**Compliance Testing, LLC**
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# Test Report

**Prepared for: Wilson Electronics, Inc.**

**Model: 272770**

**Description: Tri-Band Signal Booster**

**To**

**FCC Part 22H, 24E, 27**

**Date of Issue: July 3, 2012**

**On the behalf of the applicant:**

**Wilson Electronics, Inc.**
**3301 E. Deseret Drive**
**St. George, UT 84790**

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**Prepared By**
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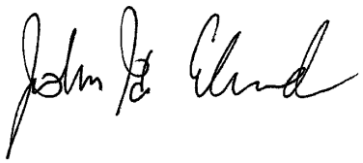
**Project No: p1260009**



**John ErhardJohn Erhard**
**Project Test Engineer**

## Test Report Revision History

| Revision | Date | Revised By | Reason for Revision |
|---|---|---|---|
| 1.0 | July 3, 2012 | John Erhard | Original Document |
| | | | |
| | | | |
| | | | |

## Table of Contents

**ILAC / A2LA**

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

Testing Certificate Number: **2152.01**

**FCC OATS Reg, #933597**

**IC Reg. #2044A-1**

**Non-accredited tests contained in this report:**

**N/A**

**Test and Measurement Data**
Sub-part
2.1033(c)(14):

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Part 2, Sub-part J and the following individual Parts: 22H, 24E, 27 Signal Booster.

**Standard Test Conditions and Engineering Practices**

Except as noted herein, the following conditions and procedures were observed during the testing.

In accordance with ANSI/C63.4-2009, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

| Environmental Conditions | | |
|---|---|---|
| **Temp (ºC)** | **Humidity (%)** | **Pressure (mbar)** |
| **21.80 - 24.70** | **47.50 - 52.80** | **964.9 - 969.5** |

Measurement results, unless otherwise noted, are worst-case measurements.

**EUT Description**

**Model:** 272770
**Description:** FCC – Tri-Band Signal Booster
**Firmware:** N/A
**Software:** N/A
**Accessories:** None
**Cables:** None
**Modifications:** None
**Additional Information:**

The EUT is a bi-directional amplifier for the boosting of cellular phone signals and data communication devices. The following frequency bands and emission types are utilized.

| Frequency Band | | | |
|---|---|---|---|
| **Uplink** | 824 – 849 | 1850 – 1910 | 1710 – 1755 |
| **Downlink** | 869 – 894 | 1930 – 1990 | 2110 - 2150 |
| **Modulation Type** | CDMA, GSM, Edge, HSPA, EVDO, LTE | | CDMA, HSPA, LTE |

**EUT Operation during Tests**

The EUT was in a normal operating condition.

**Test Result Summary**

| Specification | Test Name | Pass, Fail, N/A | Comments |
|---|---|---|---|
| Part 22H, 24E, 27 | Carrier Output Power | Pass | |
| Part 22H, 24E, 27 | Spurious Emissions (Transmitter Conducted) | Pass | |
| Part 22H, 24E, 27 | Spurious Emissions (Transmitter Radiated) | Pass | |
| Part 22H, 24E, 27 | Intermodulation | Pass | |
| Part 22H, 24E, 27 | Occupied Bandwidth | Pass | |
| Part 22H, 24E, 27 | Out of Band Rejection | Pass | |
| Part 22H, 24E, 27 | Frequency Stability (Temperature Variation) | N/A | The EUT does not perform frequency translation |
| Part 22H, 24E, 27 | Frequency Stability (Voltage Variation) | N/A | The EUT does not perform frequency translation |

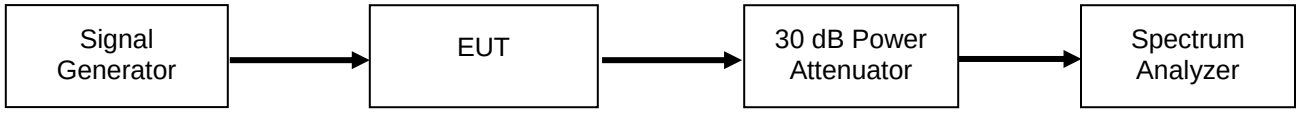
**Carrier Output Power**

| | | |
|---|---|---|
| **Name of Test:** | Carrier Output Power | **Engineer:** John Erhard |
| **Test Equipment Utilized:** | i00348, i00331, i00347 | **Test Date:** 6/28/12 |

**Test Procedure**

The EUT was connected to a spectrum analyzer through a 30 dB power attenuator. A signal generator was utilized to produce a CW input signal. The RF input level was increased while monitoring the output power. The input RF drive level was increased until the EUT output reached saturation (the output stopped increasing) whereby the maximum power level and gain was achieved. The uplink / downlink power and gain levels for the low, middle, and high channels are recorded in the following tables.

**Test Setup**




**Uplink Test Results**

**800 MHz Band**

| Tuned Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|---|---|---|---|
| 824 | -43.7 | 29.26 | 72.96 |
| 836 | -42.5 | 33.65 | 76.15 |
| 849 | -44.6 | 29.12 | 73.72 |

**1700 MHz Band**

| Tuned Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|---|---|---|---|
| 1710 | -37.6 | 28.46 | 66.06 |
| 1742 | -38.9 | 28.15 | 67.05 |
| 1755 | -36.3 | 30.45 | 66.75 |

**1900 MHz Band**

| Tuned Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|---|---|---|---|
| 1850 | -39.5 | 29.51 | 69.01 |
| 1880 | -40.8 | 30.54 | 71.34 |
| 1910 | -41.3 | 27.32 | 68.62 |

## Downlink Test Results

### 800 MHz Band

| Tuned Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|---|---|---|---|
| 869 | -47.5 | 22.99 | 70.49 |
| 881 | -51.8 | 23.76 | 75.56 |
| 894 | -48.4 | 22.94 | 71.34 |

### 2100 MHz Band

| Tuned Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|---|---|---|---|
| 2110 | -45.8 | 19.05 | 64.85 |
| 2132 | -43.7 | 21.26 | 64.96 |
| 2155 | -43.2 | 17.62 | 60.82 |

### 1900 MHz Band

| Tuned Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Gain (dB) |
|---|---|---|---|
| 1930 | -48.5 | 19.2 | 67.7 |
| 1960 | -49.9 | 20.67 | 70.57 |
| 1990 | -48.9 | 18.24 | 67.14 |

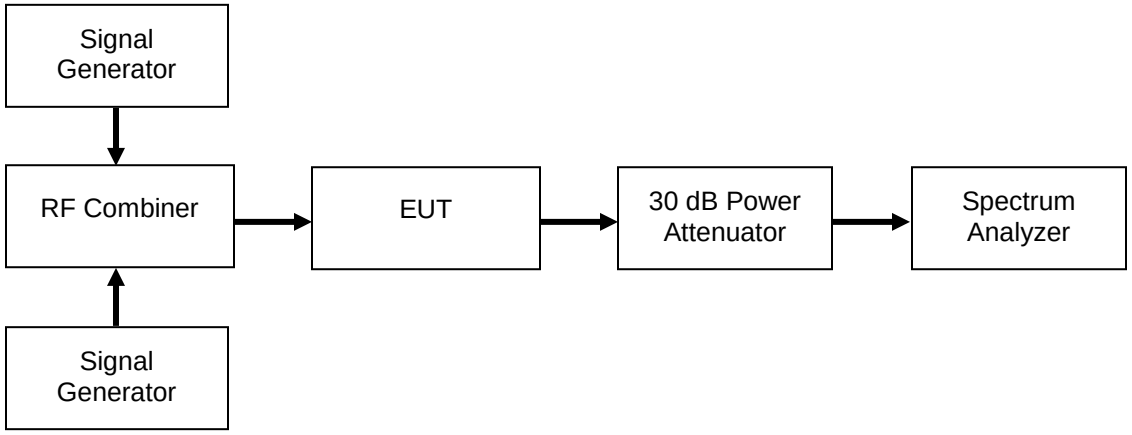
**Spurious Emissions (Transmitter Conducted)**

| | | |
|---|---|---|
| **Name of Test:** | Spurious Emissions (Transmitter Conducted) | **Engineer:** John Erhard |
| **Test Equipment Utilized:** | i00348, i00331, i00266, i00347 | **Test Date:** 06/28/12 |

**Test Procedure**

The EUT was connected to a spectrum analyzer through a 30 dB power attenuator. Two signal generators were utilized to produce a two tone signal with the channel spacing set so the intermodulation products fell within the operational band. The input signal level was increased until the intermodulation products were as close as possible to the maximum allowable level of -13 dBm without being greater than that limit. The uplink / downlink conducted spurious emissions were examined to beyond the 10$^{th}$ harmonic of the fundamental signal and no spurious emissions were detected. The two tones selected were near the center of the operational band and as there were no detectable emissions only a single test was performed per operational band. The worst case out of band emission for each operational band is indicated in the tables below. Plots are provided to show there are no additional emissions.

**Test Setup**




**Uplink Test Results**

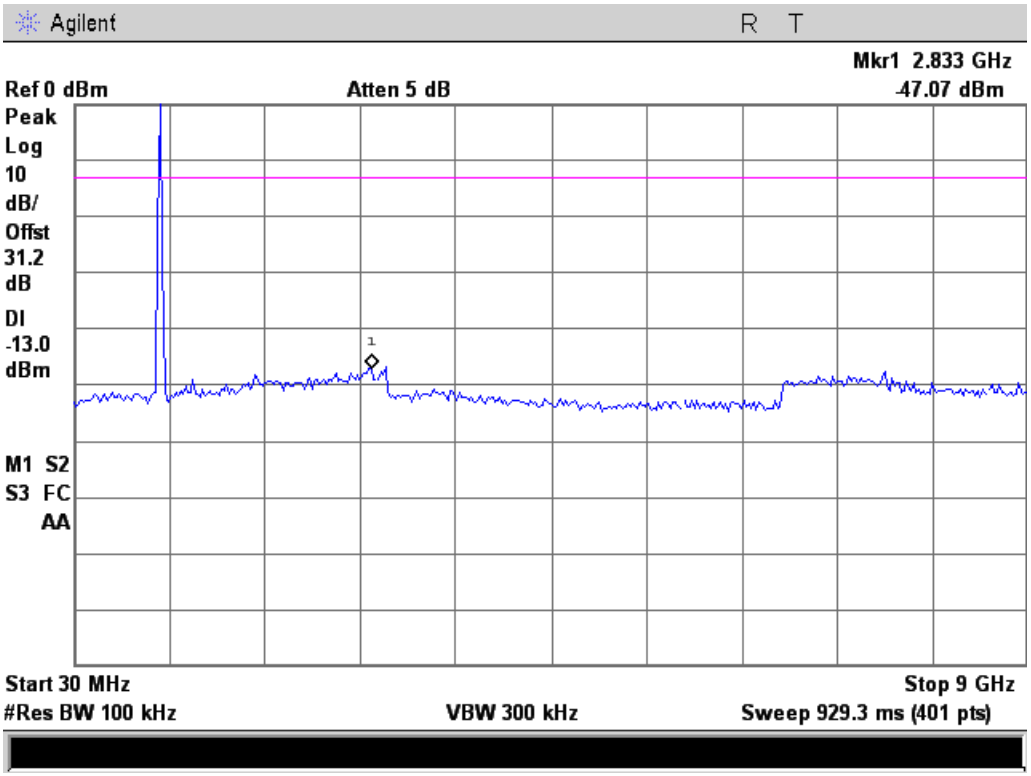
| Frequency Band (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 800 | -47.07 | -13 | -34.07 | Pass |
| 1700 | -44.14 | -13 | -31.14 | Pass |
| 1900 | -45.22 | -13 | -32.22 | Pass |

**Downlink Test Results**

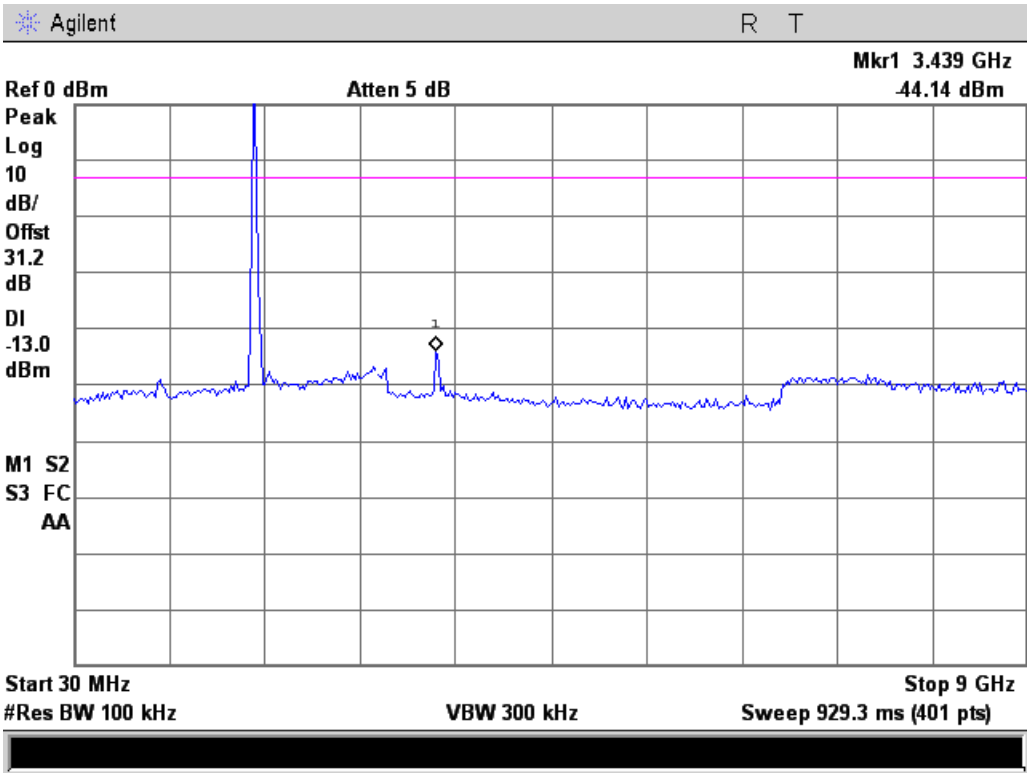
| Frequency Band (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 800 | -46.98 | -13 | -33.98 | Pass |
| 2100 | -43.31 | -13 | -30.31 | Pass |
| 1900 | -46.85 | -13 | -33.85 | Pass |

## Uplink Test Plots

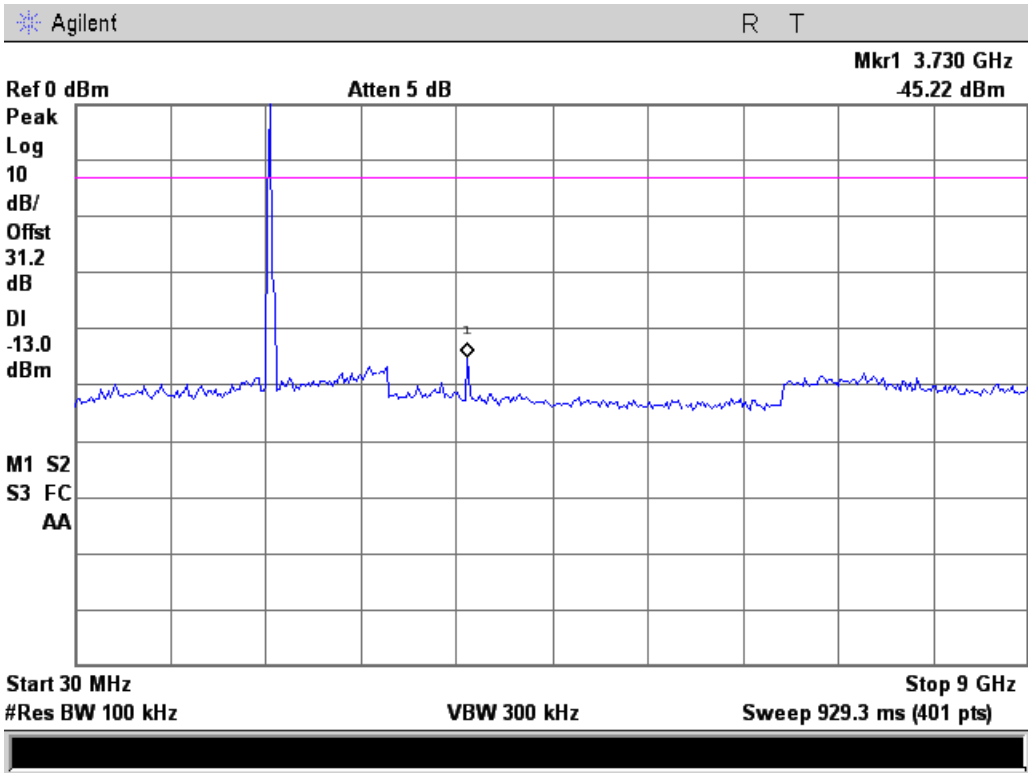
### 800 MHz Band




### 1700 MHz Band

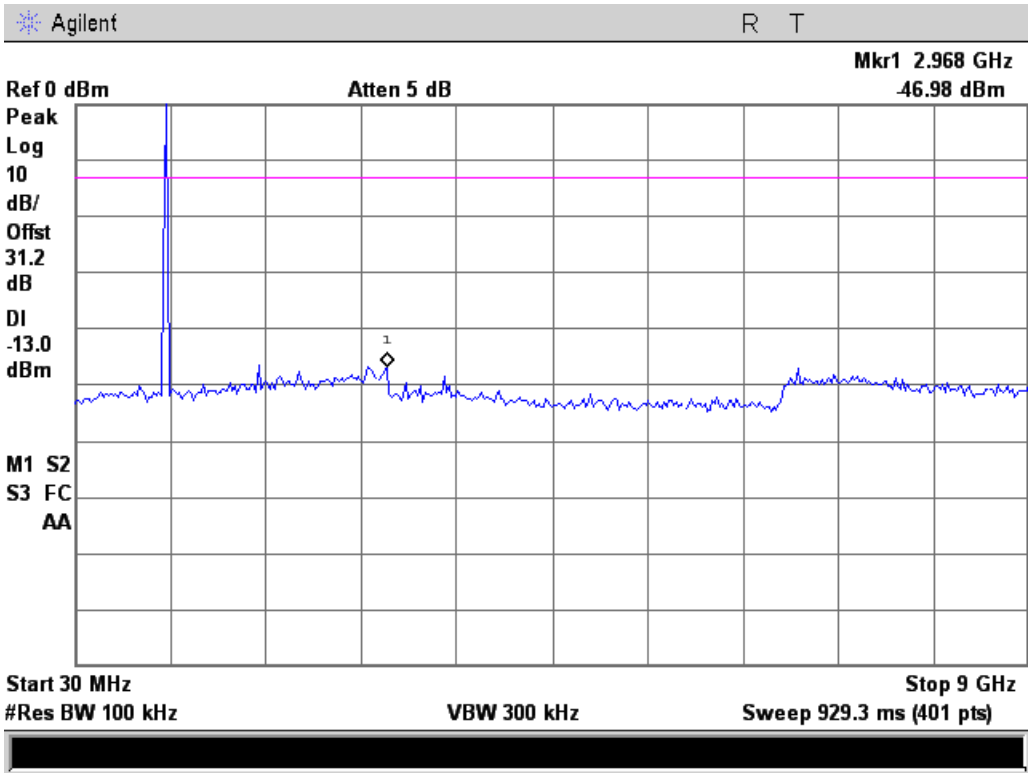


**1900 MHz Band**

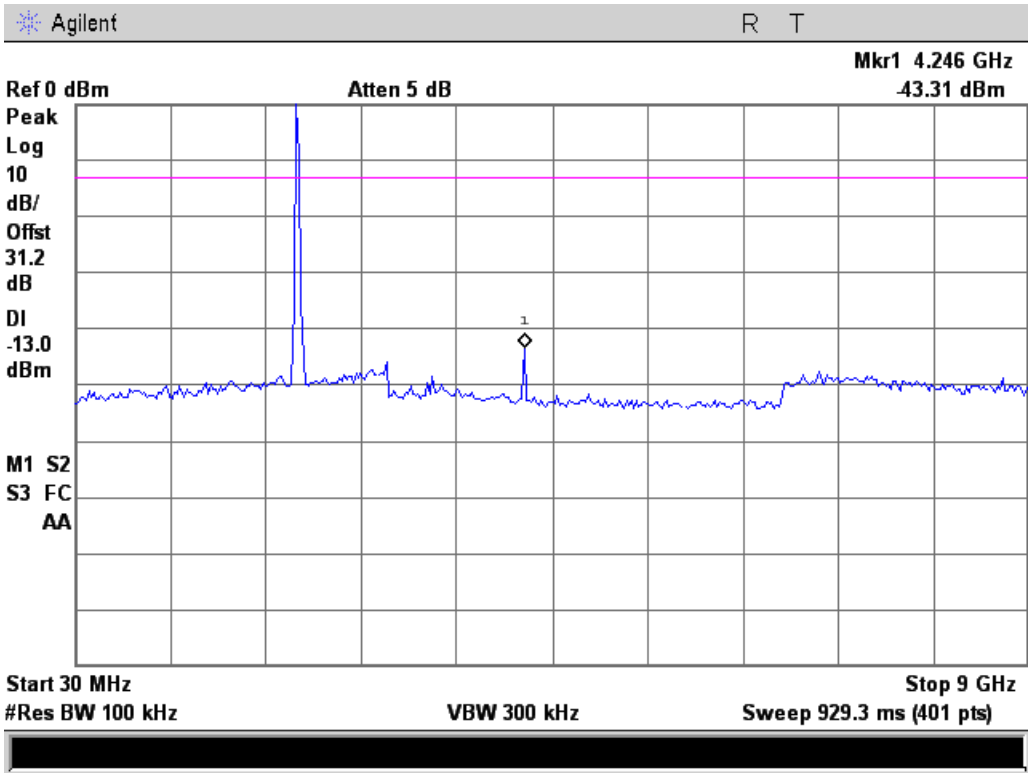



**Downlink Test Plots**

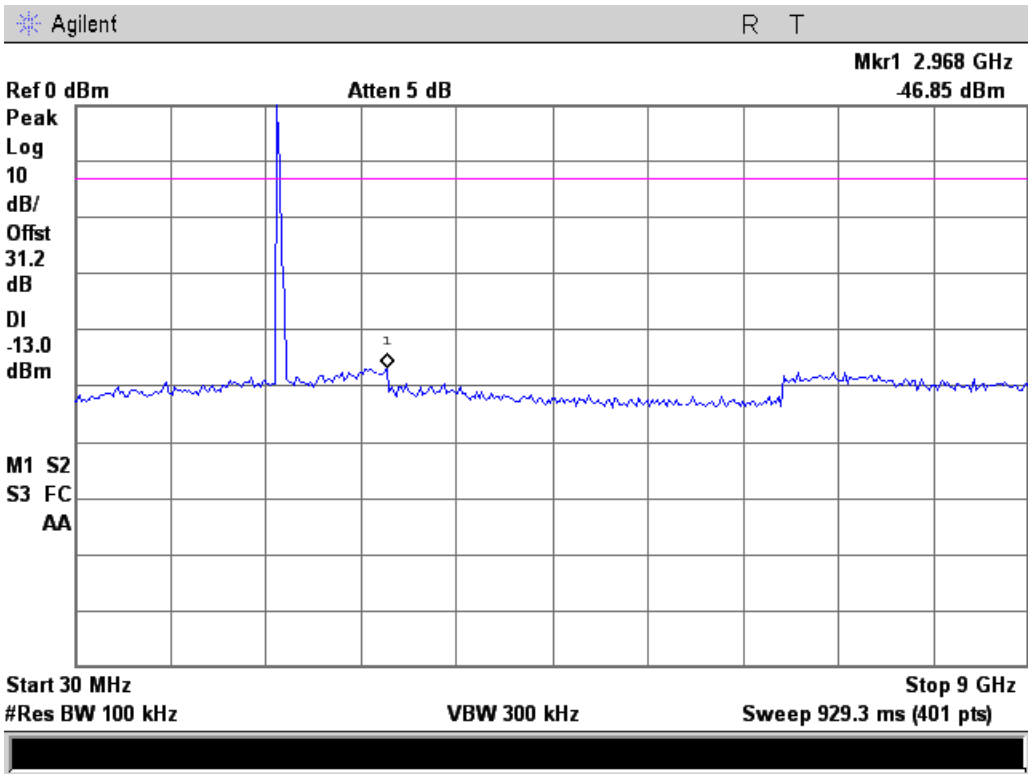
**800 MHz Band**



**2100 MHz Band**




**1900 MHz Band**



**Spurious Emissions (Transmitter Radiated)**

**Name of Test:** Spurious Emissions (Transmitter Radiated) **Engineer:** John Erhard

**Test Equipment Utilized:** i00348, i00331, i00103 **Test Date:** 06/29/12

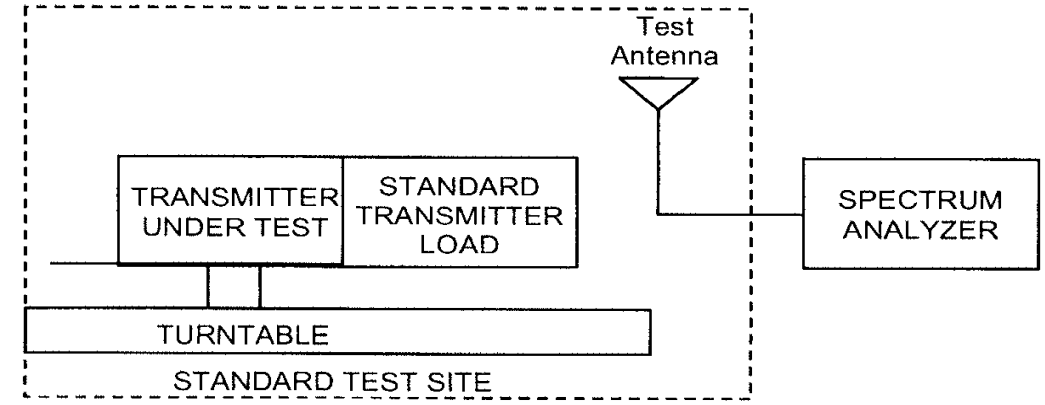
## Test Procedure

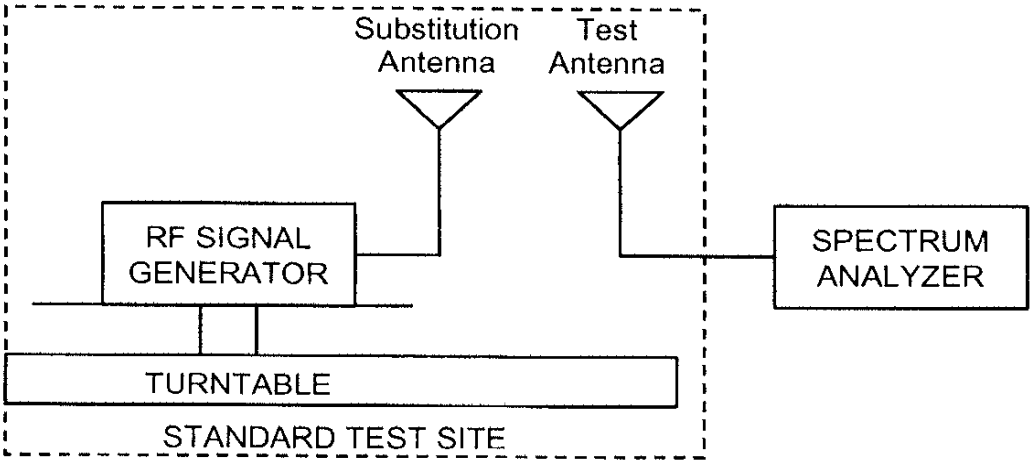
A) Connect the equipment as illustrated below.
B) Adjust the spectrum analyzer to the following settings:
   1) Resolution Bandwidth 100 kHz (< 1 GHZ), 1 MHZ (> 1GHz)
   2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz
   3) Sweep Speed ≤2000 Hz/second
   4) Detector Mode = Mean or Average Power
C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non- radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.
D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see Section 1.3.4.4).
E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
F) Repeat Step E) for each spurious frequency with the test antenna polarized vertically.
G) Reconnect the equipment as illustrated.
H) Keep the spectrum analyzer adjusted as in Step B).
I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
K) Repeat Step J) with both antennas vertically polarized for each spurious frequency.
L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in Steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
M) The levels recorded in Step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB = $10\log_{10}$ (TX power in watts/0.001) – the levels in Step I)

*NOTE: It is permissible that the other antennas provided can be referenced to a dipole.*

**Test Setup**


Test
Antenna
TRANSMITTER
UNDER TEST
STANDARD
TRANSMITTER
LOAD
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE


Substitution
Antenna
Test
Antenna
RF SIGNAL
GENERATOR
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE

**Uplink Test Results**

**800 MHz Band**

**836 MHz Tuned Frequency**

| Measured Frequency (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 1672 | -62.82 | -13 | -49.82 | Pass |
| 2508 | -58.8 | -13 | -45.8 | Pass |
| 3344 | -43.85 | -13 | -30.85 | Pass |

**1700 MHz Band**

**1742 MHz Tuned Frequency**

| Measured Frequency (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 3484 | -42.38 | -13 | -29.38 | Pass |
| 5226 | -40.65 | -13 | -27.65 | Pass |
| 6967 | -35.03 | -13 | -22.03 | Pass |

**1900 MHz Band**

**1880 MHz Tuned Frequency**

| Measured Frequency (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 5640 | -50.63 | -13 | -37.63 | Pass |
| 7520 | -43.63 | -13 | -30.63 | Pass |
| 9400 | -38.06 | -13 | -25.06 | Pass |

The conducted spurious emissions testing did not indicate any potential failures therefore only the center channel of each operational band was evaluated.

No other emissions were detected. All emissions were lower than –13 dBm.
All emissions were system noise floor.

**Downlink Test Results**

**800 MHz Band**

**881 MHz Tuned Frequency**

| Measured Frequency (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 1762 | -36.2 | -13 | -23.2 | Pass |
| 2643 | -63.65 | -13 | -50.65 | Pass |
| 3524 | -48.92 | -13 | -35.92 | Pass |

**2100 MHz Band**

**2132 MHz Tuned Frequency**

| Measured Frequency (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 4264 | -48.29 | -13 | -35.29 | Pass |
| 6396 | -51.26 | -13 | -38.26 | Pass |
| 8528 | -40.36 | -13 | -27.36 | Pass |

**1900 MHz Band**

**1960 MHz Tuned Frequency**

| Measured Frequency (MHz) | Measured Level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|
| 3920 | -50.62 | -13 | -37.62 | Pass |
| 5880 | -47.87 | -13 | -34.87 | Pass |
| 7840 | -39.80 | -13 | -26.8 | Pass |

The conducted spurious emissions testing did not indicate any potential failures therefore only the center channel of each operational band was evaluated.

No other emissions were detected.
All emissions were lower than –13 dBm.

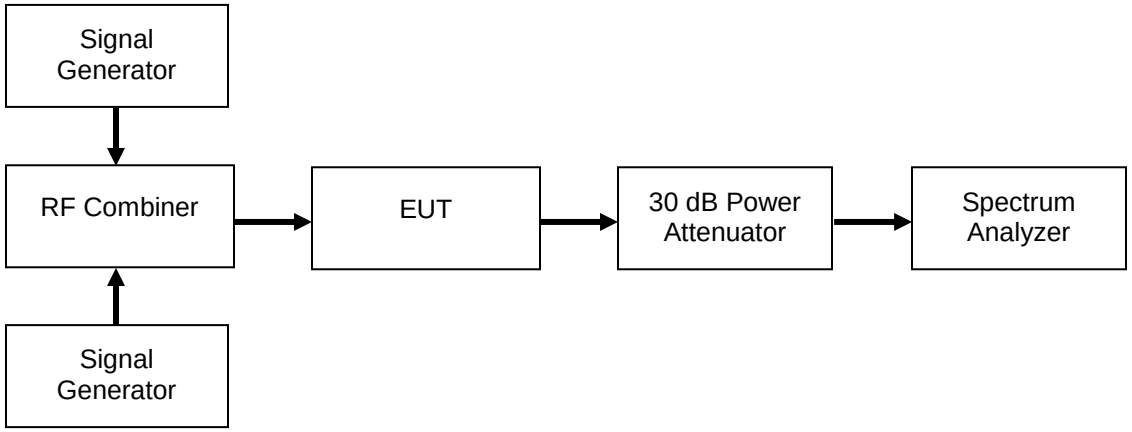
**Intermodulation**

| | | |
|---|---|---|
| **Name of Test:** | Intermodulation | **Engineer:** John Erhard |
| **Test Equipment Utilized:** | i00348, i00331, i00266, i00347 | **Test Date:** 06/28/12 |

## Test Procedure

The EUT was connected to a spectrum analyzer through a 30 dB power attenuator. Two signal generators were utilized to produce a two tone signal with the channel spacing set so the intermodulation products fell within the operational band. The input signal level was increased until the intermodulation products were as close as possible to the maximum allowable level of -13 dBm without being greater than that limit. The uplink / downlink intermodulation products within the operational band were examined. The two tones near the lower edge and the upper edge were plotted. The input signal level, peak output power, and intermodulation level are listed in the summary tables.

## Test Setup



## GSM Uplink Test Results

### 800 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 830-835 | -47.7 | -13.62 | 21.57 |
| 842-845 | -48.5 | -13.2 | 20.03 |

### 1700 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 1720-1725 | -53 | -13.18 | 16.7 |
| 1740-1745 | -51.3 | -13.77 | 17.16 |

### 1900 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 1860-1865 | -51 | -13.51 | 18.63 |
| 1895-1900 | -47.7 | -13.41 | 16.16 |

## GSM Downlink Test Results

### 800 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 875-880 | -47.6 | -13.43 | 21.03 |
| 880-885 | -46.9 | -13.35 | 21.6 |

### 2100 MHz Band

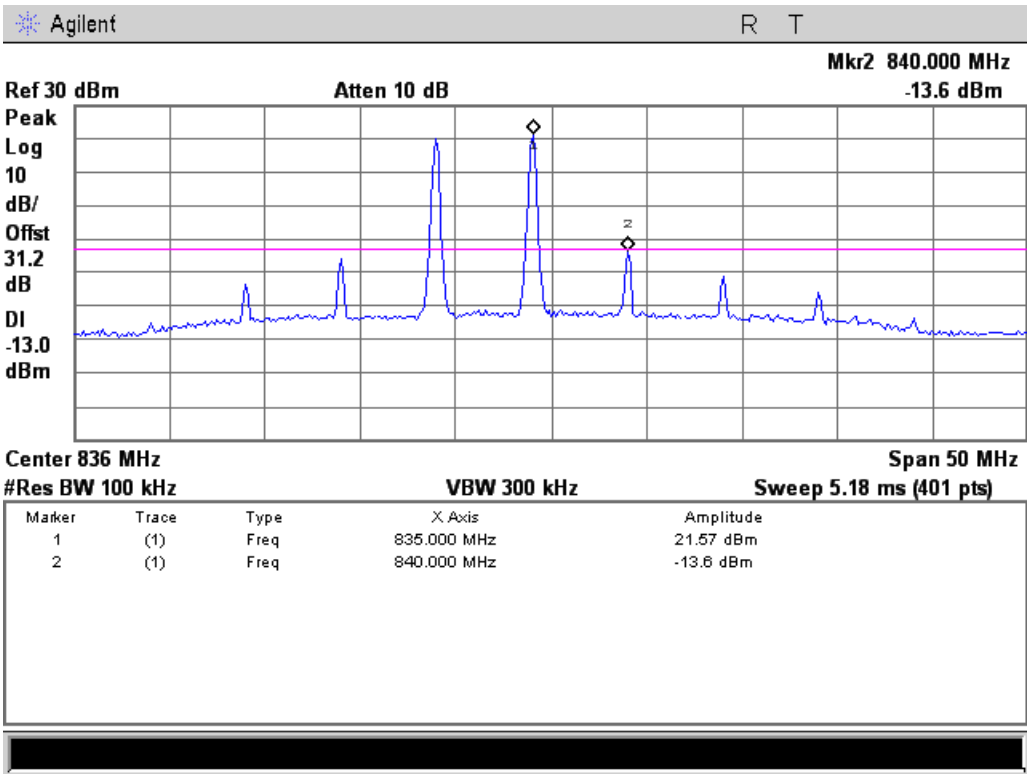
| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 2120-2125 | -48.8 | -13.14 | 16.34 |
| 2140-2145 | -48.7 | -13.34 | 16.68 |

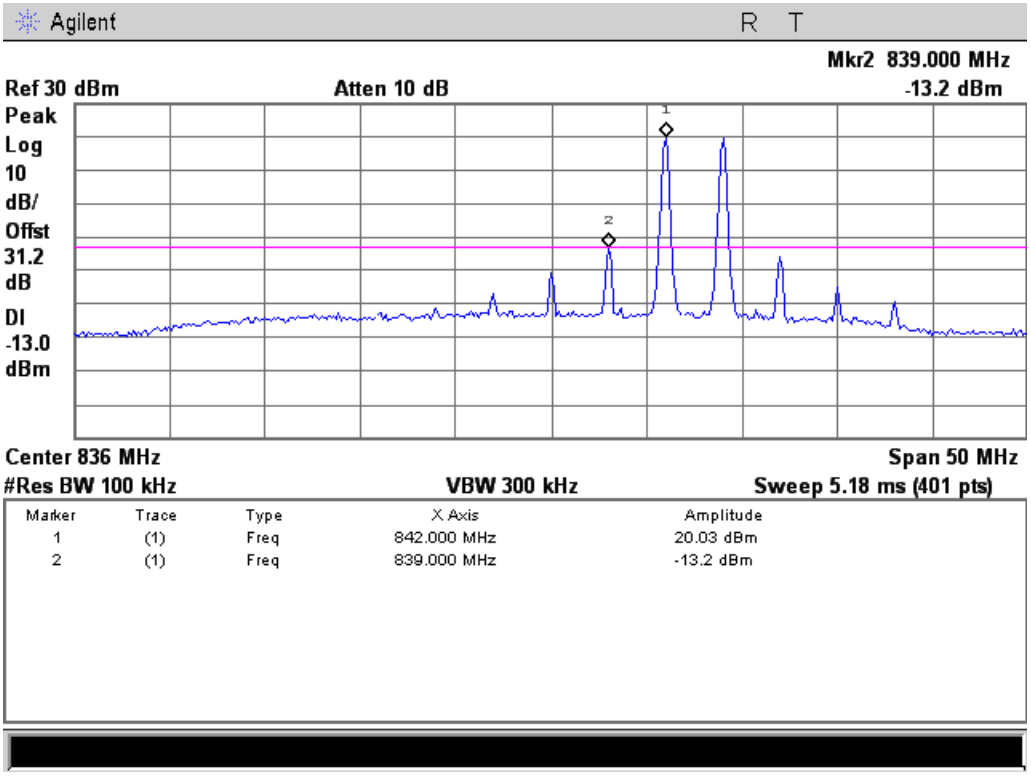
### 1900 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 1940-1945 | -53.1 | -13.1 | 15.85 |
| 1975-1980 | -52.6 | -13.35 | 17.13 |

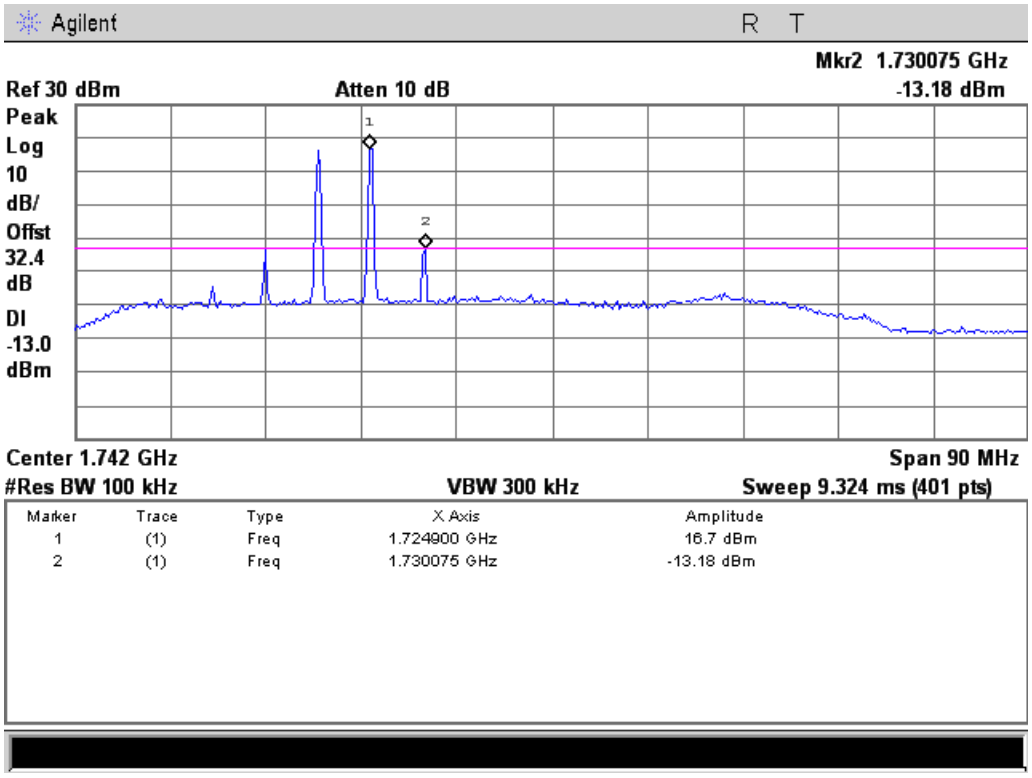
## GSM Uplink Test Plots

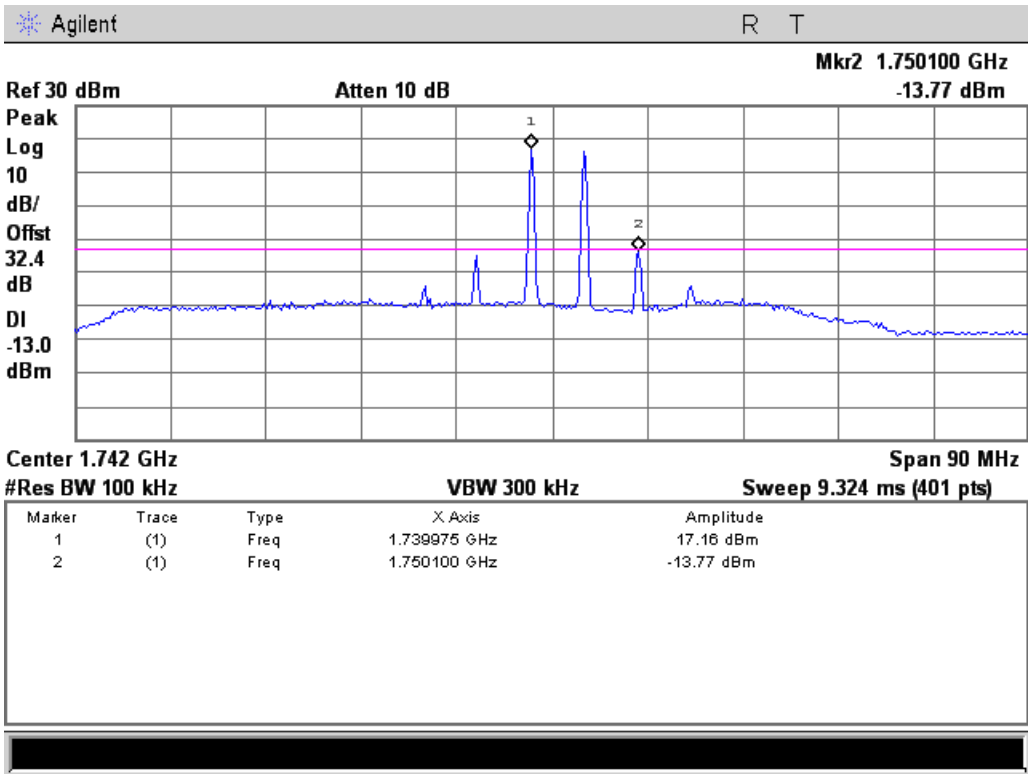
### 800 MHz Band



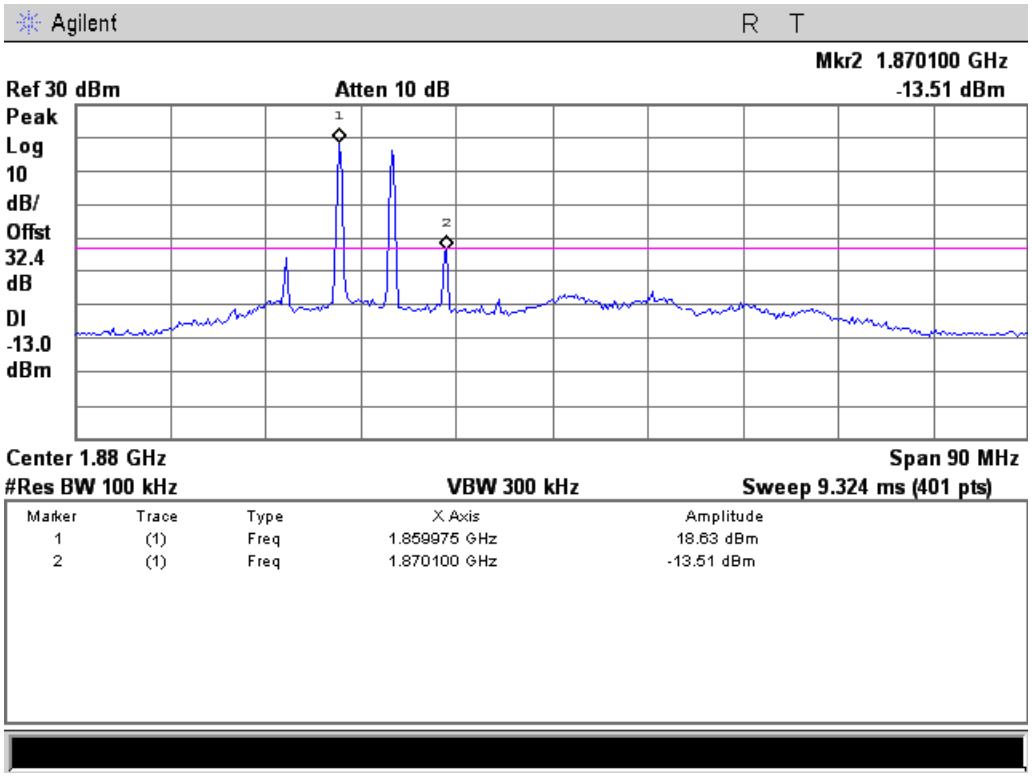



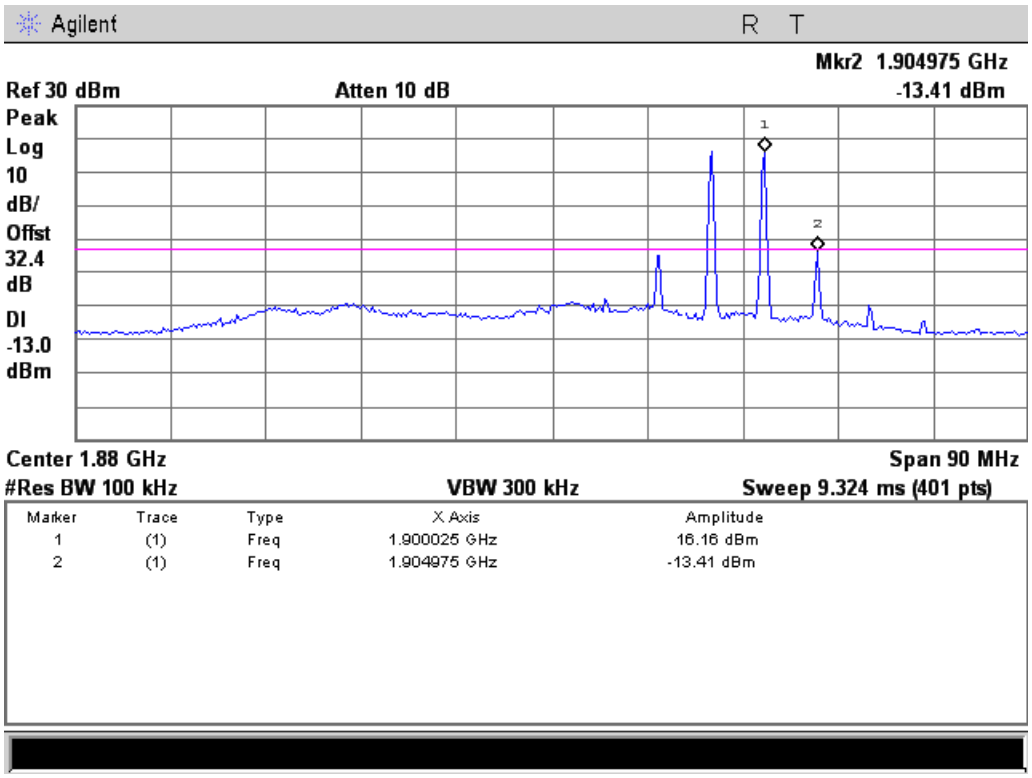
## 1700 MHz Band



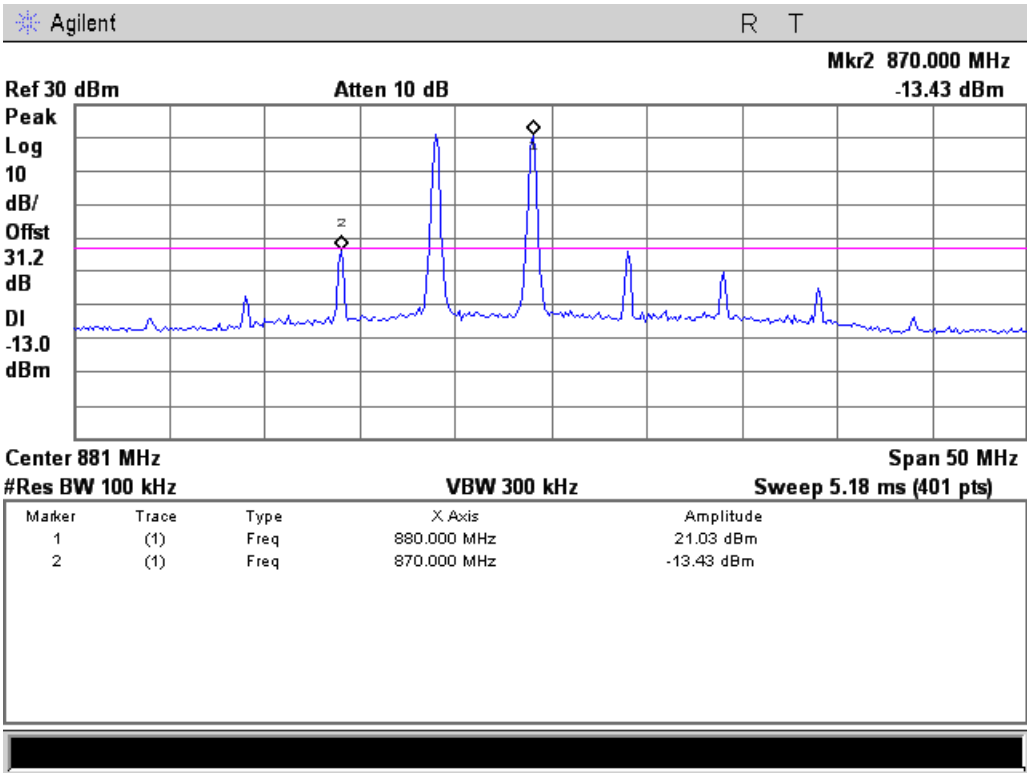
## 1900 MHz Band

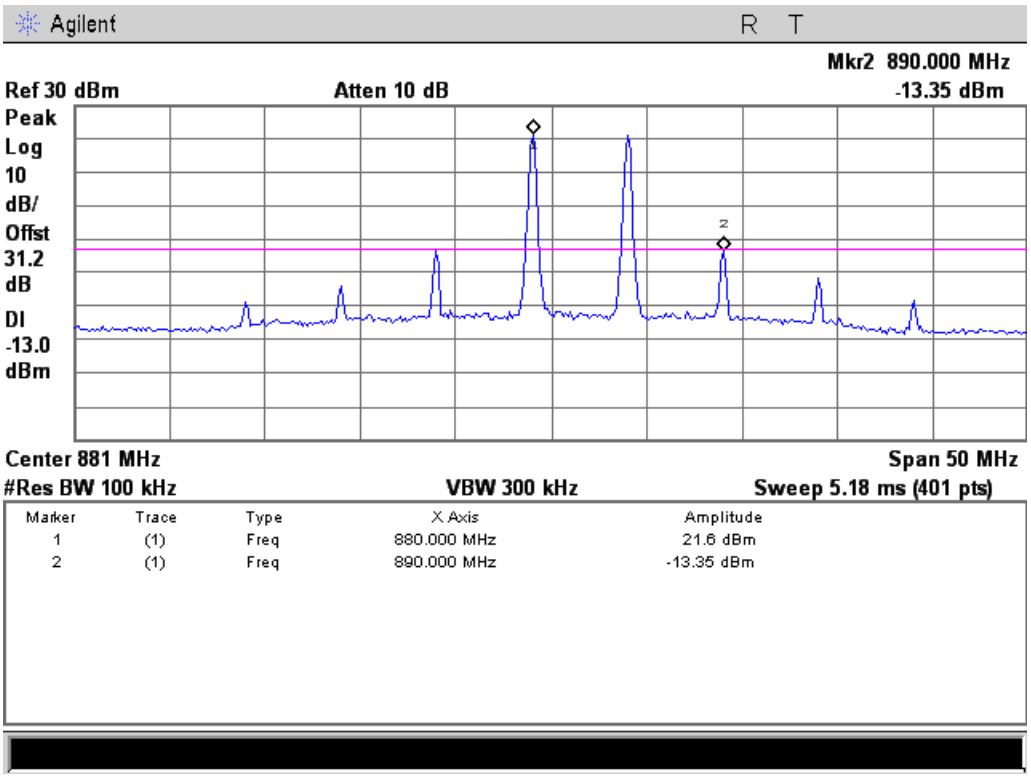


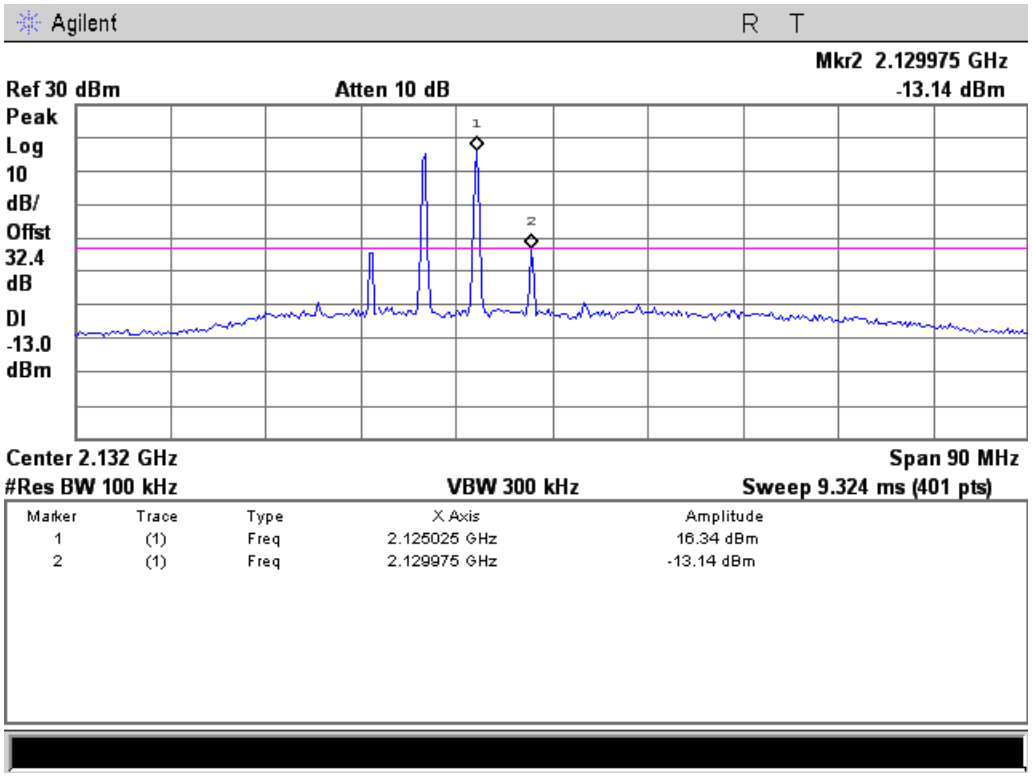
## GSM Downlink Test Plots

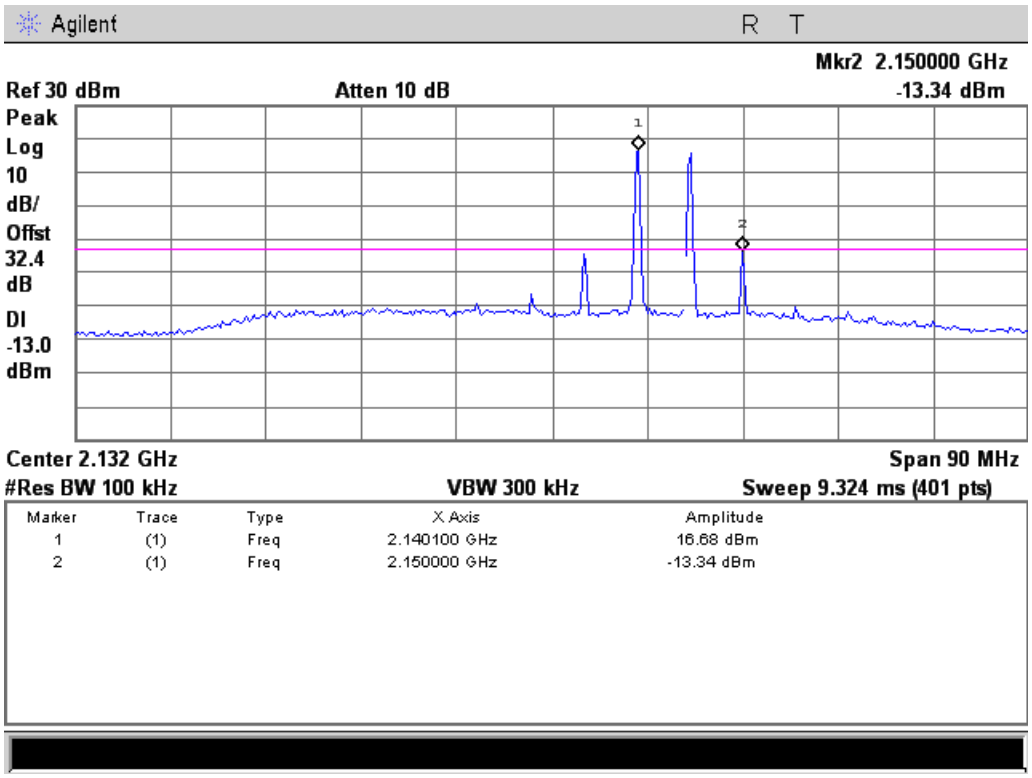
### 800 MHz Band



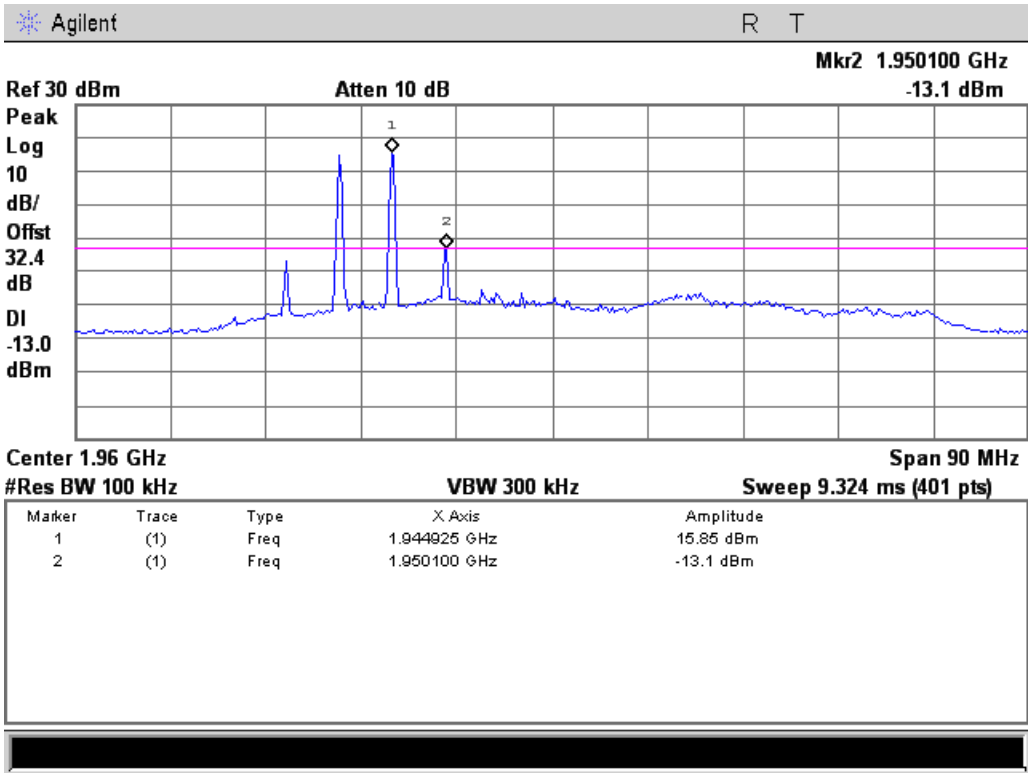



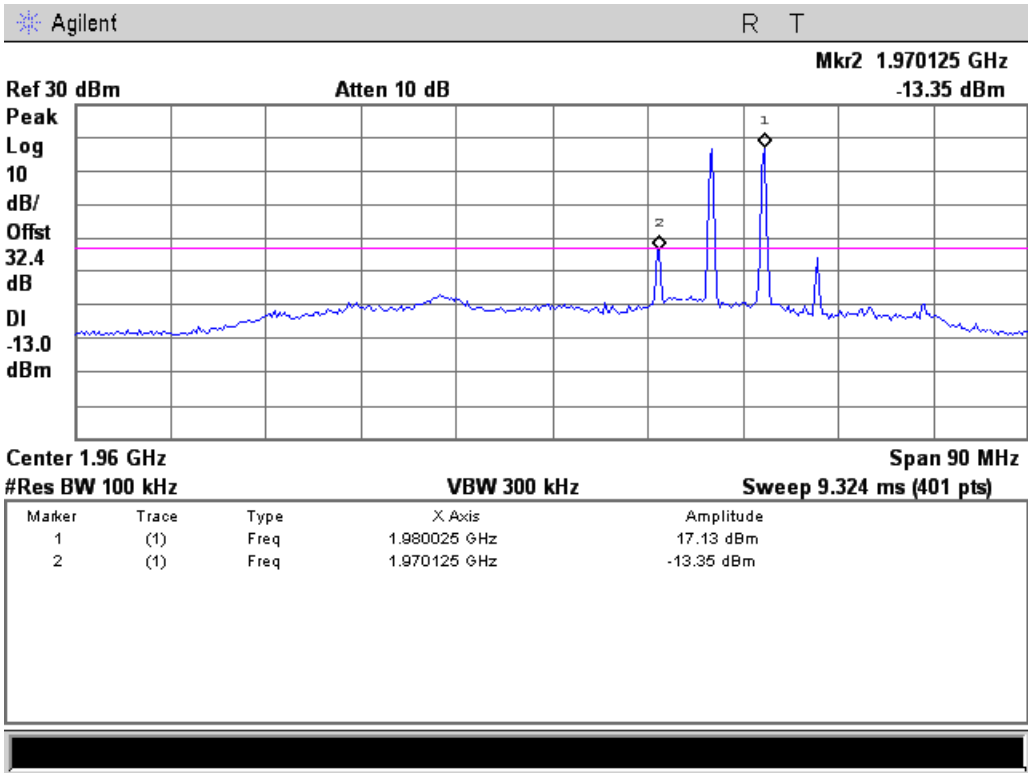
## 2100 MHz Band



## 1900 MHz Band



## CDMA Uplink Test Results

### 800 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 830-835 | -48 | -13.42 | 21.47 |
| 842-845 | -48.3 | -13.67 | 20.95 |

### 1700 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 1720-1725 | -51.8 | -13.7 | 17.23 |
| 1740-1745 | -50.5 | -13.37 | 17.78 |

### 1900 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 1860-1865 | -50 | -13.54 | 19.72 |
| 1895-1900 | -45.7 | -13.12 | 17.74 |

## CDMA Downlink Test Results

### 800 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 875-880 | -47.5 | -13.51 | 20.97 |
| 880-885 | -46.9 | -13.44 | 21.62 |

### 2100 MHz Band

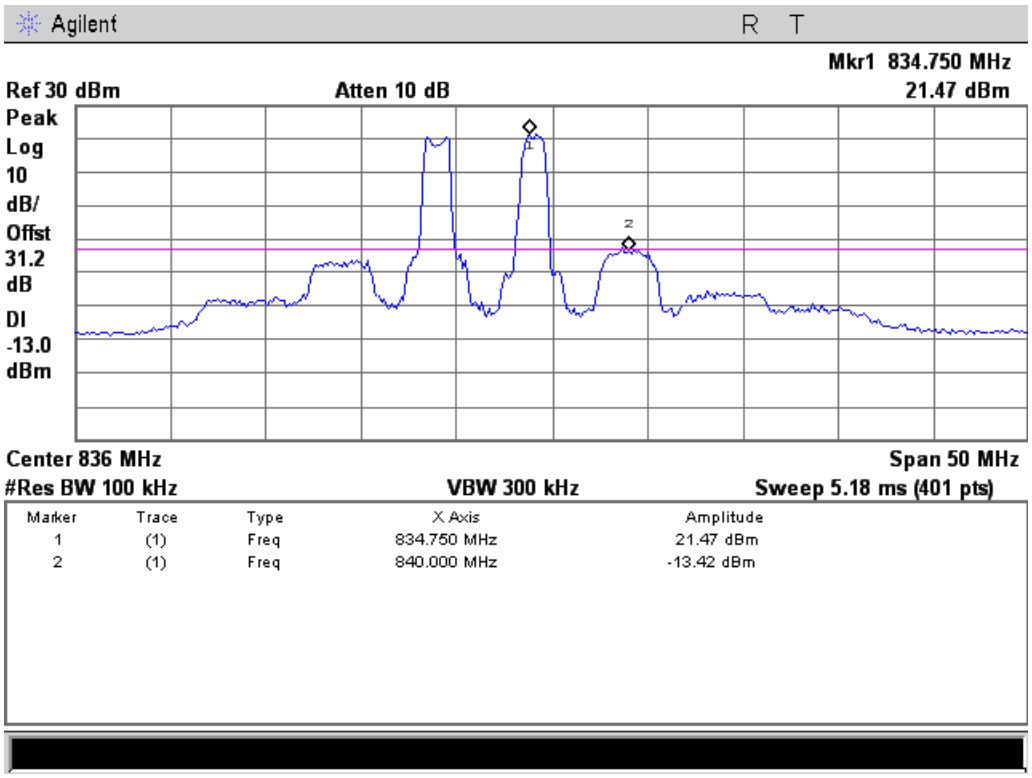
| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 2120-2125 | -48.3 | -13.3 | 16.11 |
| 2140-2145 | -48.1 | -13.37 | 17.07 |

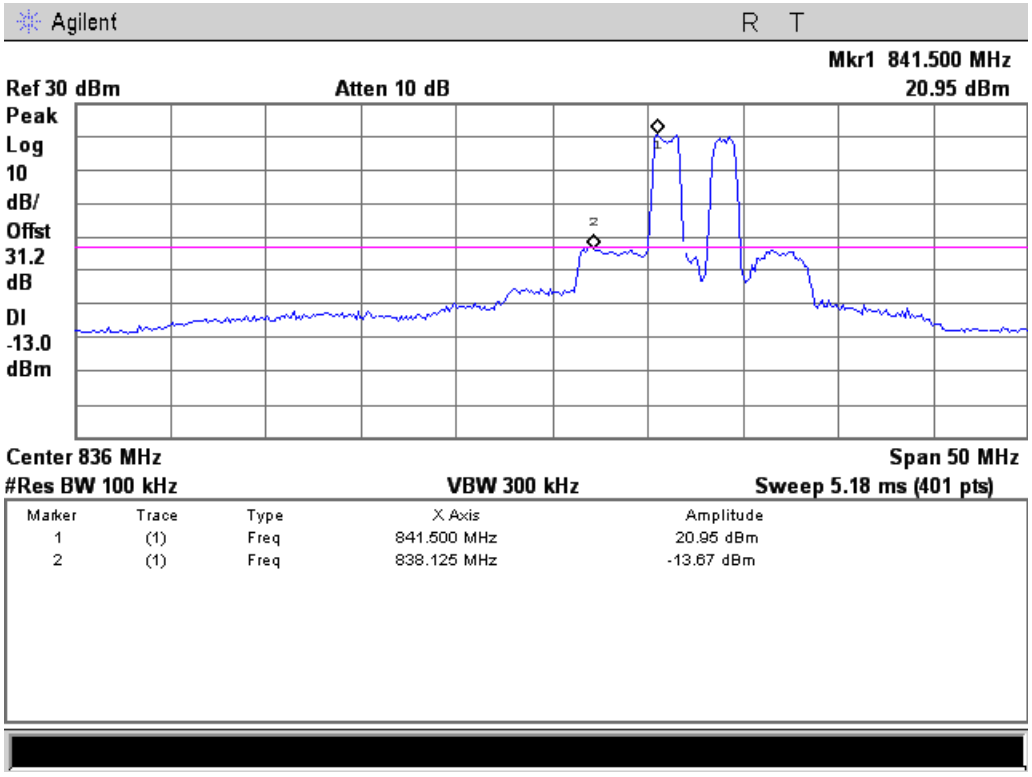
### 1900 MHz Band

| Tuned Frequency Pair (MHz) | Input Power (dBm) | Intermodulation Level (dBm) | Output Power (dBm) |
|---|---|---|---|
| 1940-1945 | -52.8 | -13.26 | 17.49 |
| 1975-1980 | -50.1 | -14.56 | 19.28 |

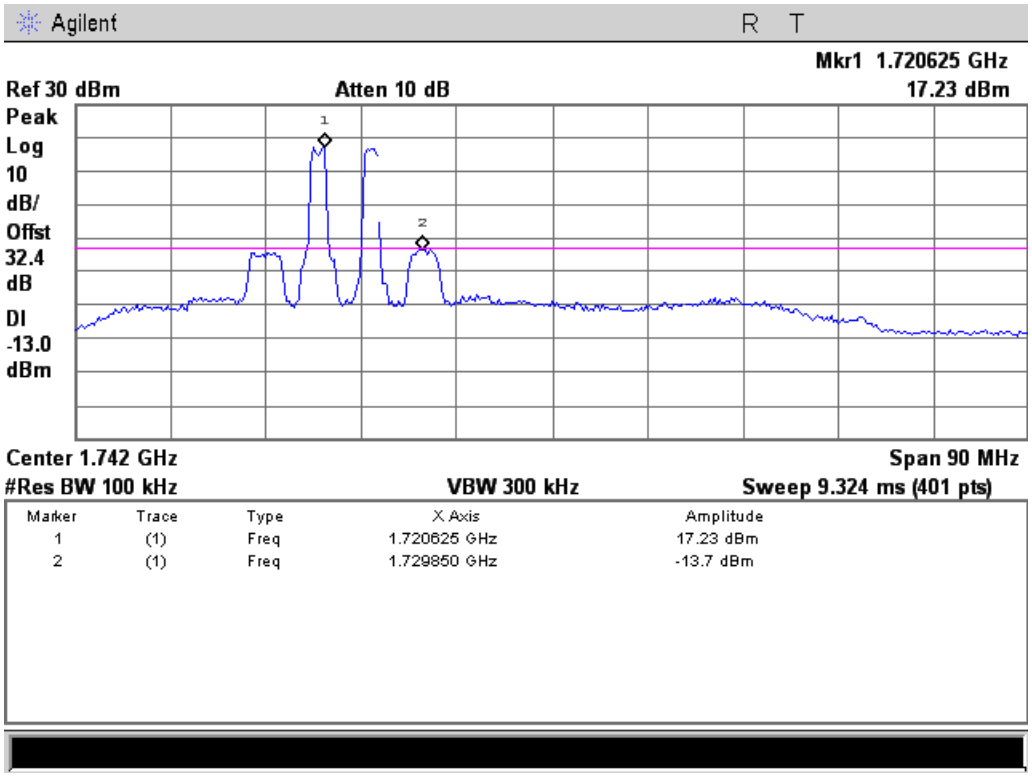
## CDMA Uplink Test Plots

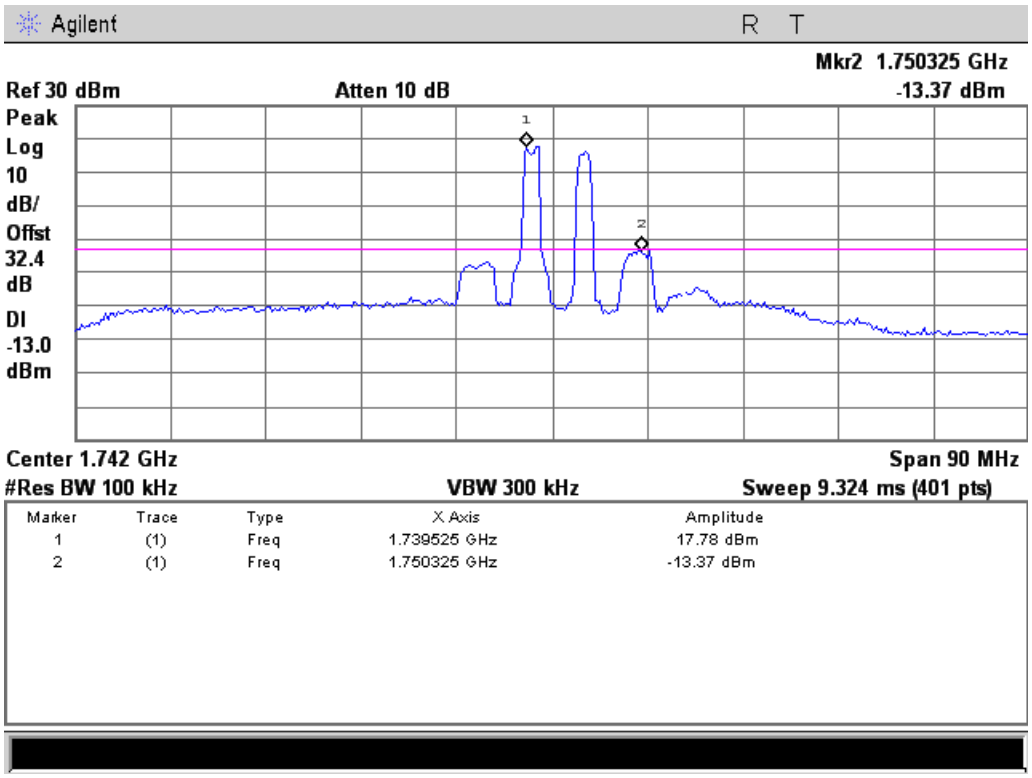
### 800 MHz Band



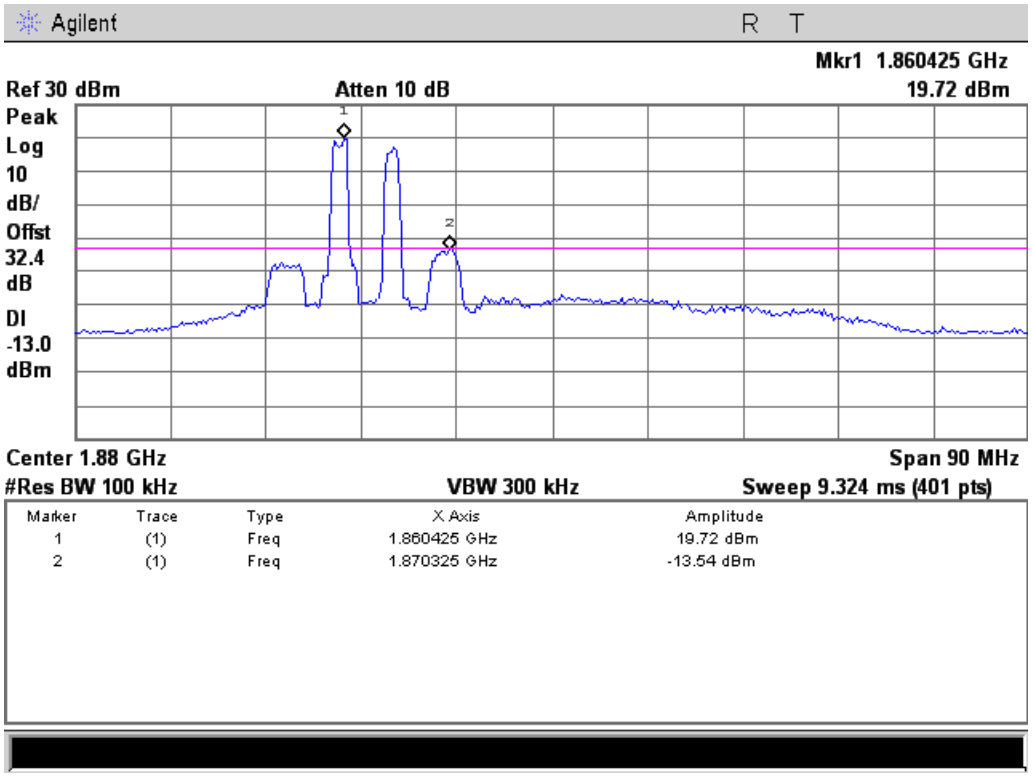



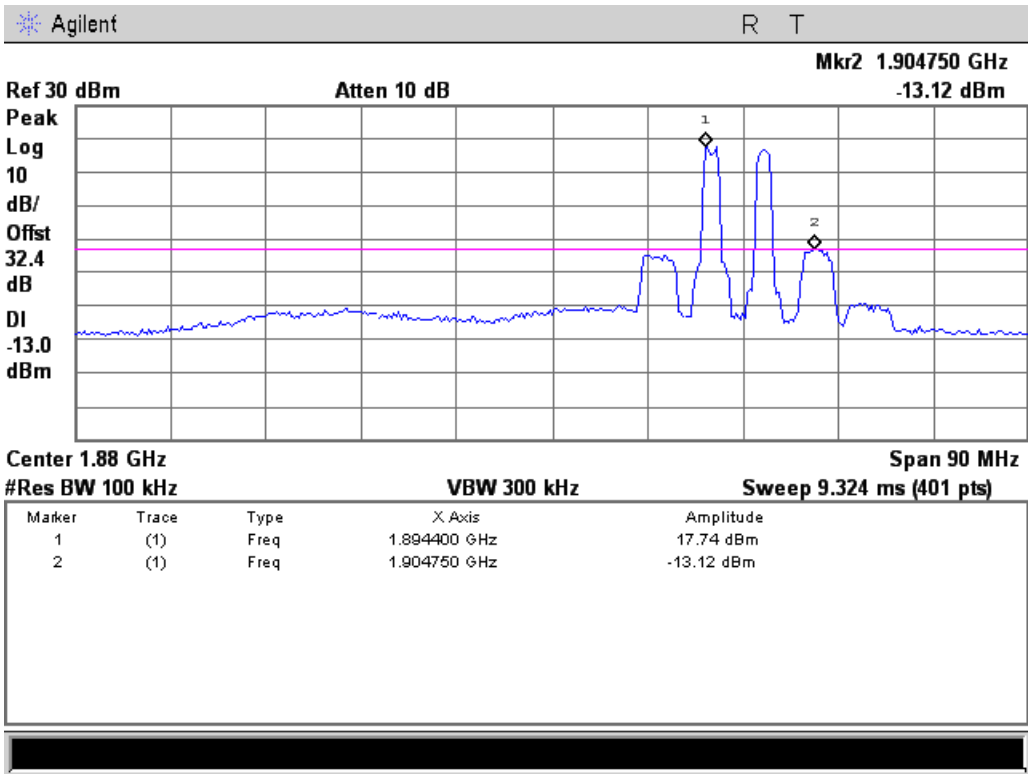
## 1700 MHz Band



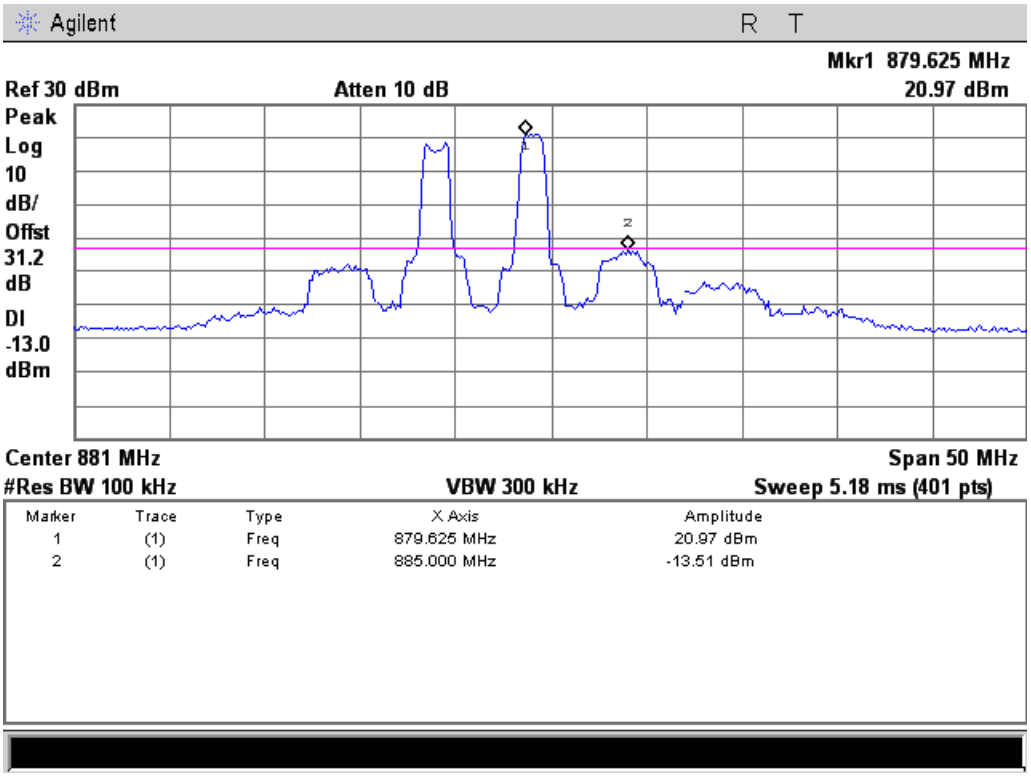
## 1900 MHz Band

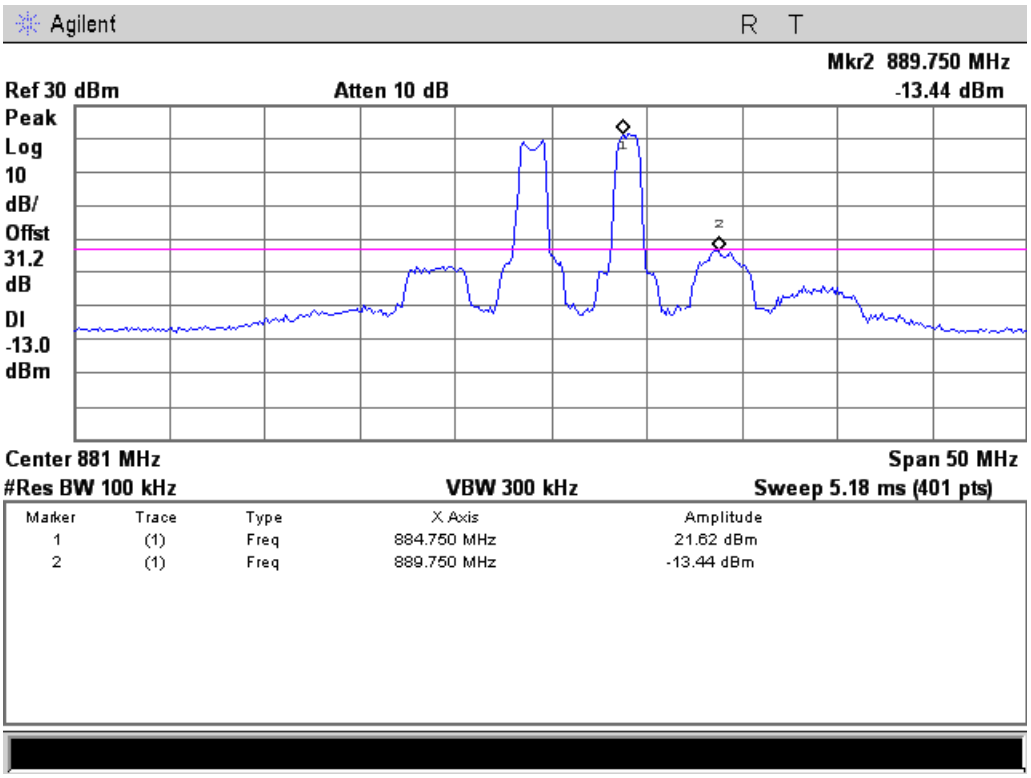


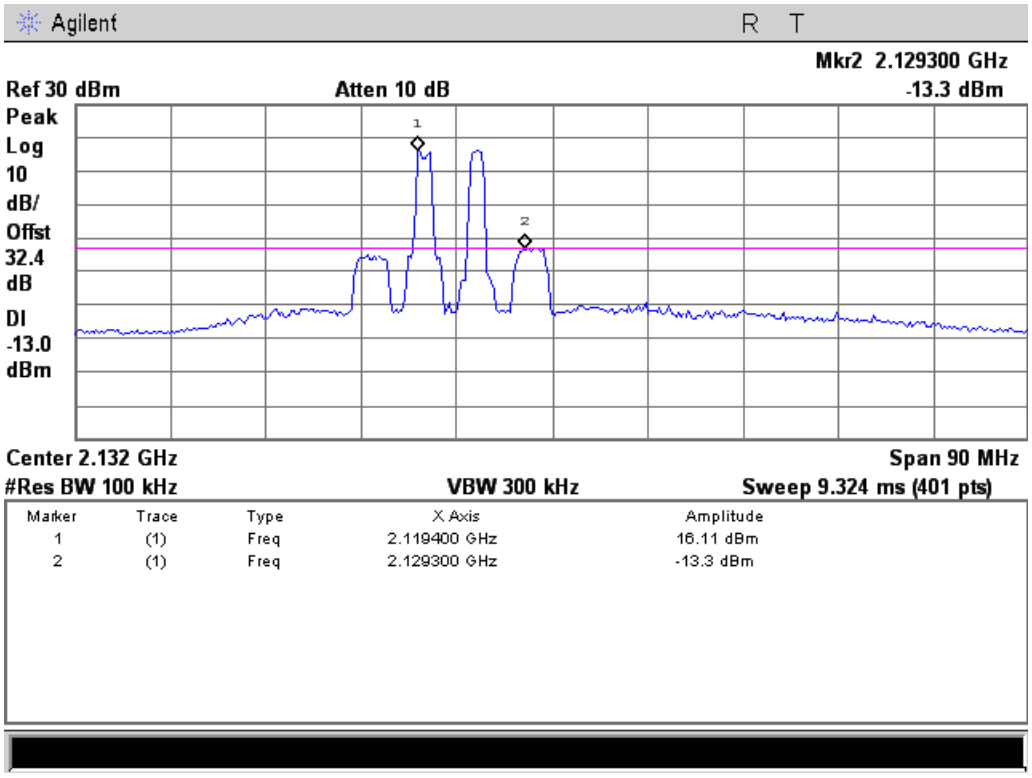
## CDMA Downlink Test Plots

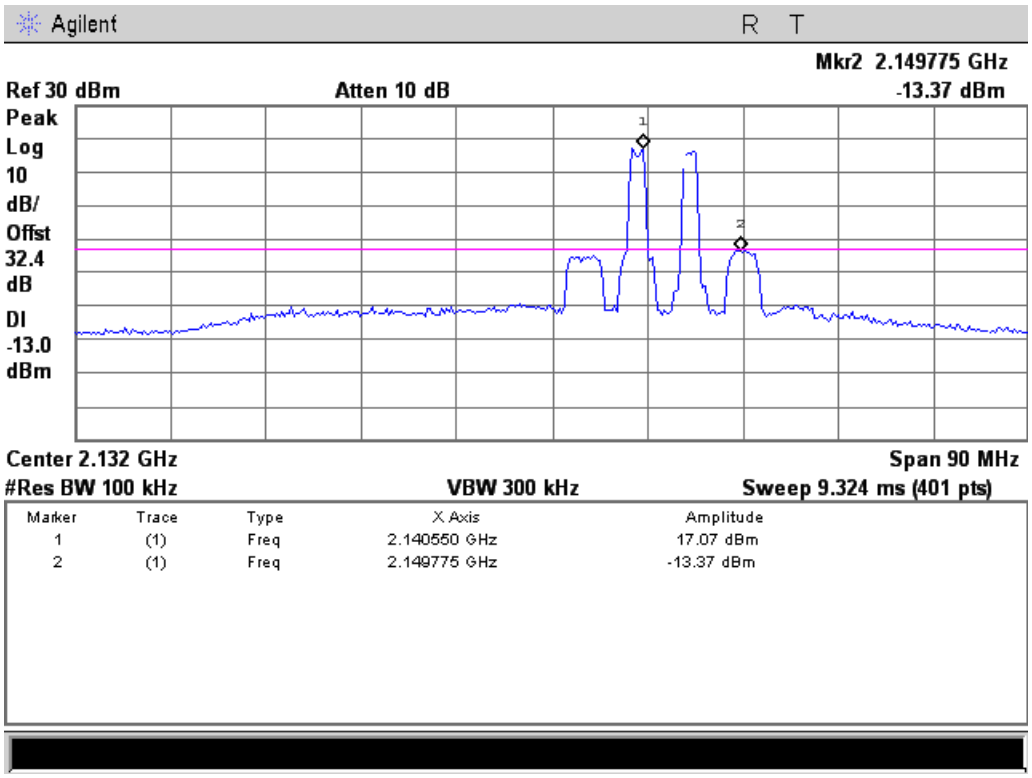
### 800 MHz Band



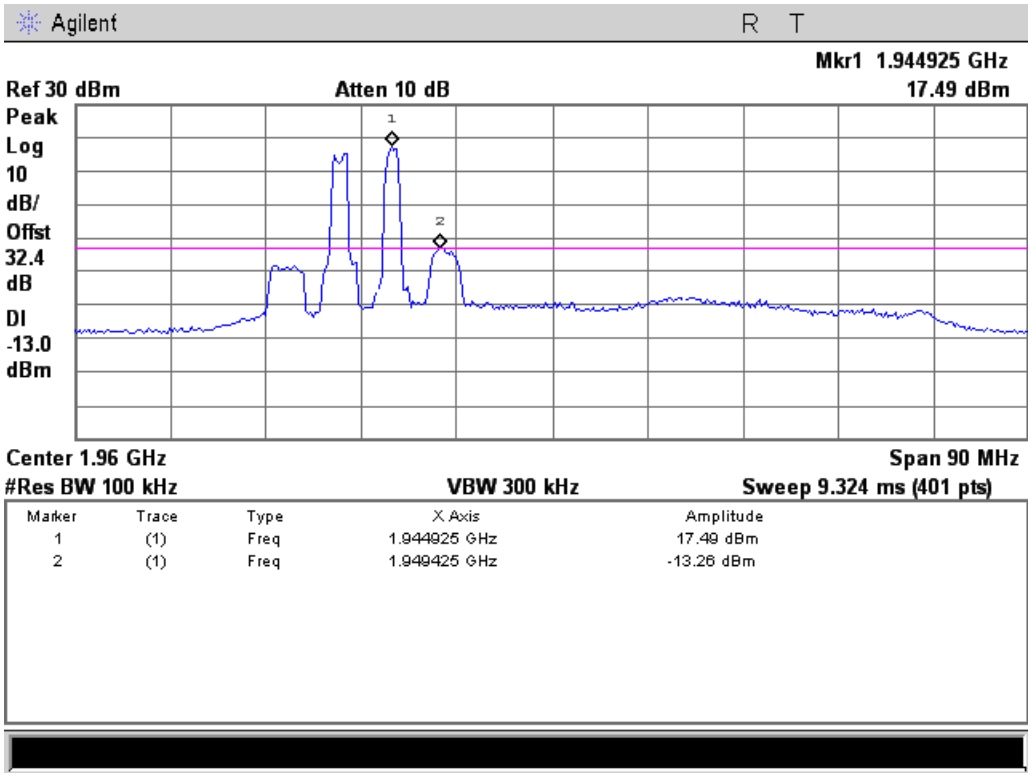



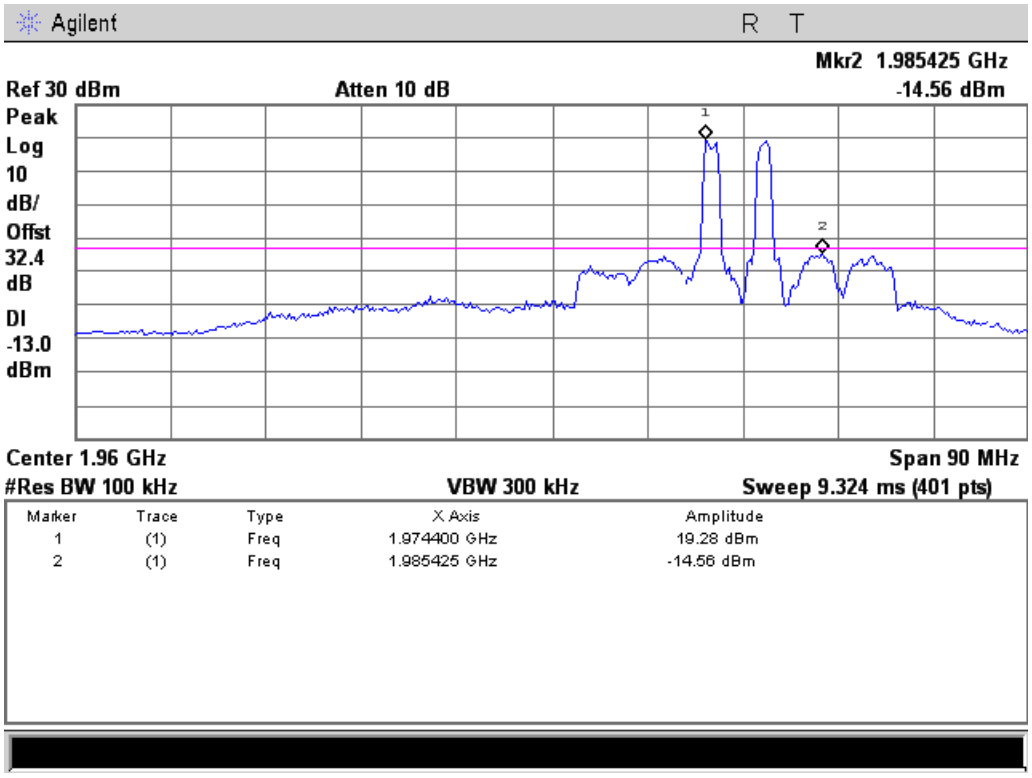
## 2100 MHz Band



## 1900 MHz Band



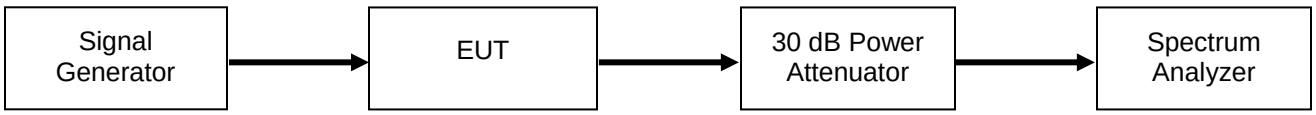
**Occupied Bandwidth**

| | | |
|---|---|---|
| **Name of Test:** | Occupied Bandwidth | **Engineer:** John Erhard |
| **Test Equipment Utilized:** | i00348, i00331, i00347 | **Test Date:** 6/28/12 |

**Test Procedure**

The EUT was connected to a spectrum analyzer through a 30 dB power attenuator. A signal generator was utilized to produce the following signals; GSM, CDMA, and WCDMA. The RF input level was set to the level as determined by the intermodulation testing requirements. The input and output spectrums were observed and the plots captured to ensure that the signals remained similar with minimal non-linearity in accordance to FCC guidelines. The center channel of each band was measured. All emissions are within the pass band.

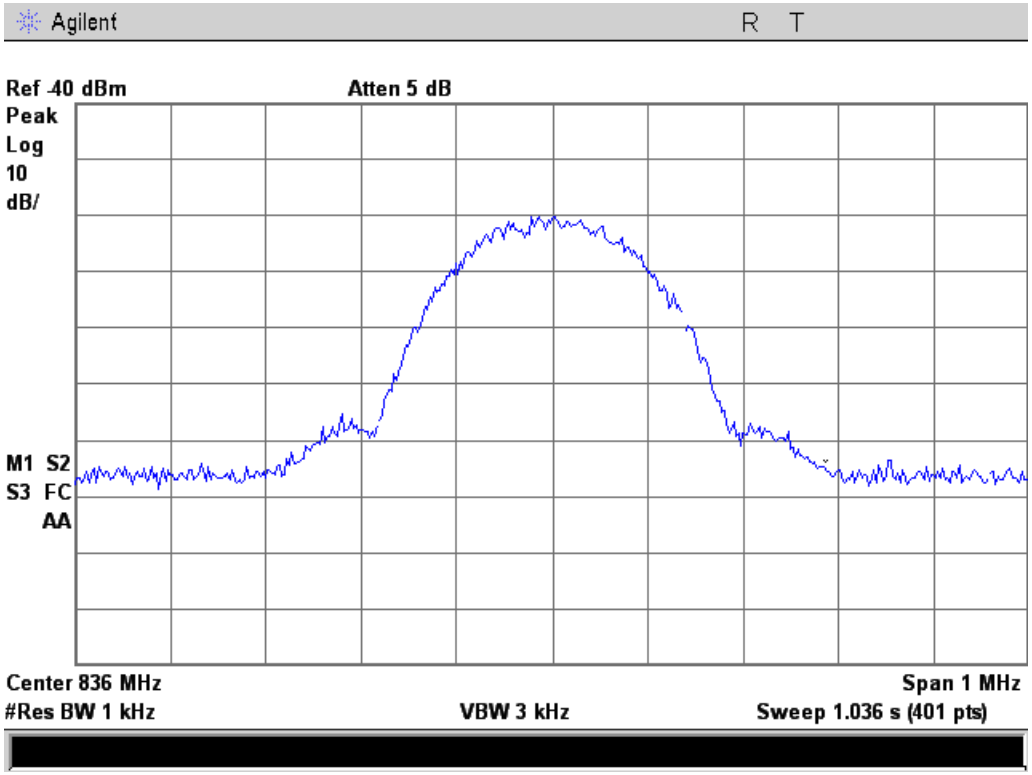
**Test Setup**



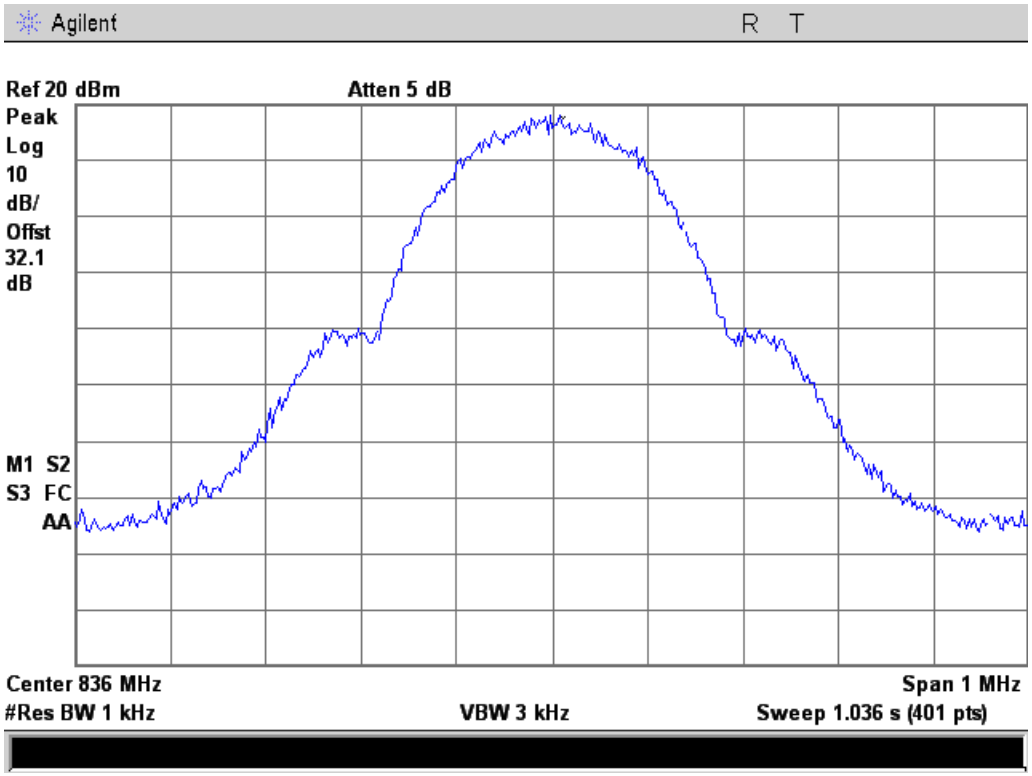
## GSM Uplink Test Results

## 800 MHz Band

### Input

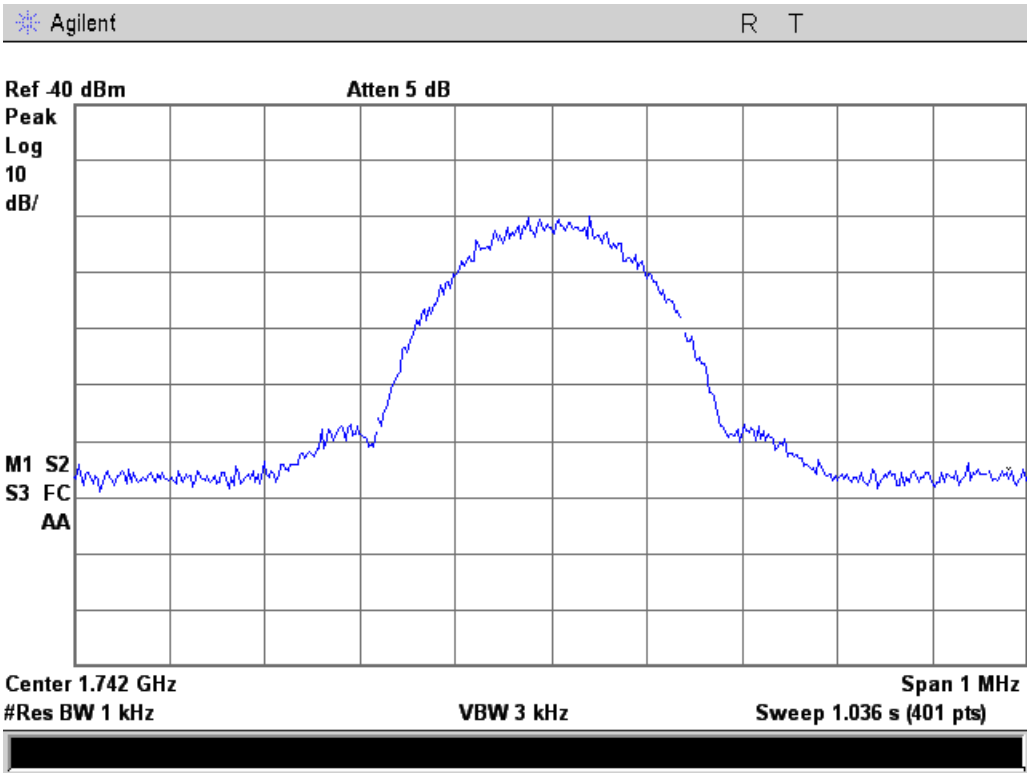



### Output

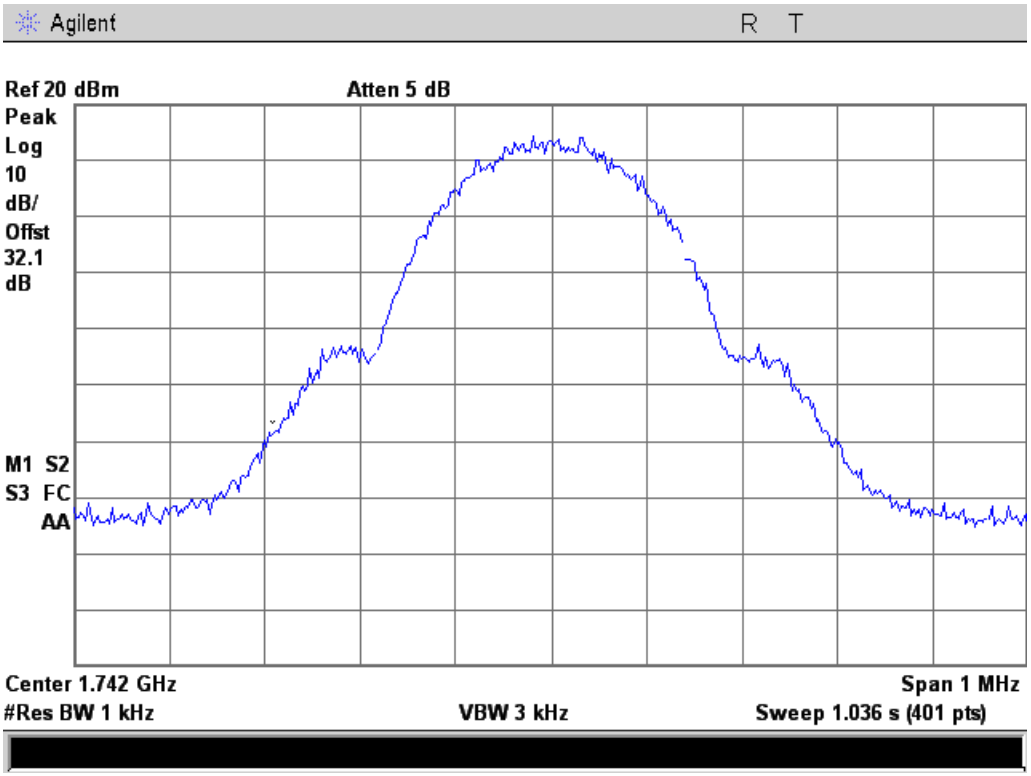


## 1700 MHz Band

### Input

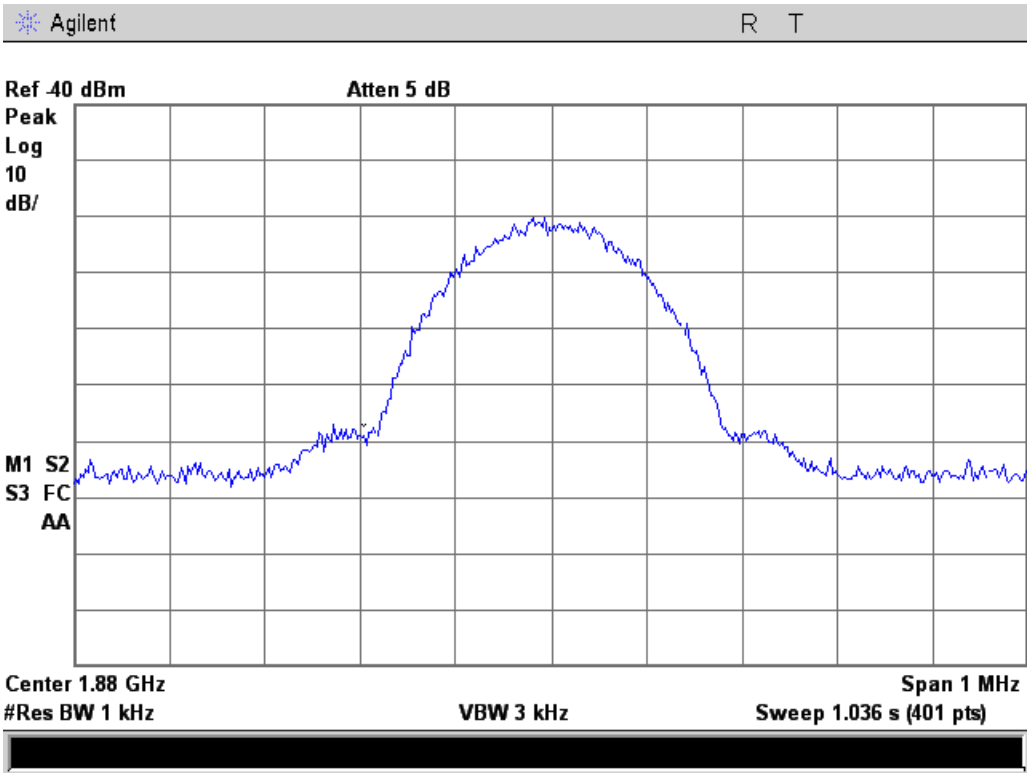



### Output

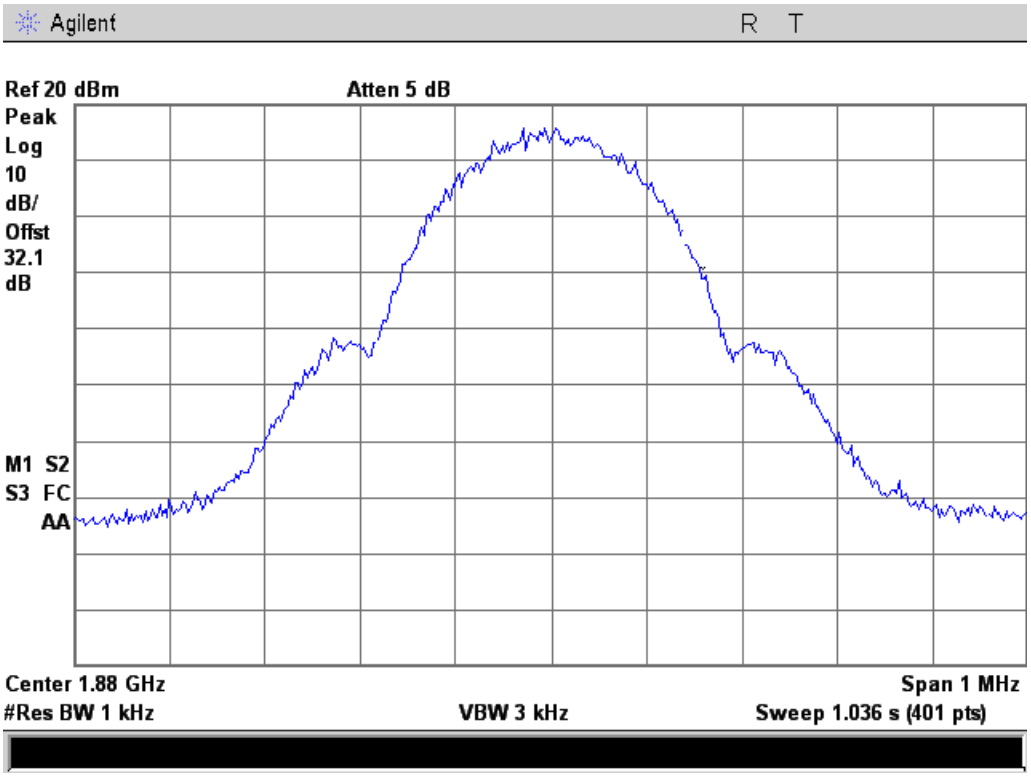


## 1900 MHz Band

### Input



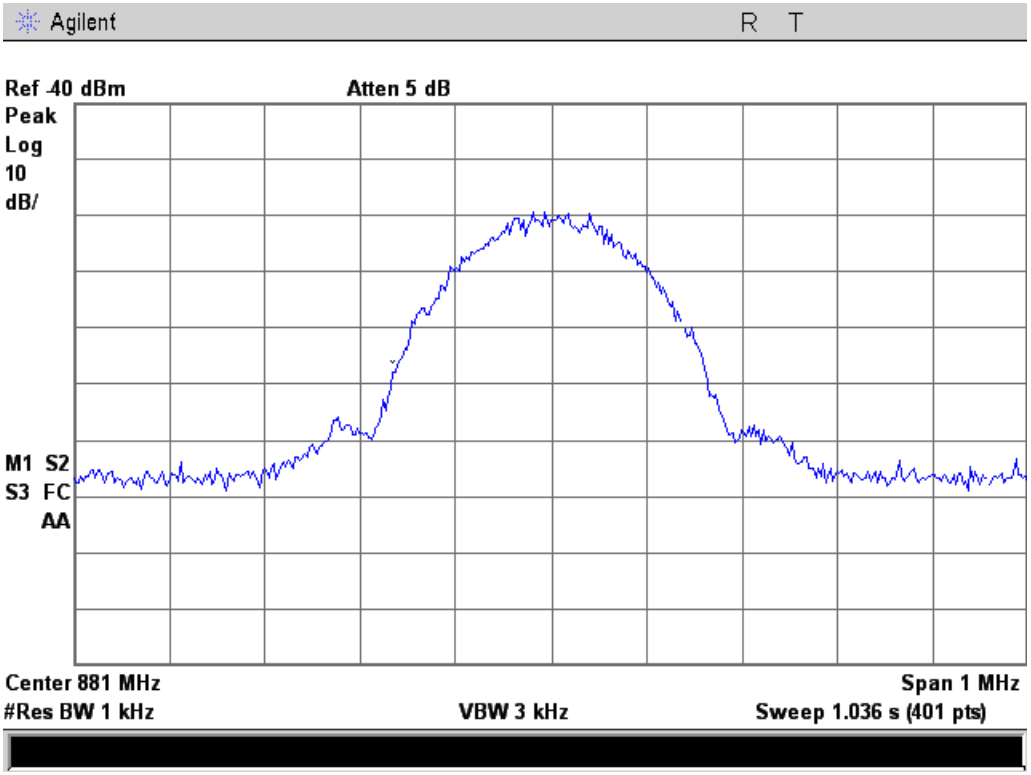

### Output



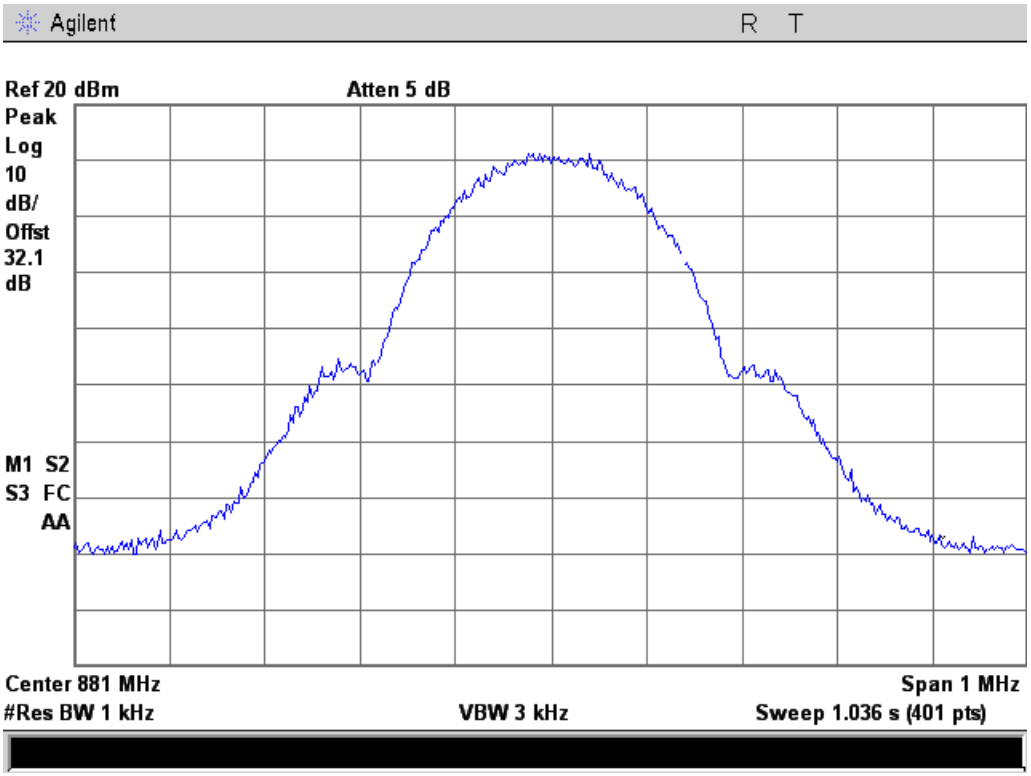
## GSM Downlink Test Results

## 800 MHz Band

### Input

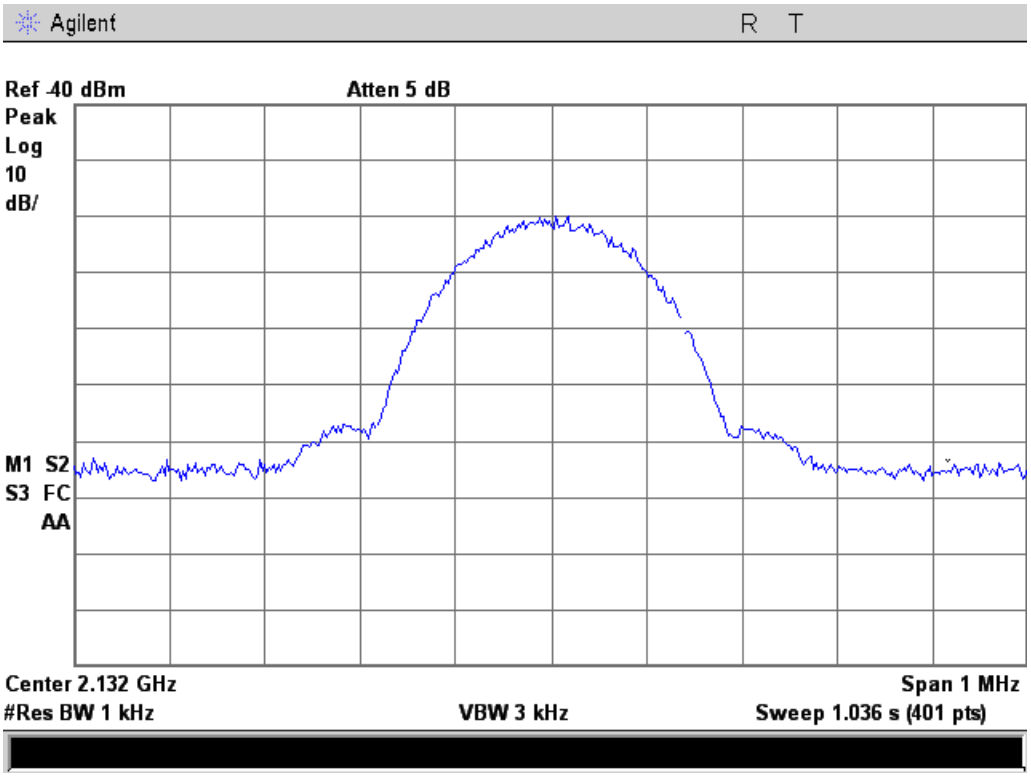



### Output

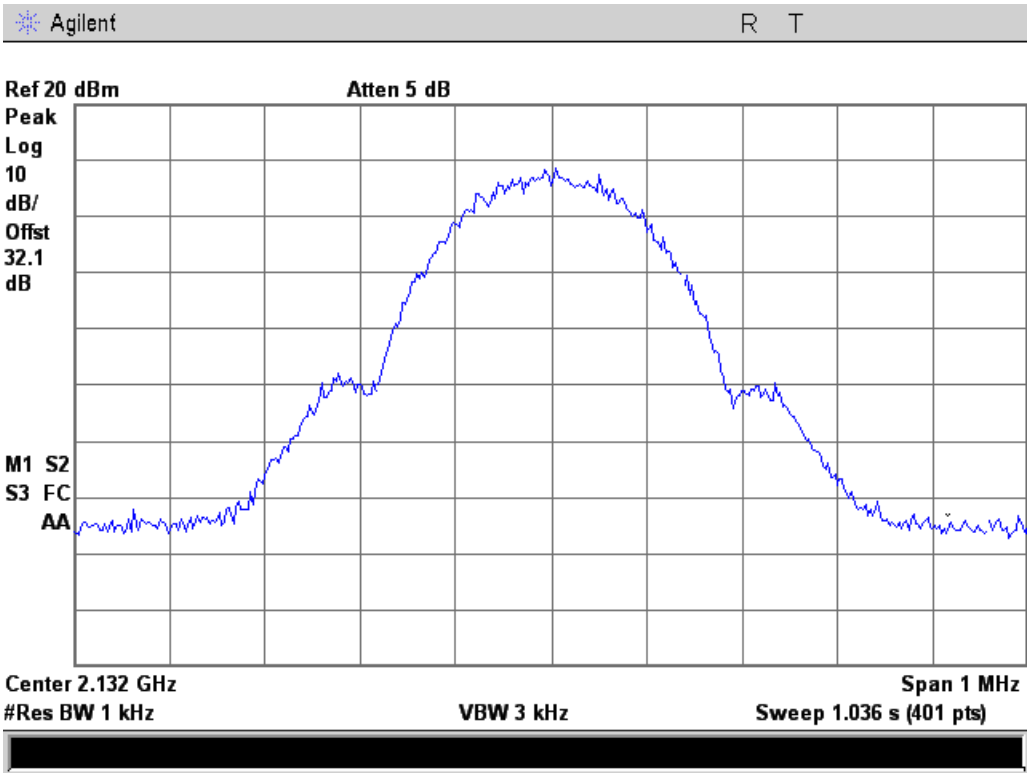


## 2100 MHz Band

### Input

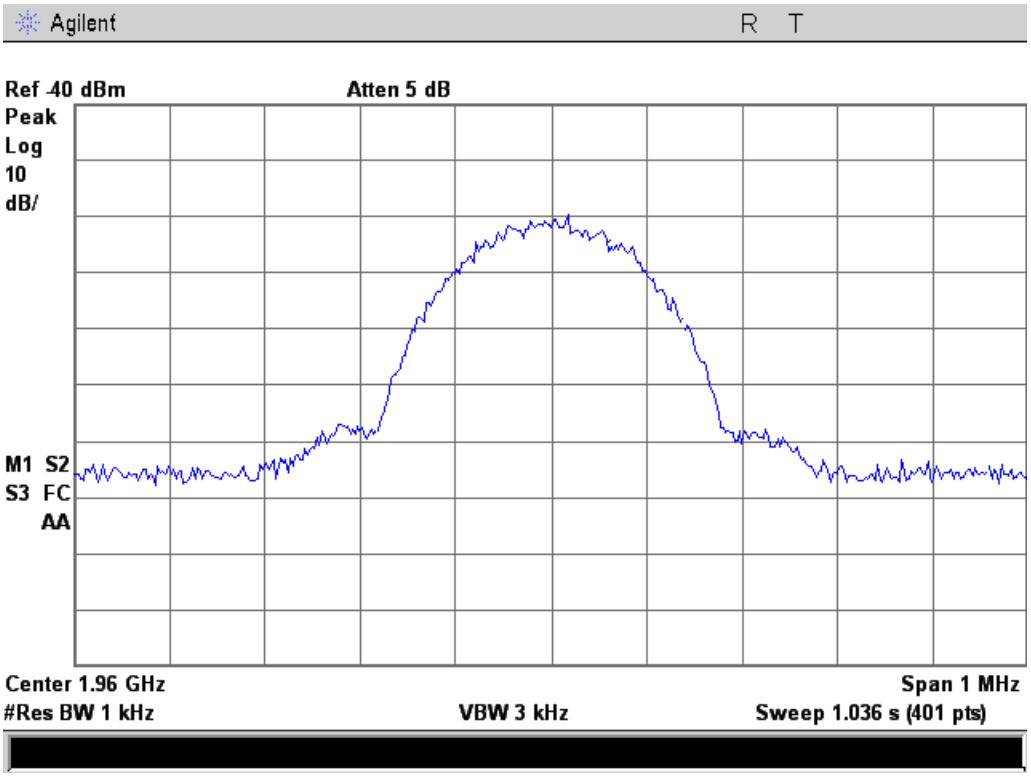



### Output

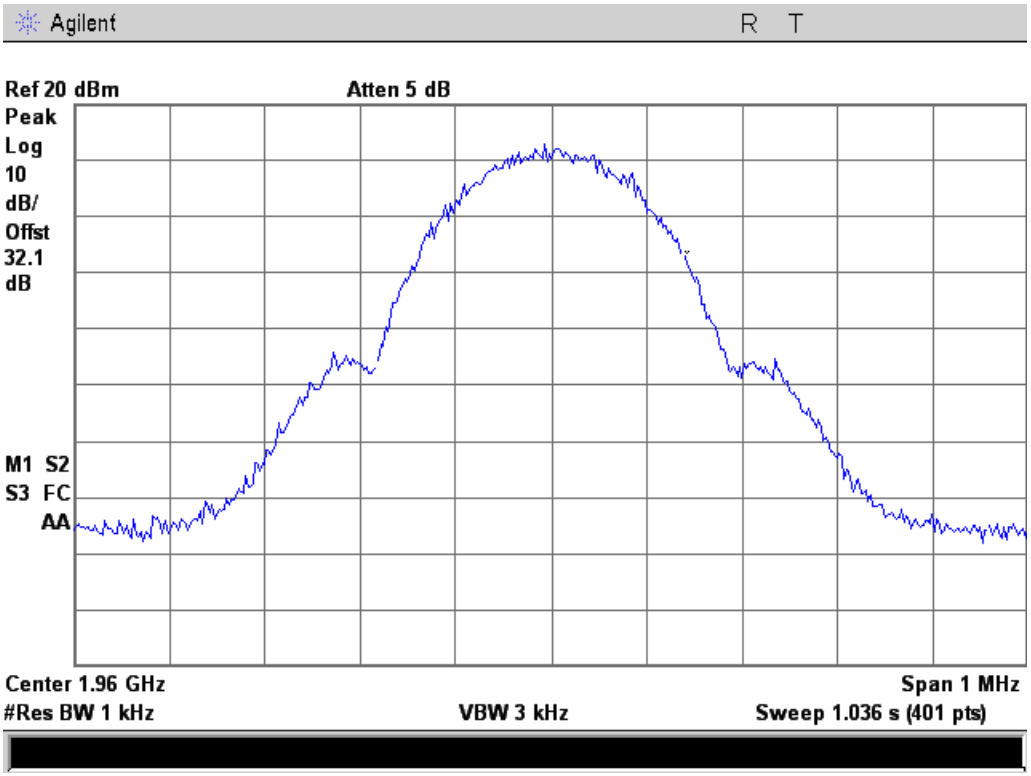


## 1900 MHz Band

### Input



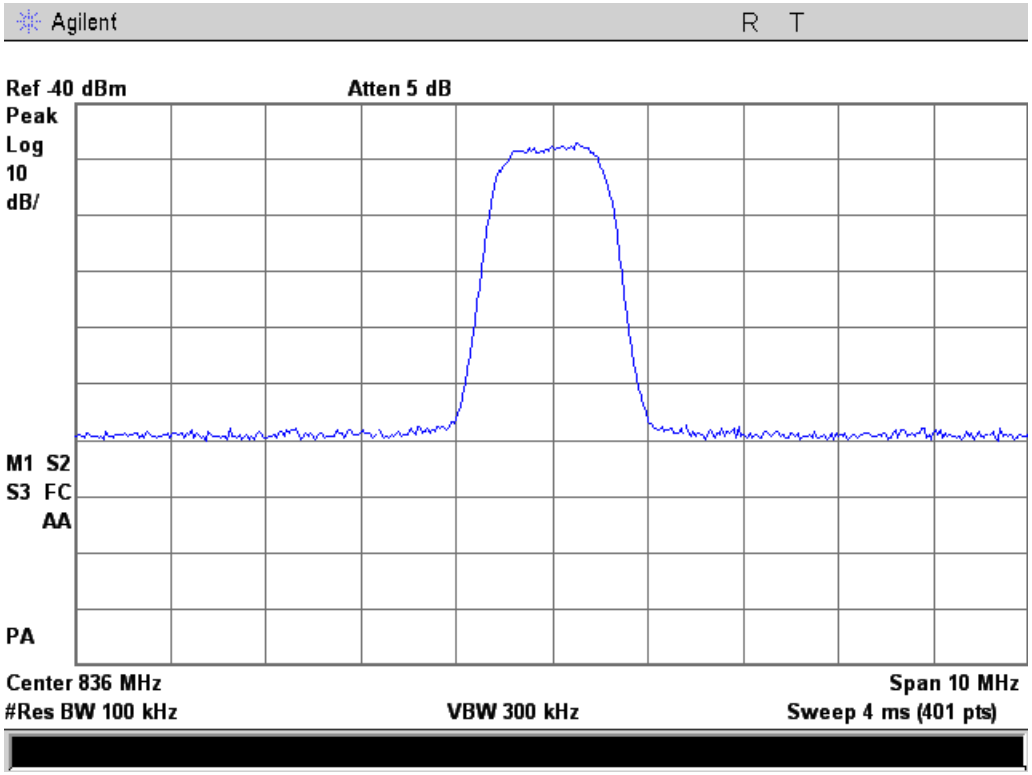

### Output



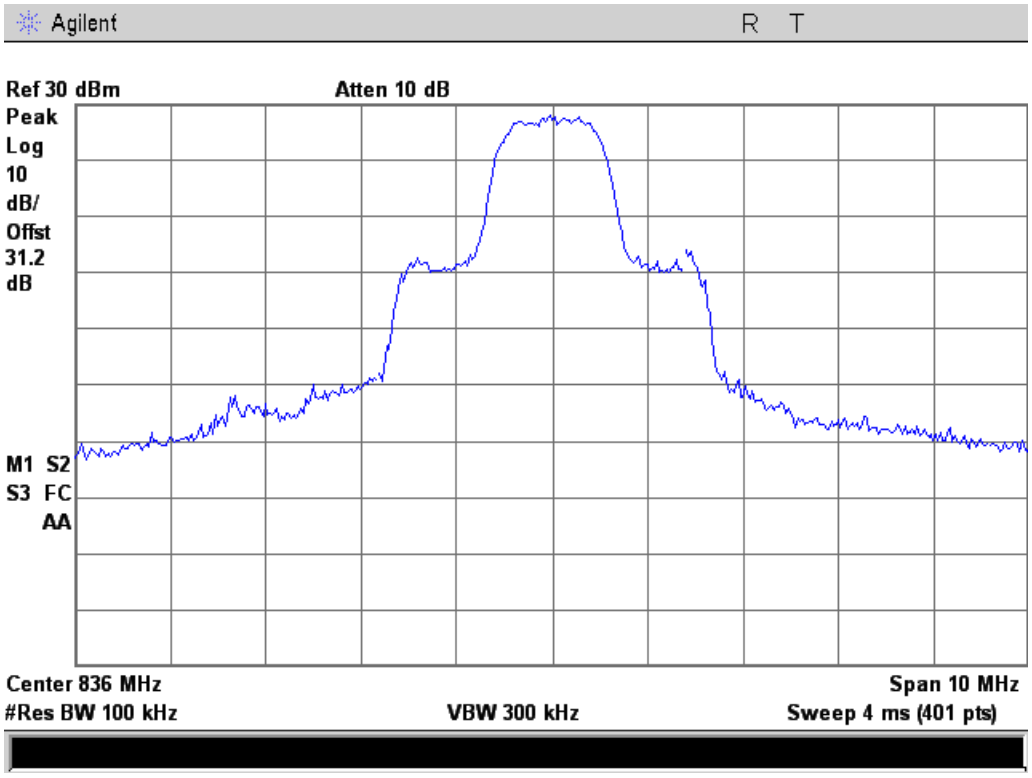
## CDMA Uplink Test Results

## 800 MHz Band

### Input

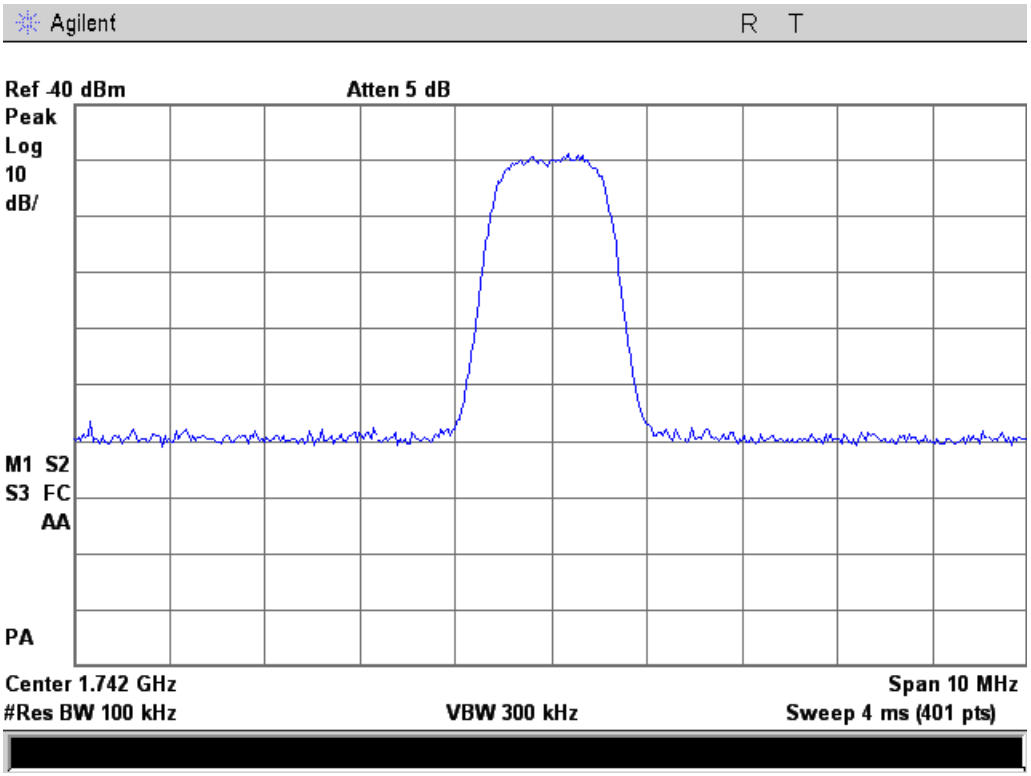



### Output

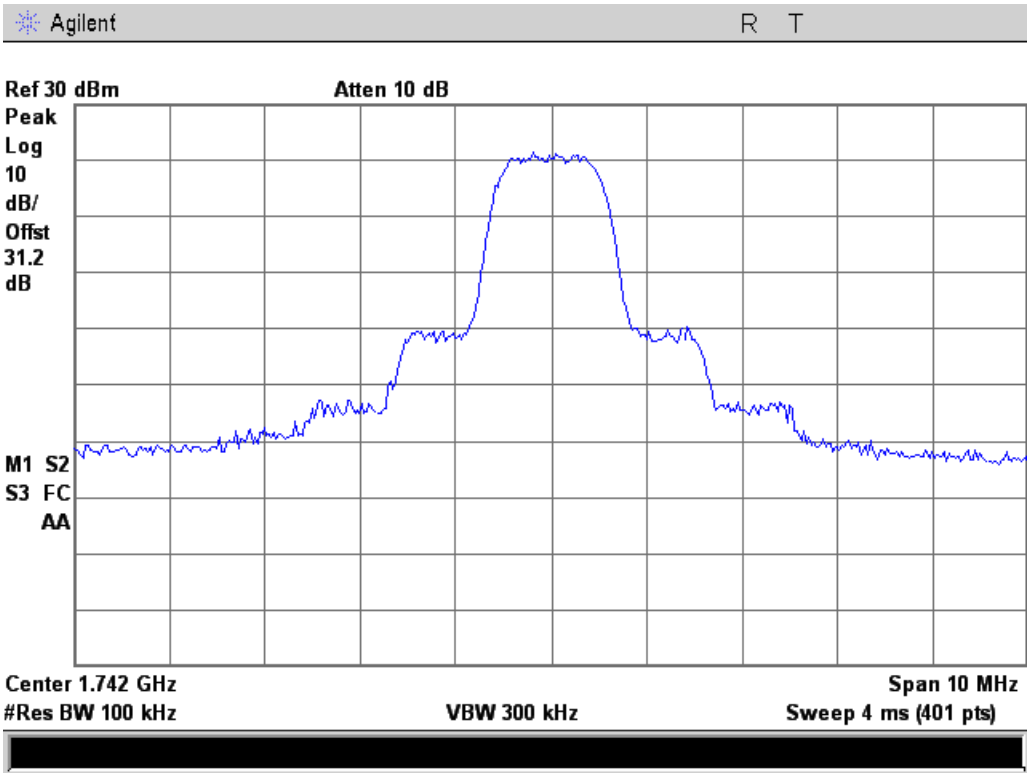


## 1700 MHz Band

### Input

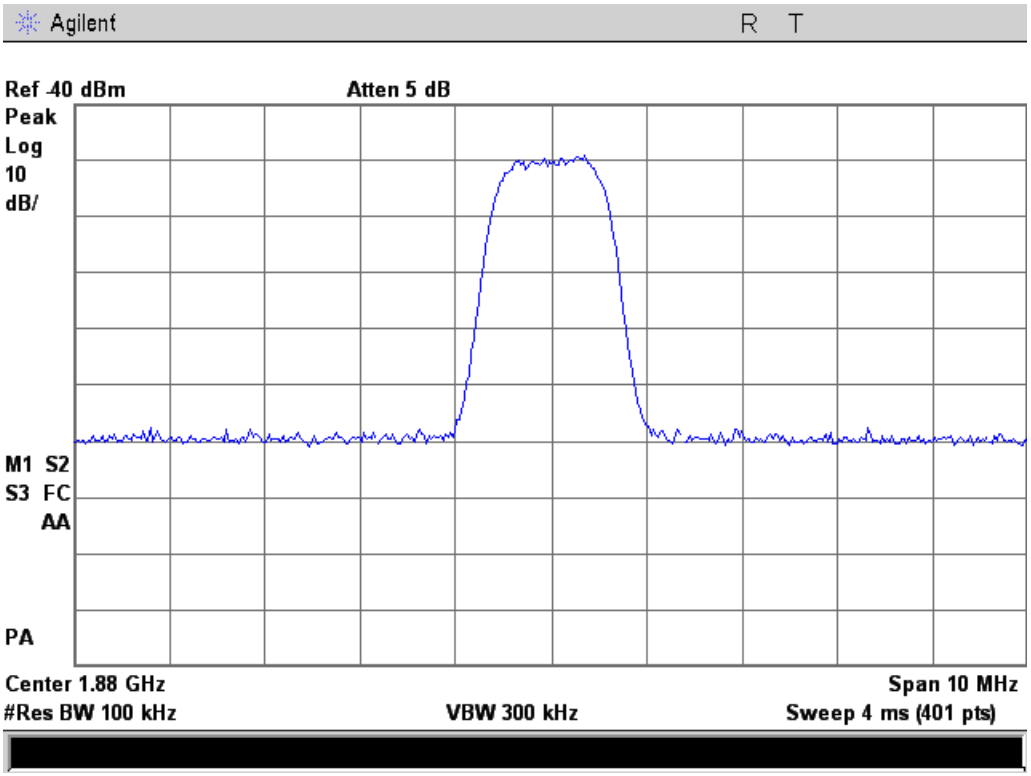



### Output

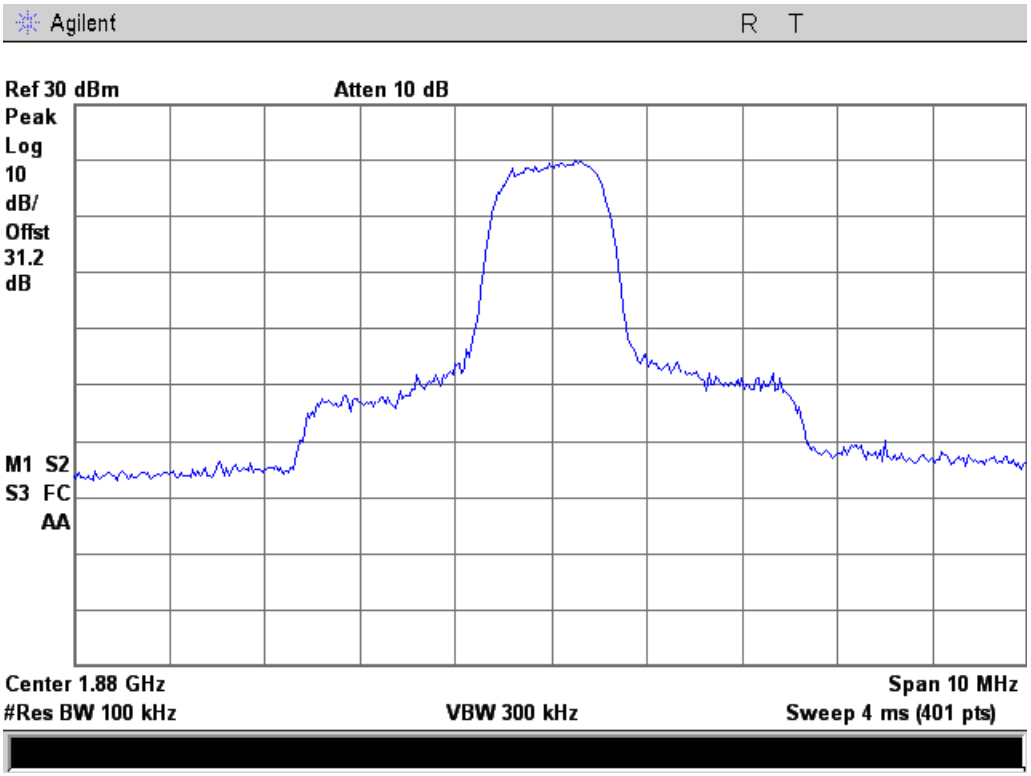


## 1900 MHz Band

### Input



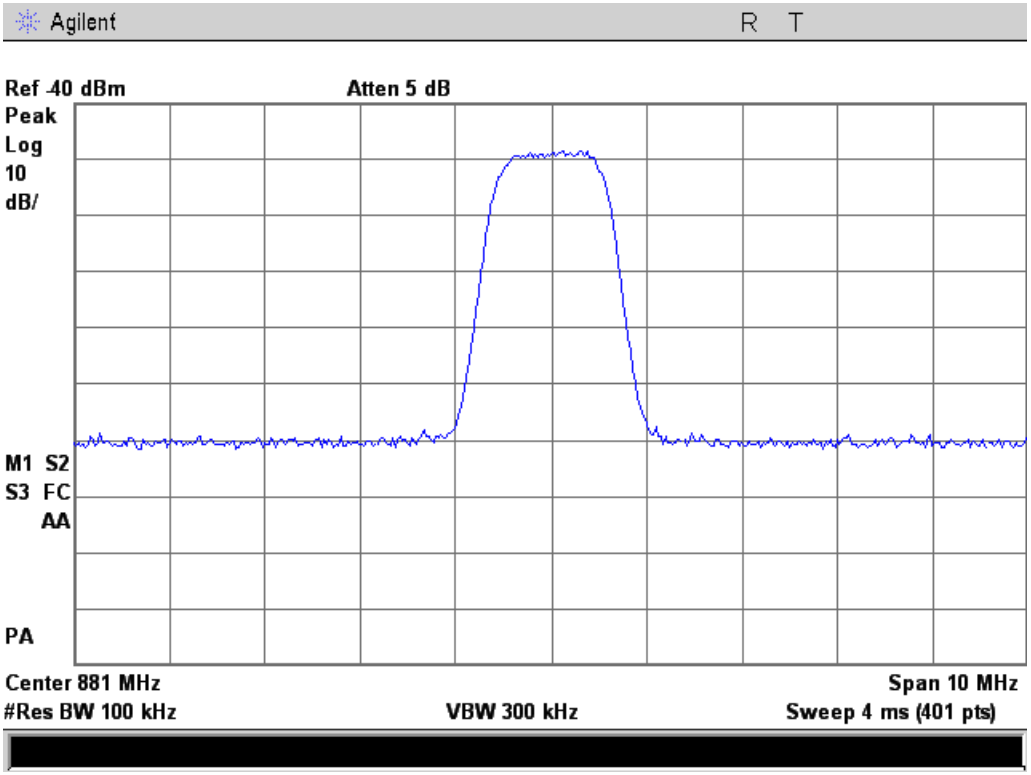

### Output



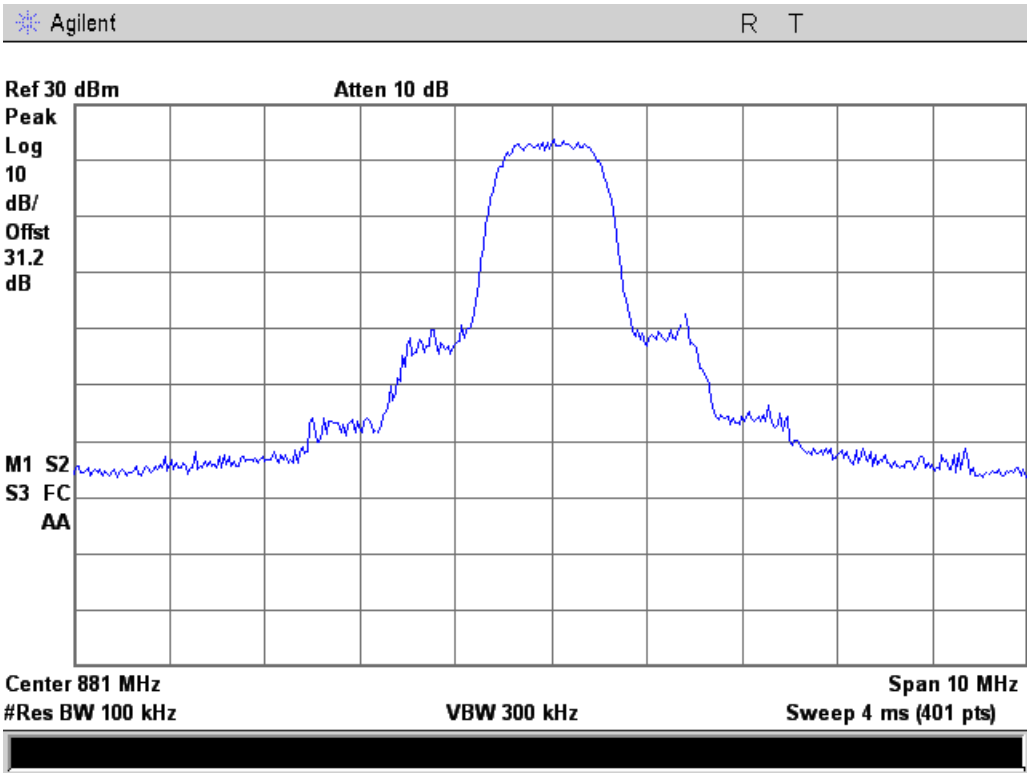
## CDMA Downlink Test Results

## 800 MHz Band

### Input

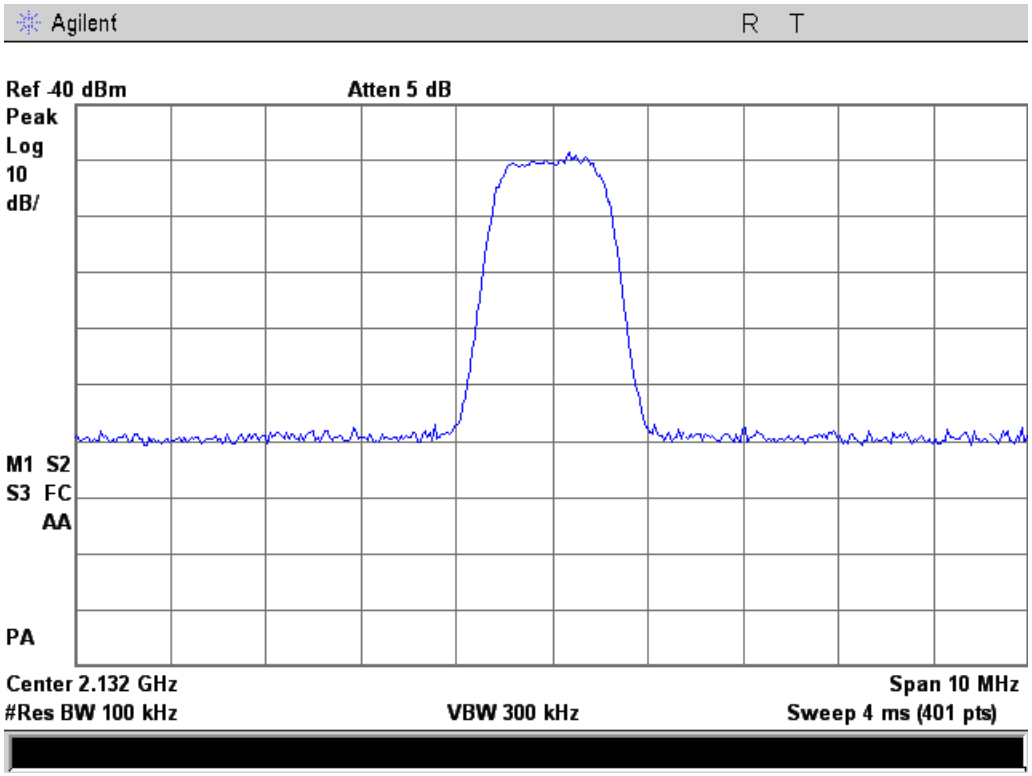



### Output

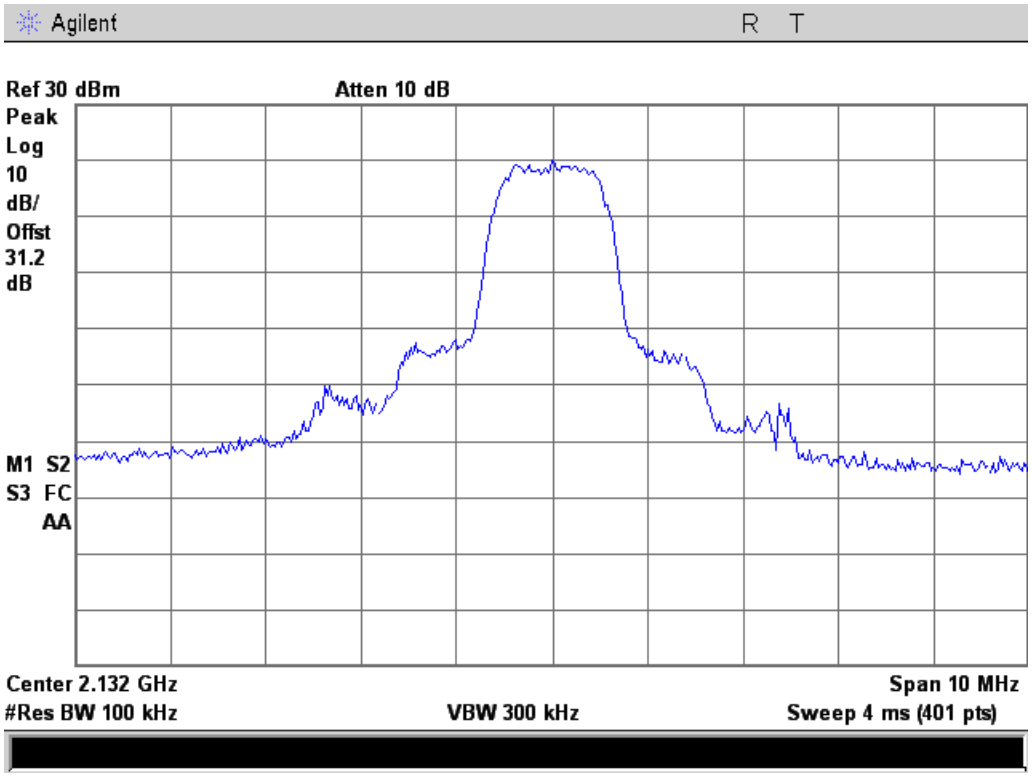


## 2100 MHz Band

### Input

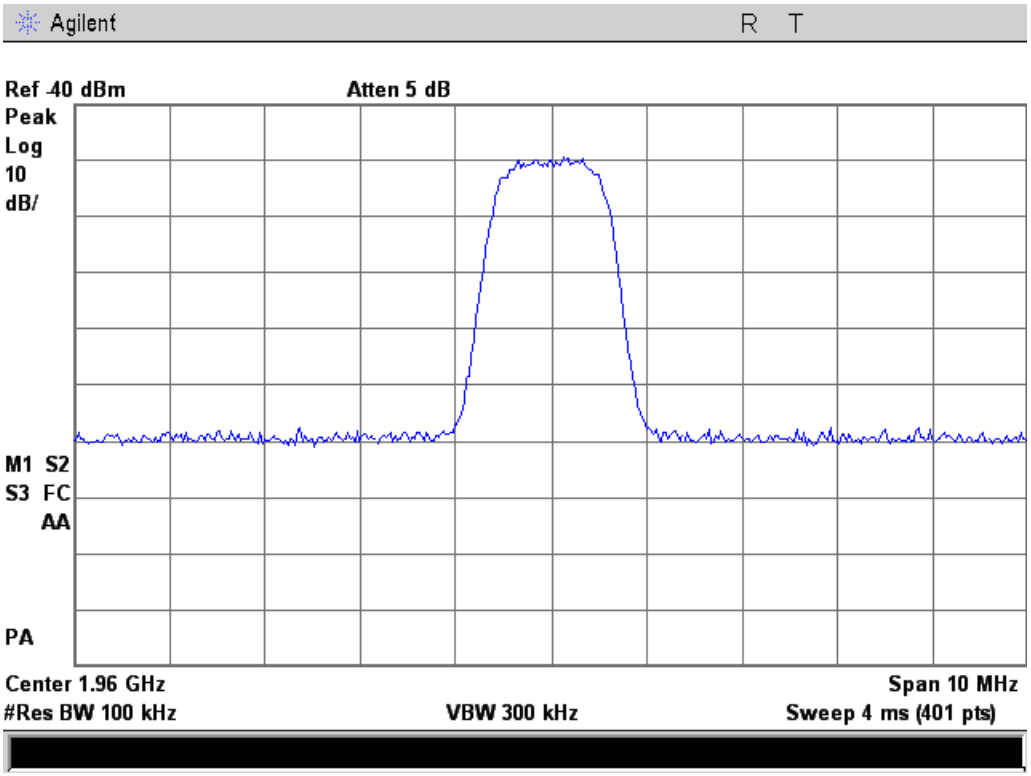



### Output

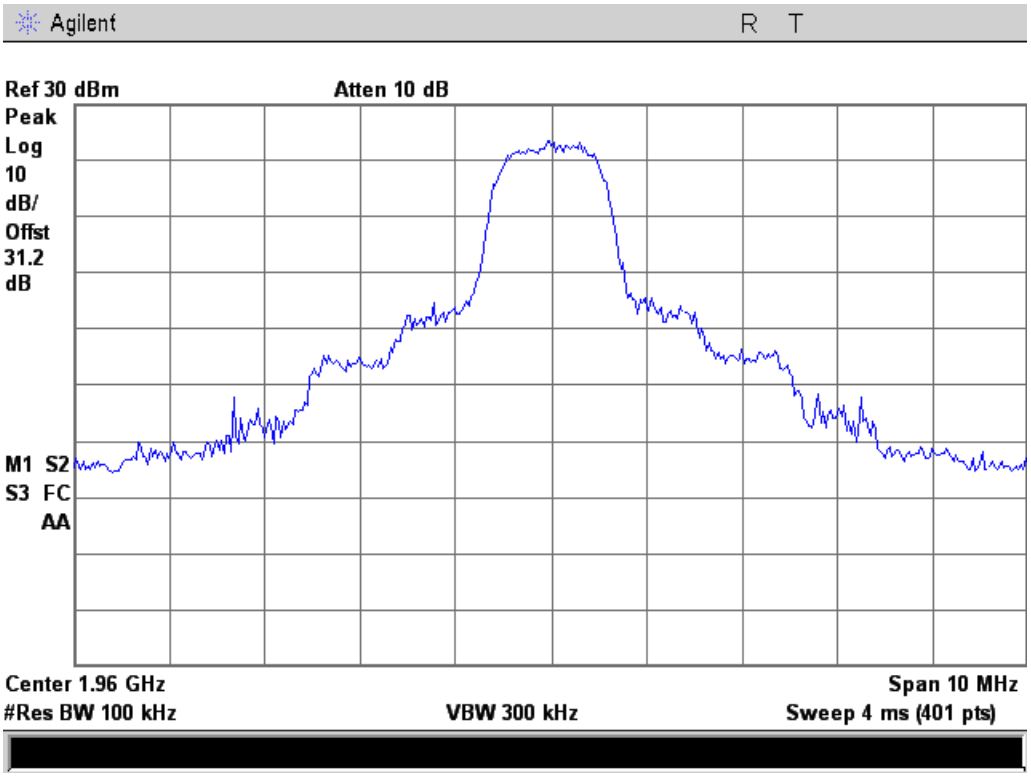


## 1900 MHz Band

### Input



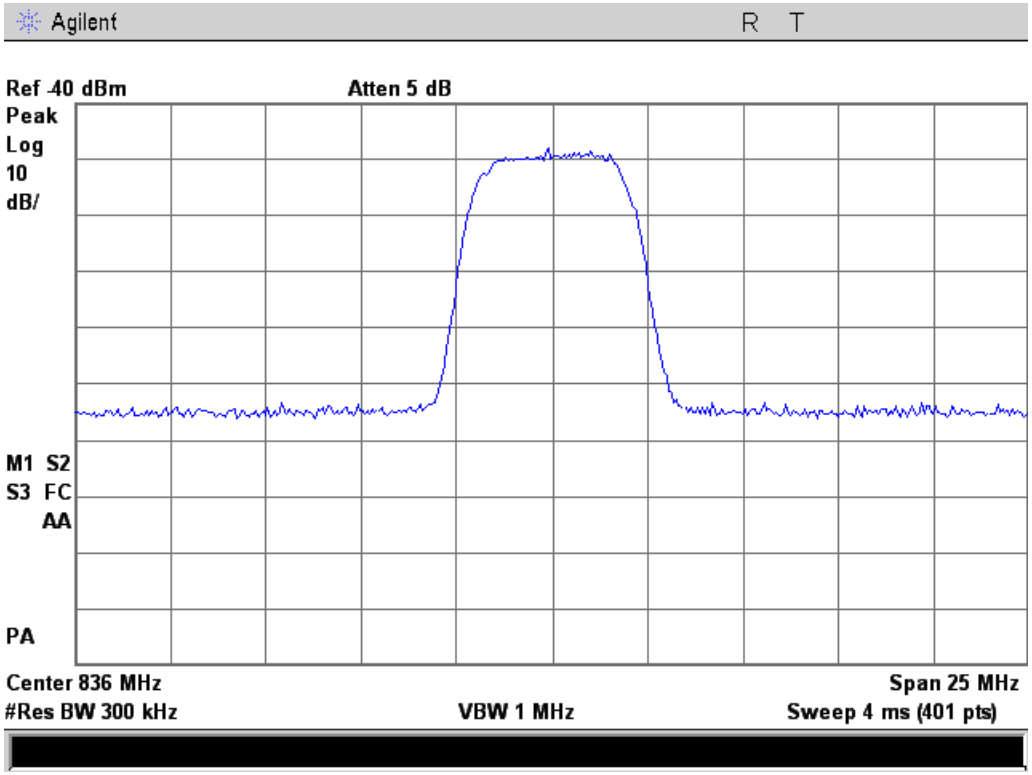

### Output



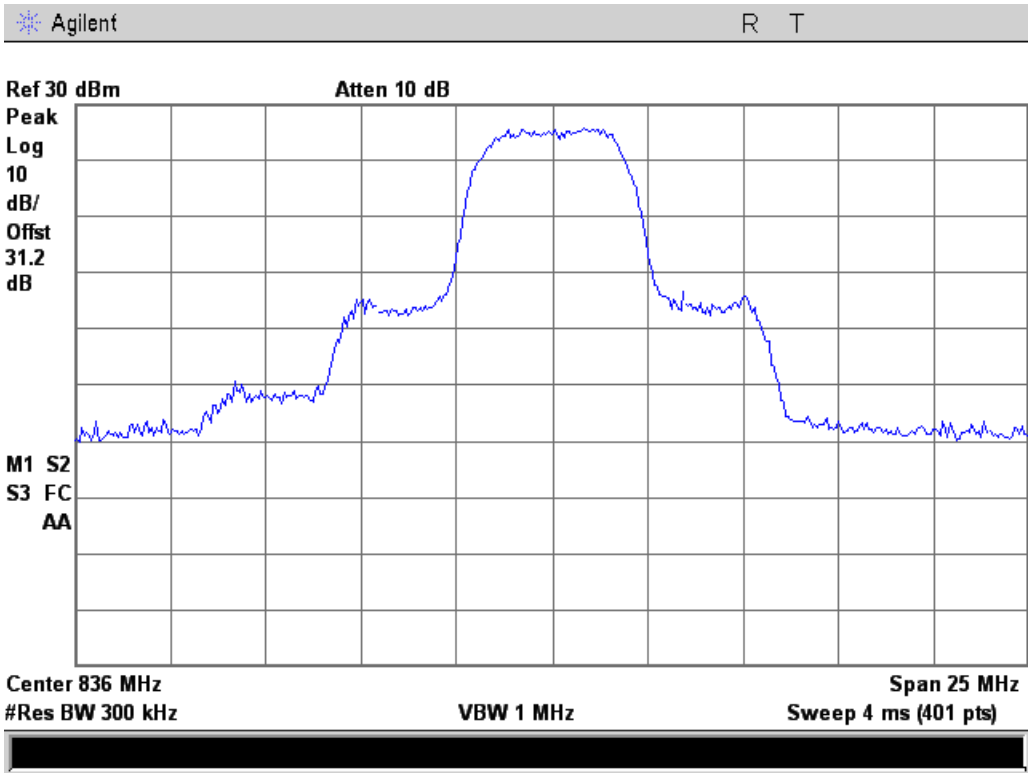
## WCDMA Uplink Test Results

## 800 MHz Band

### Input

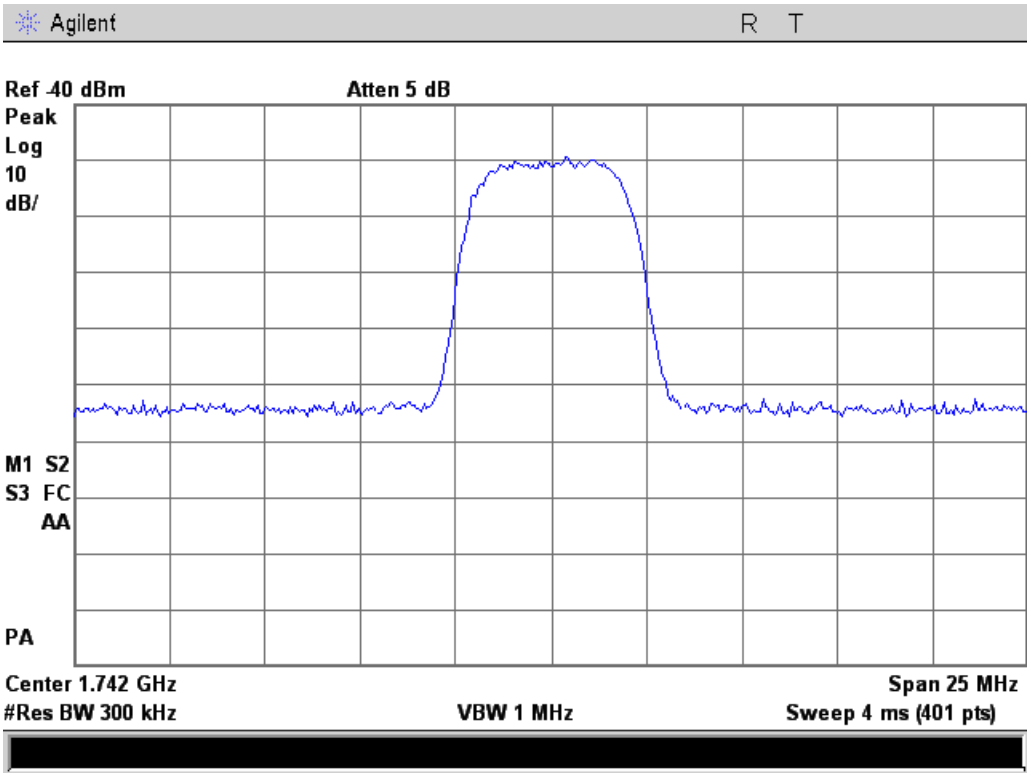



### Output

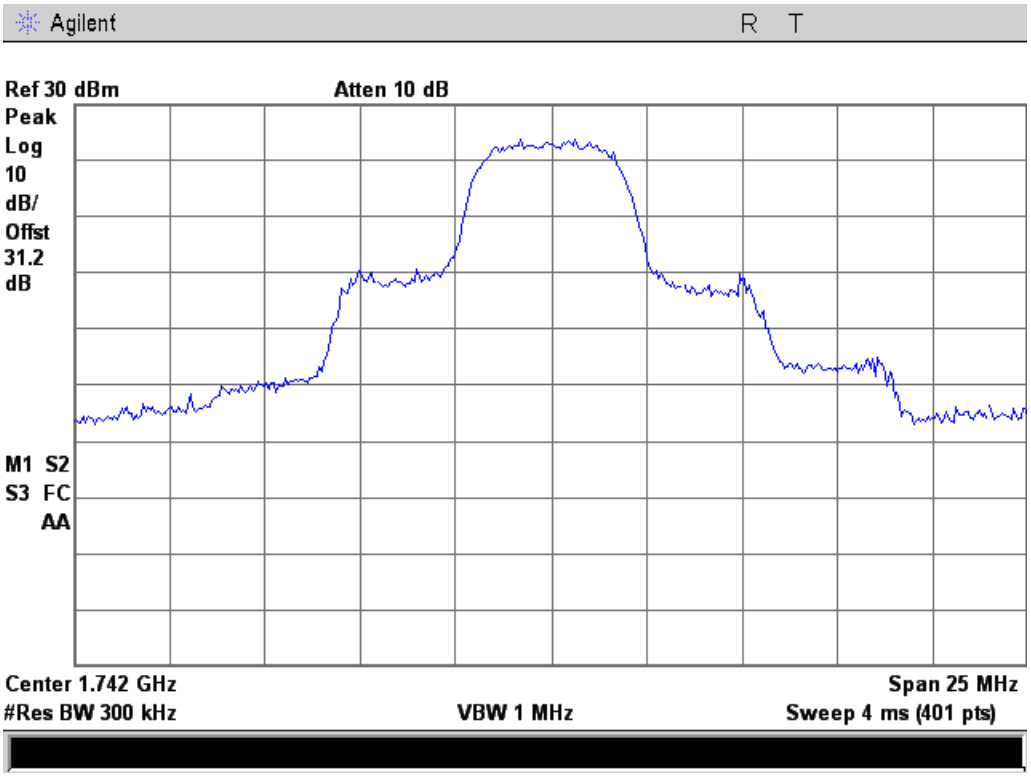


## 1700 MHz Band

### Input

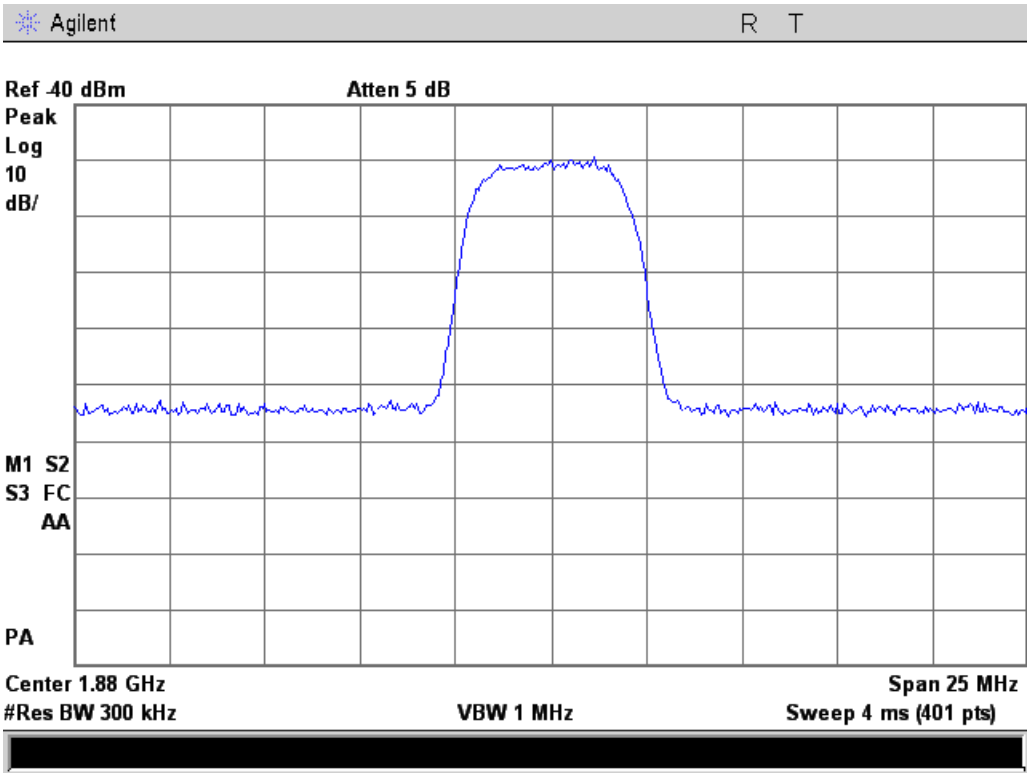



### Output

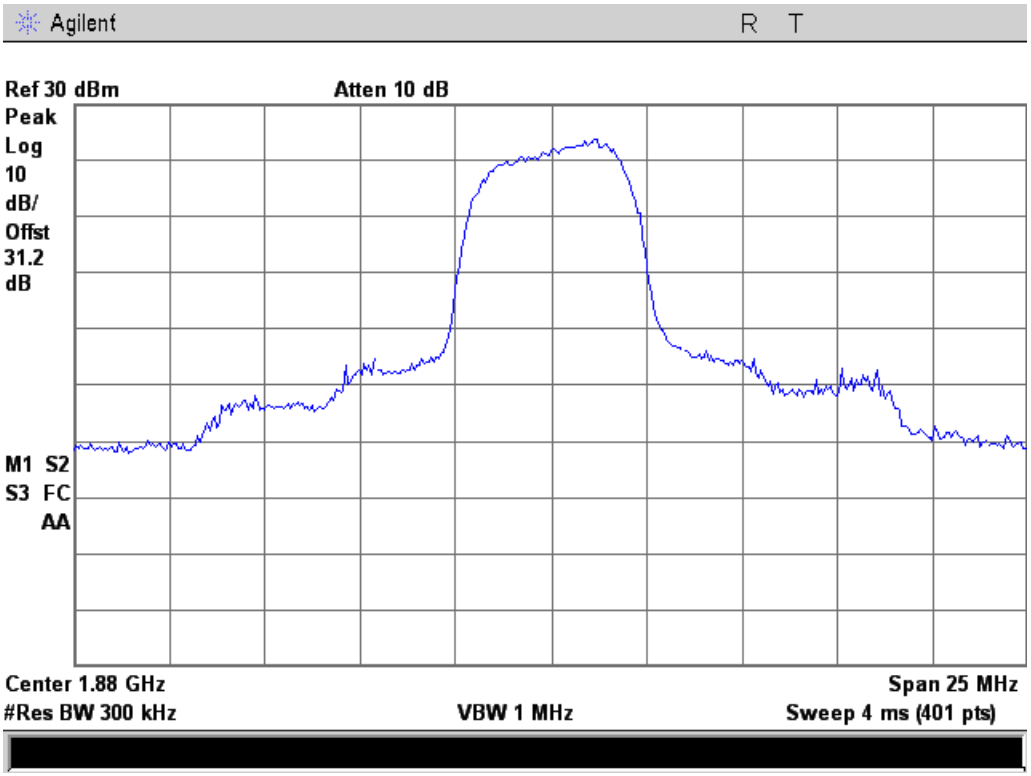


## 1900 MHz Band

### Input



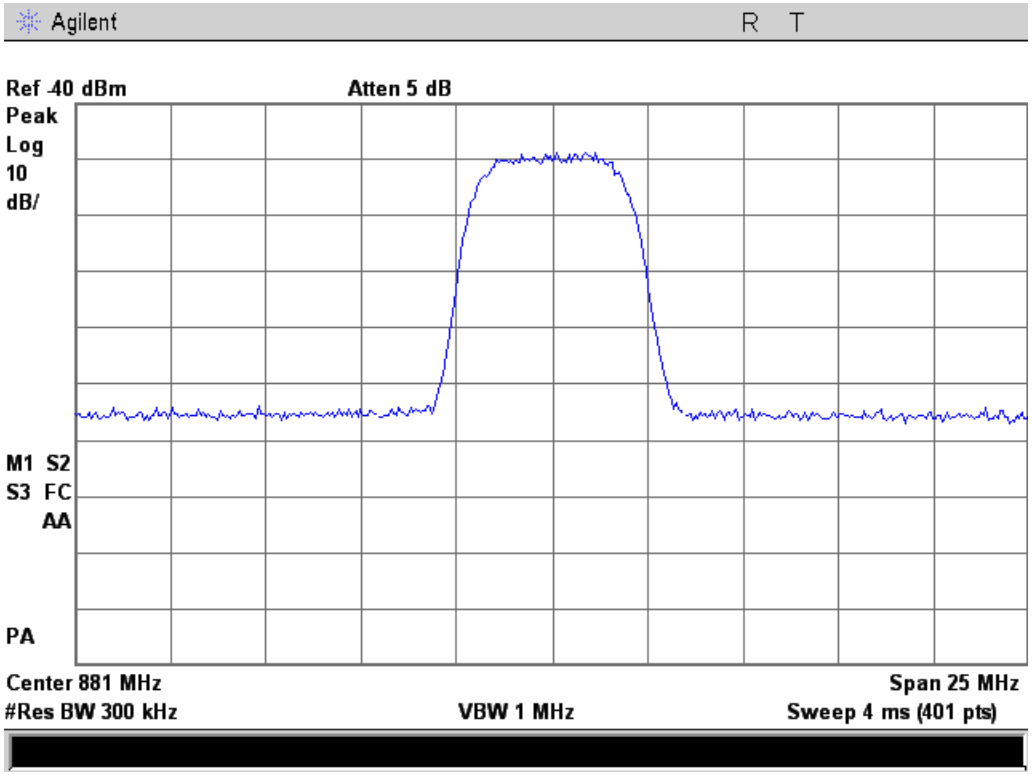

### Output



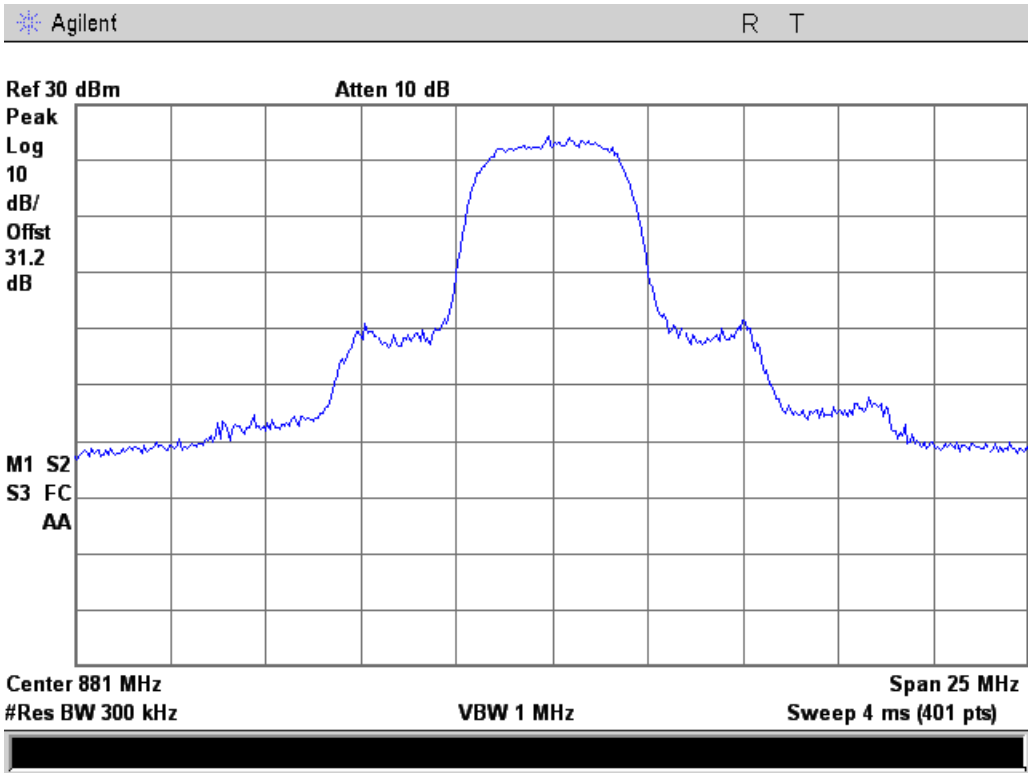
## WCDMA Downlink Test Results

## 800 MHz Band

### Input

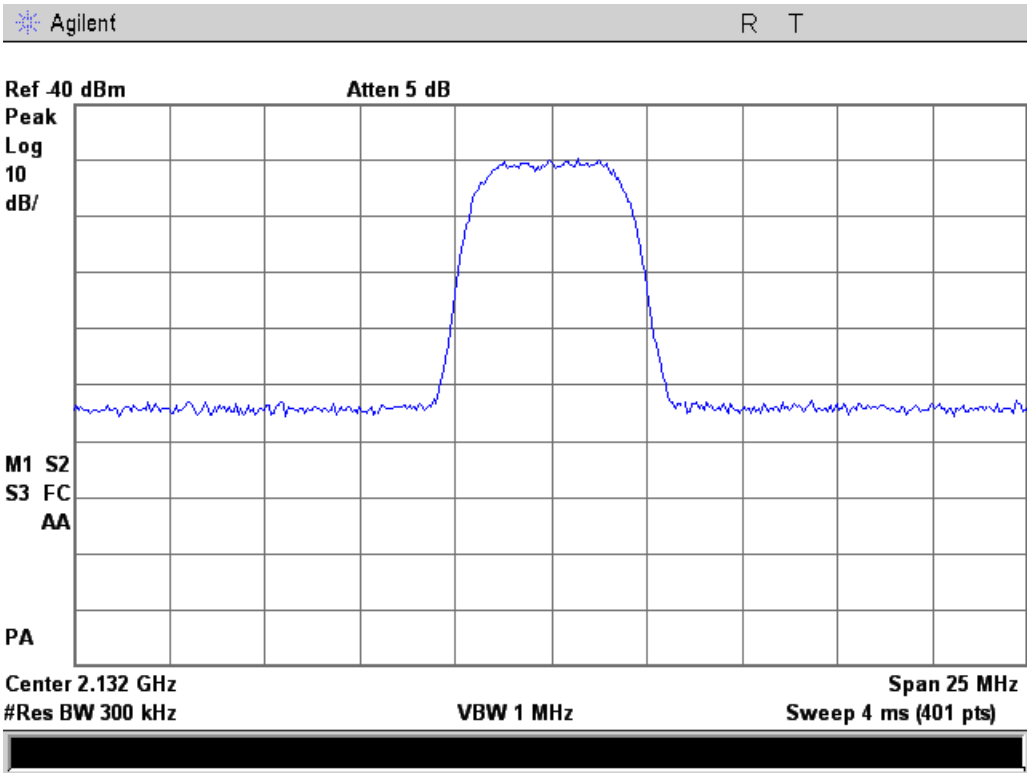



### Output

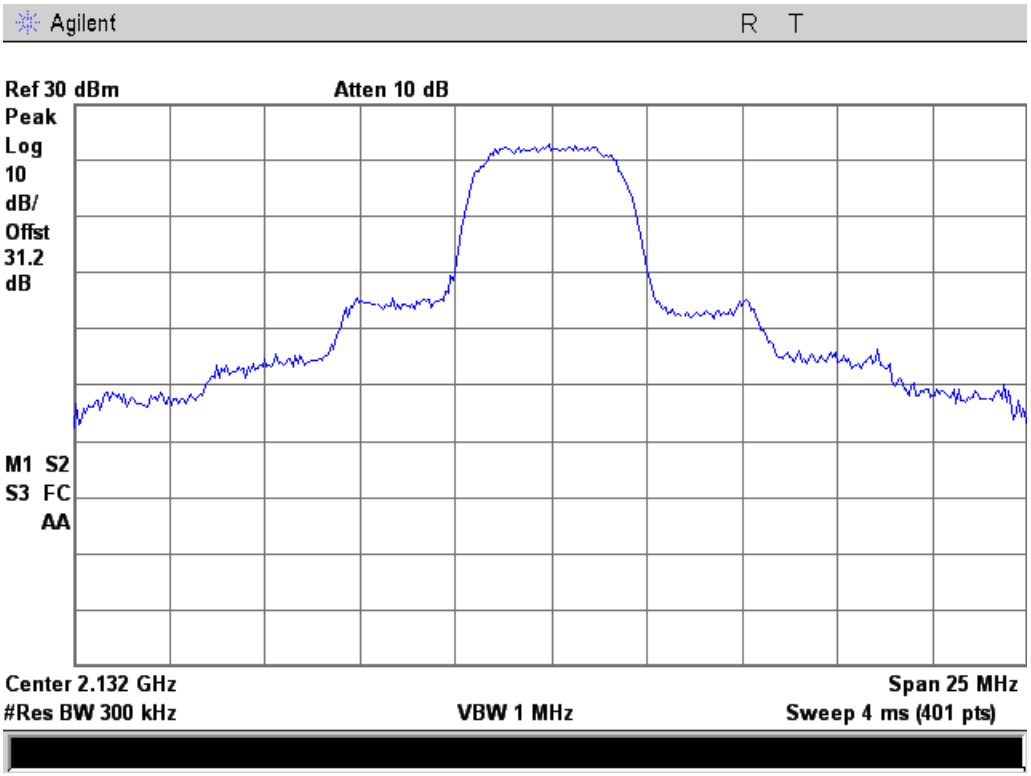


## 2100 MHz Band

### Input

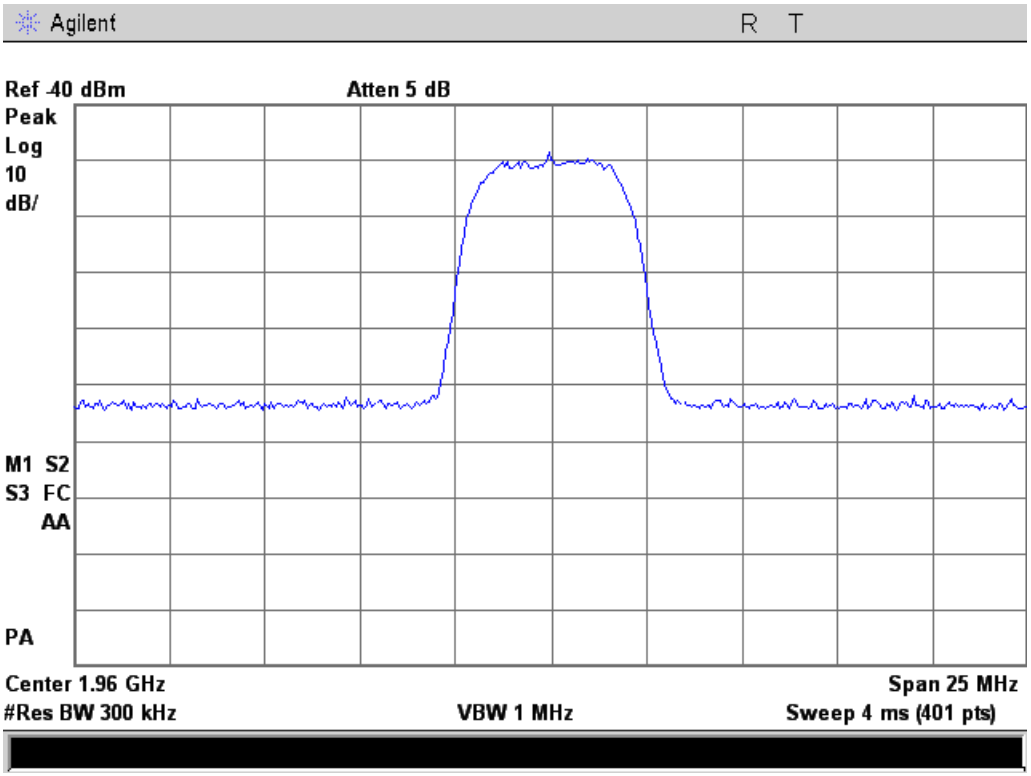



### Output

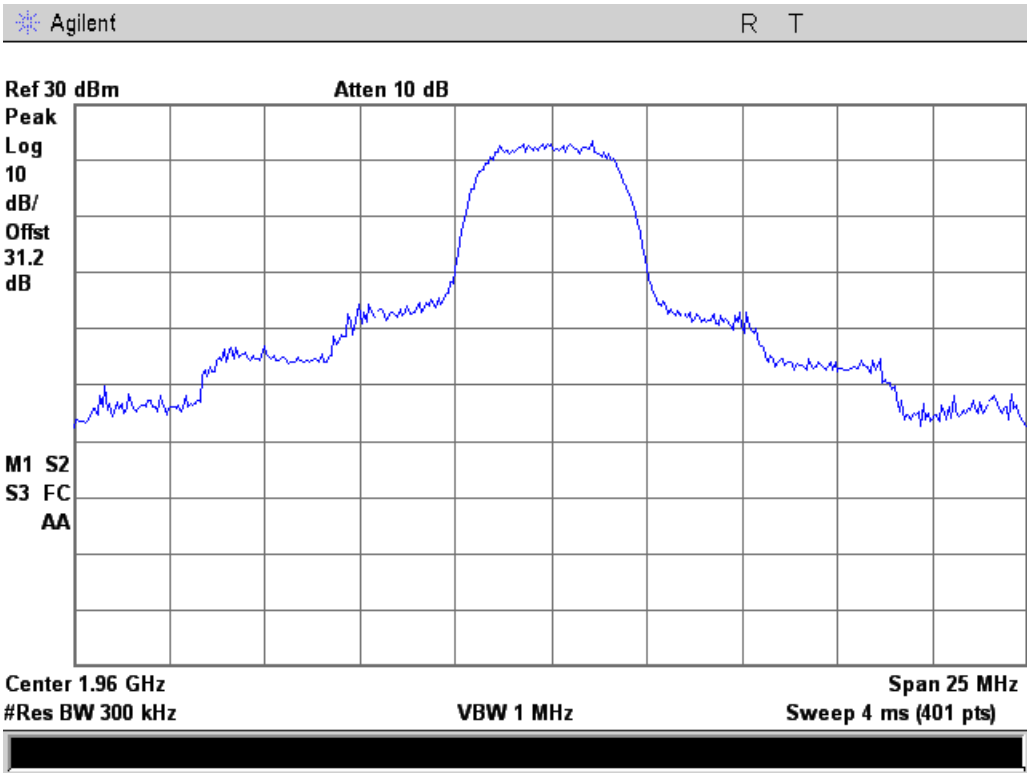


## 1900 MHz Band

### Input




### Output



## Out of Band Rejection

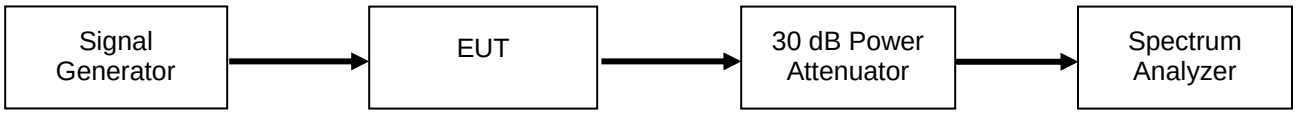
**Name of Test:** Out of Band Rejection **Engineer:** John Erhard

**Test Equipment Utilized:** i00348, i00331, i00347 **Test Date:** 06/28/12

### Test Procedure

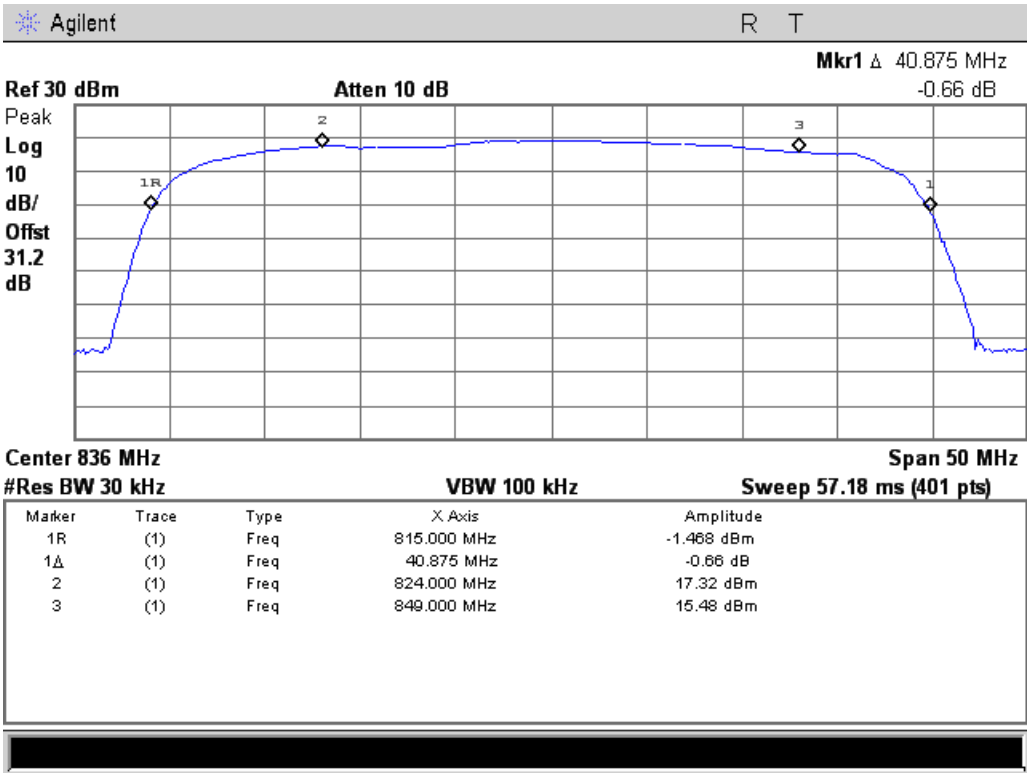
The EUT was connected to a spectrum analyzer through a 30 dB power attenuator. A signal generator was utilized to produce a swept CW signal with the RF input level set to the level determined by the intermodulation testing requirements. The uplink and downlink filter response and bandwidth were measured. The marker table function of the spectrum analyzer was used to show the band edges and the 20 dB bandwidth of the pass band filter.

### Test Setup



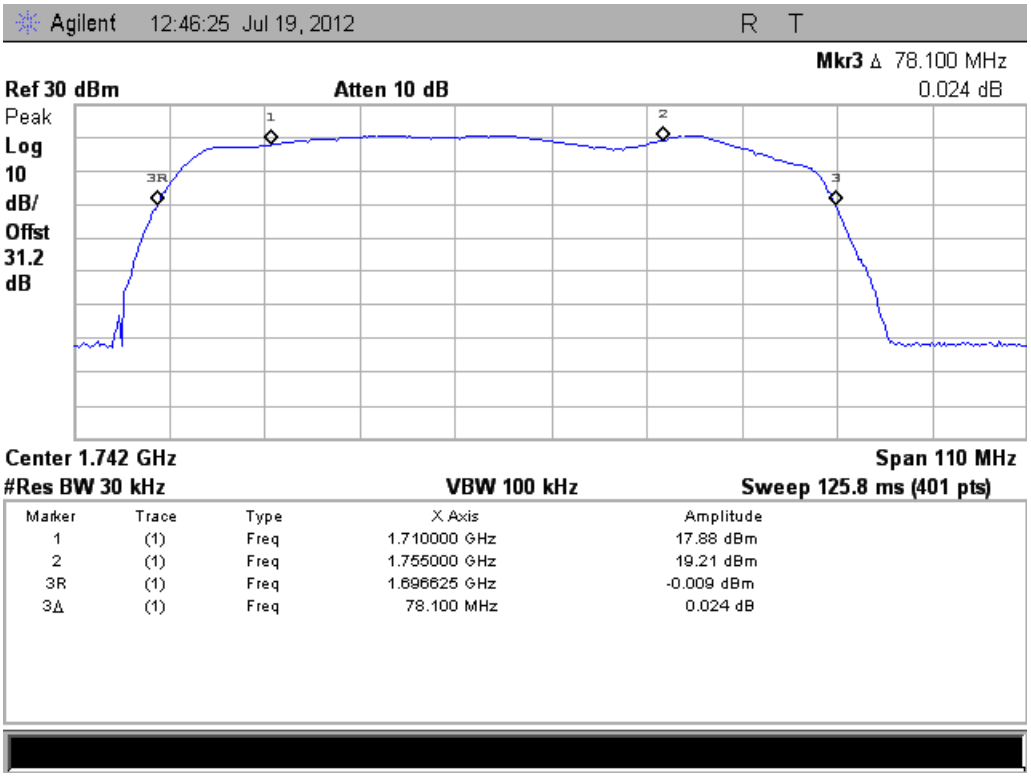
## Uplink Test Plots

### 800 MHz Band



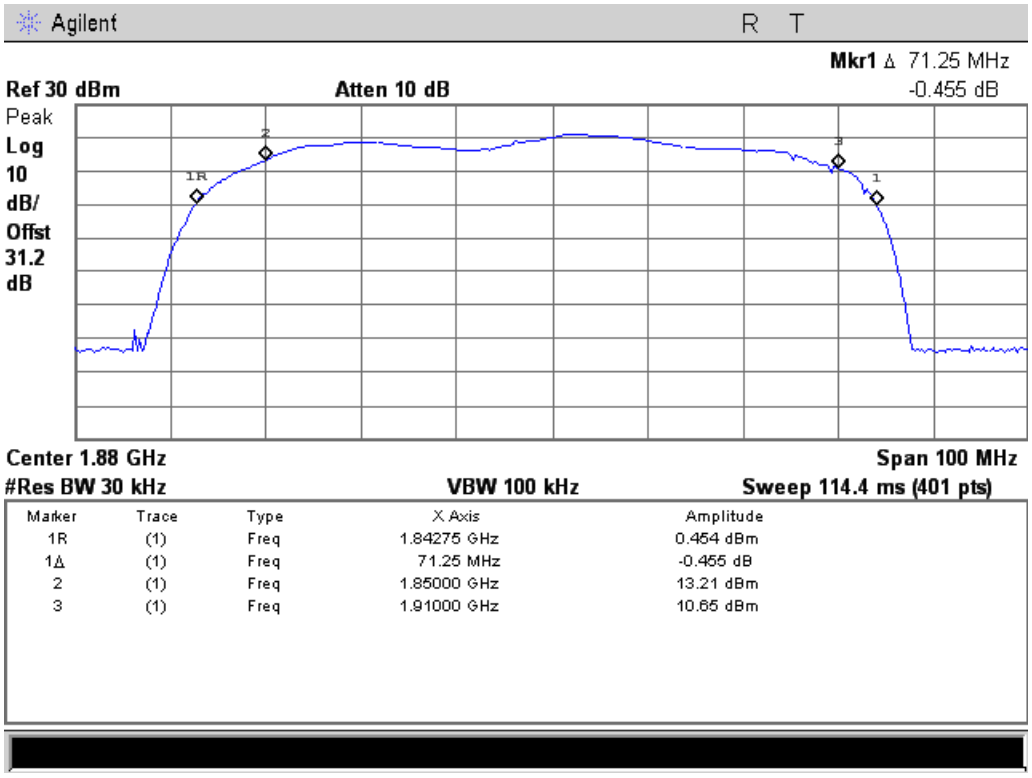

| Marker | Trace | Type | X Axis | Amplitude |
|---|---|---|---|---|
| 1R | (1) | Freq | 815.000 MHz | -1.468 dBm |
| 1Δ | (1) | Freq | 40.875 MHz | -0.66 dB |
| 2 | (1) | Freq | 824.000 MHz | 17.32 dBm |
| 3 | (1) | Freq | 849.000 MHz | 15.48 dBm |

### 1700 MHz Band



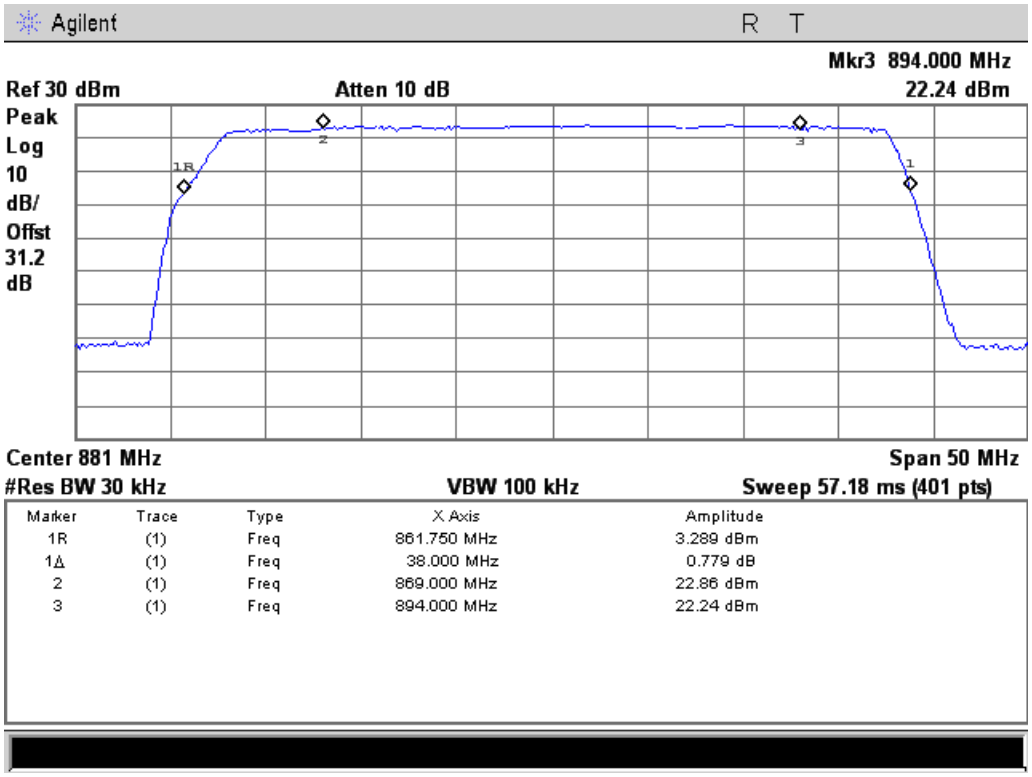

| Marker | Trace | Type | X Axis | Amplitude |
|---|---|---|---|---|
| 1 | (1) | Freq | 1.710000 GHz | 17.88 dBm |
| 2 | (1) | Freq | 1.755000 GHz | 19.21 dBm |
| 3R | (1) | Freq | 1.696625 GHz | -0.009 dBm |
| 3Δ | (1) | Freq | 78.100 MHz | 0.024 dB |

**1900 MHz Band**

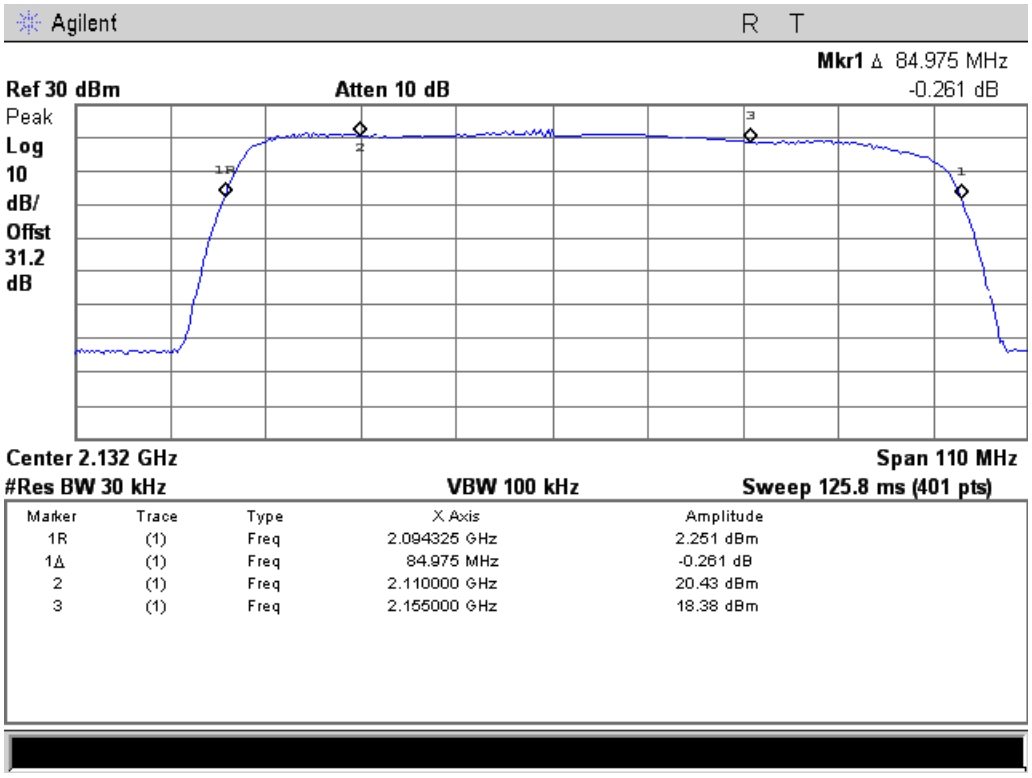



**Downlink Test Plots**

**800 MHz Band**

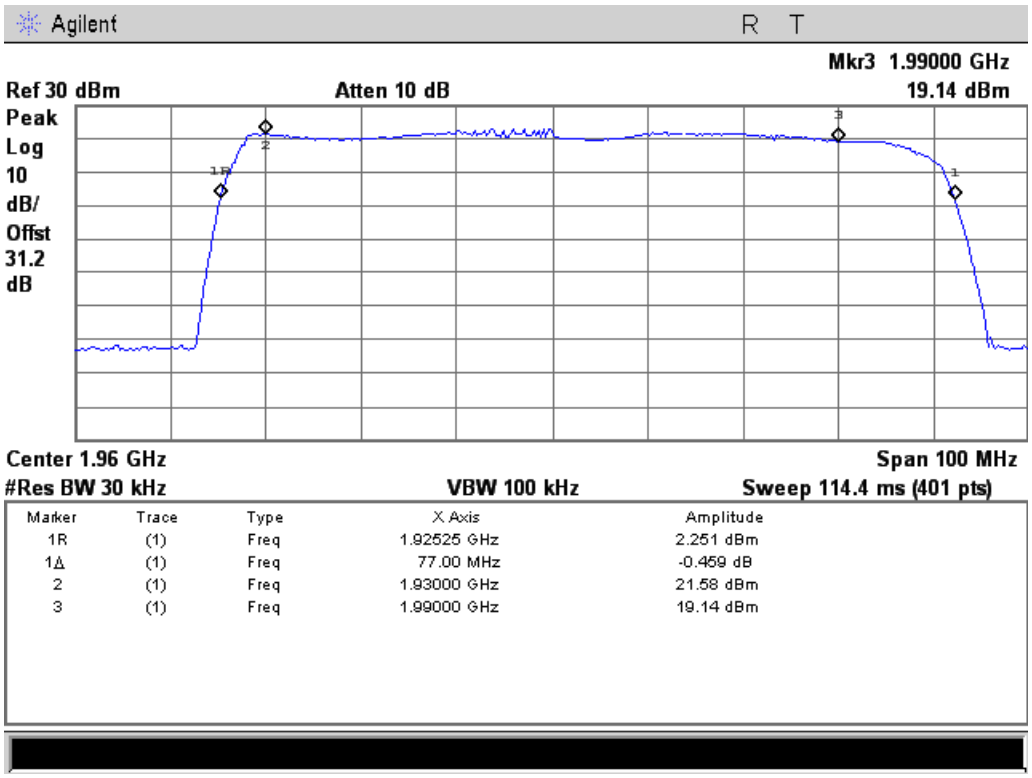


## 2100 MHz Band




| Marker | Trace | Type | X Axis | Amplitude |
|---|---|---|---|---|
| 1R | (1) | Freq | 2.094325 GHz | 2.251 dBm |
| 1Δ | (1) | Freq | 84.975 MHz | -0.261 dB |
| 2 | (1) | Freq | 2.110000 GHz | 20.43 dBm |
| 3 | (1) | Freq | 2.155000 GHz | 18.38 dBm |

## 1900 MHz Band




| Marker | Trace | Type | X Axis | Amplitude |
|---|---|---|---|---|
| 1R | (1) | Freq | 1.92525 GHz | 2.251 dBm |
| 1Δ | (1) | Freq | 77.00 MHz | -0.459 dB |
| 2 | (1) | Freq | 1.93000 GHz | 21.58 dBm |
| 3 | (1) | Freq | 1.99000 GHz | 19.14 dBm |

**Test Equipment Utilized**

| Description | Manufacturer | Model Number | CT Asset # | Last Cal Date | Cal Due Date |
|---|---|---|---|---|---|
| Horn Antenna | EMCO | 3115 | i00103 | 11/5/10 | 11/5/12 |
| Signal Generator | Rohde & Schwarz | SMT-03 | i00266 | 12/13/11 | 12/13/12 |
| Humidity / Temp Meter | Newport | IBTHX-W-5 | i00282 | 11/5/11 | 11/5/12 |
| Spectrum Analyzer | Agilent | E4407B | i00331 | 4/20/12 | 4/20/13 |
| Vector Signal Generator | Agilent | E4438C | i00348 | 9/27/11 | 9/27/12 |
| Humidity / Temp Meter | Control Company | 4189CC | i00355 | 1/11/12 | 1/11/13 |
| Power Attenuator | Narda | 769-30 | i00347 | Verified on: 6/28/12 | |

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT