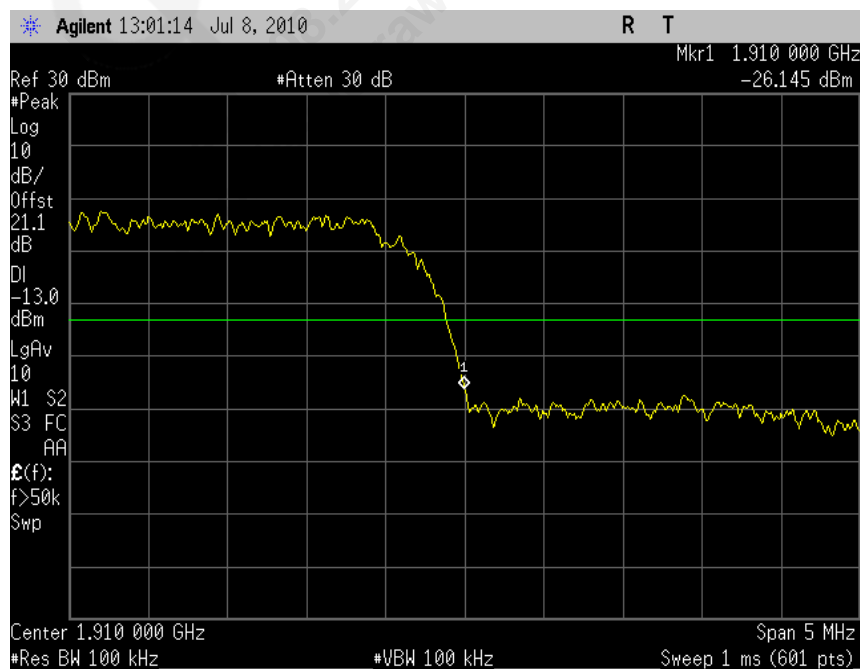
Plot 6.2-18 (Ch. 1513, HSUPA Subtest 5)



Plot 6.2-19 (Ch. 9262, HSUPA Subtest 5)

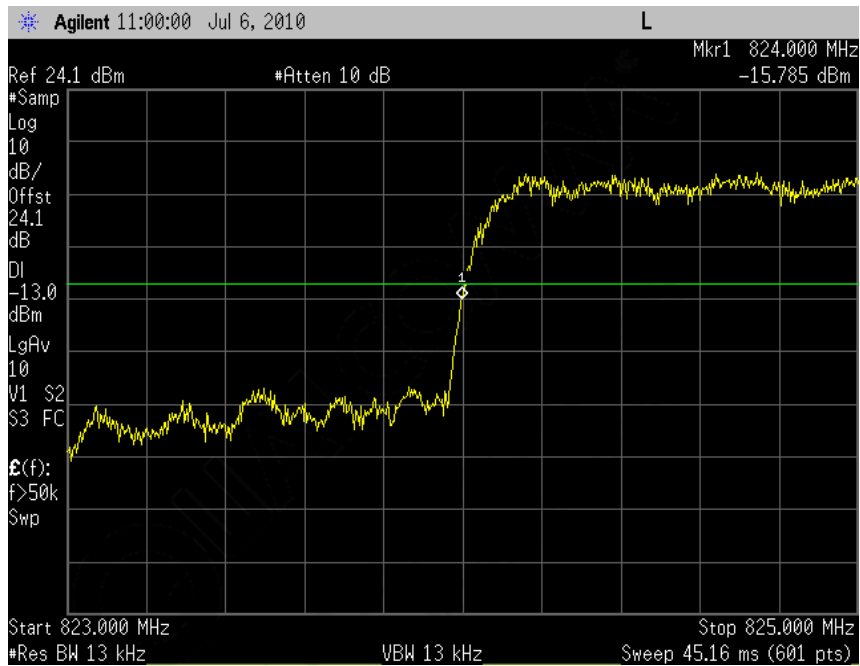


Plot 6.2-20 (Ch. 9538, HSUPA Subtest 5)

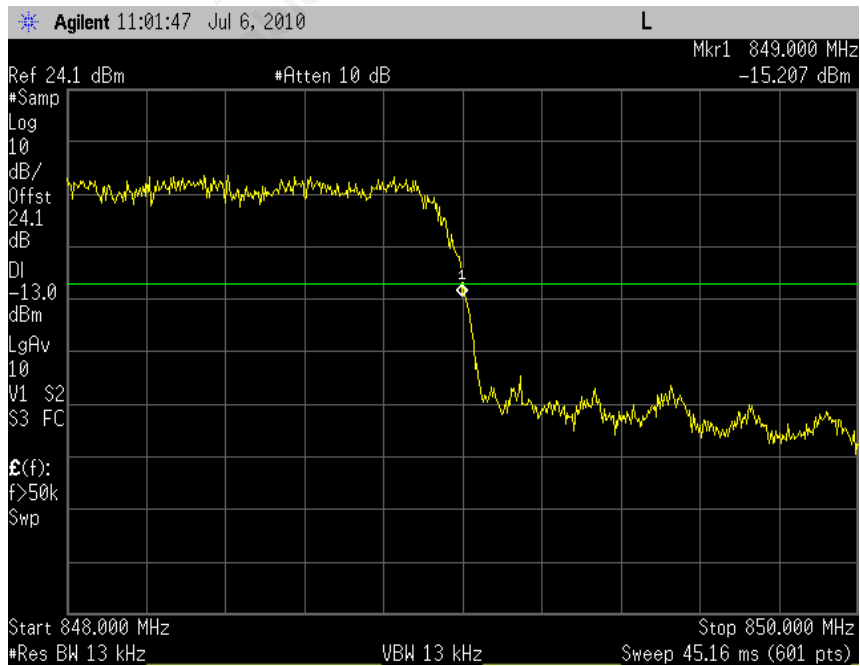


6.1.3 CDMA2000 Band Edge Plots

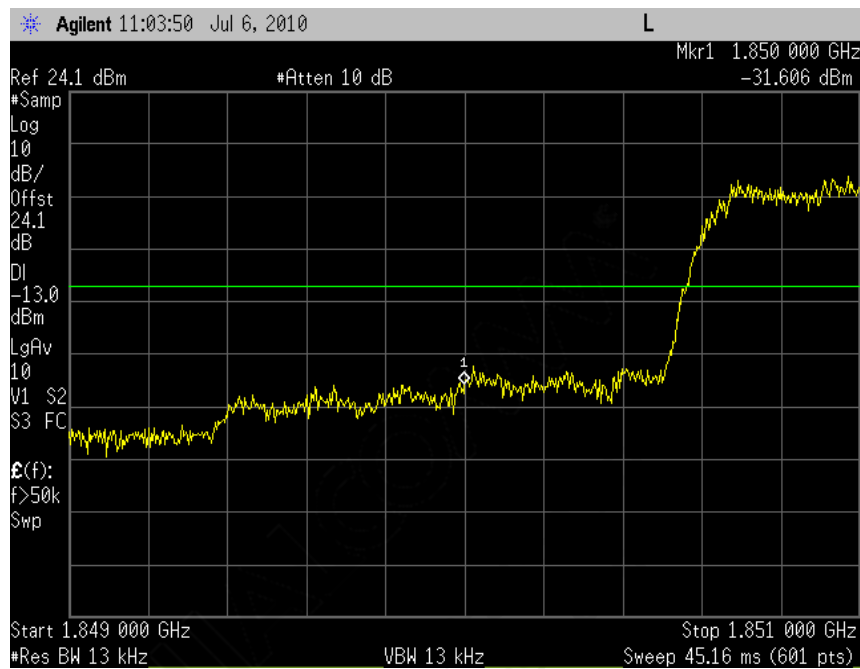
Plot 6.2-21 (Ch. 1013, RC3 SO55)



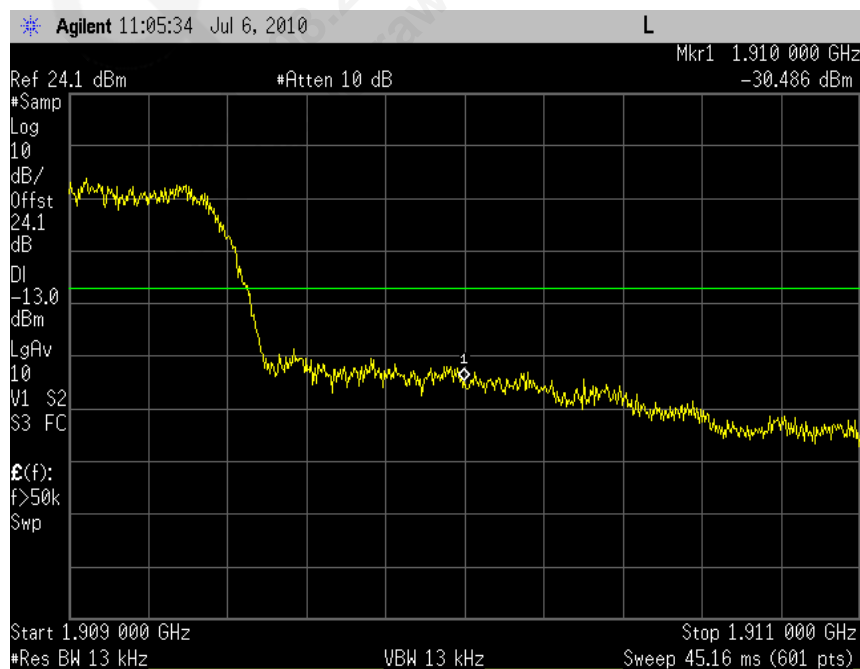
Plot 6.2-22 (Ch. 777, RC3 SO55)



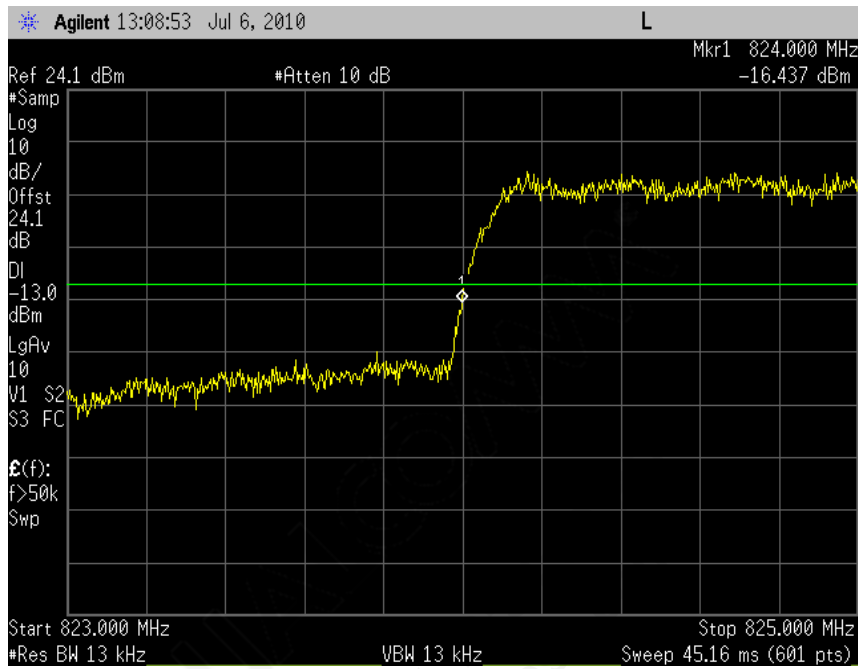
Plot 6.2-23 (Ch. 25, RC3 SO55)



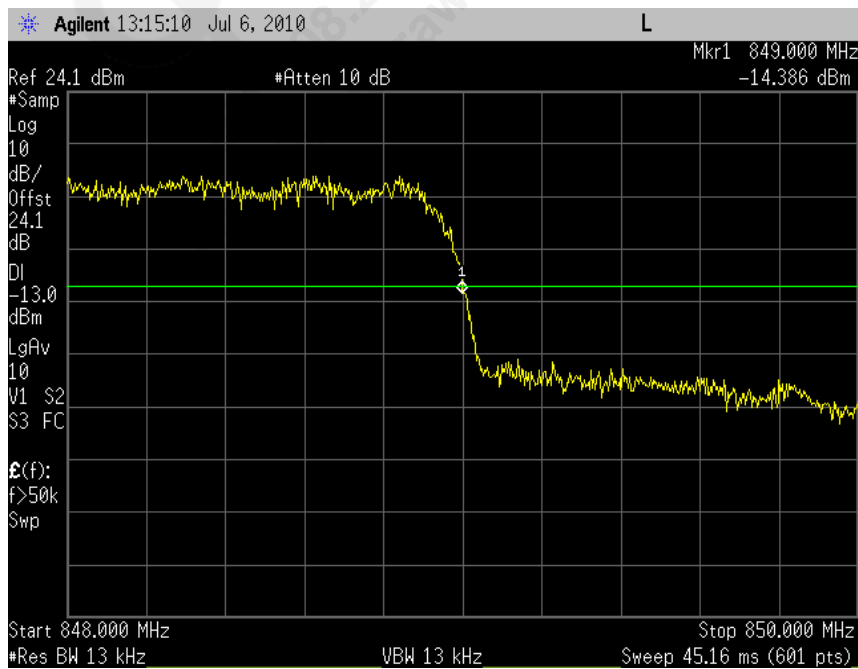
Plot 6.2-24 (Ch. 1175, RC3 SO55)



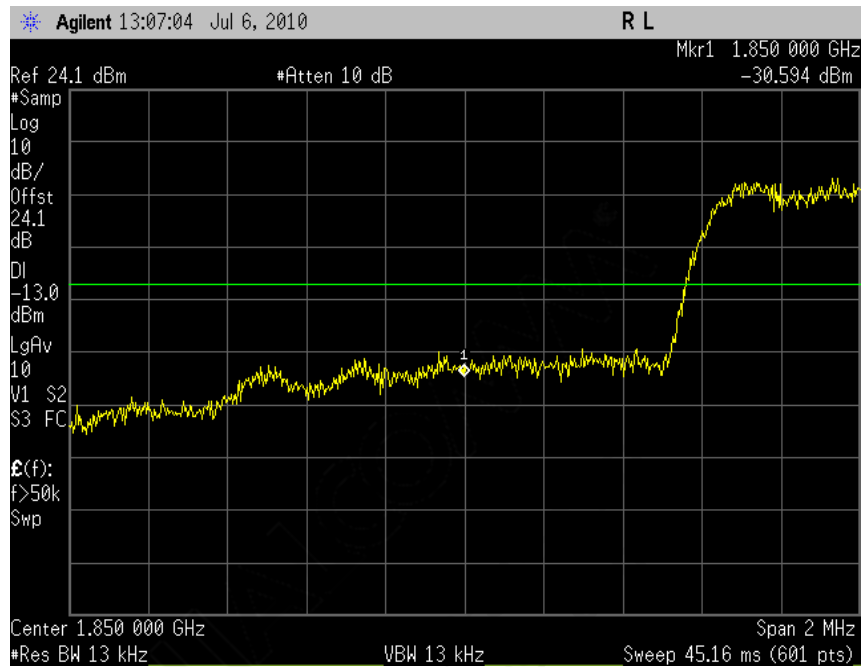
Plot 6.2-25 (Ch. 1013, Rel 0, 153.6 kbps)



Plot 6.2-26 (Ch. 777, Rel 0, 153.6 kbps)



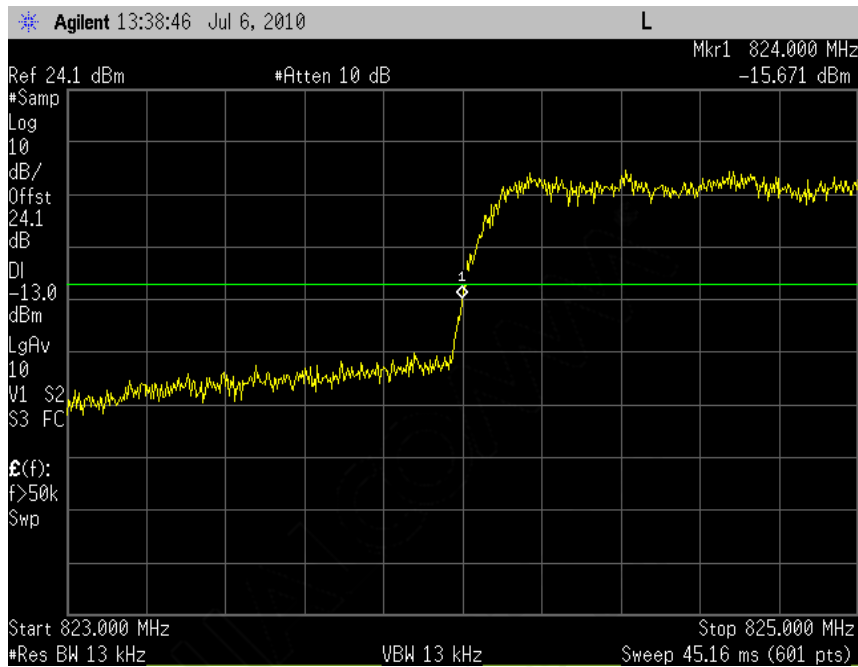
Plot 6.2-27 (Ch. 25, Rel 0, 153.6 kbps)



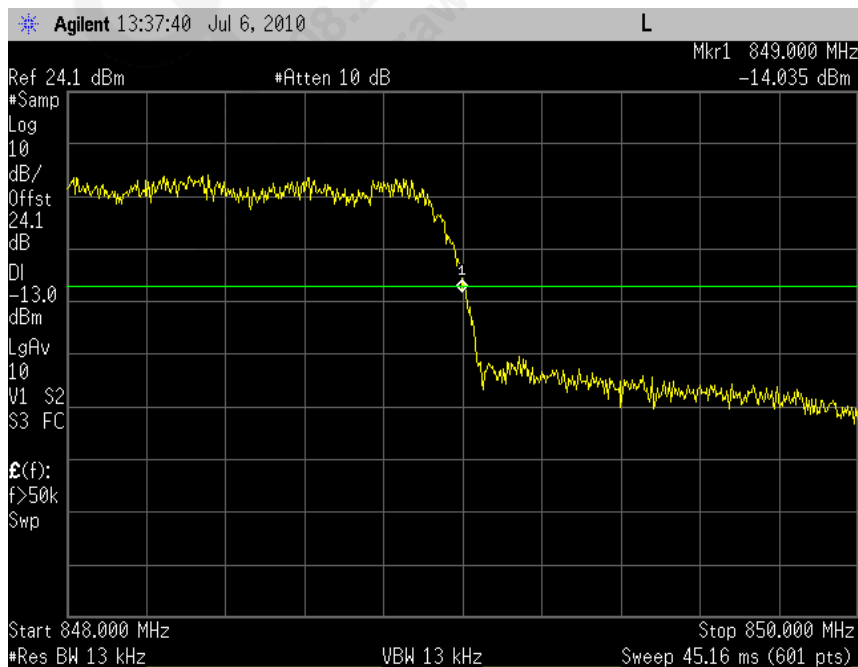
Plot 6.2-28 (Ch. 1175, Rel 0, 153.6 kbps)



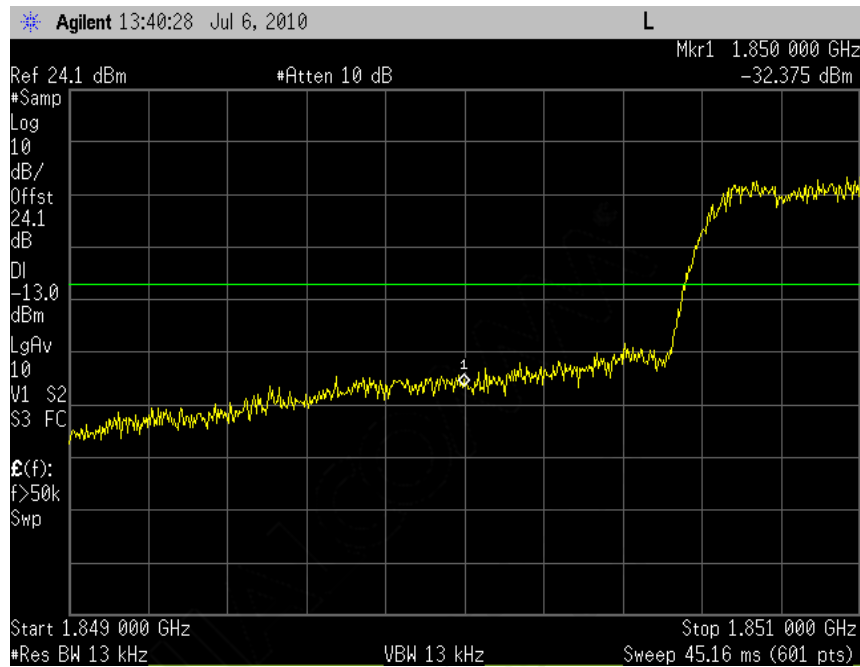
Plot 6.2-29 (Ch. 1013, Rev A, 4096 payload)



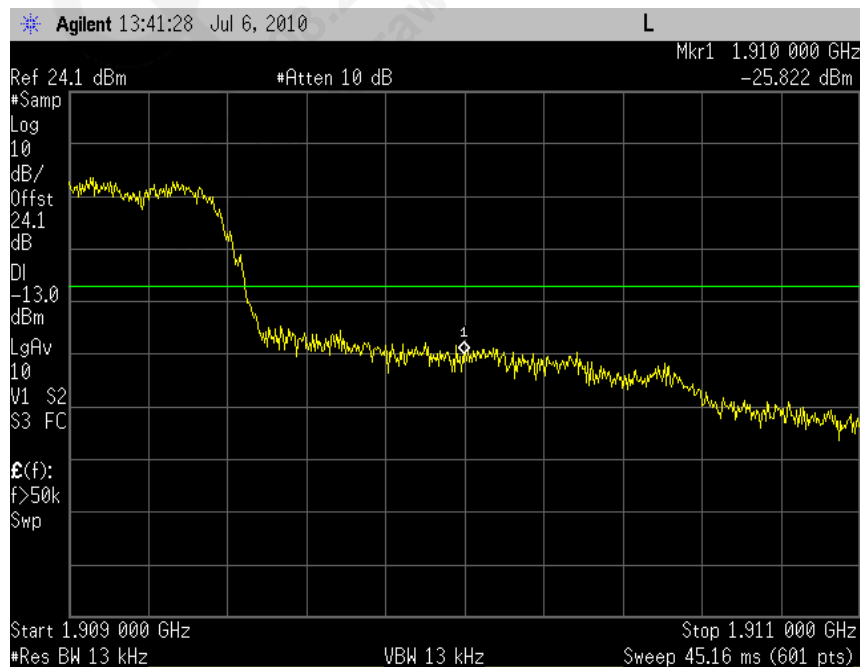
Plot 6.2-30 (Ch. 777, Rev A, 4096 payload)



Plot 6.2-31 (Ch. 25, Rev A, 4096 payload)



Plot 6.2-32 (Ch. 1175, Rev A, 4096 payload)



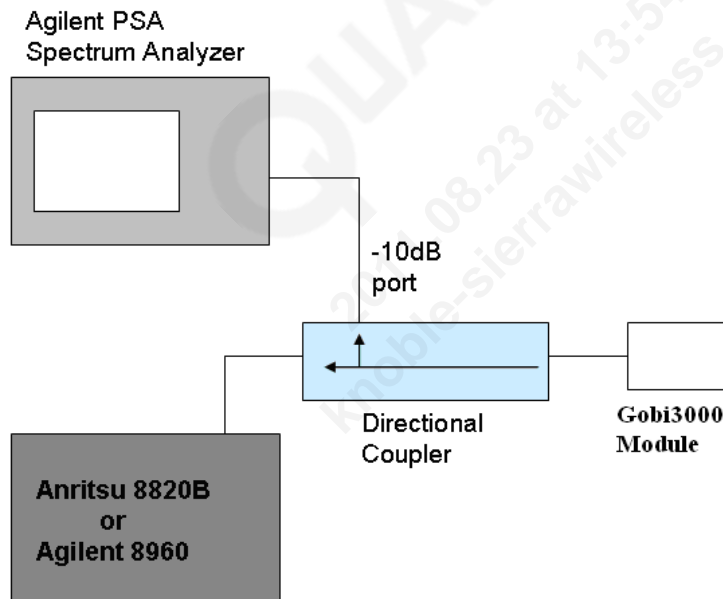
7. Out of Band Emission at Antenna Terminals

| | | | |
|---------------------|---------------------------------------|------------|---------------|
| FCC: | §22.901(d), 22.917, 24.238 (a), 27.53 | | |
| Limit: | -13dBm | | |
| DUT SN | N10F6XTXR | | |
| Modes Tested | CDMA 1x / 1x-EVDO | WCDMA/HSPA | GSM/GPRS/EDGE |
| | Rel 0, RTAP rate = 153.6kbps | Rel 99 | GSM EDGE |

7.1 Out of Band Emission Test Procedure

As shown in the figure below, the RF output to the spectrum analyzer is connected through a calibrated coaxial cable. Scan the out-of-band emission up to 10th harmonics. Set RBW and VBW as 100 kHz for the measurement below 1GHz, and 1MHz for testing above 1GHz. Recorded multiple sweeps in maximum hold mode using a peak detector to ensure that the worst case emission was caught.

The 8960 call box was used for CDMA 1x/1x-EVDO and UMTS measurements.



7.2 Emission Test Results

The test was conducted at low, mid and high channel in each band.

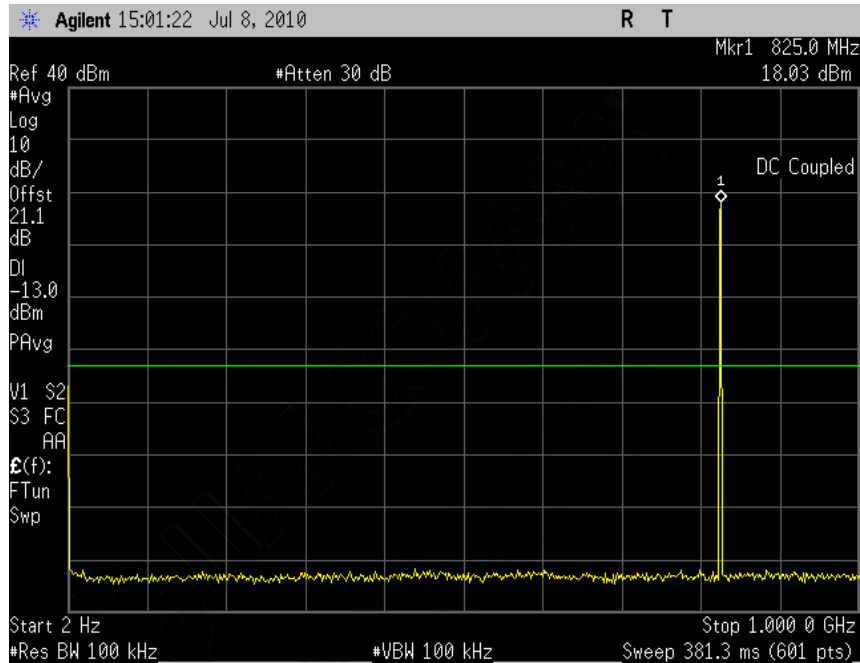
| Mode | Frequency Range Tested | Tx Channel | Corresponding Plot number | Test Result | |
|-----------------------|------------------------|------------|---------------------------|-------------------|----------|
| GSM/ GPRS/ EDGE | GMSK | 0 ~ 20 GHz | 128 | Plot 7.2 - 1, 2 | Complies |
| | | 0 ~ 20 GHz | 190 | Plot 7.2 - 3, 4 | Complies |
| | | 0 ~ 20 GHz | 251 | Plot 7.2 - 5, 6 | Complies |
| | | 0 ~ 20 GHz | 512 | Plot 7.2 - 7, 8 | Complies |
| | | 0 ~ 20 GHz | 661 | Plot 7.2 - 9, 10 | Complies |
| | | 0 ~ 20 GHz | 810 | Plot 7.2 - 11, 12 | Complies |
| | 8PSK | 0 ~ 20 GHz | 128 | Plot 7.2 - 13, 14 | Complies |
| | | 0 ~ 20 GHz | 190 | Plot 7.2 - 15, 16 | Complies |
| | | 0 ~ 20 GHz | 251 | Plot 7.2 - 17, 18 | Complies |
| | | 0 ~ 20 GHz | 512 | Plot 7.2 - 19, 20 | Complies |
| | | 0 ~ 20 GHz | 661 | Plot 7.2 - 21, 22 | Complies |
| | | 0 ~ 20 GHz | 810 | Plot 7.2 - 23, 24 | Complies |

| Mode | | Frequency Range Tested | Tx Channel | Corresponding Plot number | Test Result |
|---------------------------|--------|------------------------|------------|---------------------------|-------------|
| WCDMA/ HSDPA/ HSUPA | Rel 99 | 0 ~ 20 GHz | 4132 | Plot 7.2 - 25, 26 | Complies |
| | | 0 ~ 20 GHz | 4182 | Plot 7.2 - 27, 28 | Complies |
| | | 0 ~ 20 GHz | 4233 | Plot 7.2 - 29, 30 | Complies |
| | | 0 ~ 20 GHz | 1312 | Plot 7.2 - 31, 32 | Complies |
| | | 0 ~ 20 GHz | 1427 | Plot 7.2 - 33, 34 | Complies |
| | | 0 ~ 20 GHz | 1513 | Plot 7.2 - 35, 36 | Complies |
| | | 0 ~ 20 GHz | 9262 | Plot 7.2 - 37, 38 | Complies |
| | | 0 ~ 20 GHz | 9400 | Plot 7.2 - 39, 40 | Complies |
| | | 0 ~ 20 GHz | 9538 | Plot 7.2 - 41, 42 | Complies |

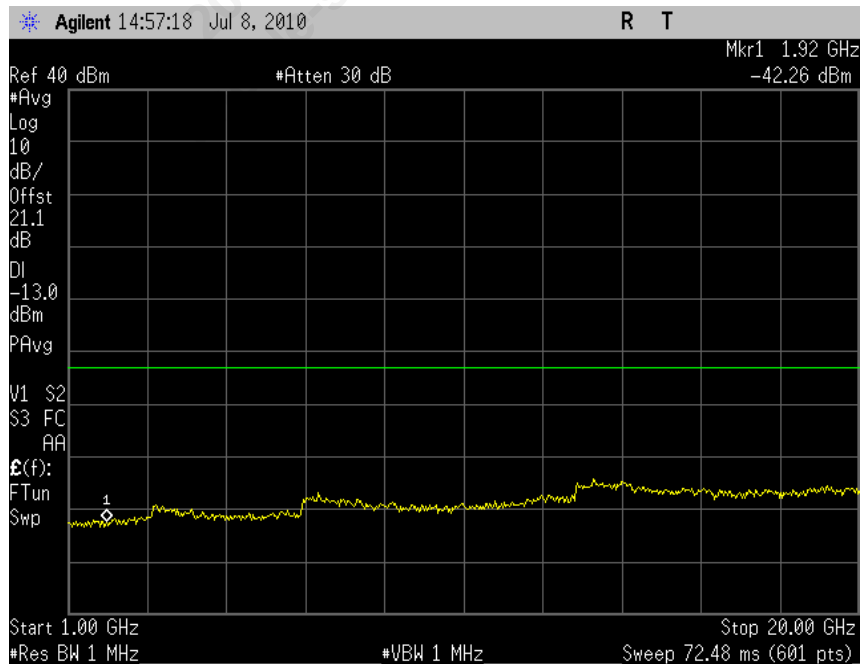
| Mode | | Frequency (MHz) | Channel Tested | Corresponding Plot number | Test Result |
|--------------------|--------------------------------------|-----------------|----------------|---------------------------|-------------|
| CDMA1x/ 1x-EVDO | Rel 0 RTAP rate = 153.6kbps | 0 ~ 20 GHz | 1013 | Plot 7.2 - 43, 44 | Complies |
| | | 0 ~ 20 GHz | 384 | Plot 7.2 - 45, 46 | Complies |
| | | 0 ~ 20 GHz | 777 | Plot 7.2 - 47, 48 | Complies |
| | | 0 ~ 20 GHz | 25 | Plot 7.2 - 49, 50 | Complies |
| | | 0 ~ 20 GHz | 600 | Plot 7.2 - 51, 52 | Complies |
| | | 0 ~ 20 GHz | 1175 | Plot 7.2 - 53, 54 | Complies |

7.2.1 GSM Emissions Plots

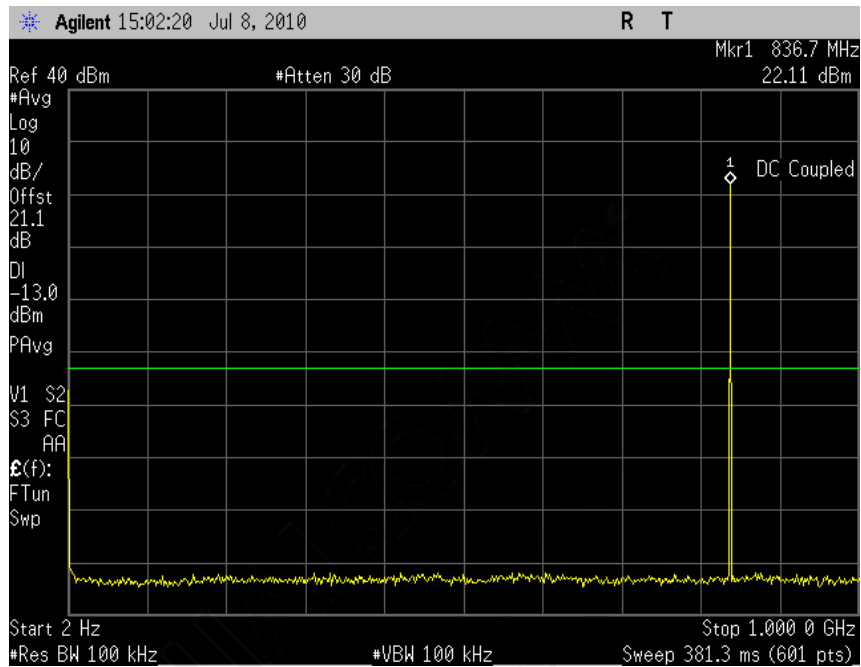
Plot 7.2 - 1 (GMSK Ch128)



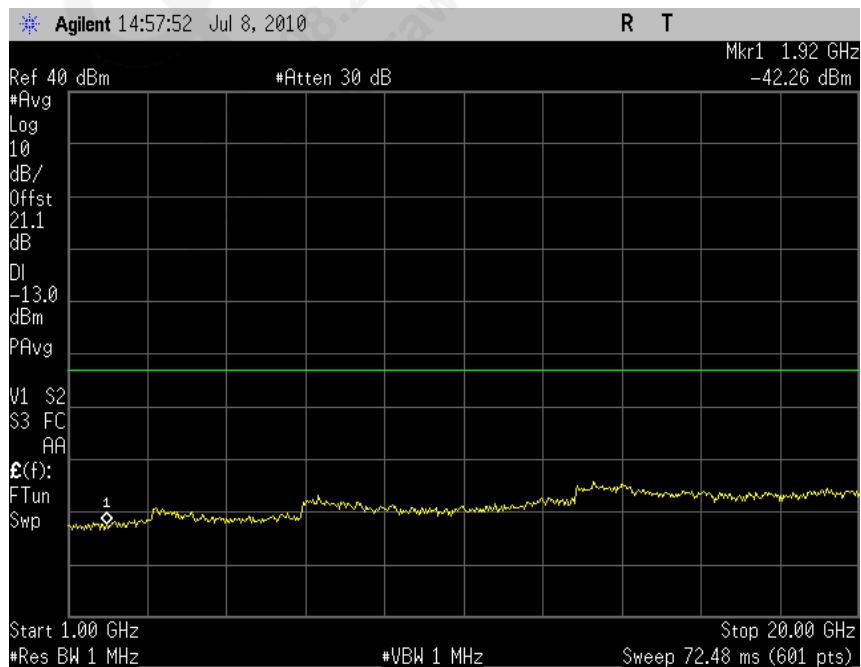
Plot 7.2 - 2 (GMSK Ch128)



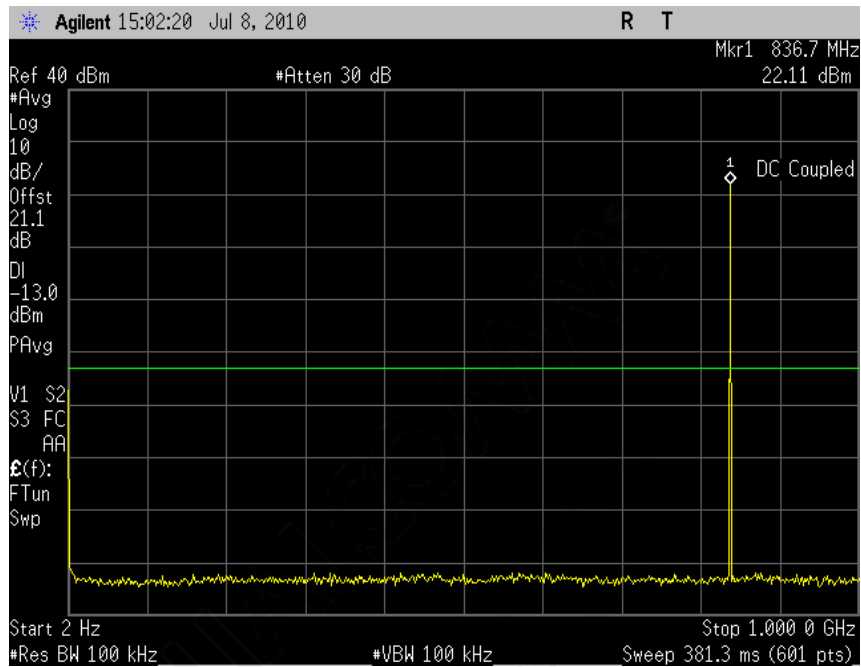
Plot 7.2 - 3 (8PSK Ch190)



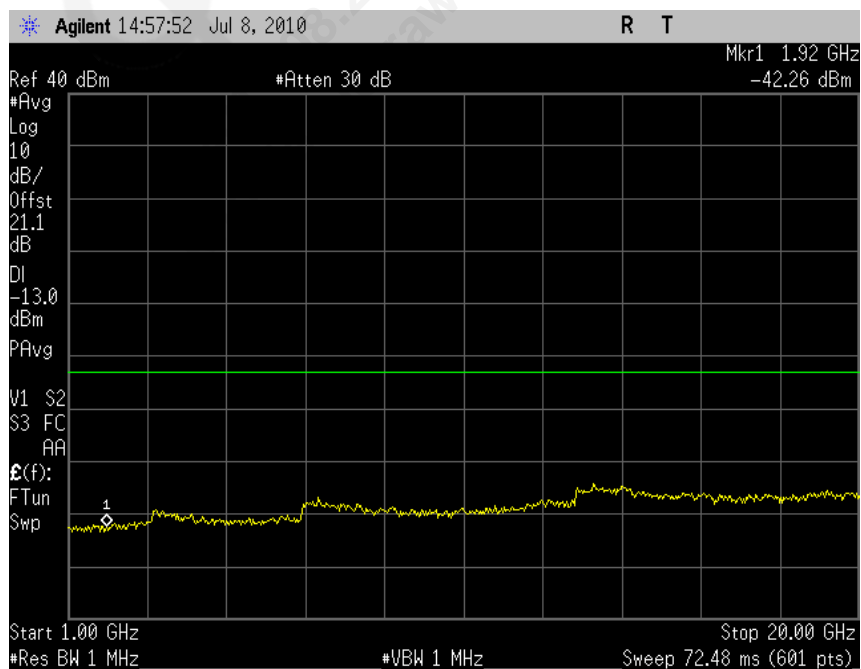
Plot 7.2 - 4 (8PSK Ch190)



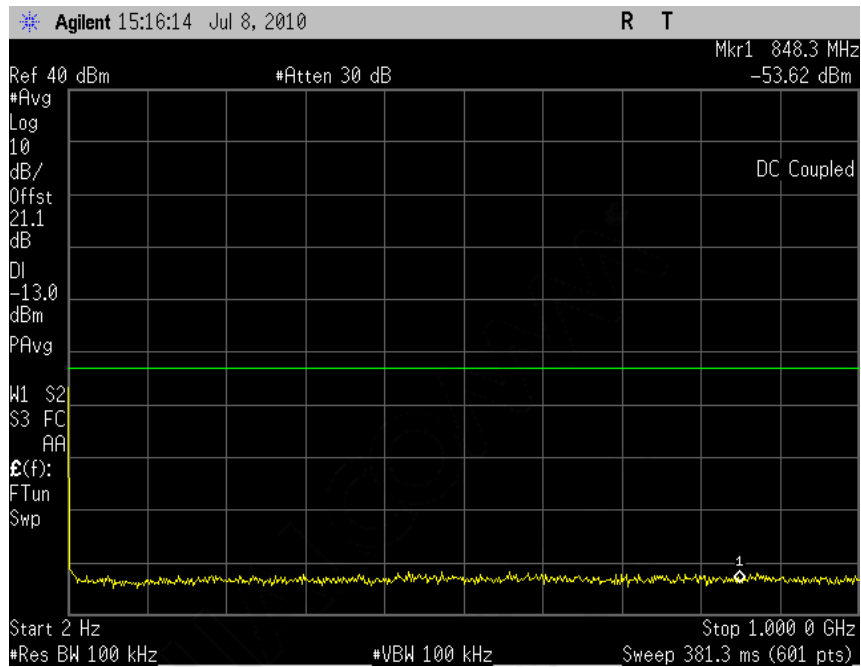
Plot 7.2 -5 (GMSK Ch251)



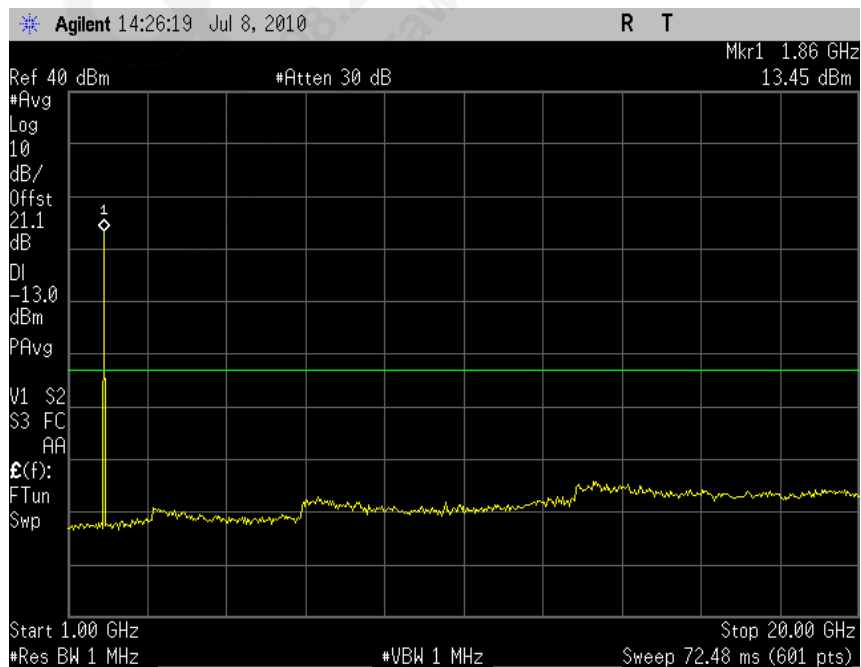
Plot 7.2 -6 (GMSK Ch251)



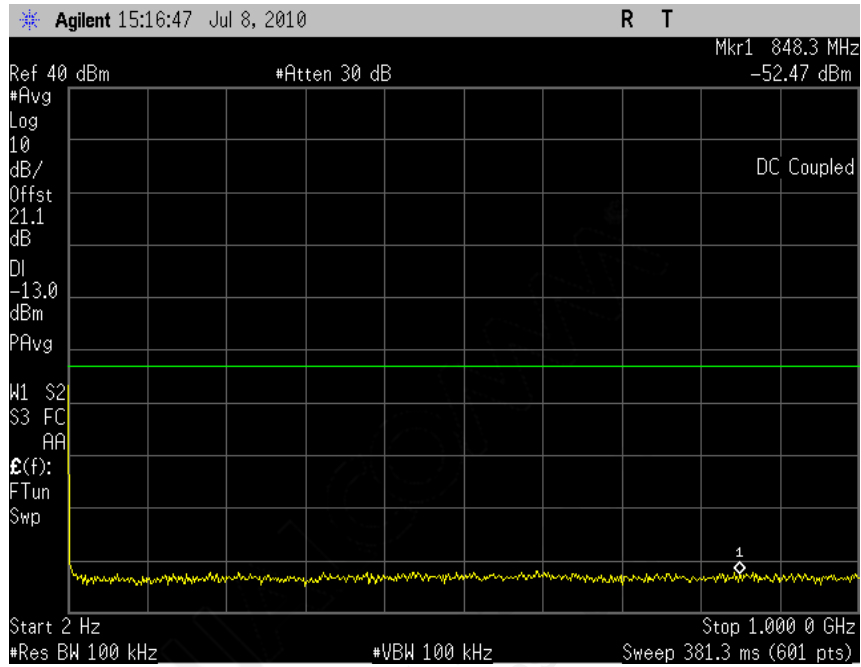
Plot 7.2 -7 (GMSK Ch512)



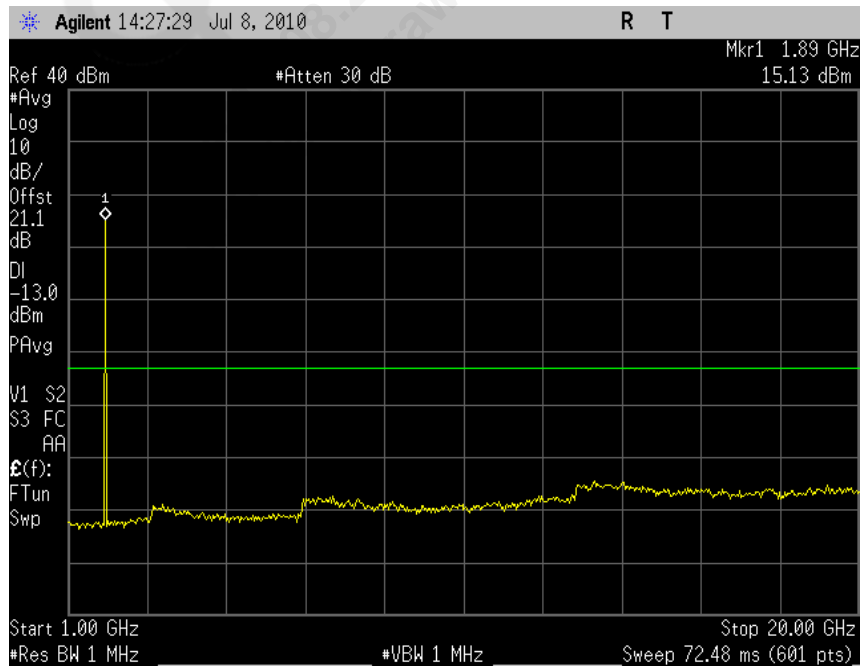
Plot 7.2 -8 (GMSK Ch512)



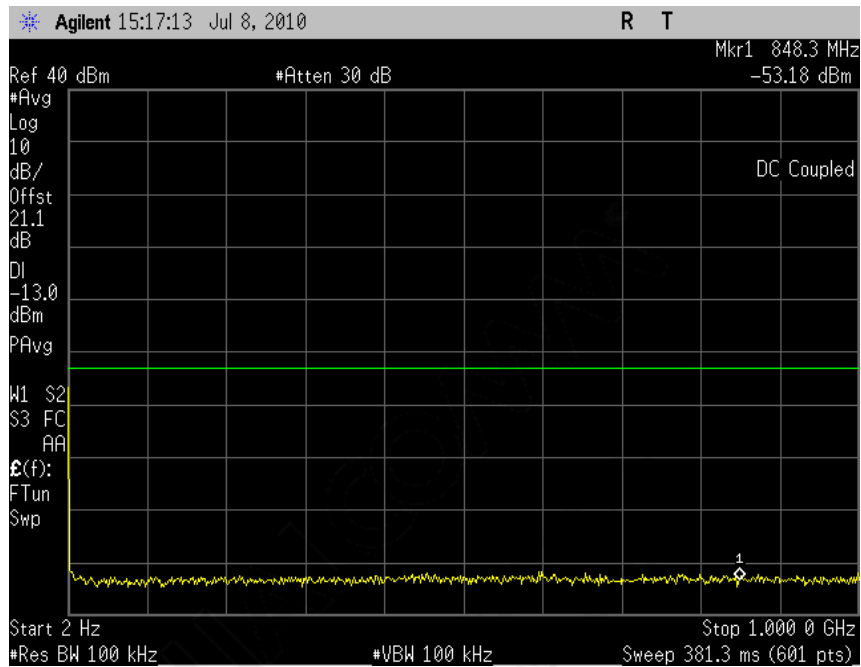
Plot 7.2 -9 (8PSK Ch661)



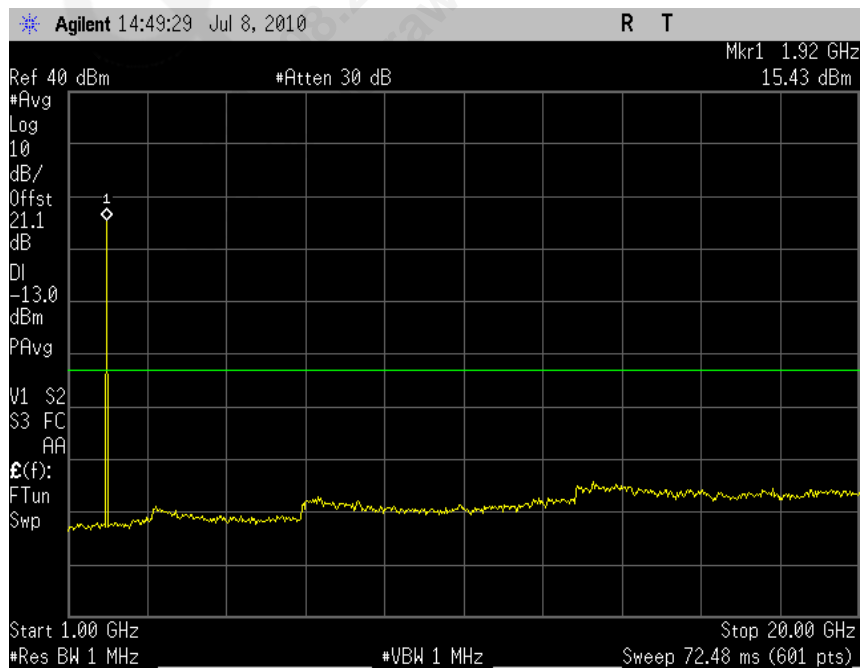
Plot 7.2 -10 (8PSK Ch661)



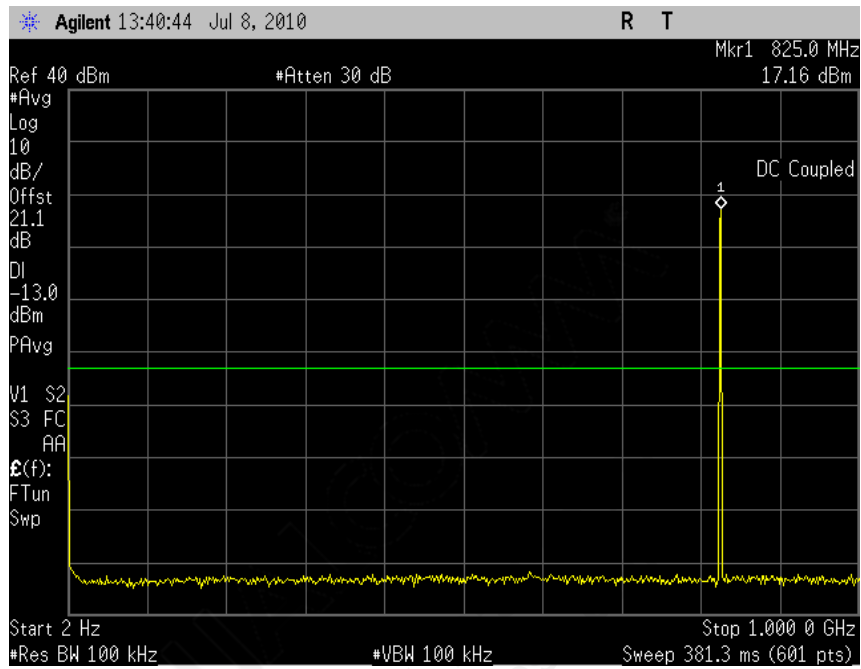
Plot 7.2 -11 (GMSK Ch810)



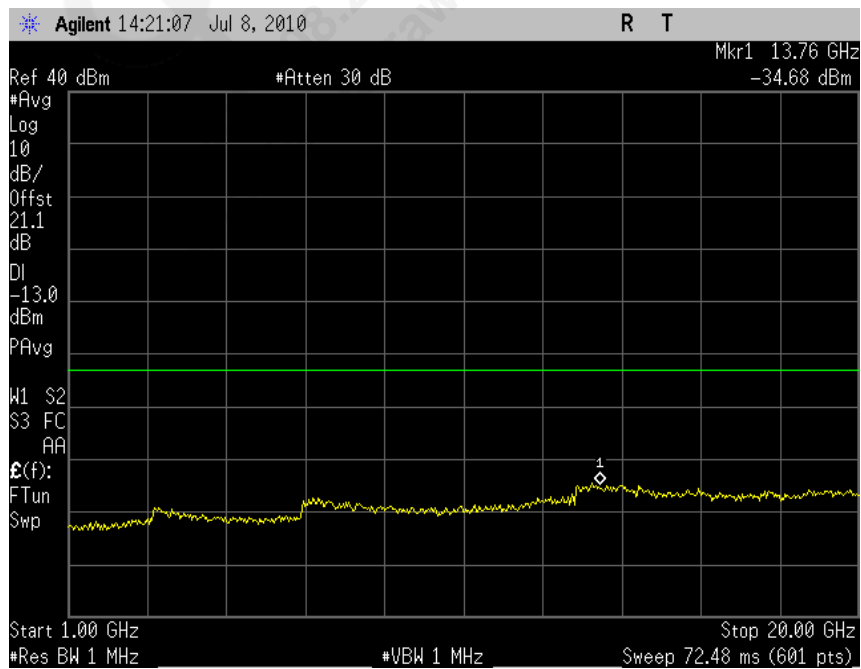
Plot 7.2 -12 (GMSK Ch810)



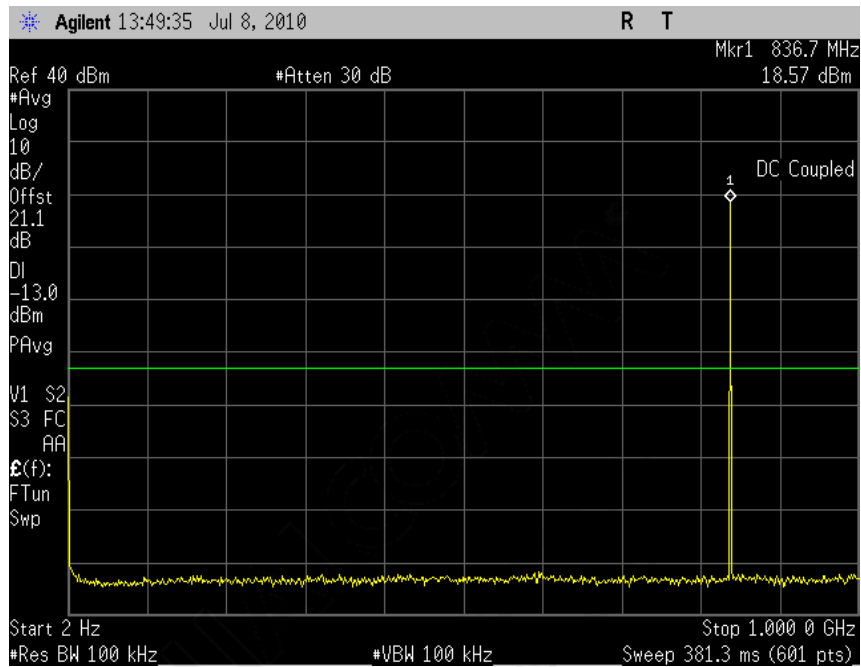
Plot 7.2 -13 (8PSK Ch128)



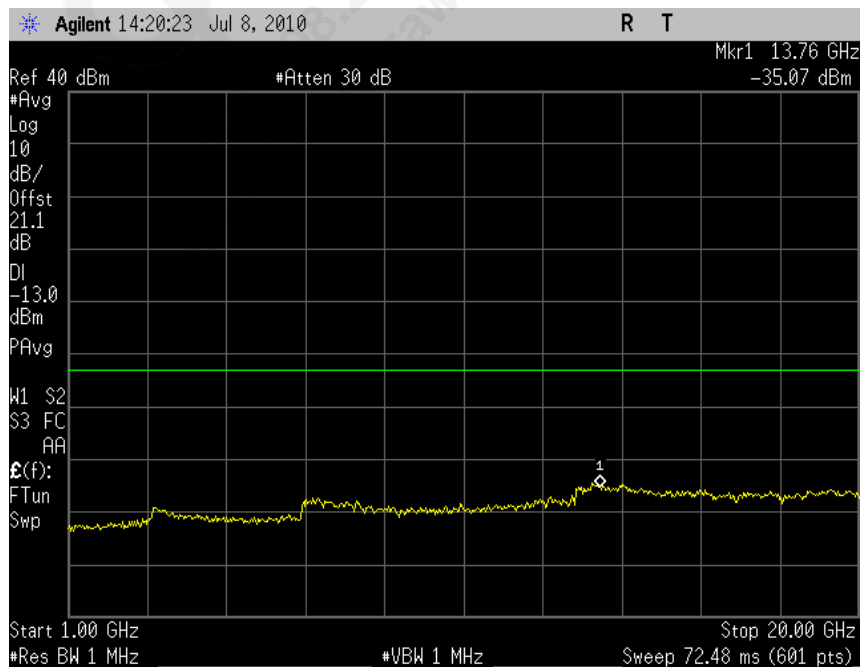
Plot 7.2 -14 (8PSK Ch128)



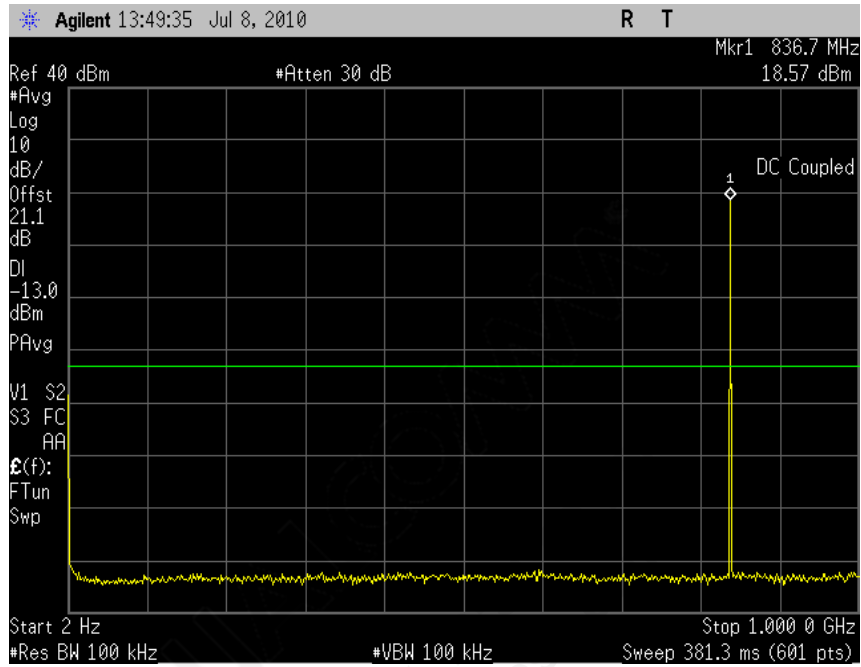
Plot 7.2 -15 (8PSK Ch190)



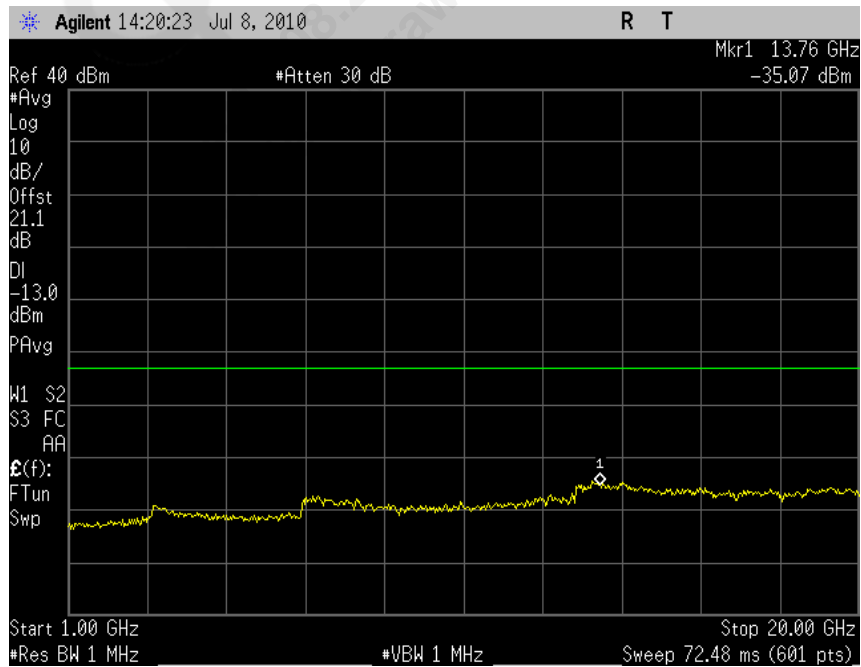
Plot 7.2 -16 (8PSK Ch190)



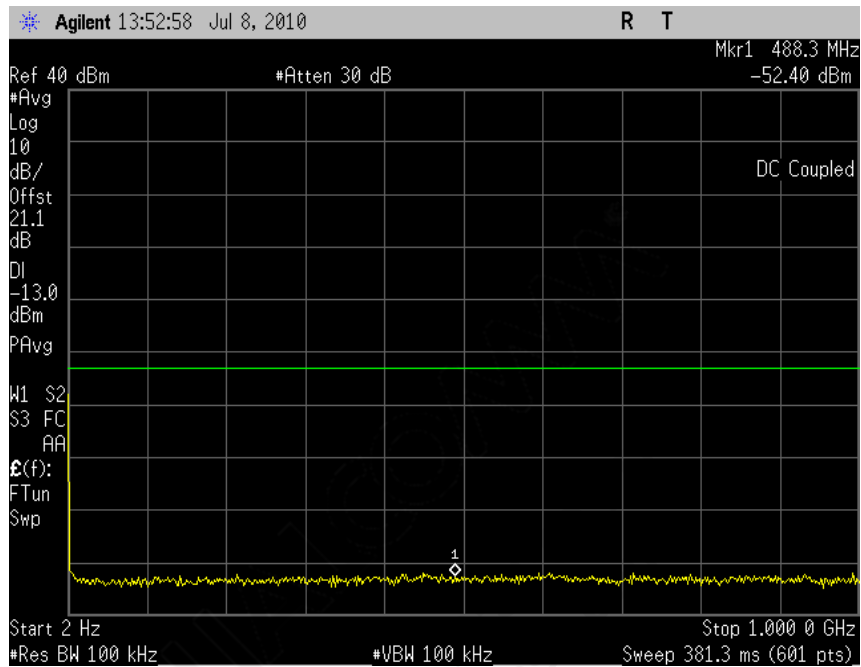
Plot 7.2 -17 (8PSK Ch251)



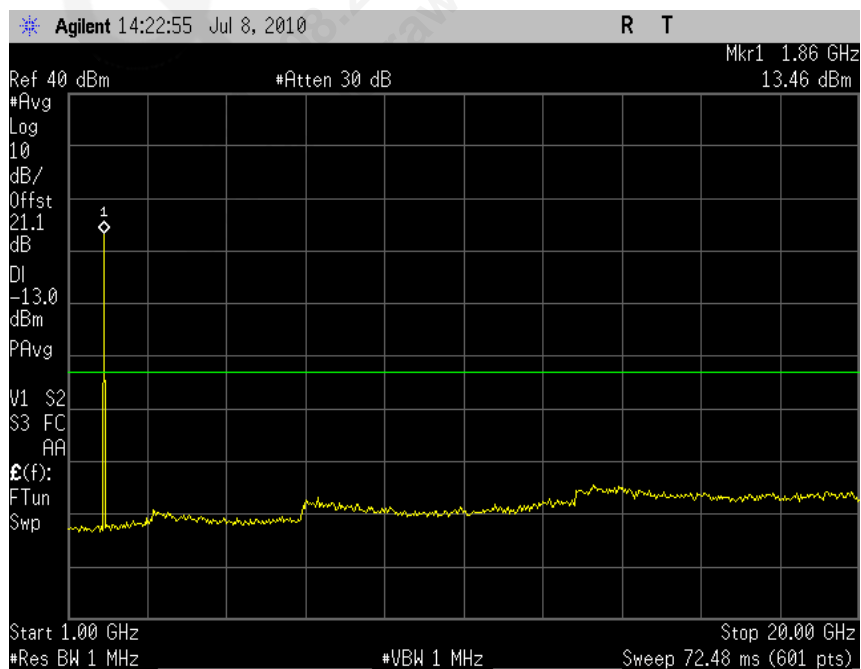
Plot 7.2 -18 (8PSK Ch251)



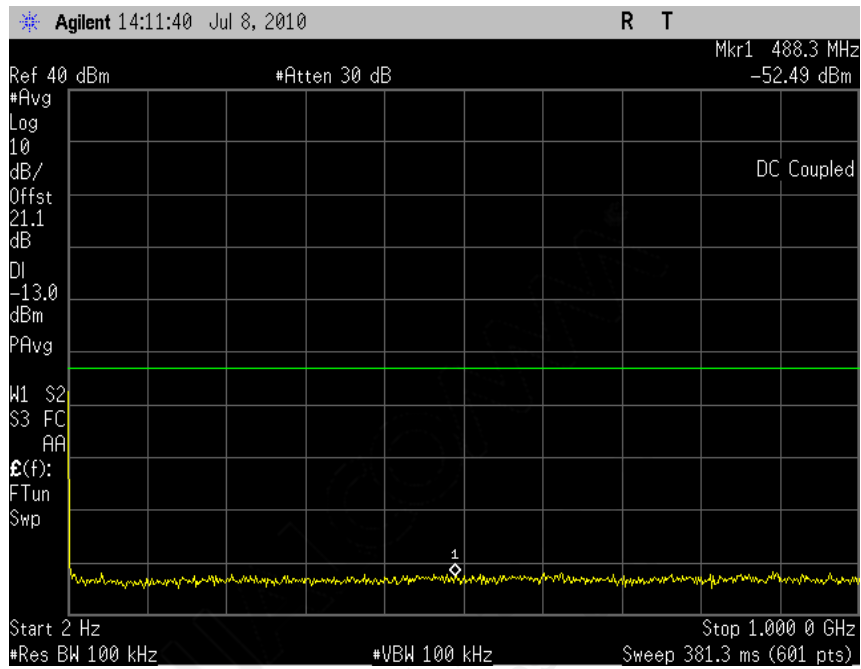
Plot 7.2 -19 (8PSK Ch512)



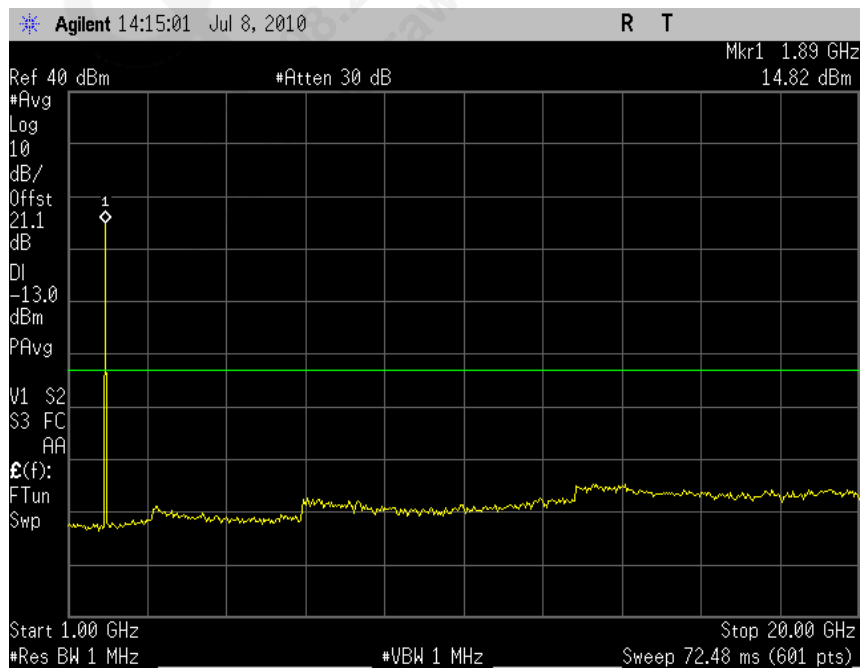
Plot 7.2 -20 (8PSK Ch512)



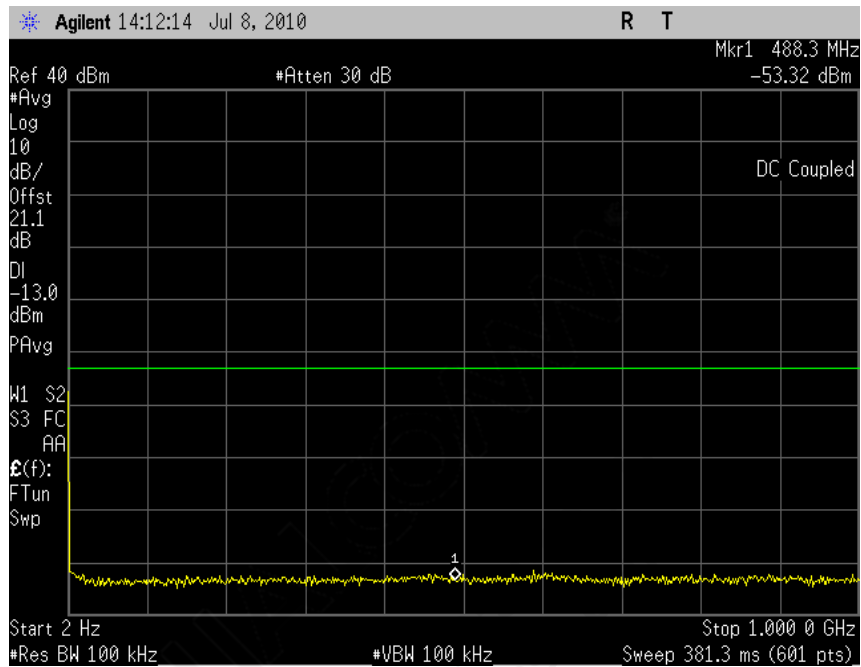
Plot 7.2 - 21 (8PSK Ch661)



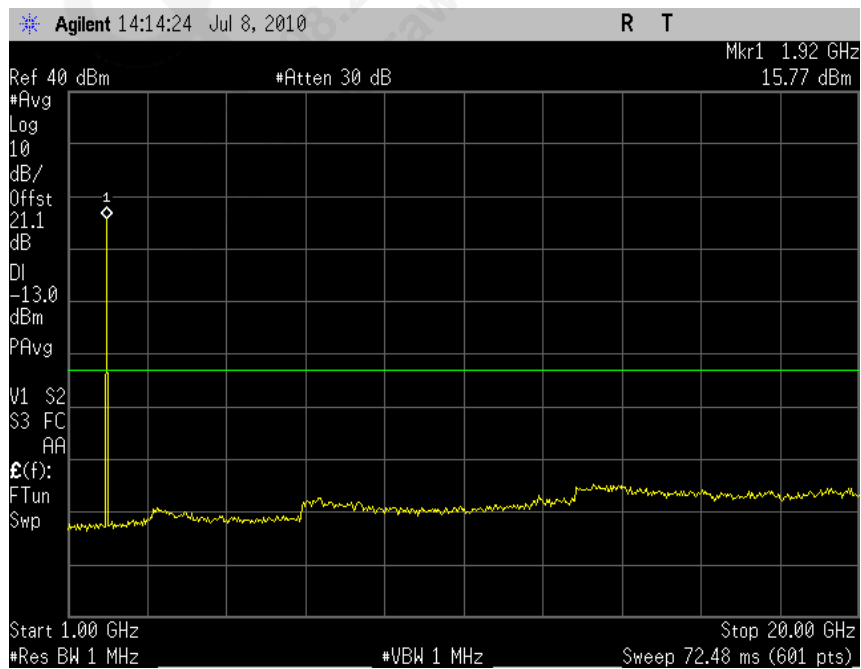
Plot 7.2 - 22 (8PSK Ch661)



Plot 7.2 - 23 (8PSK Ch810)

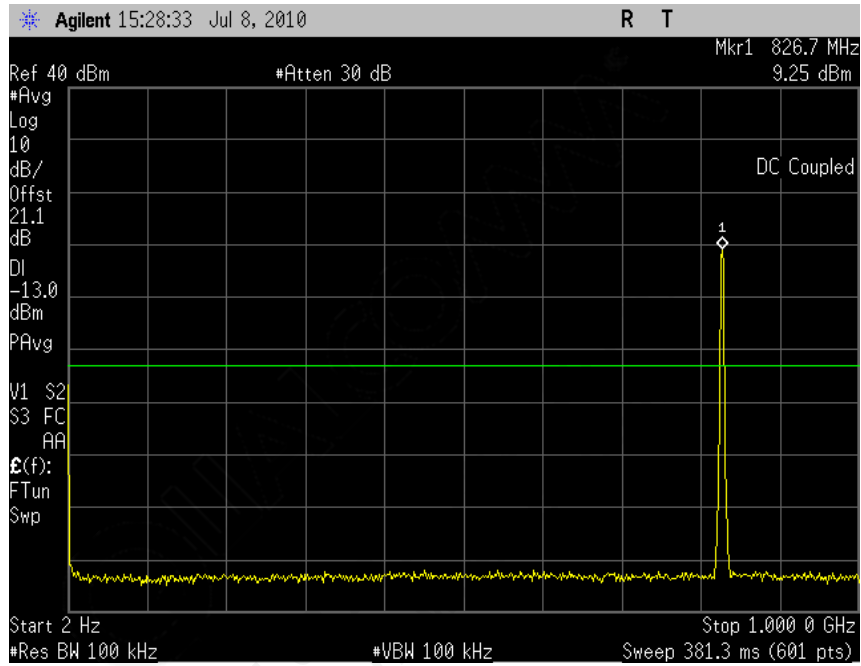


Plot 7.2 - 24 (8PSK Ch810)

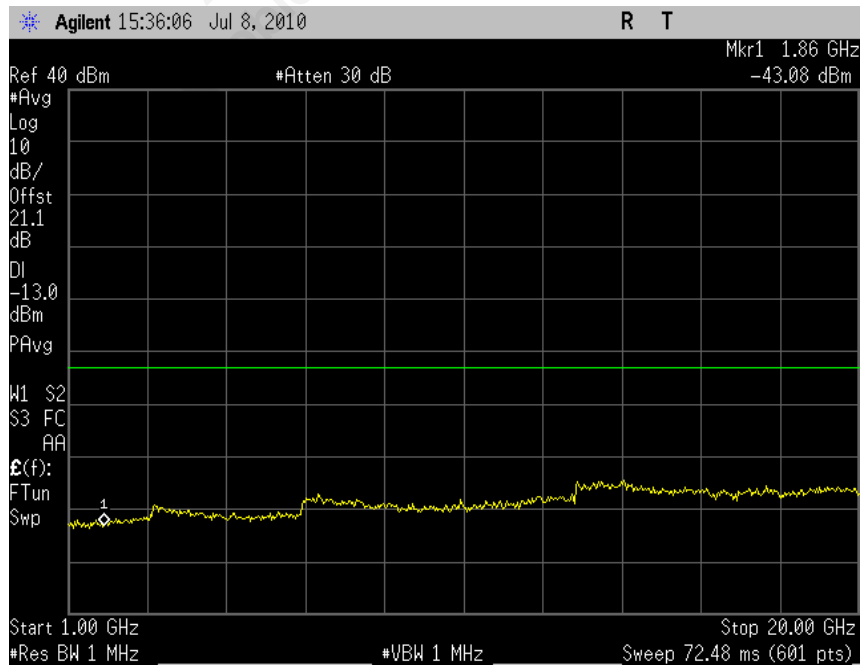


7.2.2 UMTS Emissions Plots

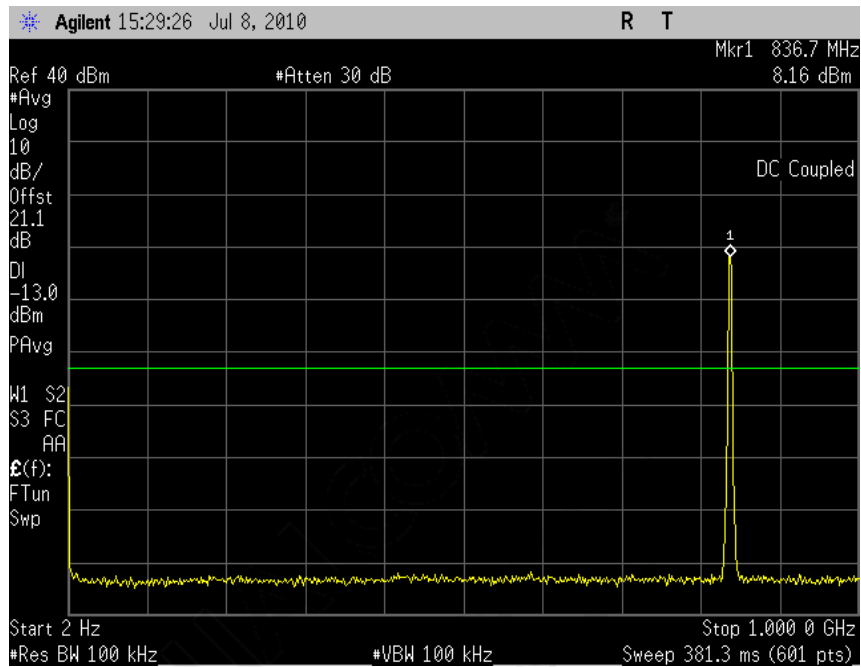
Plot 7.2 - 25 (Rel99, Ch4132)



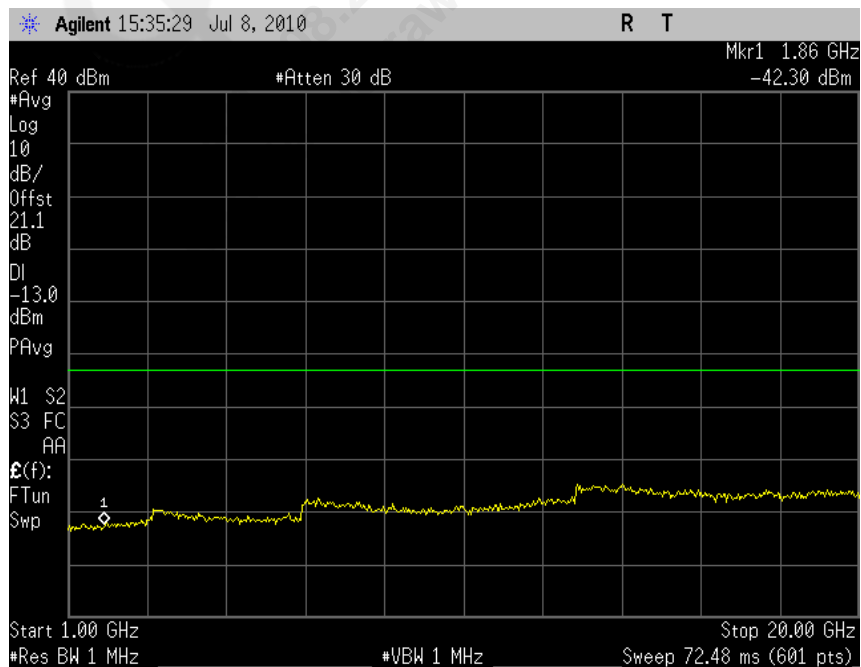
Plot 7.2 - 26 (Rel99, Ch4132)



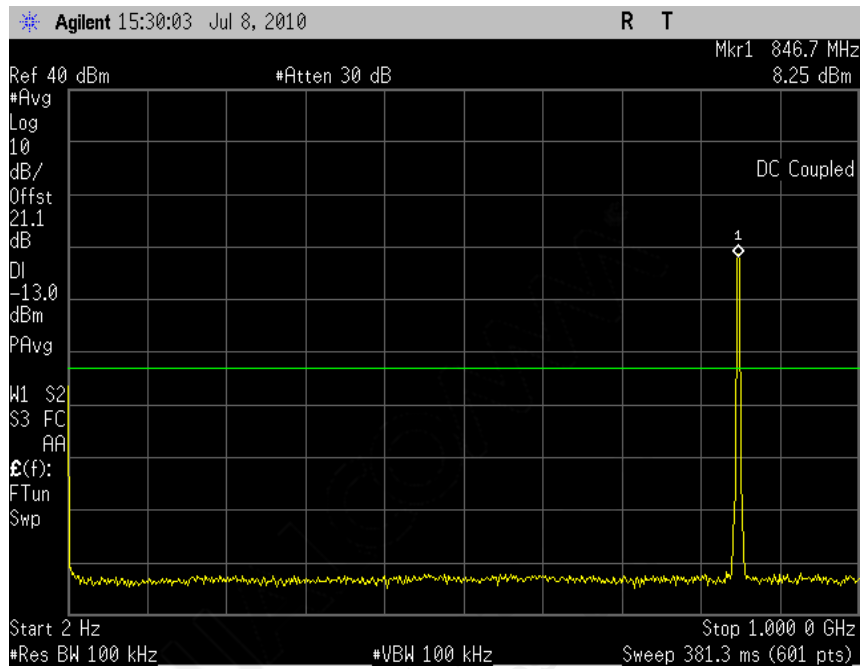
Plot 7.2 - 27 (Rel99, Ch4182)



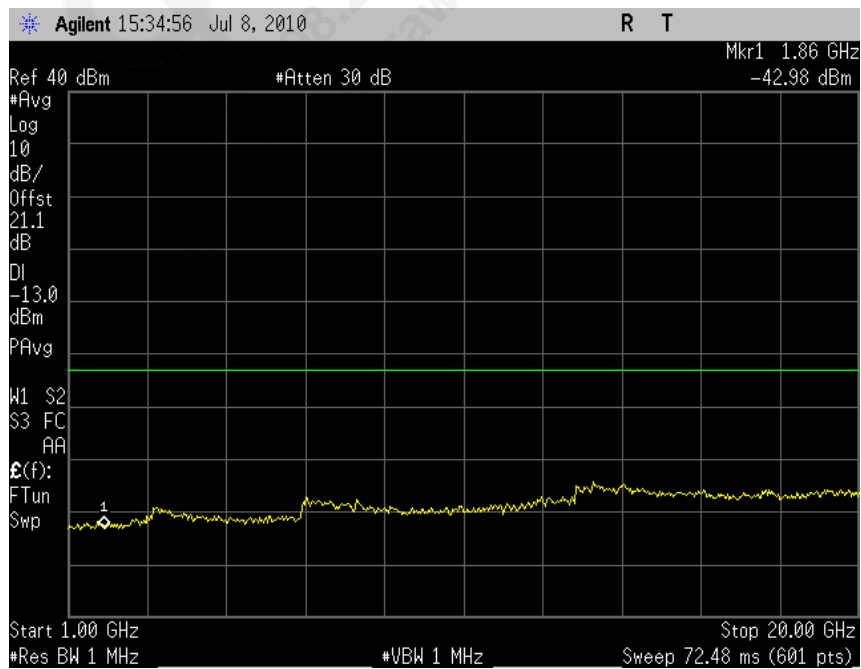
Plot 7.2 - 28 (Rel99, Ch4182)



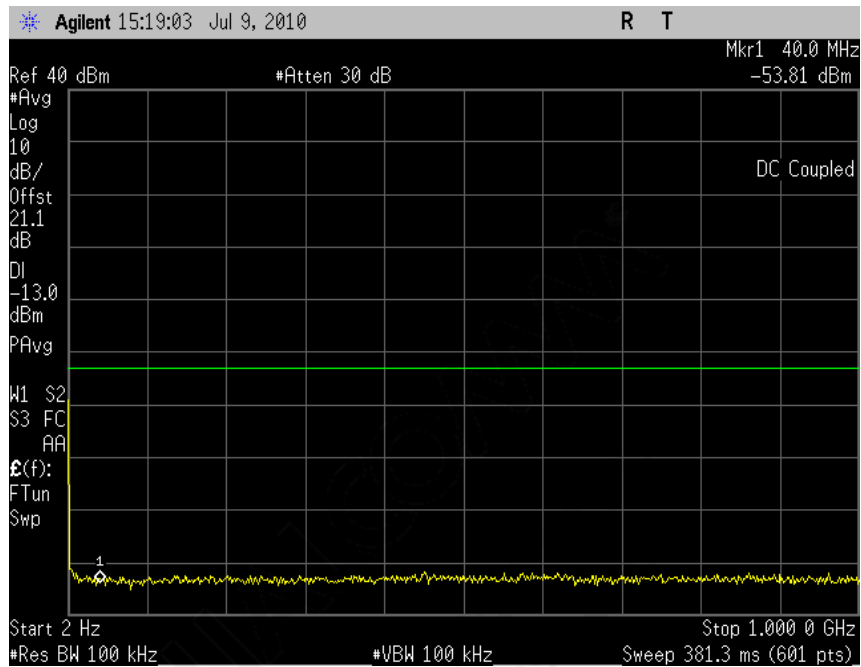
Plot 7.2 - 29 (Rel99, Ch4233)



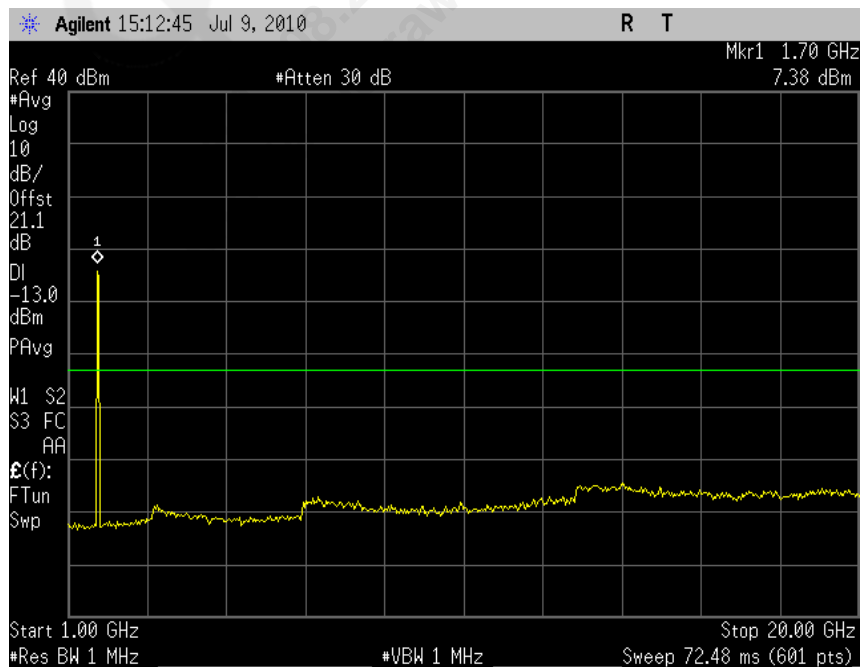
Plot 7.2 - 30 (Rel99, Ch4233)



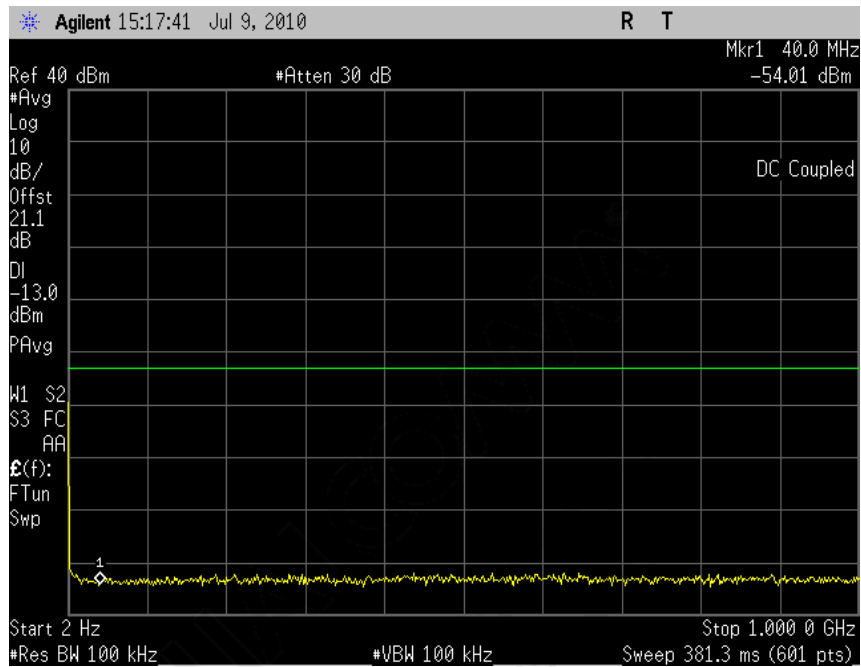
Plot 7.2 - 31 (Rel99, Ch1312)



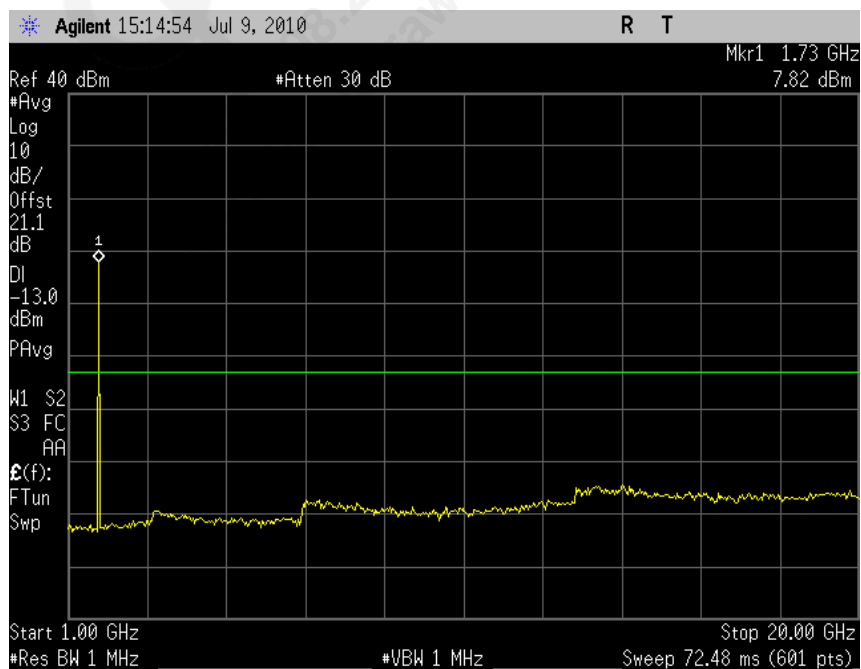
Plot 7.2 - 32 (Rel99, Ch1312)



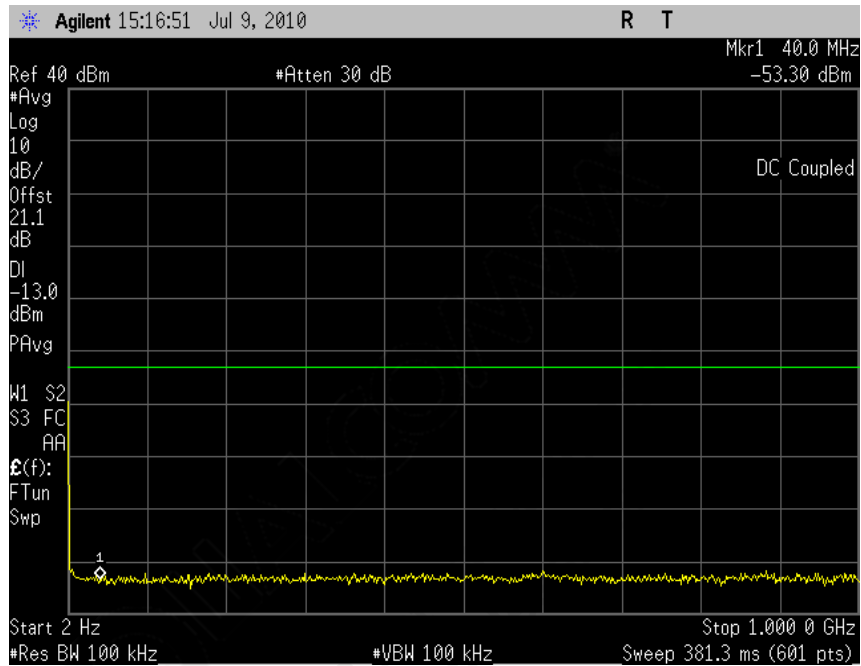
Plot 7.2 - 33 (Rel99, Ch1427)



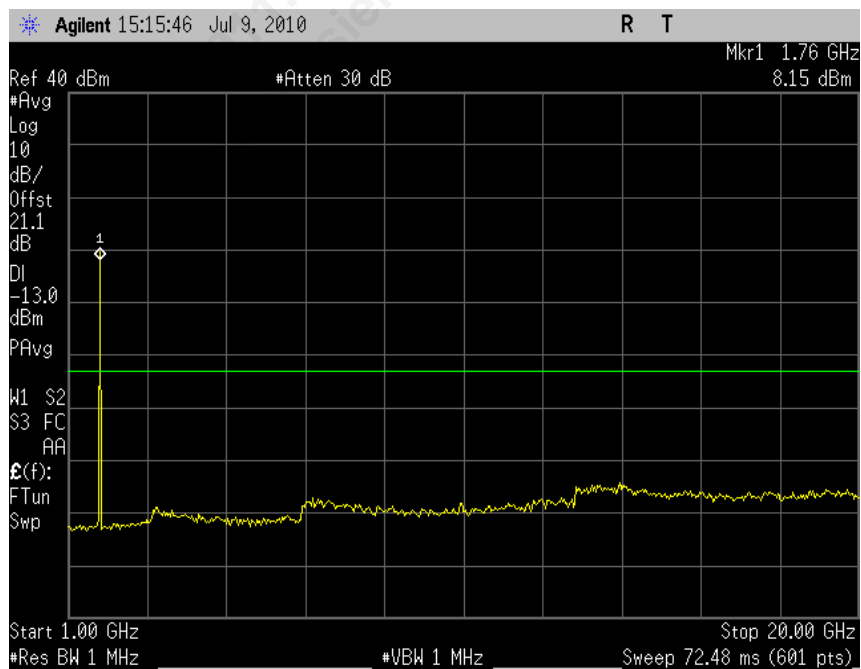
Plot 7.2 - 34 (Rel99, Ch1427)



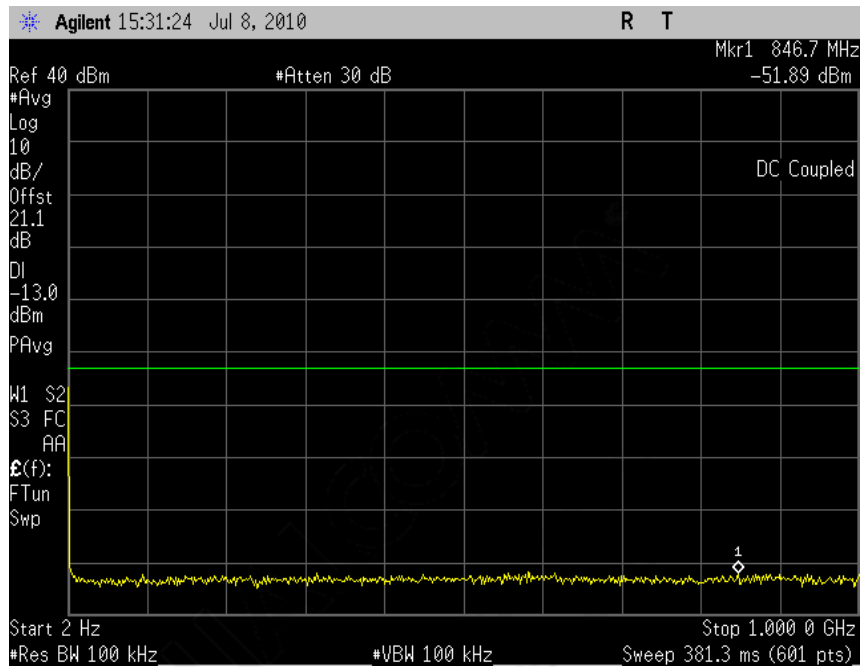
Plot 7.2 - 35 (Rel99, Ch1513)



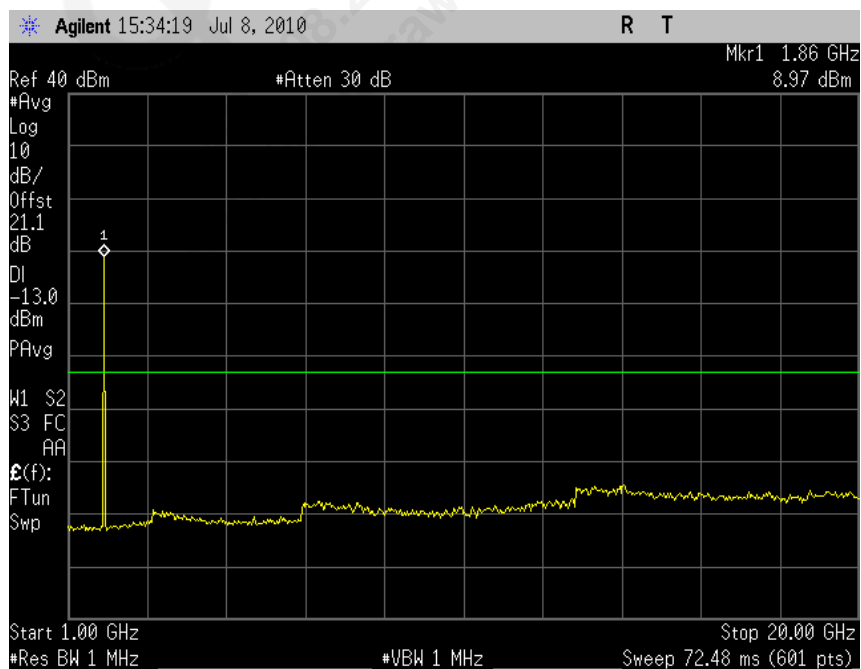
Plot 7.2 - 36 (Rel99, Ch1513)



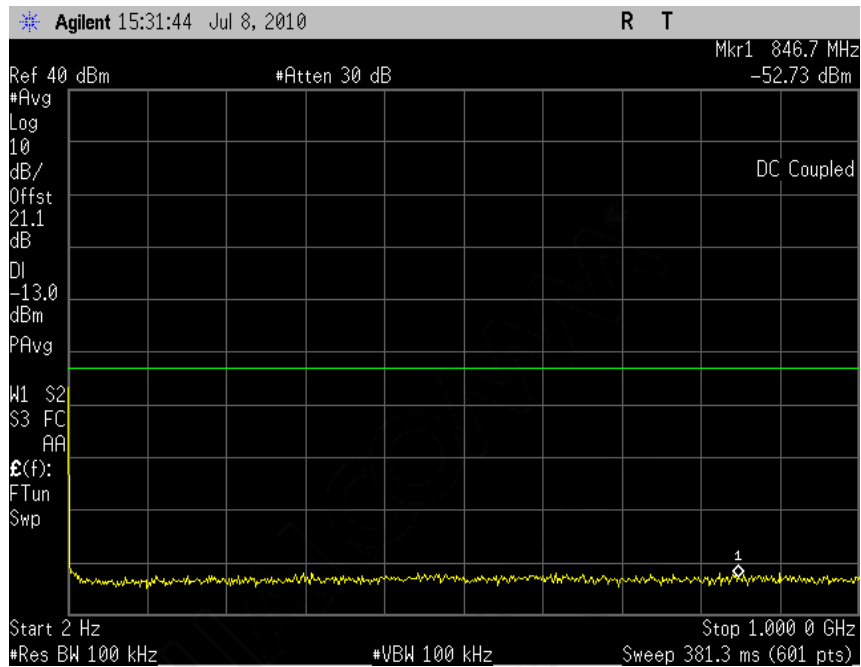
Plot 7.2 - 37 (Rel99, Ch9262)



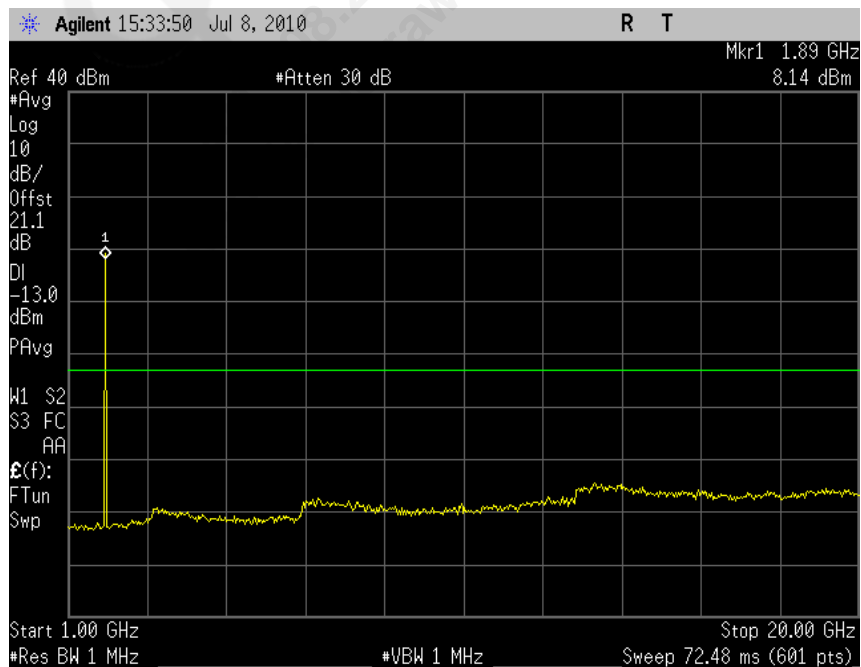
Plot 7.2 - 38 (Rel99, Ch9262)



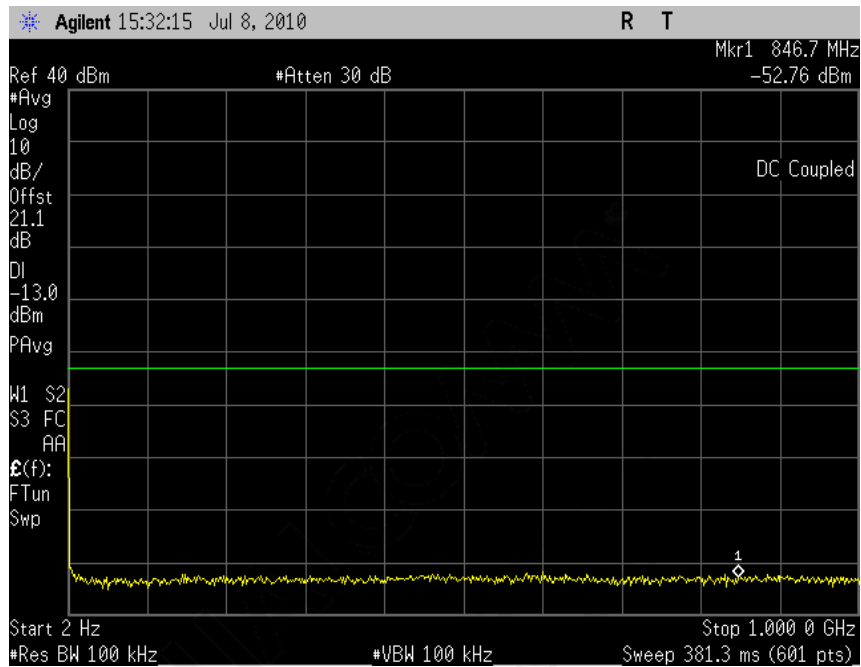
Plot 7.2 - 39 (Rel99, Ch9400)



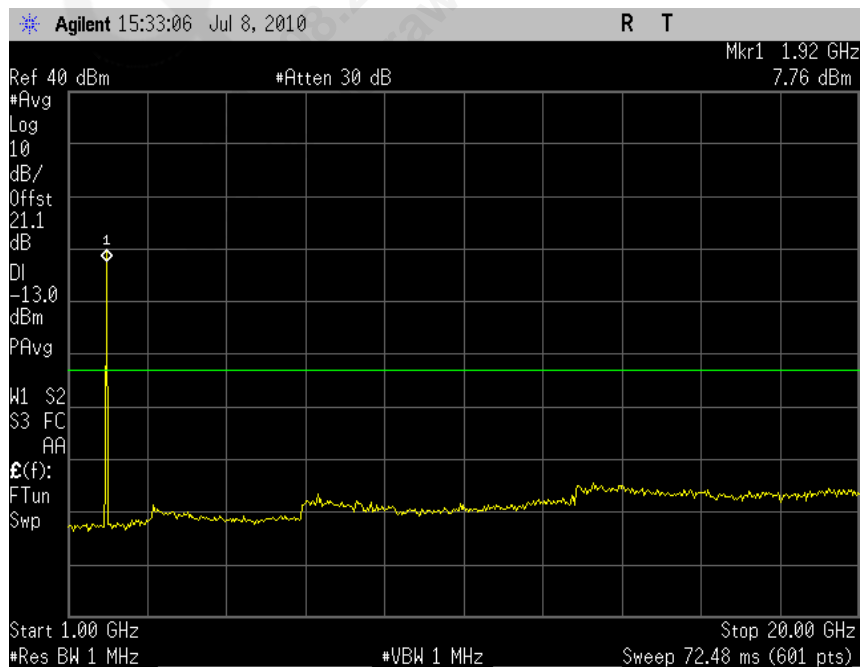
Plot 7.2 - 40 (Rel99, Ch9400)



Plot 7.2 - 41 (Rel99, Ch9538)

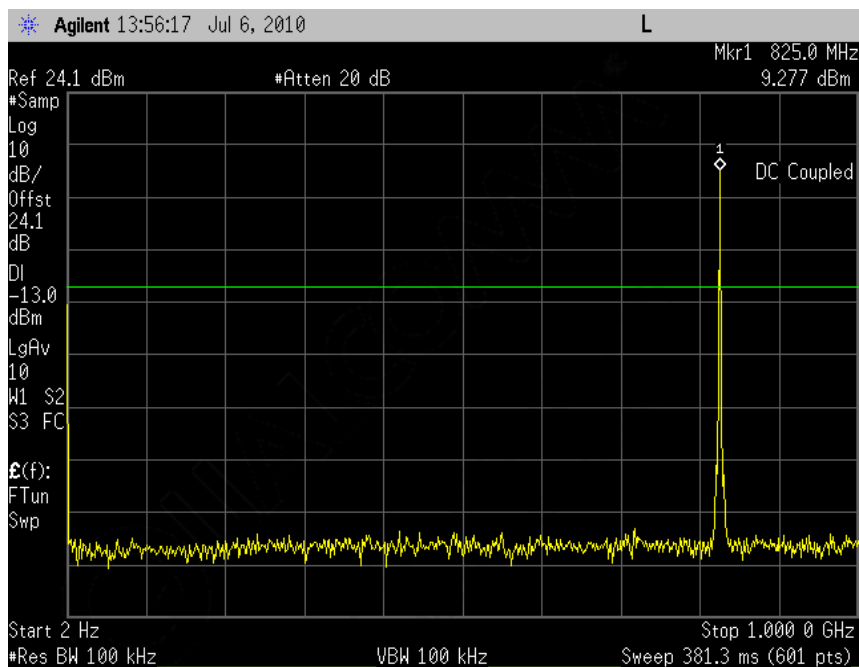


Plot 7.2 - 42 (Rel99, Ch9538)

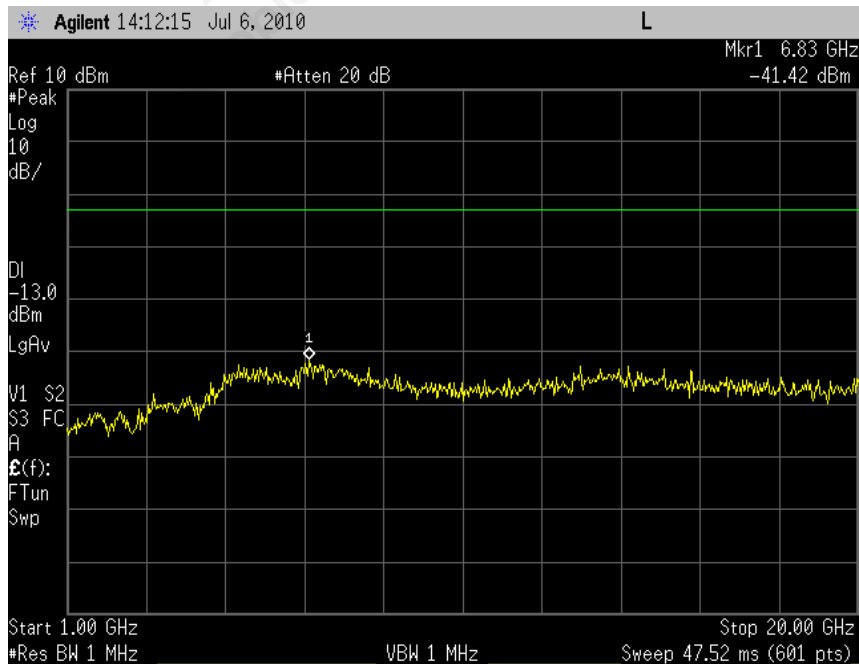


7.2.3 CDMA2000 Emissions Plots

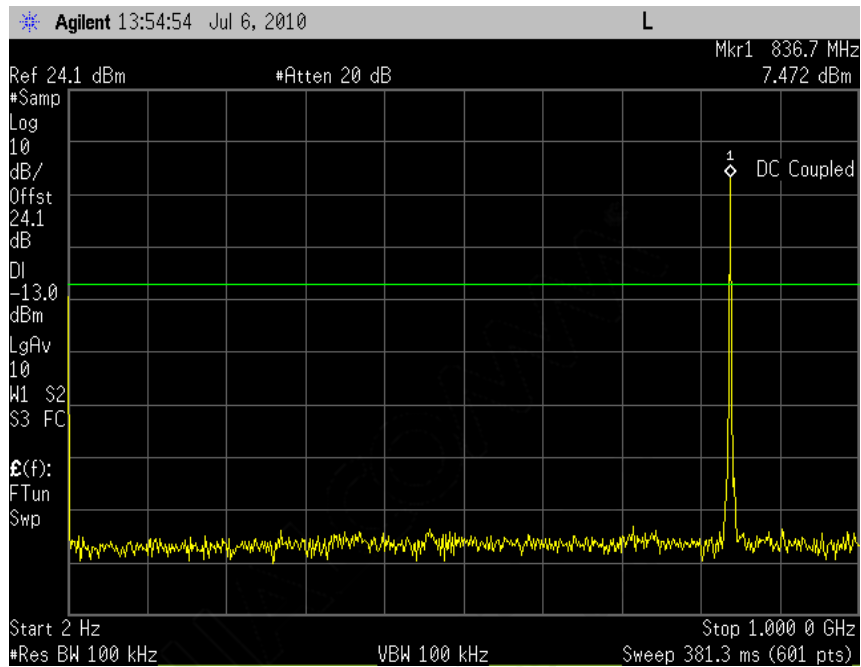
Plot 7.2 -43 (EVDO, Rel 0, Ch. 1013)



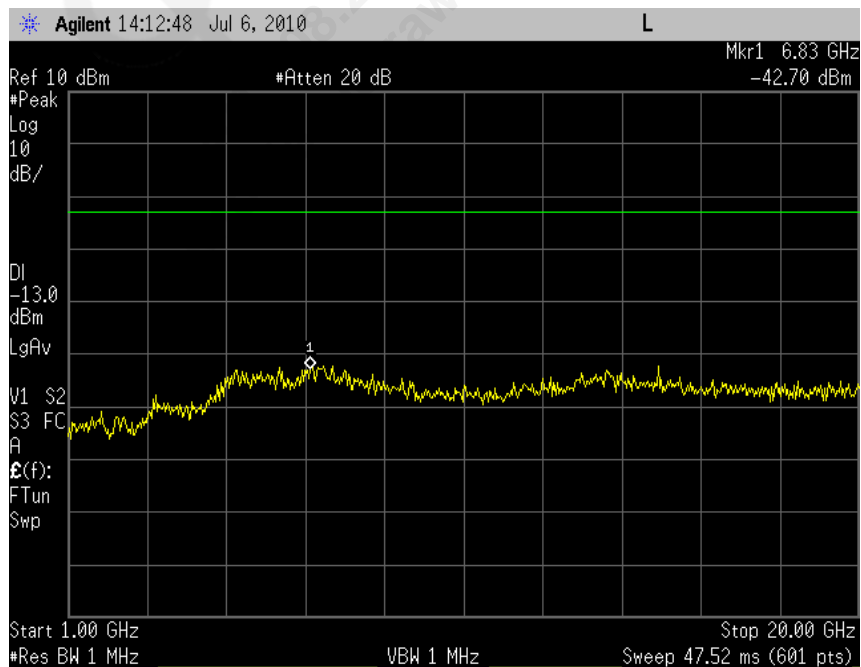
Plot 7.2 -44 (EVDO, Rel 0, Ch. 1013)



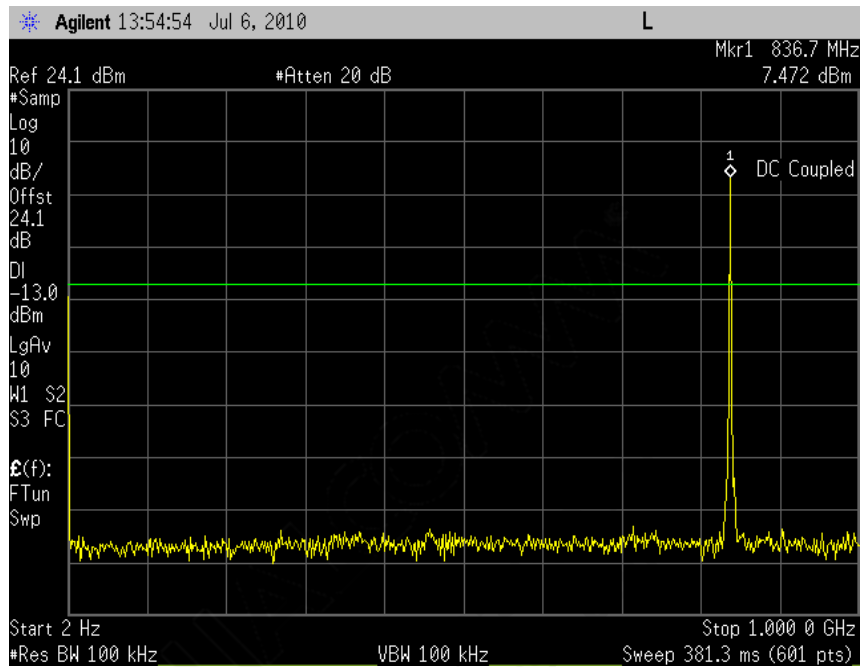
Plot 7.2 -45 (EVDO, Rel 0, Ch. 384)



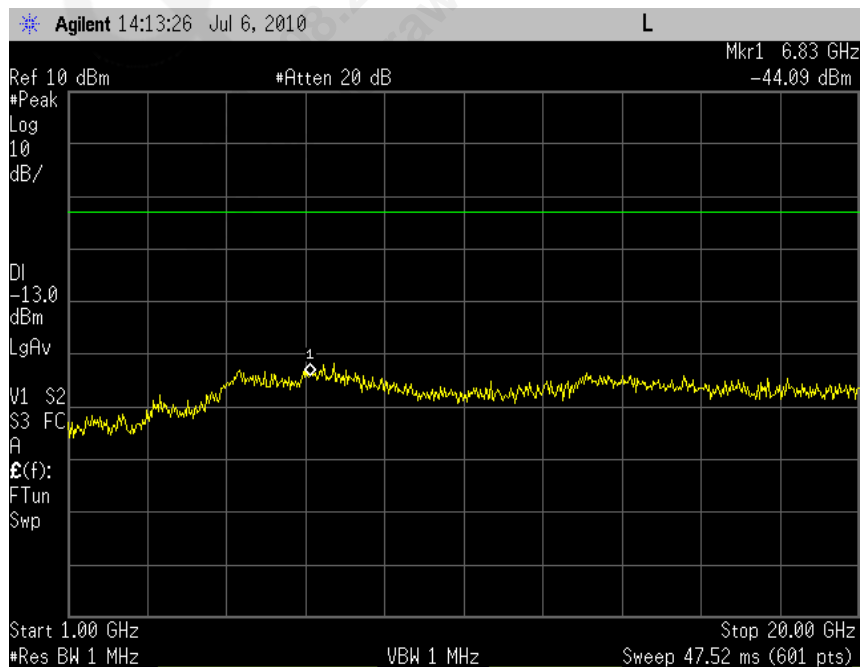
Plot 7.2 -46 (EVDO, Rel 0, Ch. 384)



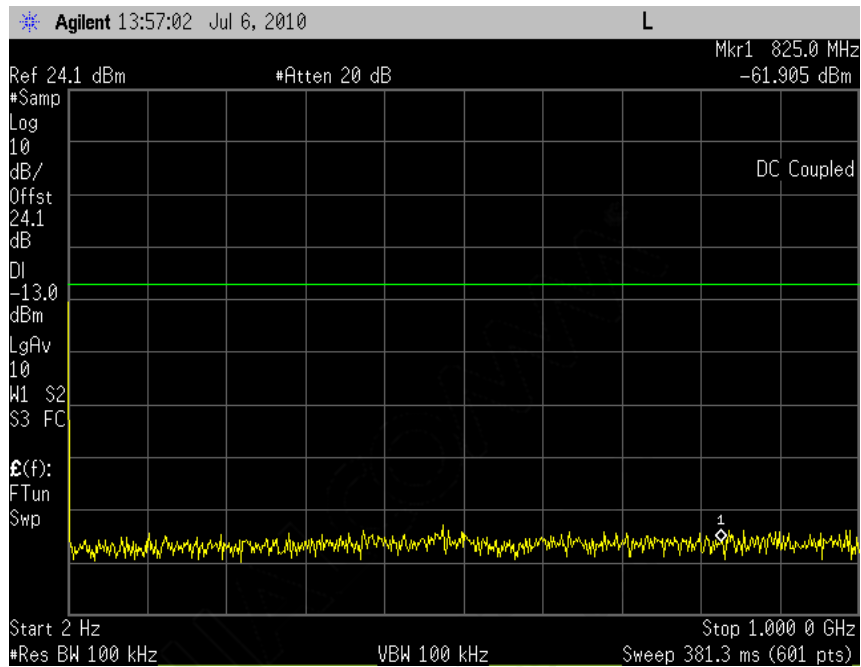
Plot 7.2 - 47 (EVDO, Rel 0, Ch. 777)



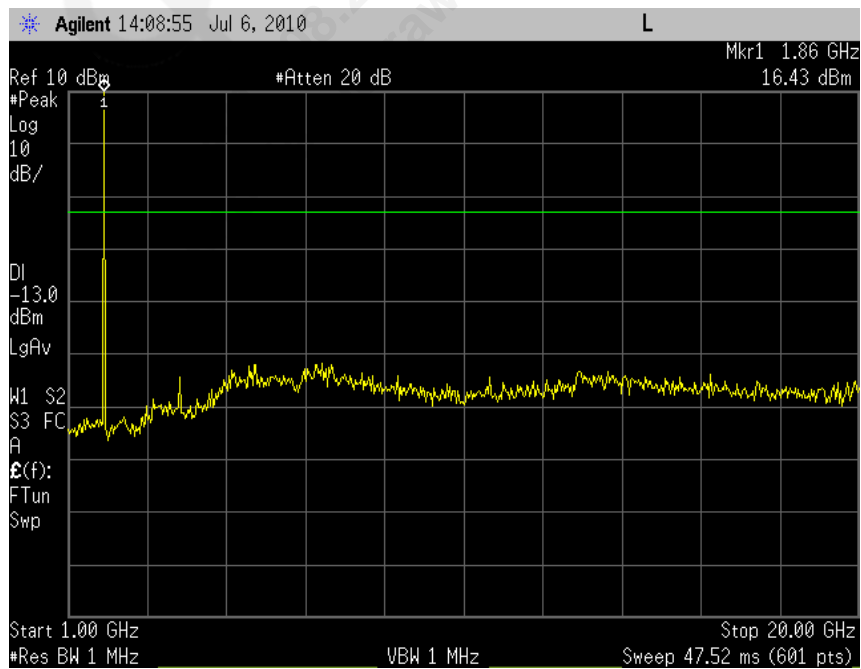
Plot 7.2 - 48 (EVDO, Rel 0, Ch. 777)



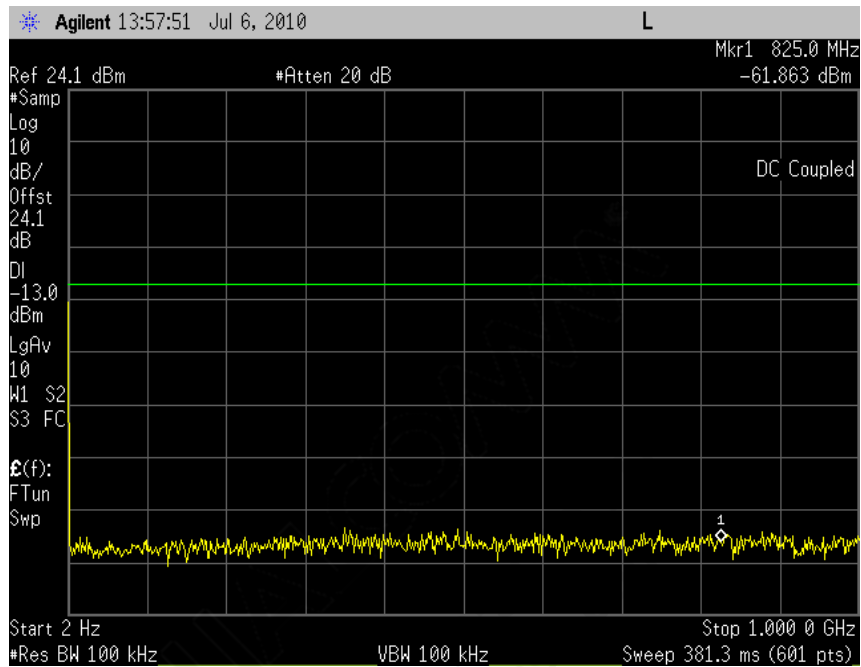
Plot 7.2 - 49 (EVDO, Rel 0, Ch. 25)



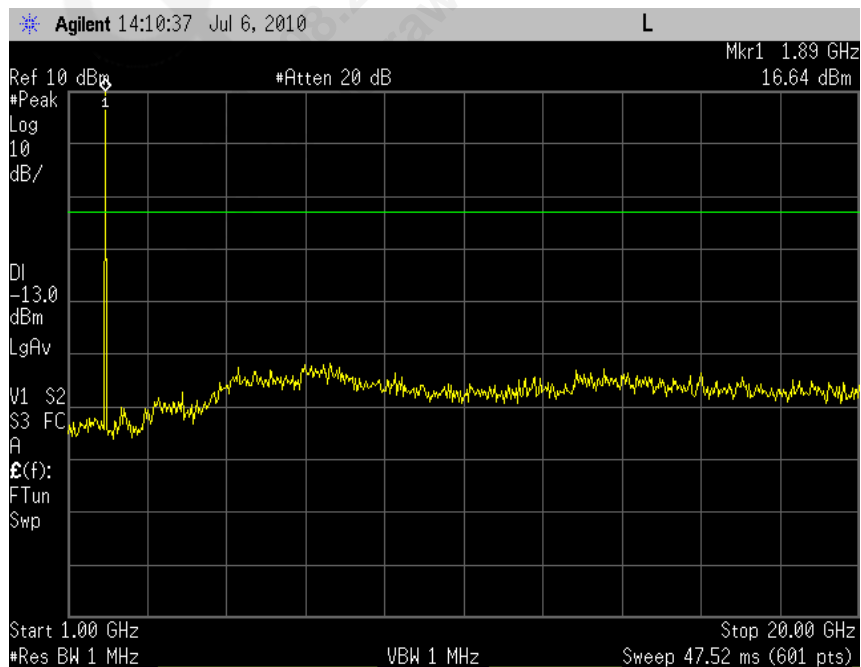
Plot 7.2 - 50 (EVDO, Rel 0, Ch. 25)



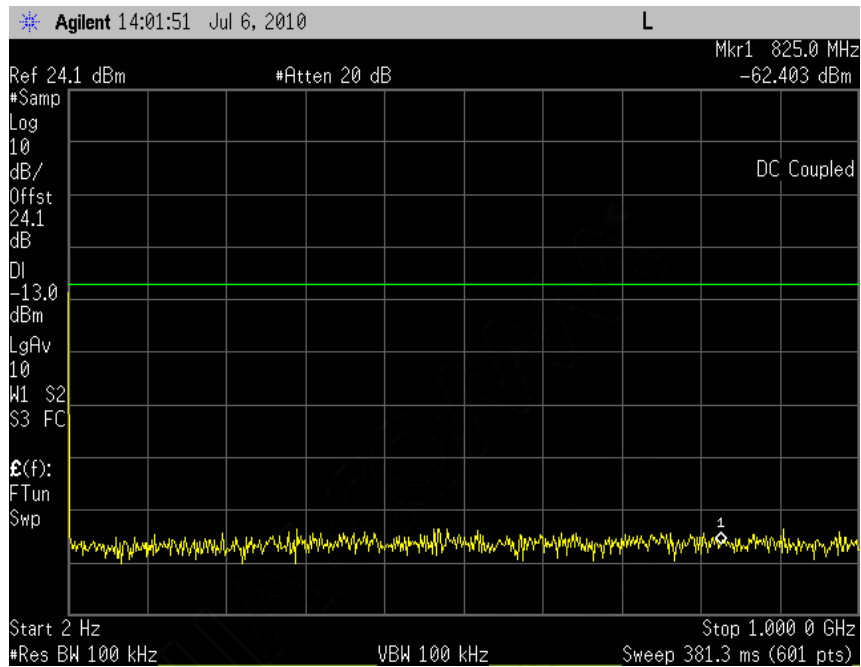
Plot 7.2 - 51 (EVDO, Rel 0, Ch. 600)



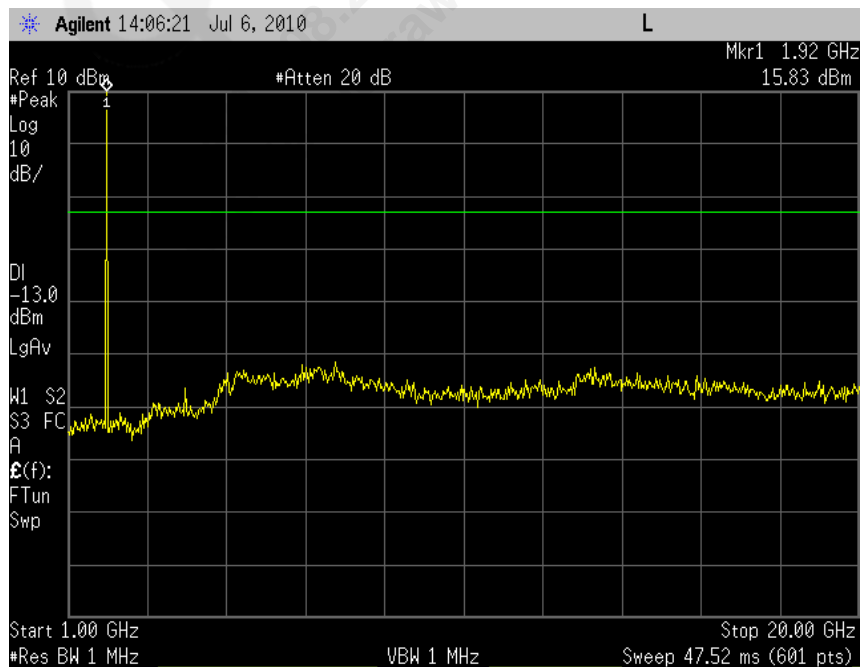
Plot 7.2 - 52 (EVDO, Rel 0, Ch. 600)



Plot 7.2 - 53 (EVDO, Rel 0, Ch. 1175)



Plot 7.2 - 54 (EVDO, Rel 0, Ch. 1175)



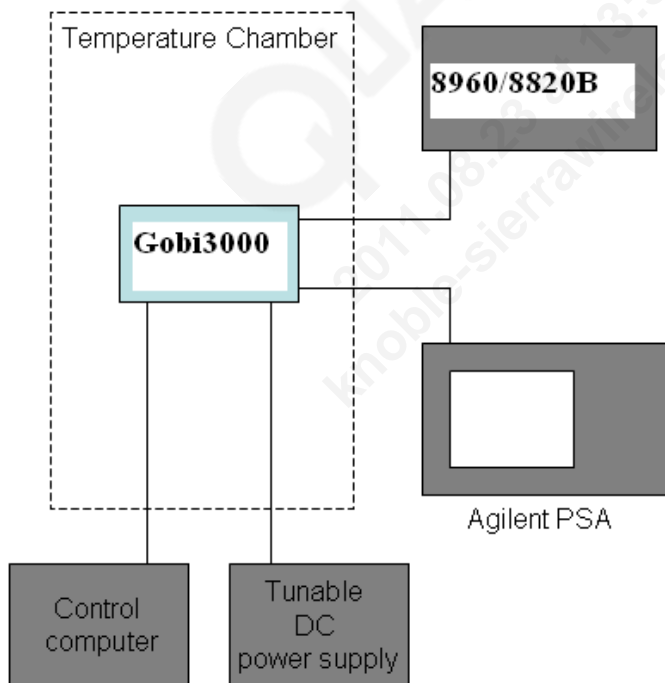
8. Frequency Stability

| | | | |
|---------------------|--------------------------------|------------|---------------|
| FCC: | §2.1055, 22.355, 24.235, 27.54 | | |
| Limit: | ±2.5ppm | | |
| DUT SN | N10F6XTXR | | |
| Modes Tested | CDMA 1x / 1x-EVDO | WCDMA/HSPA | GSM/GPRS/EDGE |
| | Rel 0, RTAP rate = 153.6kbps | Rel 99 | GSM EDGE |

8.1 Frequency Stability Test Procedure

As the test setup indicates, placed the Gobi3000 module inside the temperature chamber. Measured the transmitting frequency error at 20 degrees C with DC voltage varying from 3.0 volts to 3.6 volts, and then set the temperature to -30 degrees C and allow it to stabilize. After 1 hour soak time, take the measurement on transmitting frequency error at -30 degrees in the same manner. As an incremental of 10 degrees C, repeat the same process until +60 degrees C is completed.

An 8960 call box was used for CDMA 1x/1x-EVDO and UMTS testing.

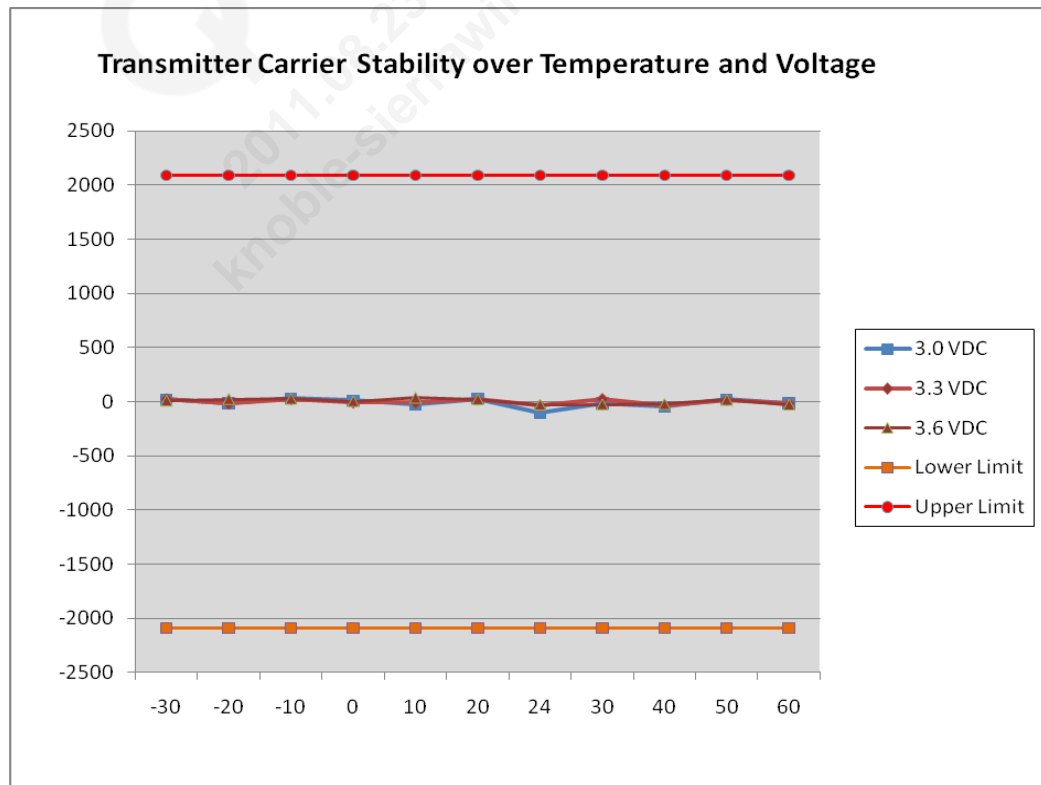


8.2 Frequency Stability Test Results

The test was conducted at mid channel in each band.

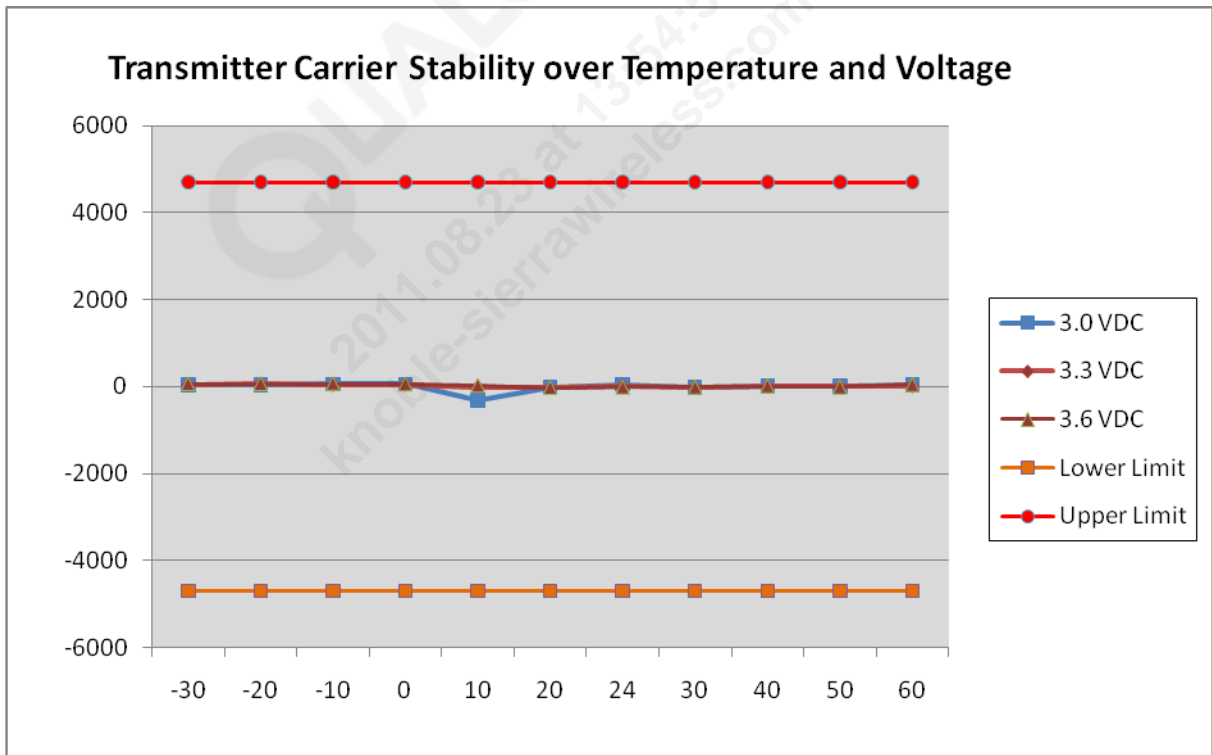
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | GMSK | Channel: | 190 |
| Tx Frequency: | 836.6MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±2091Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 20.1 | 25.6 | 10.1 | -2091 | 2091 |
| -20 | -16.6 | -17.4 | 23.5 | -2091 | 2091 |
| -10 | 31.3 | 21.6 | 25.7 | -2091 | 2091 |
| 0 | 11.2 | -7.8 | 3.8 | -2091 | 2091 |
| 10 | -24.6 | -8.6 | 36.1 | -2091 | 2091 |
| 20 | 27.6 | 20.4 | 22.0 | -2091 | 2091 |
| 24 | -104.4 | -33.2 | -28.7 | -2091 | 2091 |
| 30 | -15.2 | 27.1 | -25.3 | -2091 | 2091 |
| 40 | -46.5 | -30.2 | -23.4 | -2091 | 2091 |
| 50 | 20.6 | 18.8 | 15.3 | -2091 | 2091 |
| 60 | -15.4 | -16.2 | -26.5 | -2091 | 2091 |



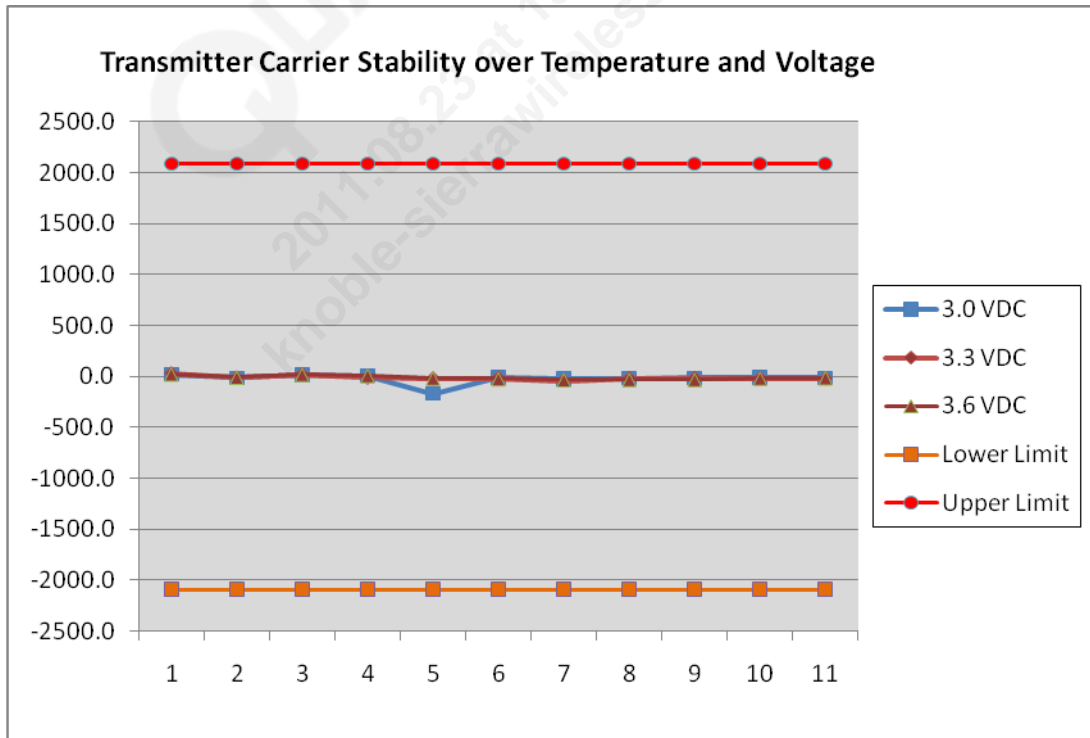
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | GMSK | Channel: | 661 |
| Tx Frequency: | 1880MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±4700Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 40.7 | 48.2 | 56.6 | -4700 | 4700 |
| -20 | 37.5 | 60.1 | 63.7 | -4700 | 4700 |
| -10 | 59.7 | 41.1 | 64.1 | -4700 | 4700 |
| 0 | 55.3 | 50.2 | 53.7 | -4700 | 4700 |
| 10 | -310.7 | -5.1 | 25.1 | -4700 | 4700 |
| 20 | -16.1 | -30.1 | -29.3 | -4700 | 4700 |
| 24 | 46.3 | 14.5 | -18.4 | -4700 | 4700 |
| 30 | -15.4 | -18.6 | -16.5 | -4700 | 4700 |
| 40 | 7.4 | 6.4 | 8.6 | -4700 | 4700 |
| 50 | 6.4 | -4.3 | -17.1 | -4700 | 4700 |
| 60 | 38.5 | 13.5 | 41.2 | -4700 | 4700 |



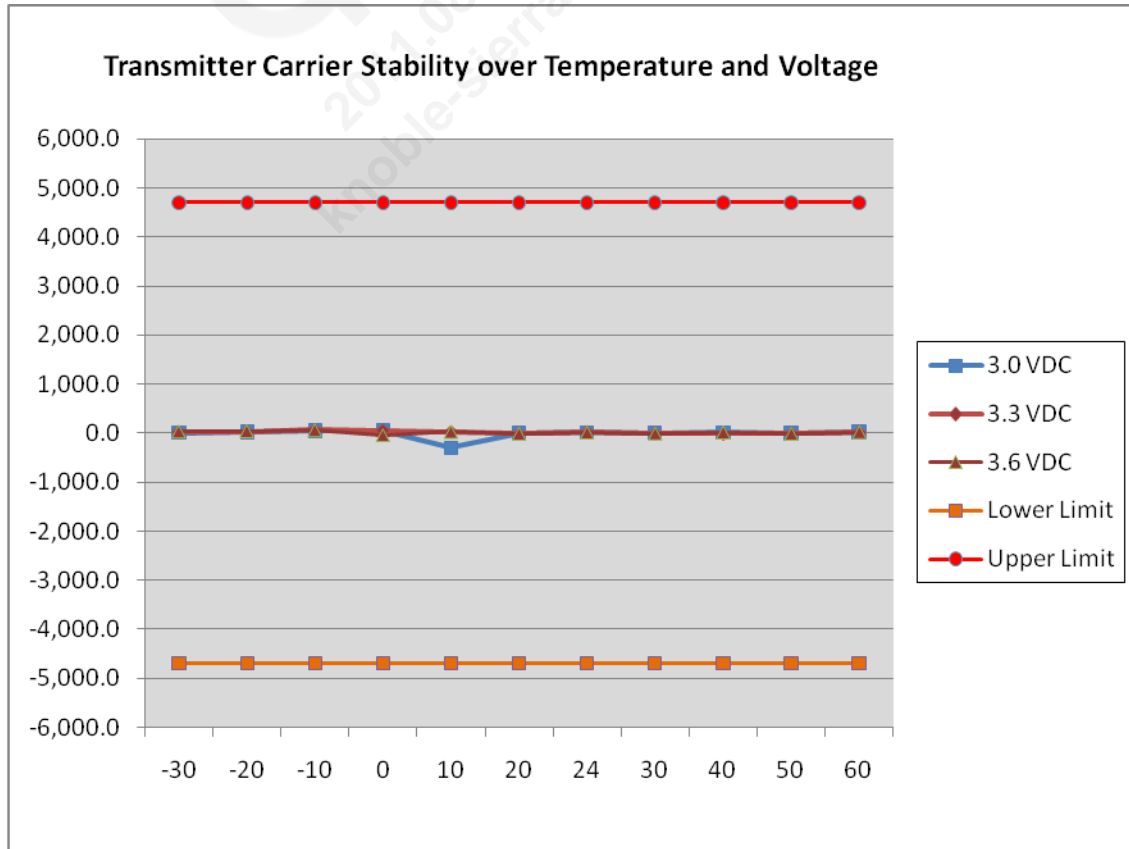
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | 8PSK | Channel: | 190 |
| Tx Frequency: | 836.6MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±2091Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 19.4 | 26.1 | 24.2 | -2091 | 2091 |
| -20 | -14.3 | -14.5 | -6.7 | -2091 | 2091 |
| -10 | 18.6 | 17.3 | 21.4 | -2091 | 2091 |
| 0 | 7.6 | -14.2 | 11.2 | -2091 | 2091 |
| 10 | -169.7 | -21.7 | -14.4 | -2091 | 2091 |
| 20 | -11.2 | -17.5 | -20.4 | -2091 | 2091 |
| 24 | -23.2 | -41.3 | -32.5 | -2091 | 2091 |
| 30 | -15.8 | -21.5 | -28.5 | -2091 | 2091 |
| 40 | -11.8 | -17.6 | -27.4 | -2091 | 2091 |
| 50 | -9.6 | -18.4 | -16.2 | -2091 | 2091 |
| 60 | -13.4 | -20.6 | -10.8 | -2091 | 2091 |



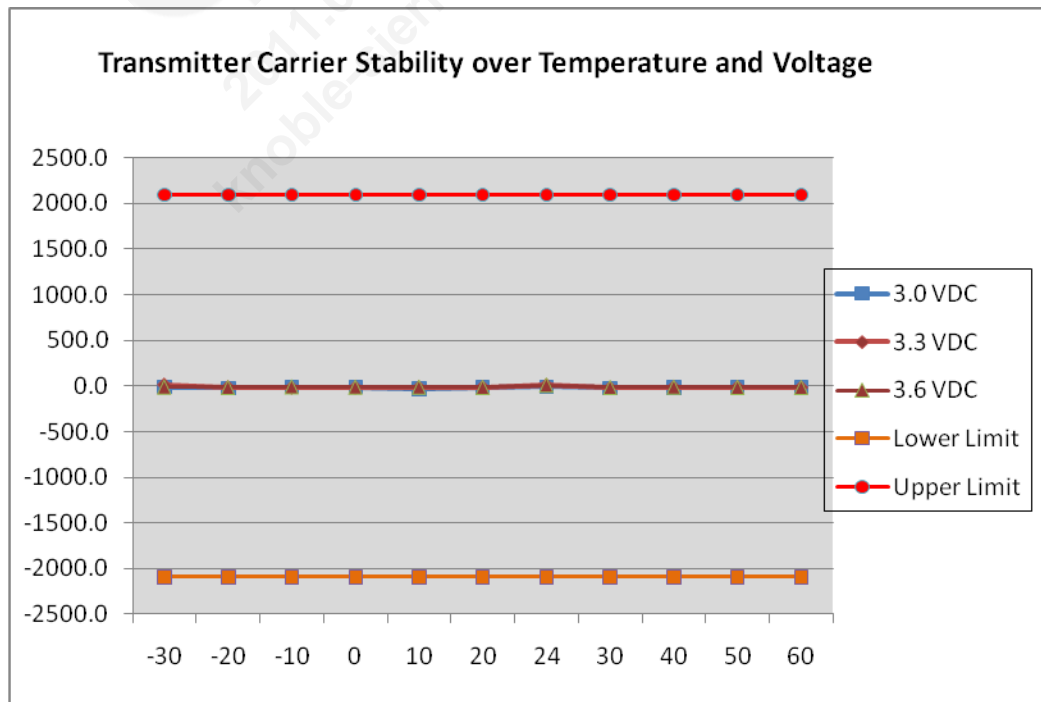
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | 8PSK | Channel: | 661 |
| Tx Frequency: | 1880MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±4700Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 7.4 | 24.7 | 30.2 | -4700 | 4700 |
| -20 | 20.9 | 33.6 | 40.2 | -4700 | 4700 |
| -10 | 50.2 | 67.4 | 61.1 | -4700 | 4700 |
| 0 | 57.2 | 60.2 | -46.3 | -4700 | 4700 |
| 10 | -304.6 | 29.2 | 23.2 | -4700 | 4700 |
| 20 | 6.4 | -11.5 | -16.3 | -4700 | 4700 |
| 24 | 14.4 | 25.7 | 8.8 | -4700 | 4700 |
| 30 | 5.5 | -8.4 | -12.4 | -4700 | 4700 |
| 40 | 12.6 | -15.4 | 14.1 | -4700 | 4700 |
| 50 | -5.4 | -8.8 | -15.3 | -4700 | 4700 |
| 60 | 21.5 | 21.4 | 17.1 | -4700 | 4700 |



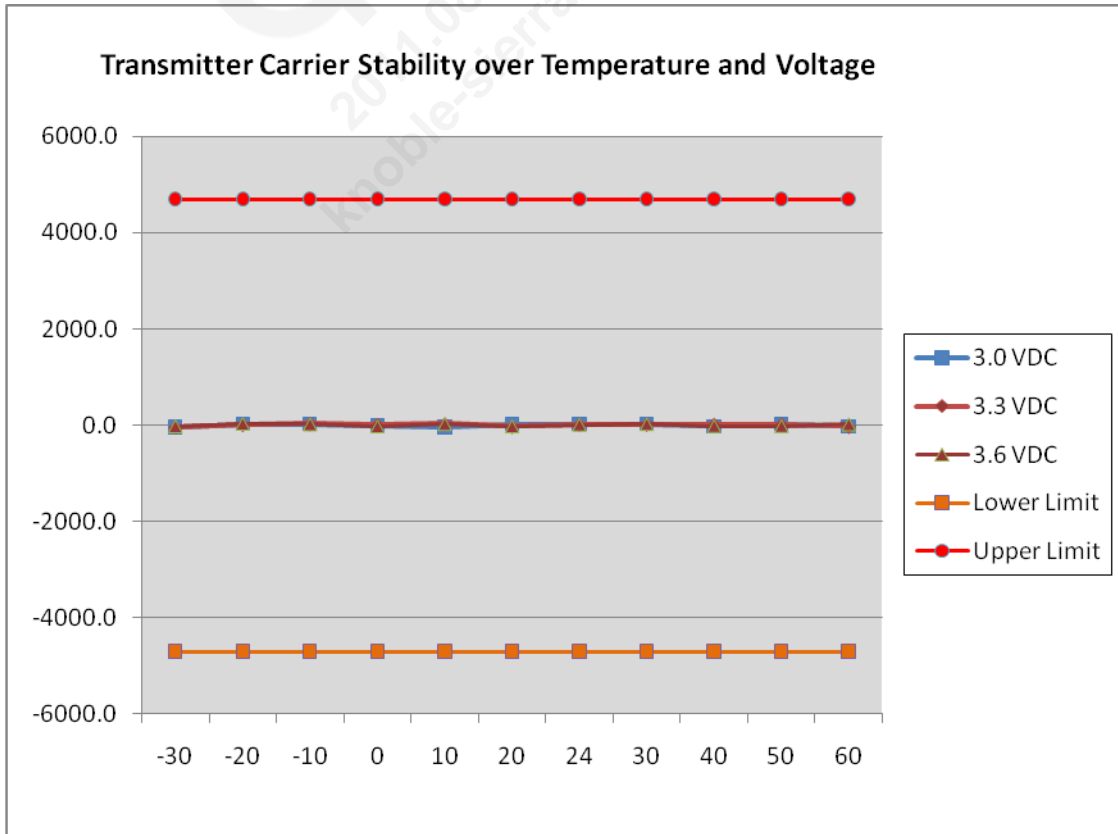
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | WCDMA Rel 99 | Channel: | 4182 |
| Tx Frequency: | 836.4MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±2091Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | -12.6 | 14.0 | -11.8 | -2091 | 2091 |
| -20 | -22.5 | -12.7 | -16.5 | -2091 | 2091 |
| -10 | -10.6 | -16.8 | -8.4 | -2091 | 2091 |
| 0 | -13.4 | -14.4 | -12.5 | -2091 | 2091 |
| 10 | -29.3 | -15.6 | -12.2 | -2091 | 2091 |
| 20 | -14.5 | -12.5 | -15.3 | -2091 | 2091 |
| 24 | -8.8 | 9.6 | 9.5 | -2091 | 2091 |
| 30 | -21.9 | -20.4 | -15.3 | -2091 | 2091 |
| 40 | -15.3 | -12.4 | -11.9 | -2091 | 2091 |
| 50 | -11.0 | -11.2 | -13.8 | -2091 | 2091 |
| 60 | -12.5 | -13.9 | -14.8 | -2091 | 2091 |



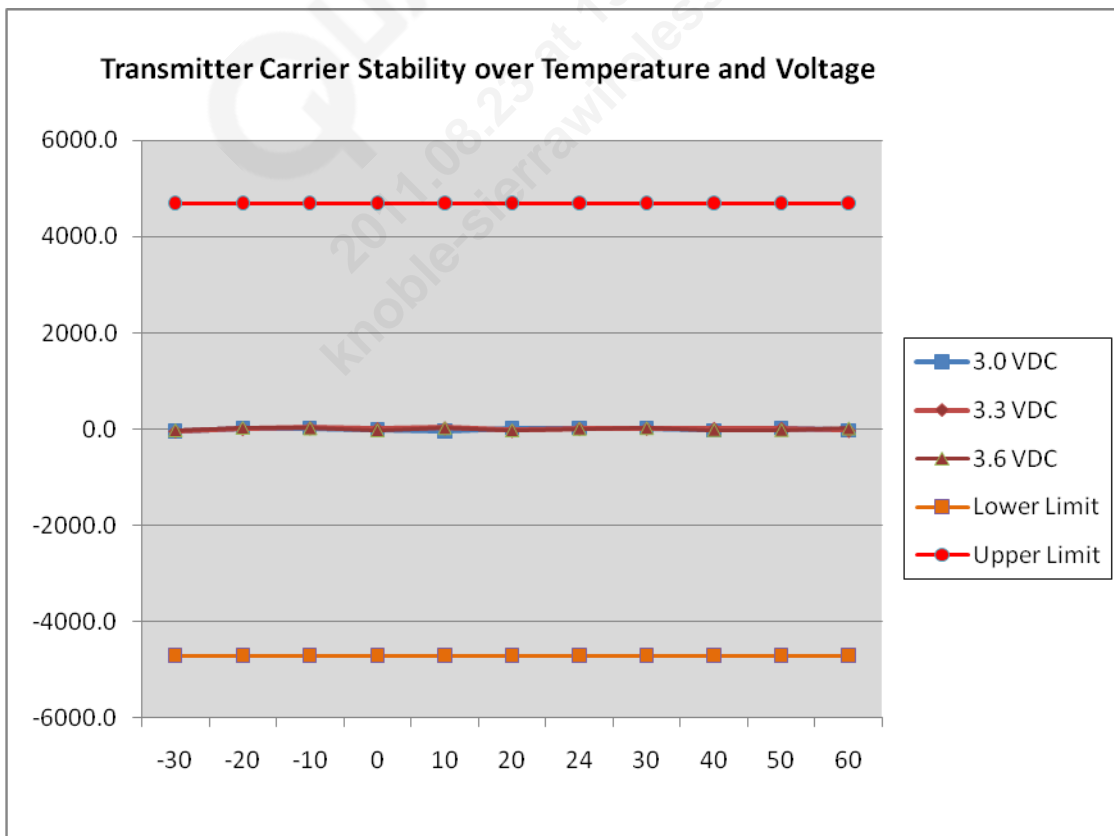
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | WCDMA Rel 99 | Channel: | 9400 |
| Tx Frequency: | 1880MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±4700Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | -36.3 | -33.3 | -21.7 | -4700 | 4700 |
| -20 | 24.7 | 17.1 | 30.6 | -4700 | 4700 |
| -10 | 25.3 | 32.6 | 20.3 | -4700 | 4700 |
| 0 | -16.1 | 13.9 | -27.2 | -4700 | 4700 |
| 10 | -33.5 | 28.4 | 23.4 | -4700 | 4700 |
| 20 | 25.4 | -23.8 | -23.8 | -4700 | 4700 |
| 24 | 23.1 | 18.8 | 11.6 | -4700 | 4700 |
| 30 | 25.6 | 23.6 | 21.8 | -4700 | 4700 |
| 40 | -22.9 | 18.1 | -17.8 | -4700 | 4700 |
| 50 | 25.9 | 19.9 | -17.2 | -4700 | 4700 |
| 60 | -18.4 | -21.8 | 20.5 | -4700 | 4700 |



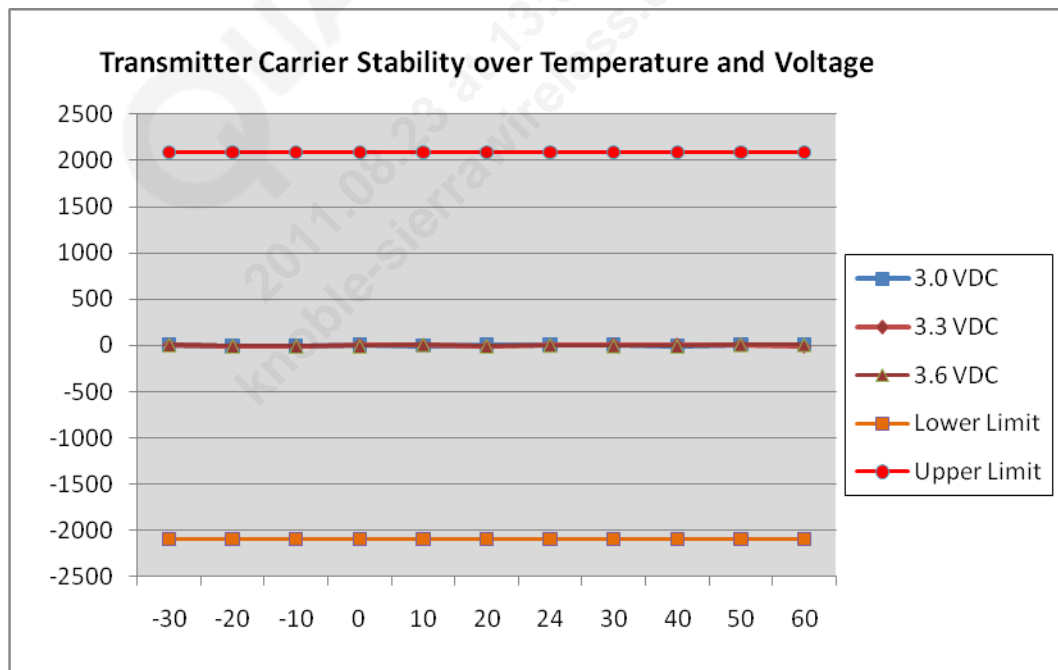
| | | | |
|------------------------|-------------------|-----------------|--------------------|
| Operation Mode: | WCDMA Rel 99 | Channel: | 1427 |
| Tx Frequency: | 1880MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±4700Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|-------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 24.5 | 29.0 | 18.7 | -4700 | 4700 |
| -20 | 18.5 | 22.3 | -17.8 | -4700 | 4700 |
| -10 | 27.8 | 26.1 | 25.2 | -4700 | 4700 |
| 0 | 25.1 | 23.3 | 15.0 | -4700 | 4700 |
| 10 | -51.9 | 22.7 | 16.1 | -4700 | 4700 |
| 20 | -31.2 | -20.1 | -22.3 | -4700 | 4700 |
| 24 | -13.9 | -19.3 | 16.3 | -4700 | 4700 |
| 30 | -22.4 | 15.7 | 16.1 | -4700 | 4700 |
| 40 | -19.6 | 22.5 | 17.7 | -4700 | 4700 |
| 50 | -22.9 | -20.5 | -21.4 | -4700 | 4700 |
| 60 | -20.6 | -22.5 | -22.4 | -4700 | 4700 |



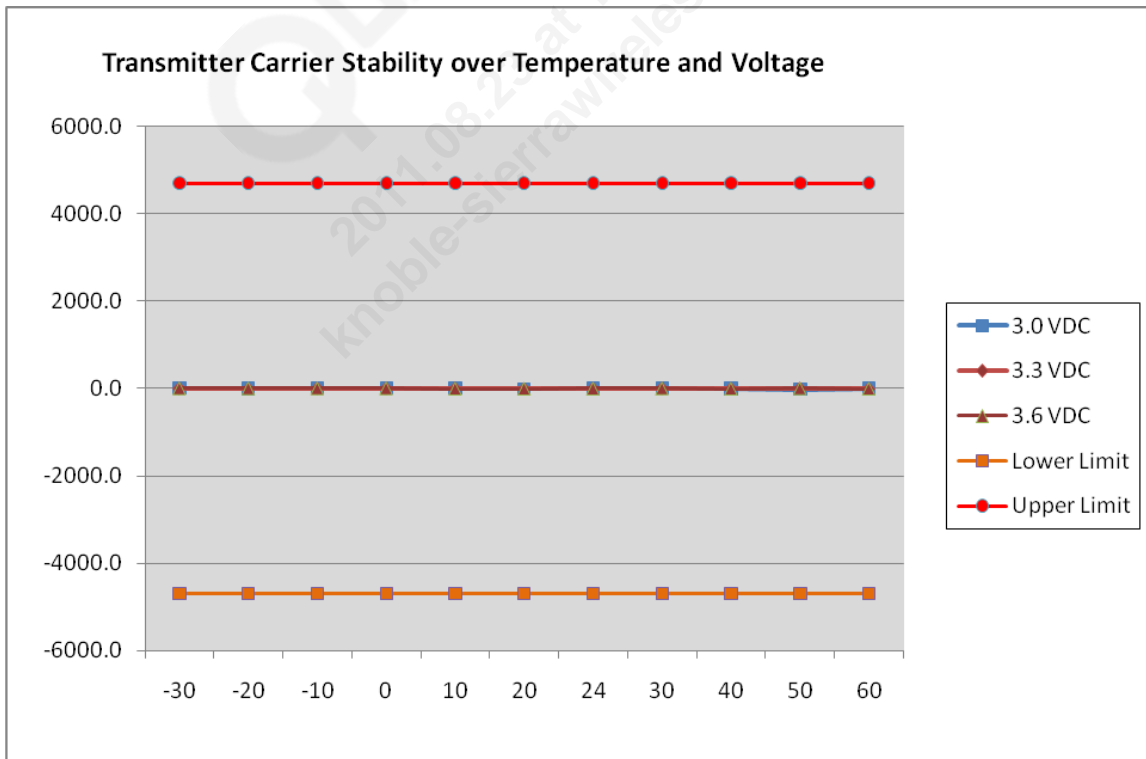
| | | | |
|------------------------|------------------------------------|-----------------|--------------------|
| Operation Mode: | EVDO, Rel 0, RTAP rate = 153.6kbps | Channel: | 384 |
| Tx Frequency: | 836.52MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±2091Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|-------|------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 6.9 | 6.4 | 6.5 | 2091 | -2091 |
| -20 | -7.3 | -7.5 | -6.4 | 2091 | -2091 |
| -10 | -7.1 | -7.4 | -6.8 | 2091 | -2091 |
| 0 | 7 | 7.3 | -8.7 | 2091 | -2091 |
| 10 | -4.7 | 7.8 | 9.3 | 2091 | -2091 |
| 20 | 9.2 | -7.1 | -6.8 | 2091 | -2091 |
| 24 | 3.1 | 1.9 | 3.2 | 2091 | -2091 |
| 30 | 9.5 | 10.6 | -4.4 | 2091 | -2091 |
| 40 | -9.8 | 11.1 | -5.9 | 2091 | -2091 |
| 50 | 11.8 | 10.2 | 10.0 | 2091 | -2091 |
| 60 | 11.3 | -10.1 | 8.8 | 2091 | -2091 |



| | | | |
|------------------------|------------------------------------|-----------------|--------------------|
| Operation Mode: | EVDO, Rel 0, RTAP rate = 153.6kbps | Channel: | 600 |
| Tx Frequency: | 1880MHz | Voltage: | 3.3v (3.0v ~ 3.6v) |
| Limit: | ±2.5ppm (±4700Hz) | | |

| Temperature (°C) | Deviation of Carrier (Hz) | | | Specification (Hz) | |
|------------------|---------------------------|------|------|--------------------|-------------|
| | 3.0V | 3.3V | 3.6V | Lower limit | Upper limit |
| -30 | 4.6 | 4.2 | 4.9 | -4700 | 4700 |
| -20 | -7.8 | -6.5 | 3.1 | -4700 | 4700 |
| -10 | 7.5 | 7.1 | 6.3 | -4700 | 4700 |
| 0 | 5.8 | 6.4 | 5.3 | -4700 | 4700 |
| 10 | 7.0 | 4.9 | -4.6 | -4700 | 4700 |
| 20 | -12.6 | -5.2 | -3.9 | -4700 | 4700 |
| 24 | -1.8 | -1.2 | -1.5 | -4700 | 4700 |
| 30 | 4.9 | 5.6 | 2.6 | -4700 | 4700 |
| 40 | -2.8 | -2.5 | -2.6 | -4700 | 4700 |
| 50 | -21.0 | 5.2 | 4.1 | -4700 | 4700 |
| 60 | -6.1 | -4.5 | -5.0 | -4700 | 4700 |



9. Test Equipment and Firmware

The following test equipments were used.

| Model | Manufacturer | Description | S/N | Cal Date | Cal Due Date |
|-----------------------|-----------------|----------------------------|-----------|------------|--------------|
| 8960 Series 10 E5515C | Agilent | Wireless Communication Set | K119302 | 9/16/2009 | 09/16/2010 |
| E4440A PSA Series | Agilent | Spectrum Analyzer | K159342 | 9/15/2009 | 9/15/2010 |
| Compaq 6910p | Hewlett Packard | Notebook Computer | P116464 | N/R | N/R |
| Model 105 | TestEquity | Temperature Chamber | K162535 | 09/22/2009 | 09/22/2010 |
| 50-VD628-1 Rev A/A | Qualcomm | Module Fixture | N10F76FMN | N/R | N/R |

The firmwares built in the 8960 and 8820B are as follows, and have been validated to support the testing for all technologies implemented in GOBI3000.

| Call Box | Technology | Firmware Rev |
|----------|------------|--------------|
| 8960 | EVDO | A.07.21 |
| | 1x | B.12.21 |
| | UMTS | A.09.21 |