



# FCC TEST REPORT

Issued to

**Cellon Communications Technology(ShenZhen)Co., Ltd.**

For

**C1020**

Model Name: CL1135EN;PCD1135;CL1135;TE1135;PCD1135PE;PCD1135AL;  
PCD1135CL;PCD1135EC;PCD1135MV;PCD1135OM;  
PCD1135MX; PCD1135CR;TE1135PE; AL1135AL; CL1135CL;  
CL1135EV;MV1135MV;TE1135MX;CL1135CR;

Brand Name: PCD/Claro

Trade Name: N/A

FCC ID: T38PCD1020

Standard: 47 CFR Part 2  
47 CFR Part 22 Subpart H  
47 CFR Part 24 Subpart E

Test date: June 14, 2011 – June 21, 2011

Issue date: June 22, 2011

**Shenzhen Morlab Communications Technology Co., Ltd.**

Tested by Lu Lei

Lu Lei

Date 2011.6.22

Approved by Shu Luan

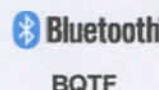
Shu Luan

Date 2011.6.22

Review by Peng Huarui

Peng Huarui

Date 2011.6.22



The report refers only to the sample tested and does not apply to the bulk. This report is issued in confidence to the client and it will be strictly treated as such by the Shenzhen MORLAB Communication Technology Co., Ltd. It may not be reproduced rather in its entirety or in part and it may not be used for advertising. The client to whom the report is issued may, however, show or send it, or a certified copy thereof prepared by the Shenzhen MORLAB Telecommunication Co., Ltd to his customer. Supplier or others persons directly concerned. Shenzhen MORLAB Telecommunication Co., Ltd will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report. In the event of the improper use of the report, Shenzhen MORLAB Telecommunication Co., Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Shenzhen MORLAB Communication Technology Co., Ltd.

3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China

Tel: +86 755 61281201 Fax: +86 755 86130218

## TABLE OF CONTENTS

|            |                                                             |           |
|------------|-------------------------------------------------------------|-----------|
| <b>1.</b>  | <b>GENERAL INFORMATION .....</b>                            | <b>3</b>  |
| <b>1.1</b> | <b>EUT Description .....</b>                                | <b>3</b>  |
| <b>1.2</b> | <b>Test Standards and Results.....</b>                      | <b>5</b>  |
| <b>1.3</b> | <b>Facilities and Accreditations .....</b>                  | <b>6</b>  |
| <b>2.</b>  | <b>47 CFR PART 2, PART 22H &amp; 24E REQUIREMENTS .....</b> | <b>7</b>  |
| <b>2.1</b> | <b>Conducted RF Output Power .....</b>                      | <b>7</b>  |
| <b>2.2</b> | <b>99% Occupied Bandwidth .....</b>                         | <b>24</b> |
| <b>2.3</b> | <b>Frequency Stability.....</b>                             | <b>28</b> |
| <b>2.4</b> | <b>Conducted Out of Band Emissions .....</b>                | <b>30</b> |
| <b>2.5</b> | <b>Band Edge .....</b>                                      | <b>37</b> |
| <b>2.6</b> | <b>Transmitter Radiated Power (EIRP/ERP) .....</b>          | <b>40</b> |
| <b>2.7</b> | <b>Radiated Out of Band Emissions .....</b>                 | <b>48</b> |

| Change History |               |                   |
|----------------|---------------|-------------------|
| Issue          | Date          | Reason for change |
| 1.0            | June 22, 2011 | First edition     |
|                |               |                   |

## 1. GENERAL INFORMATION

### 1.1 EUT Description

EUT Type .....: C1020  
 Serial No.....: (n.a, marked #1 by test site)  
 Hardware Version .....: P1  
 Software Version .....: V1.05  
 Applicant .....: Cellon Communications Technology(ShenZhen)Co., Ltd.  
 13/F, Skyworth Building C Gaoxin S. Ave. 1st, High-Tech  
 industrial Park NanShan, ShenZhen  
 Manufacturer .....: Cellon Communications Technology(ShenZhen)Co., Ltd.  
 13/F, Skyworth Building C Gaoxin S. Ave. 1st, High-Tech  
 industrial Park NanShan, ShenZhen  
 Frequency Range .....: GSM 850MHz:  
 Tx: 824.20 - 848.80MHz (at intervals of 200kHz);  
 Rx: 869.20 - 893.80MHz (at intervals of 200kHz)  
 GSM 1900MHz:  
 Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz);  
 Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)  
 Modulation Type.....: GMSK  
 Emission Designators .....: 300KGXW  
 Power Supply .....: Battery  
 Brand Name: PCD  
 Model No.: BTR1013  
 Serial No.: (n.a. marked #1 by test site)  
 Capacitance: 400mAh  
 Rated Voltage: 3.7V  
 Charge Limit: 4.2V  
 Manufacturer: Shenzhen BAK battery Co. Ltd  
 Ancillary Equipment A..... AC Adapter (Charger for Battery)  
 Brand Name: AQUILSTAR  
 Model Name: CNR1116  
 Serial No.: (n.a. marked #1 by test site)  
 Rated Input: ~ 100-240V, 50/60Hz, Max 6W  
 Rated Output: = 2.5W  
 Manufacturer: AQUILSTAR PRECISION INDUSTRIAL  
 (SHENZHEN) CO., LTD.

*Note 1:* The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula  $F(n)=824.2+0.2*(n-128)$ ,  $128 \leq n \leq 251$ ; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128 (824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

*Note 2:* The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula  $F(n)=1850.2+0.2*(n-512)$ ,  $512 \leq n \leq 810$ ; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

*Note 3:* The GPRS was tested under 4 time-slots mode.

*Note 4:* For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

## 1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 and Part 24 for the EUT FCC ID Certification:

| No. | Identity                            | Document Title                                                                |
|-----|-------------------------------------|-------------------------------------------------------------------------------|
| 1   | 47 CFR Part 2<br>(10-1-09 Edition)  | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2   | 47 CFR Part 22<br>(10-1-09 Edition) | Public Mobile Services                                                        |
| 3   | 47 CFR Part 24<br>(10-1-09 Edition) | Personal Communications Services                                              |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section                              | Description                           | Result |
|-----|--------------------------------------|---------------------------------------|--------|
| 1   | 2.1046                               | Conducted RF Output Power             | PASS   |
| 2   | 2.1049                               | 20dB Occupied Bandwidth               | PASS   |
| 3   | 2.1055<br>22.355<br>24.235           | Frequency Stability                   | PASS   |
| 4   | 2.1051<br>2.1057<br>22.917<br>24.238 | Conducted Out of Band Emissions       | PASS   |
| 5   | 2.1051<br>2.1057<br>22.917<br>24.238 | Band Edge                             | PASS   |
| 6   | 22.913<br>24.232                     | Transmitter Radiated Power (EIPR/ERP) | PASS   |
| 7   | 2.1053<br>2.1057<br>22.917<br>24.238 | Radiated Out of Band Emissions        | PASS   |

NOTE: Measurement method according to ANSI/TIA-603-D 2010.

### **1.3 Facilities and Accreditations**

#### **1.3.1 Facilities**

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

#### **1.3.2 Test Environment Conditions**

During the measurement, the environmental conditions were within the listed ranges:

|                             |         |
|-----------------------------|---------|
| Temperature (°C):           | 15 - 35 |
| Relative Humidity (%):      | 30 -60  |
| Atmospheric Pressure (kPa): | 86-106  |

## 2. 47 CFR PART 2, PART 22H & 24E REQUIREMENTS

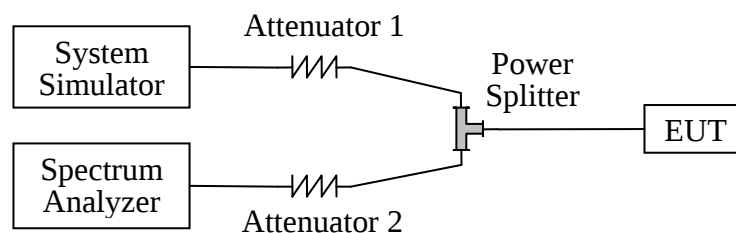
### 2.1 Conducted RF Output Power

#### 2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

#### 2.1.2 Test Description

##### 1. Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

##### 2. Equipments List:

| Description       | Manufacturer | Model  | Serial No. | Cal. Date |
|-------------------|--------------|--------|------------|-----------|
| System Simulator  | Agilent      | E5515C | GB43130131 | 2011.05   |
| Spectrum Analyzer | Agilent      | E7405A | US44210471 | 2011.05   |
| Power Splitter    | Weinschel    | 1506A  | NW521      | (n.a.)    |
| Attenuator 1      | Resnet       | 20dB   | (n.a.)     | (n.a.)    |
| Attenuator 2      | Resnet       | 3dB    | (n.a.)     | (n.a.)    |

#### 2.1.3 Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT. For the GSM 850MHz operates at PCL=5 (where Power Class is 4), the

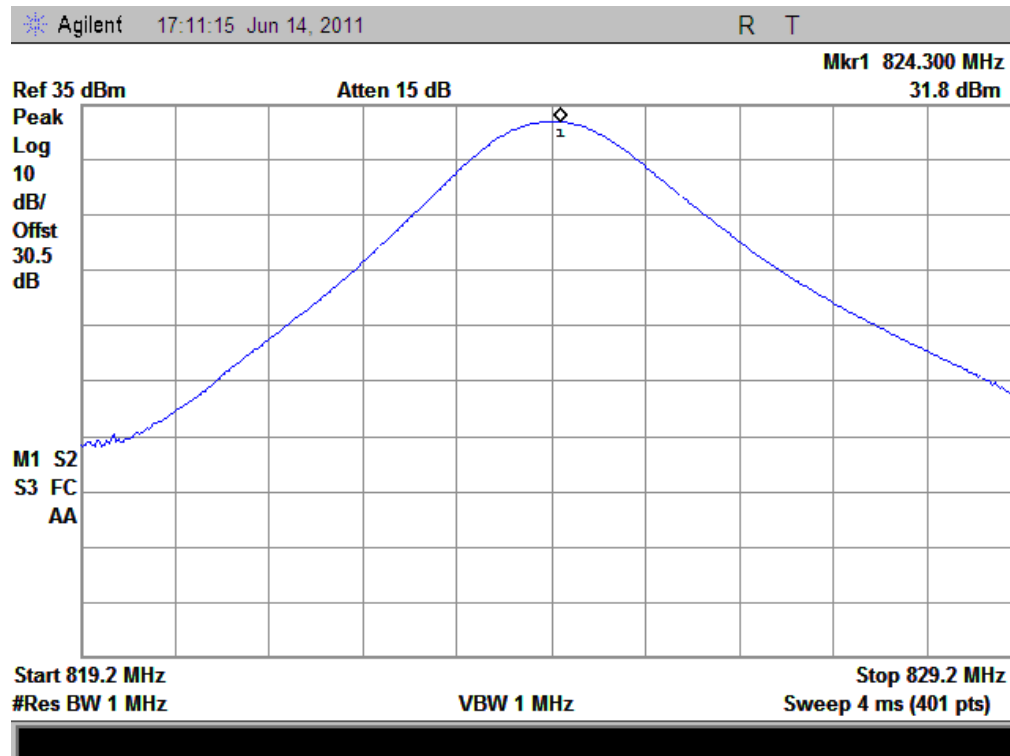
rated conducted RF output power is 33dBm, and For the GSM 1900MHz operates at PCL=0 (where Power Class is 1), the rated conducted RF output power is 30dBm.

# 1. Test Verdict:

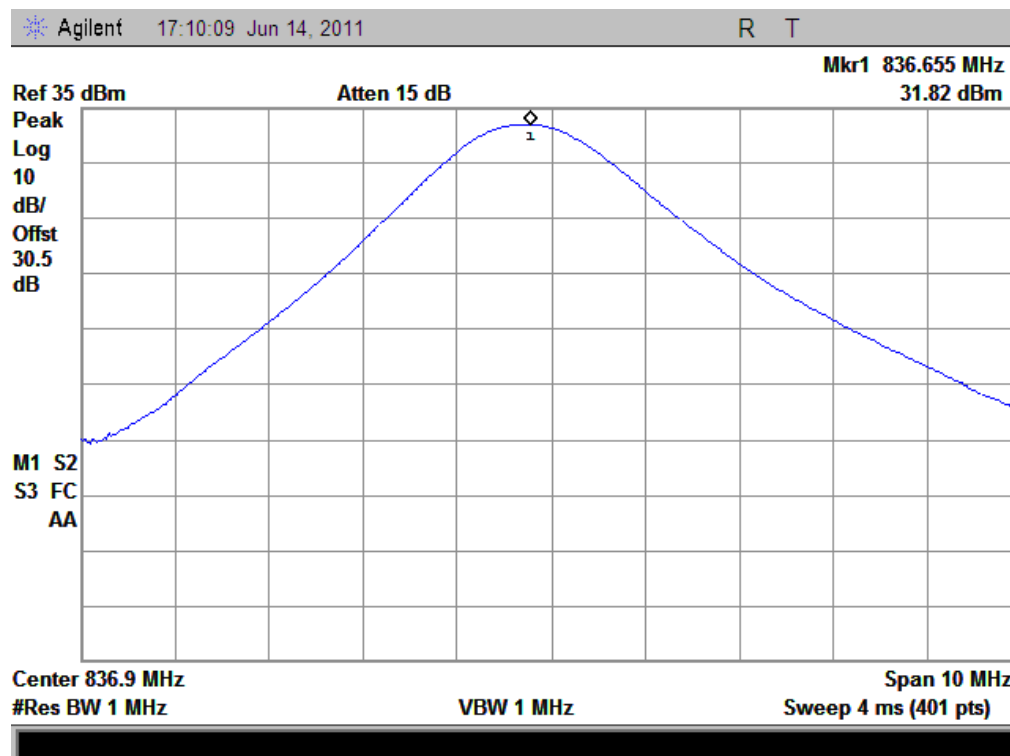
| Band         | Channel | Frequency (MHz) | Measured Output Power |                                         | Limit dBm | Verdict |
|--------------|---------|-----------------|-----------------------|-----------------------------------------|-----------|---------|
|              |         |                 | dBm                   | Refer to Plot                           |           |         |
| GSM 850MHz   | 128     | 824.2           | 31.8                  | Plot A1 to A3                           | 35        | PASS    |
|              | 190     | 836.6           | 31.82                 |                                         |           | PASS    |
|              | 251     | 848.8           | 31.66                 |                                         |           | PASS    |
| GSM 1900MHz  | 512     | 1850.2          | 28.88                 | Plot B1 to B3                           | 32        | PASS    |
|              | 661     | 1880.0          | 29.26                 |                                         |           | PASS    |
|              | 810     | 1909.8          | 29.11                 |                                         |           | PASS    |
| GPRS 850MHz  | 128     | 824.2           | 31.98                 | Plot C1 to C3<br>1down link<br>4up link | 35        | PASS    |
|              | 190     | 836.6           | 31.89                 |                                         |           | PASS    |
|              | 251     | 848.8           | 31.7                  |                                         |           | PASS    |
| GPRS 1900MHz | 512     | 1850.2          | 26.95                 | Plot D1 to D3<br>1down link<br>4up link | 32        | PASS    |
|              | 661     | 1880.0          | 27.35                 |                                         |           | PASS    |
|              | 810     | 1909.8          | 27.35                 |                                         |           | PASS    |
| GPRS 850MHz  | 128     | 824.2           | 30.52                 | Plot E1 to E3<br>2down link<br>3up link | 35        | PASS    |
|              | 190     | 836.6           | 30.35                 |                                         |           | PASS    |
|              | 251     | 848.8           | 30.16                 |                                         |           | PASS    |
| GPRS 1900MHz | 512     | 1850.2          | 26.96                 | Plot F1 to F3<br>2down link<br>3up link | 32        | PASS    |
|              | 661     | 1880.0          | 27.31                 |                                         |           | PASS    |
|              | 810     | 1909.8          | 27.36                 |                                         |           | PASS    |
| GPRS 850MHz  | 128     | 824.2           | 30.41                 | Plot G1 to G3<br>3down link<br>2up link | 35        | PASS    |
|              | 190     | 836.6           | 30.39                 |                                         |           | PASS    |
|              | 251     | 848.8           | 30.22                 |                                         |           | PASS    |
| GPRS 1900MHz | 512     | 1850.2          | 26.9                  | Plot H1 to H3<br>3down link<br>2up link | 32        | PASS    |
|              | 661     | 1880.0          | 27.27                 |                                         |           | PASS    |
|              | 810     | 1909.8          | 27.33                 |                                         |           | PASS    |
| GPRS 850MHz  | 128     | 824.2           | 31.86                 | Plot I1 to I3<br>3down link<br>2up link | 35        | PASS    |
|              | 190     | 836.6           | 31.82                 |                                         |           | PASS    |
|              | 251     | 848.8           | 31.65                 |                                         |           | PASS    |
| GPRS 1900MHz | 512     | 1850.2          | 28.34                 | Plot J1 to J3<br>3down link<br>2up link | 32        | PASS    |
|              | 661     | 1880.0          | 28.69                 |                                         |           | PASS    |
|              | 810     | 1909.8          | 28.63                 |                                         |           | PASS    |

## 2. Test Plot

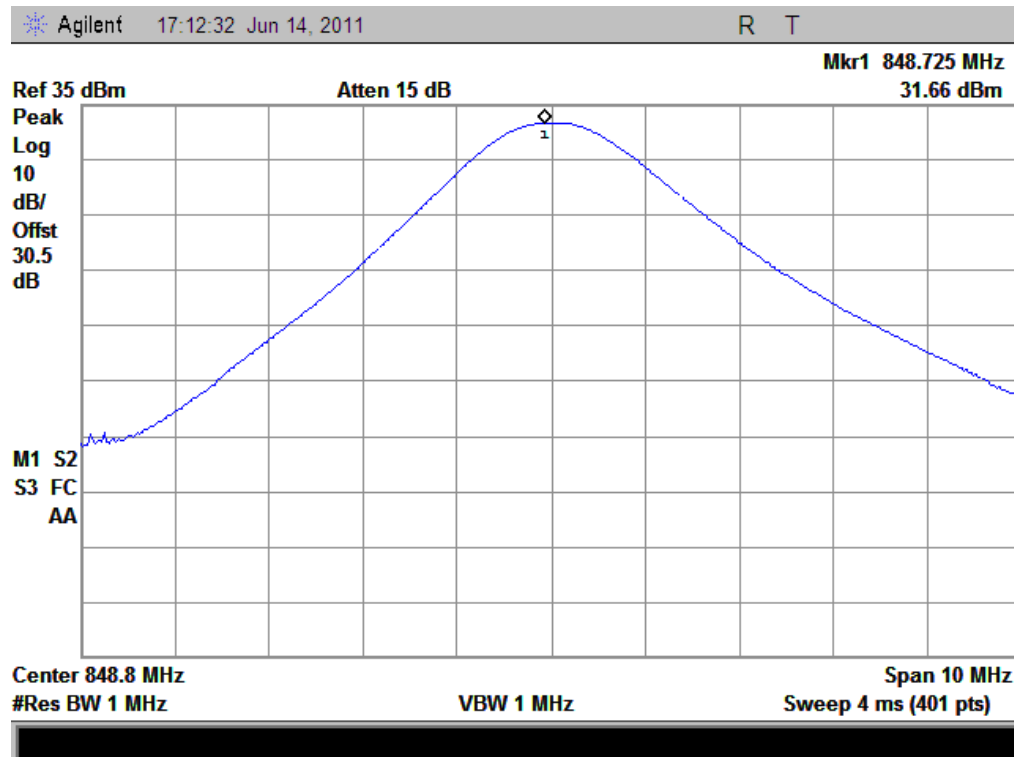
Plot A1: GSM 850MHz Channel = 128



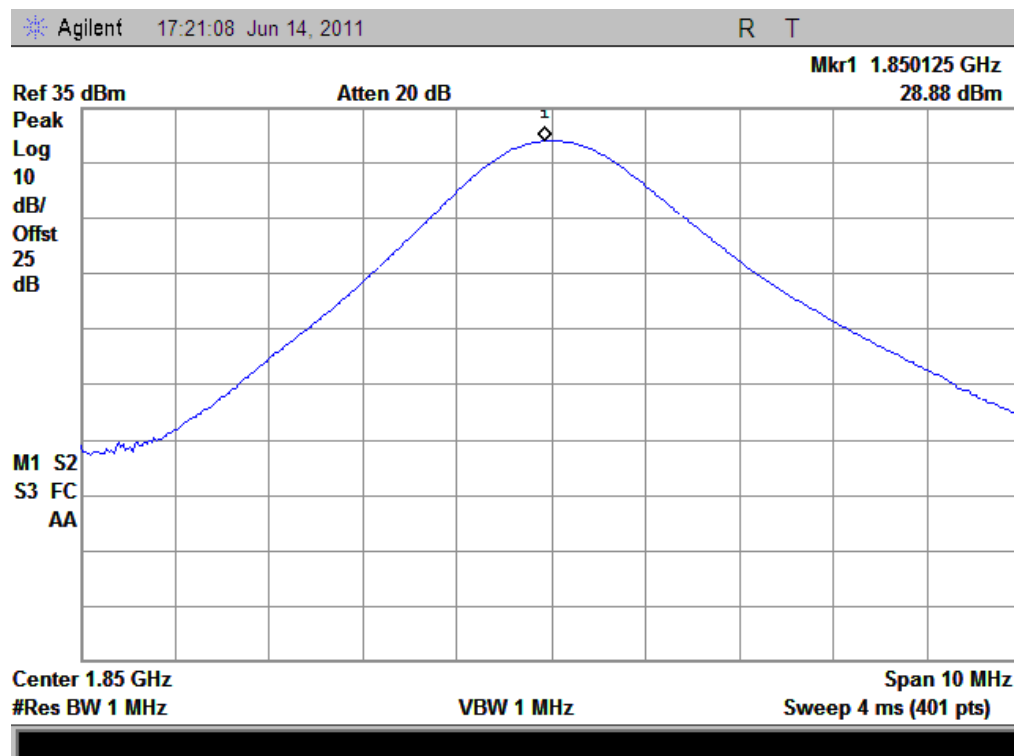
Plot A2: GSM 850MHz Channel = 190



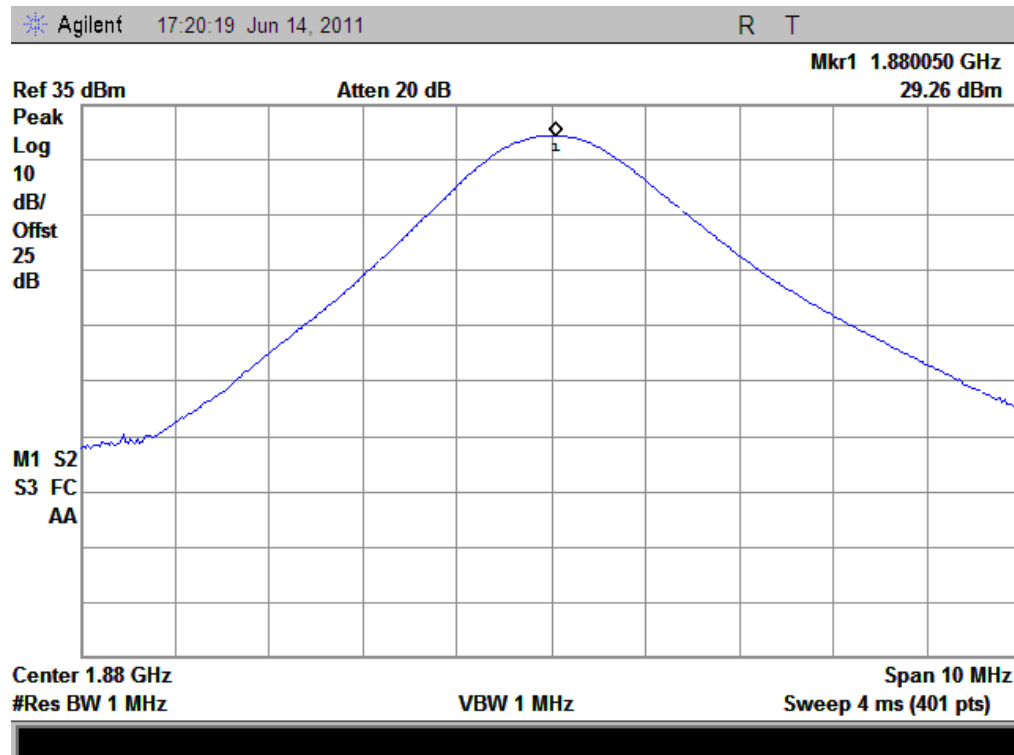
Plot A3: GSM 850MHz Channel = 251



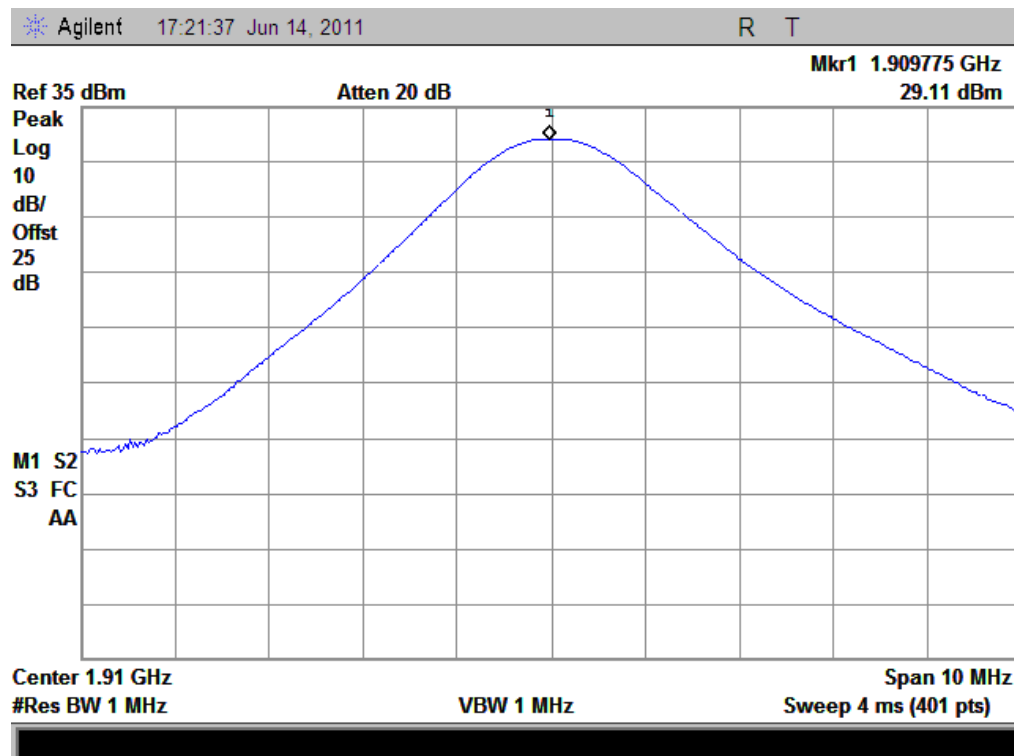
Plot B1: GSM 1900MHz Channel = 661



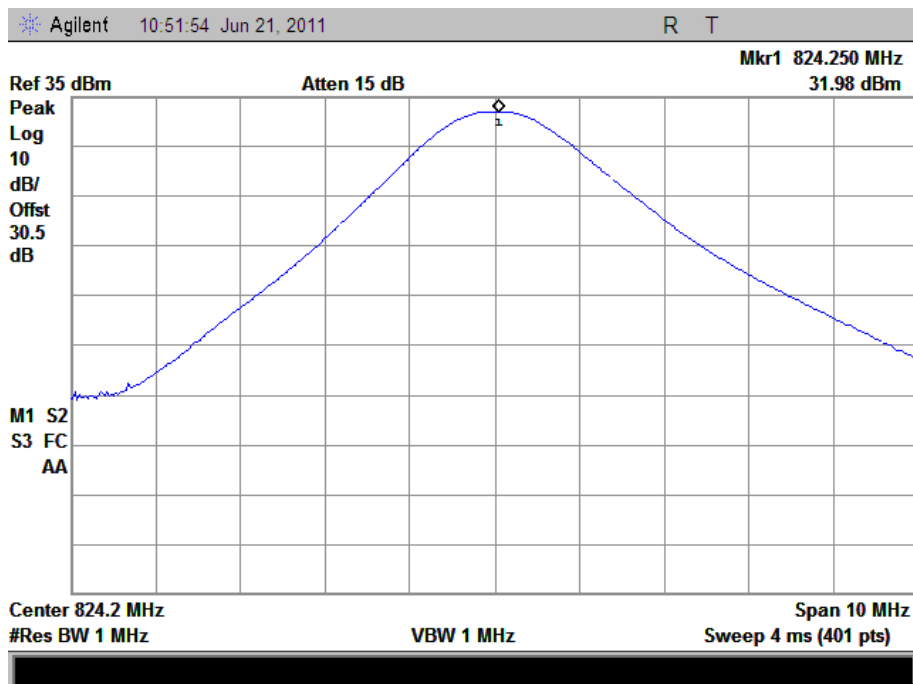
Plot B2: GSM 1900MHz Channel = 661



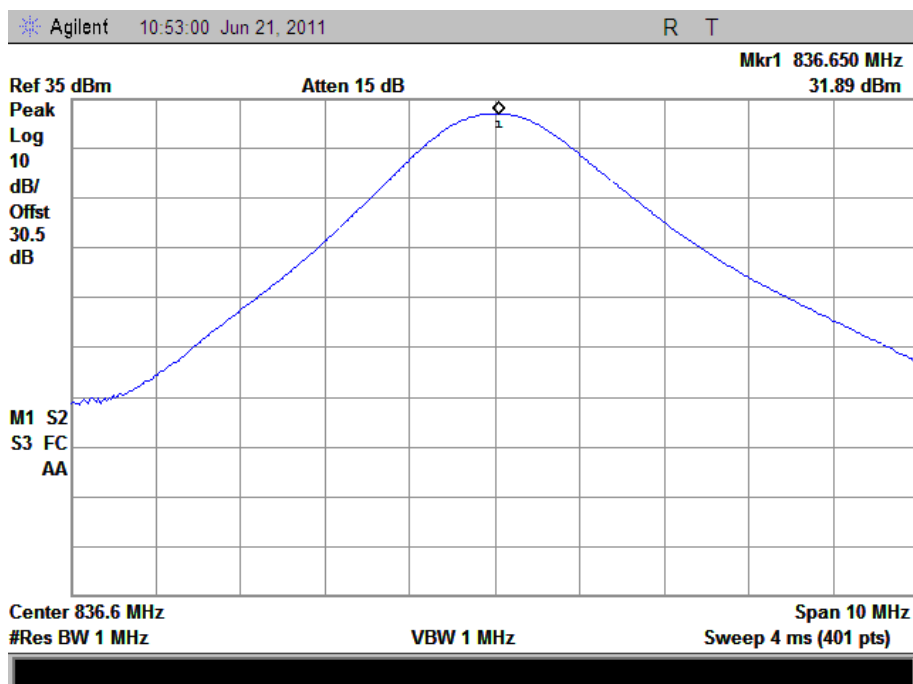
Plot B3: GSM 1900MHz Channel = 810



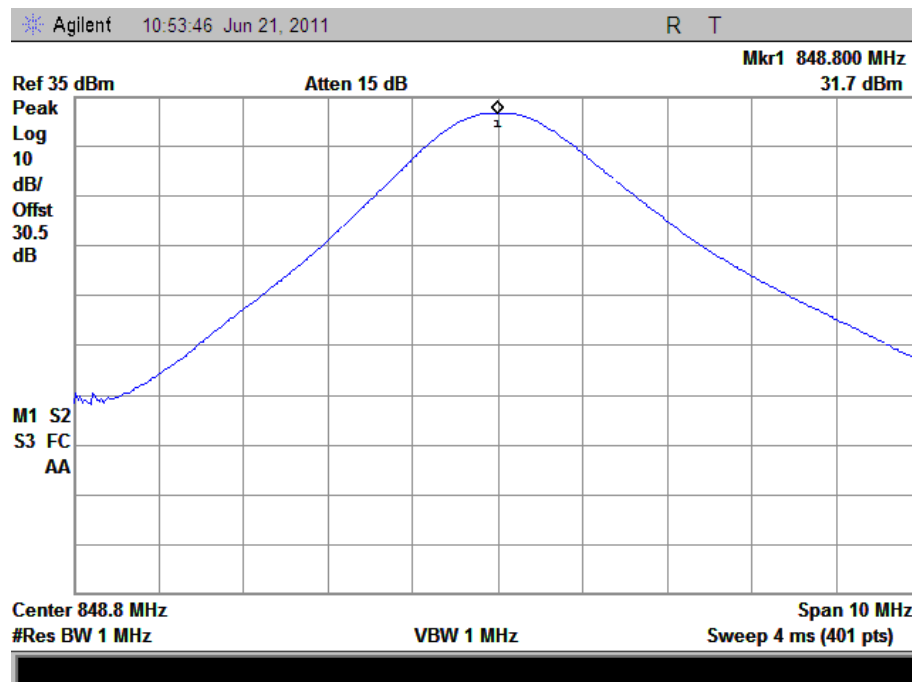
Plot C1: GSM 850MHz Channel = 128 -1down link 4up link



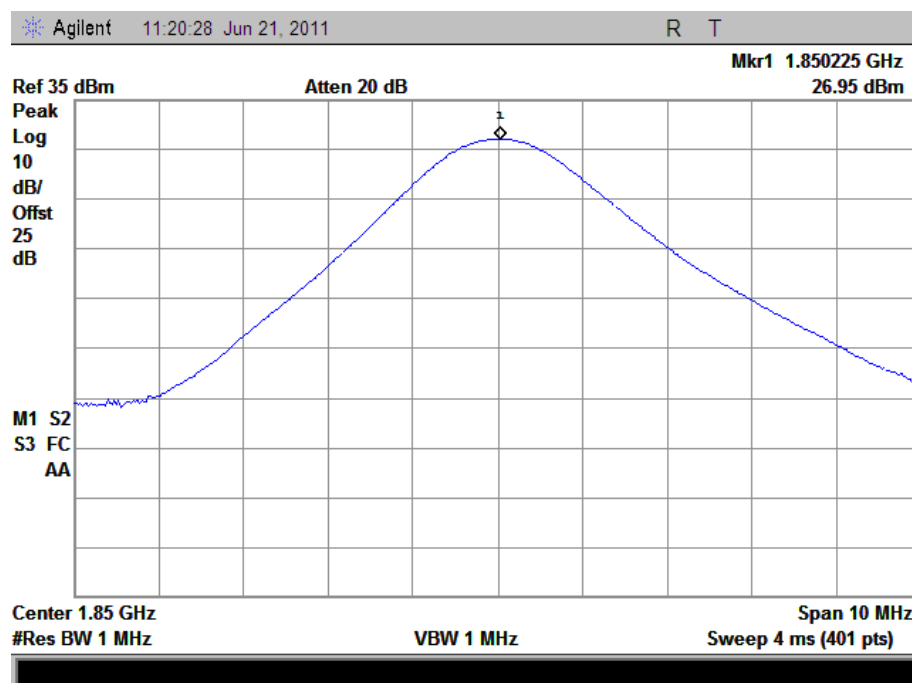
Plot C2: GSM 850MHz Channel = 190 -1down link 4up link



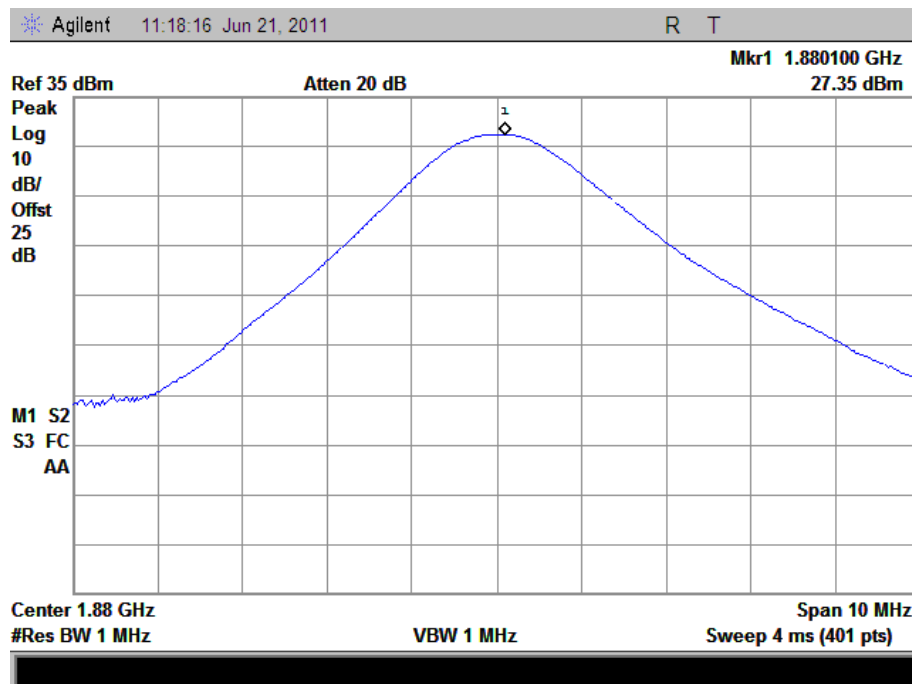
Plot C3: GSM 850MHz Channel = 251 -1down link 4up link



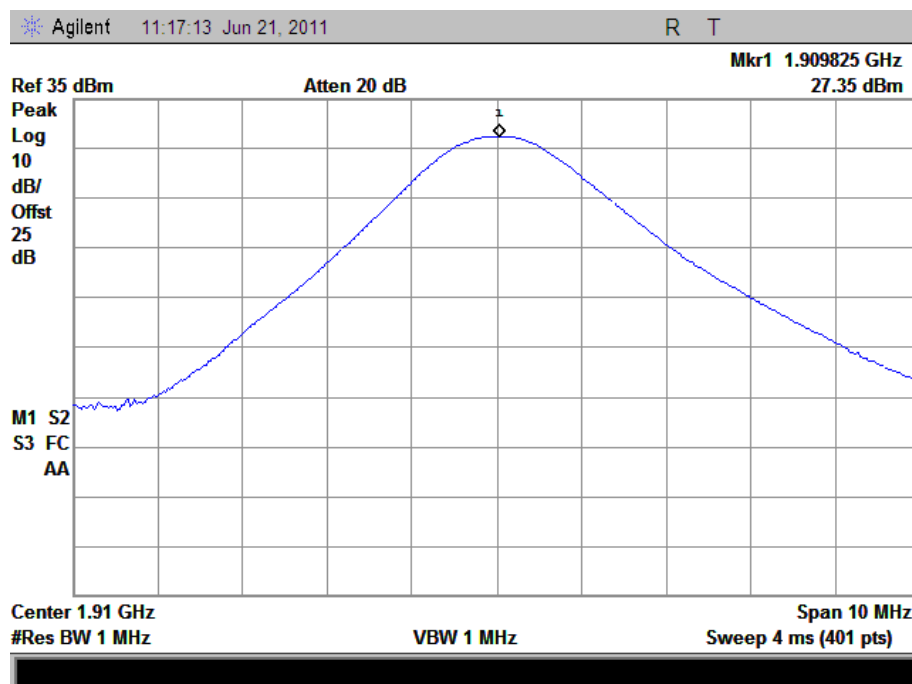
Plot D1: GSM 1900MHz Channel = 512 -1down link 4up link



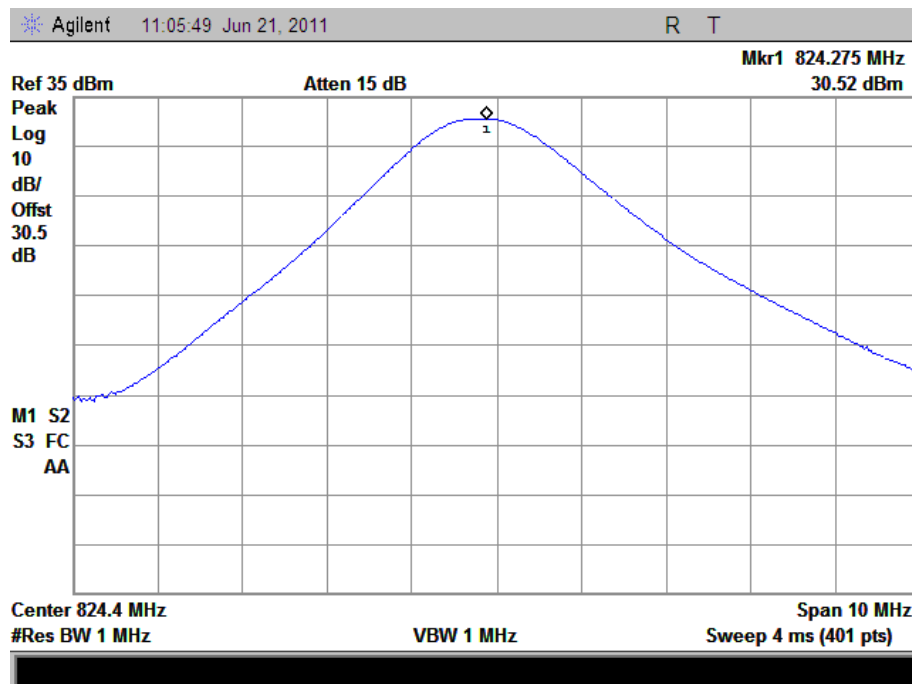
Plot D2: GSM 1900MHz Channel = 661 -1down link 4up link



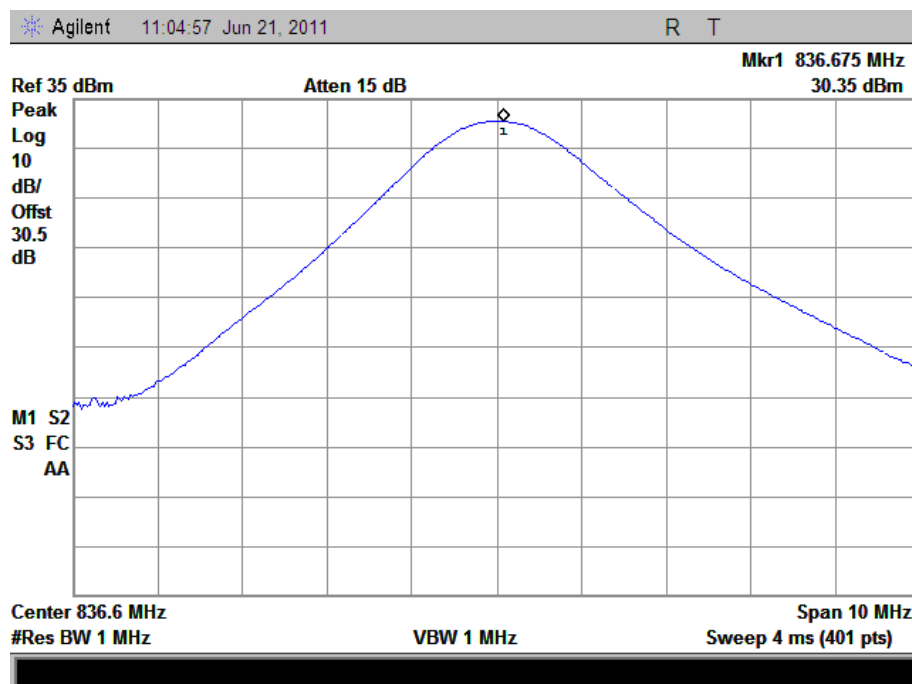
Plot D3: GSM 1900MHz Channel = 810 -1down link 4up link



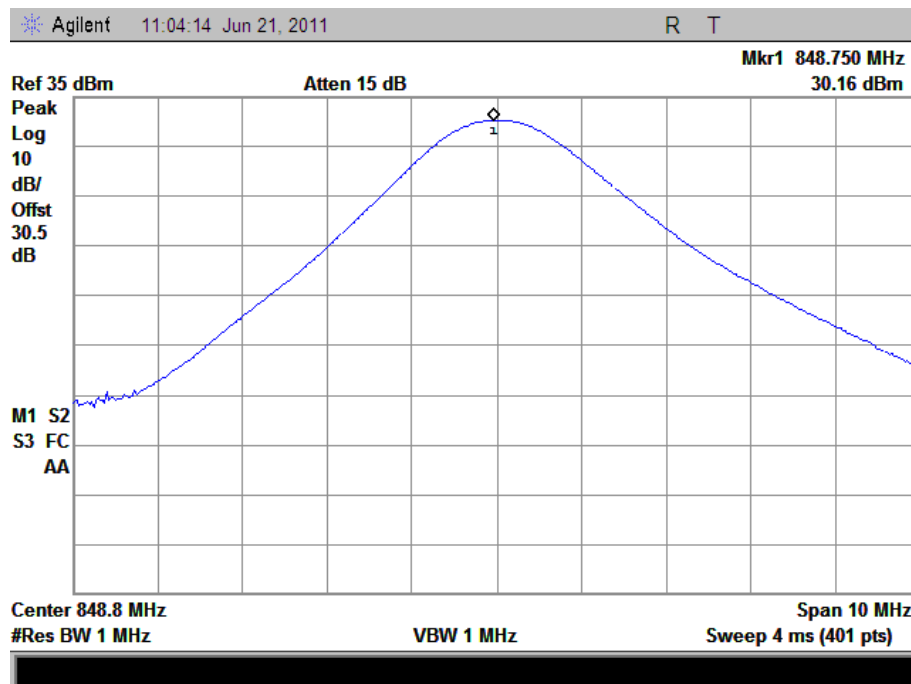
Plot E1: GSM 850MHz Channel = 128 -2down link 3up link



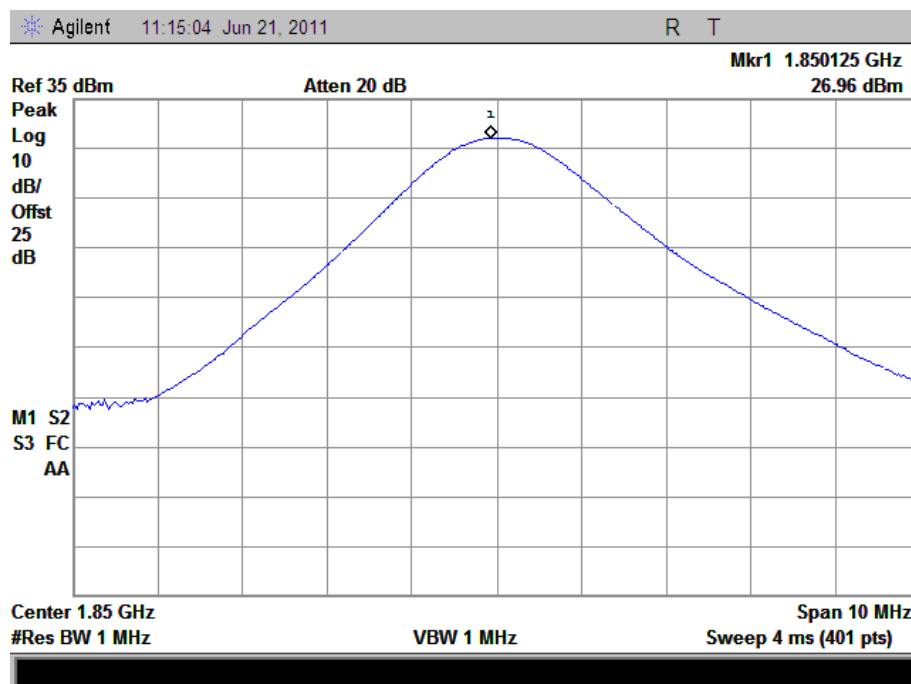
Plot E2: GSM 850MHz Channel = 190-2down link 3up link



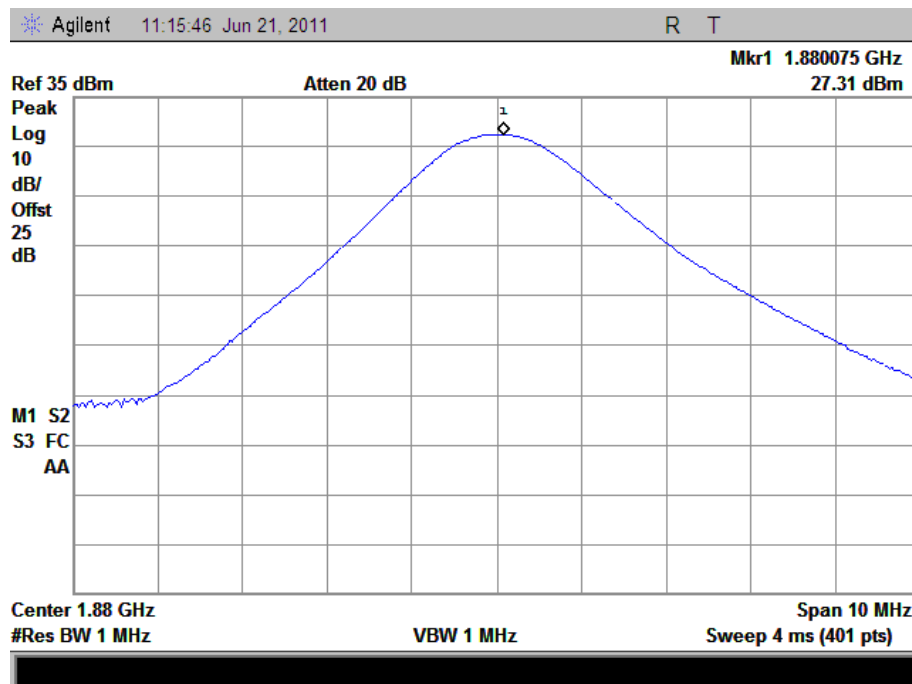
Plot E3: GSM 850MHz Channel = 251-2down link 3up link



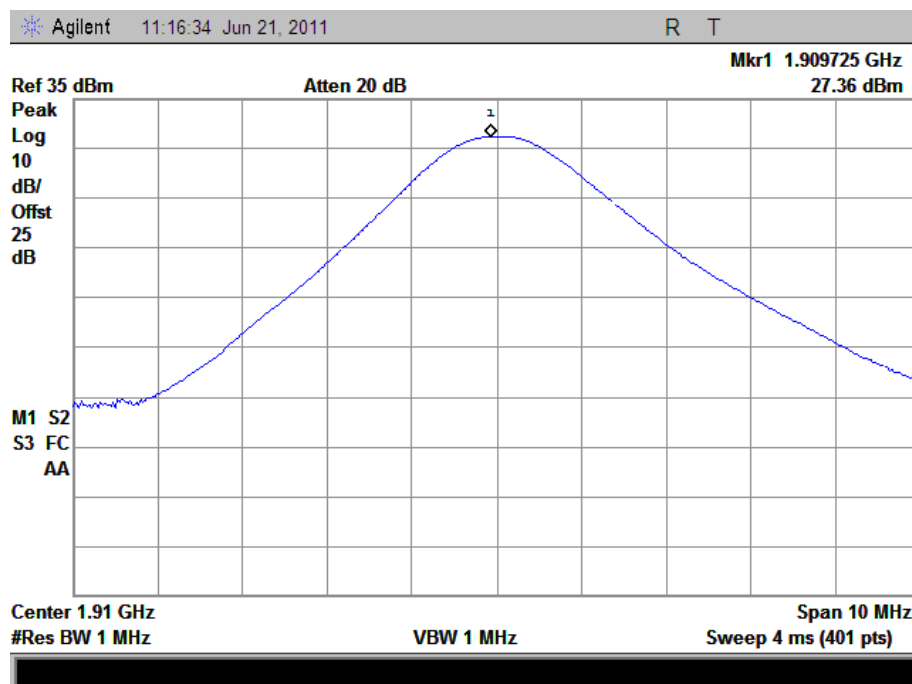
Plot F1: GSM 1900MHz Channel = 512 -2down link 3up link



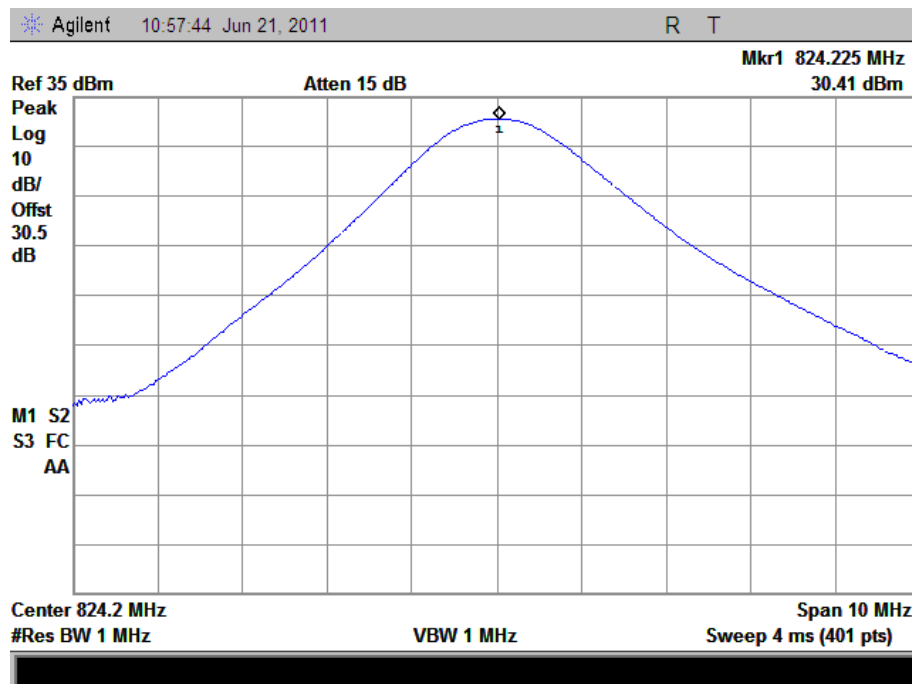
Plot F2: GSM 1900MHz Channel = 661-2down link 3up link



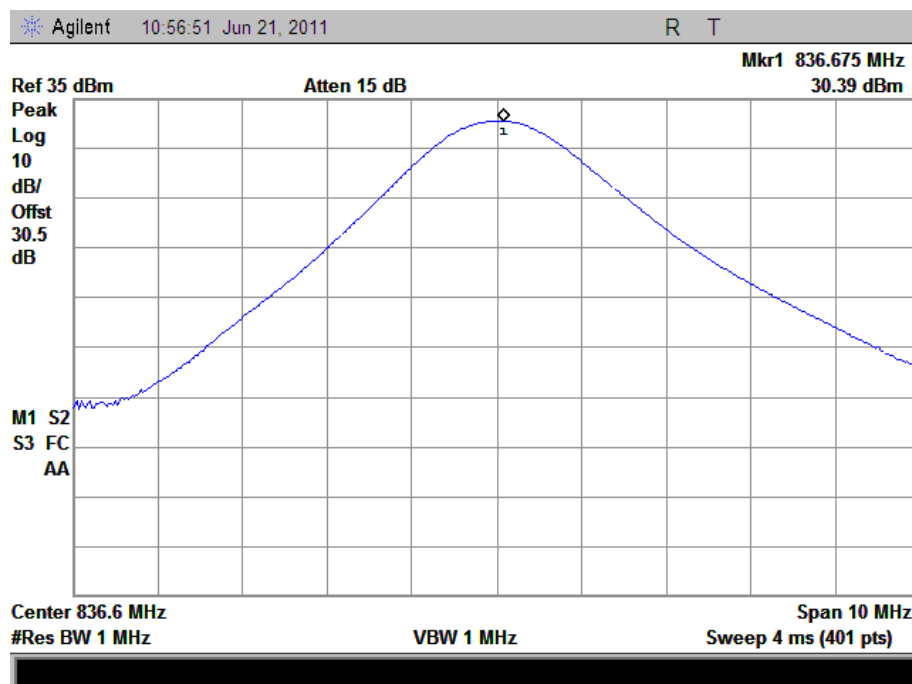
Plot F3: GSM 1900MHz Channel = 810 -2down link 3up link



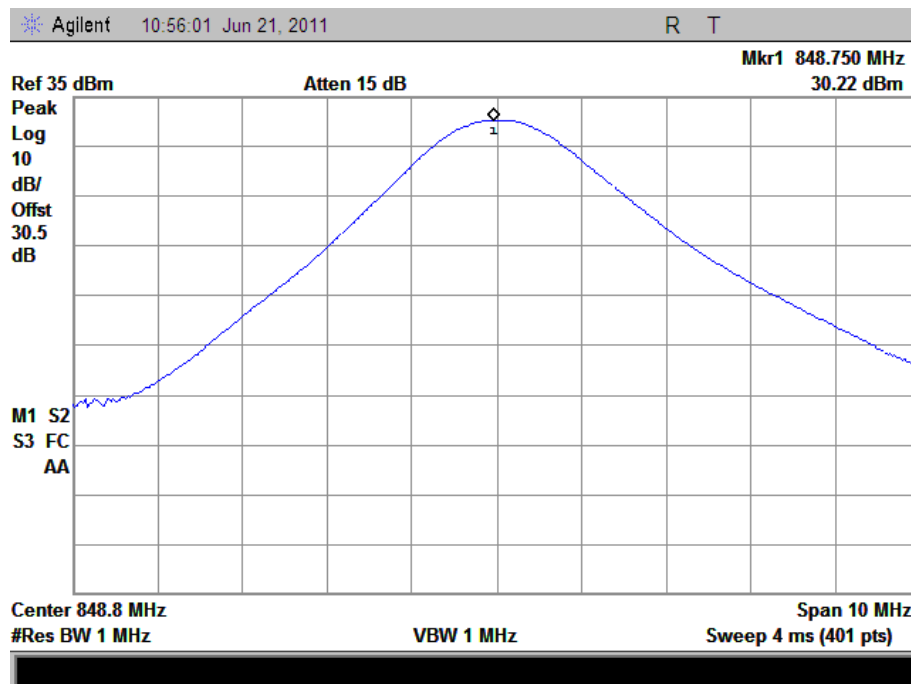
Plot G1: GSM 850MHz Channel = 128-3down link 2up link



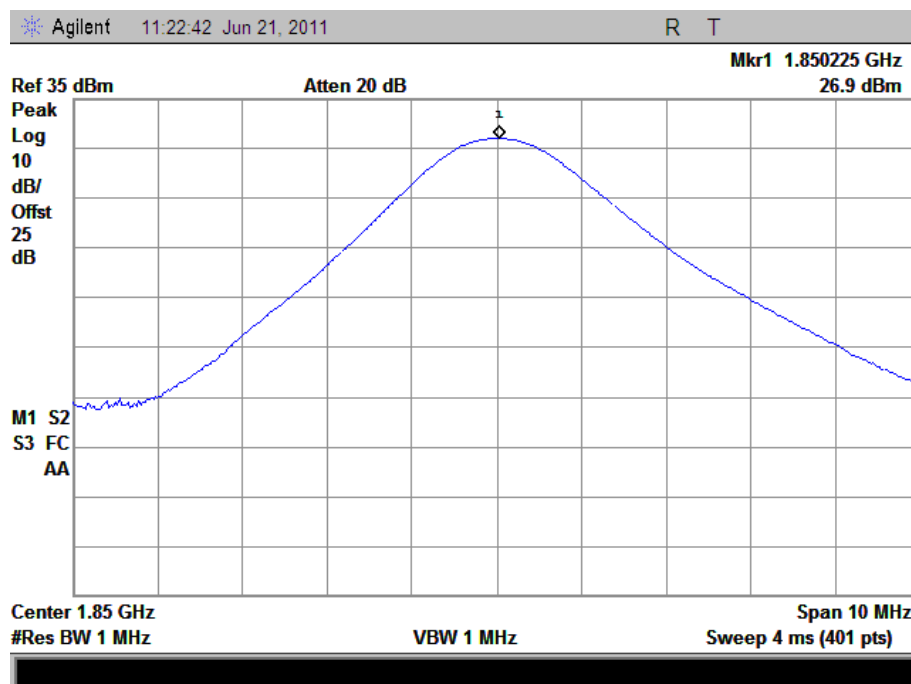
Plot G2: GSM 850MHz Channel = 190-3down link 2up link



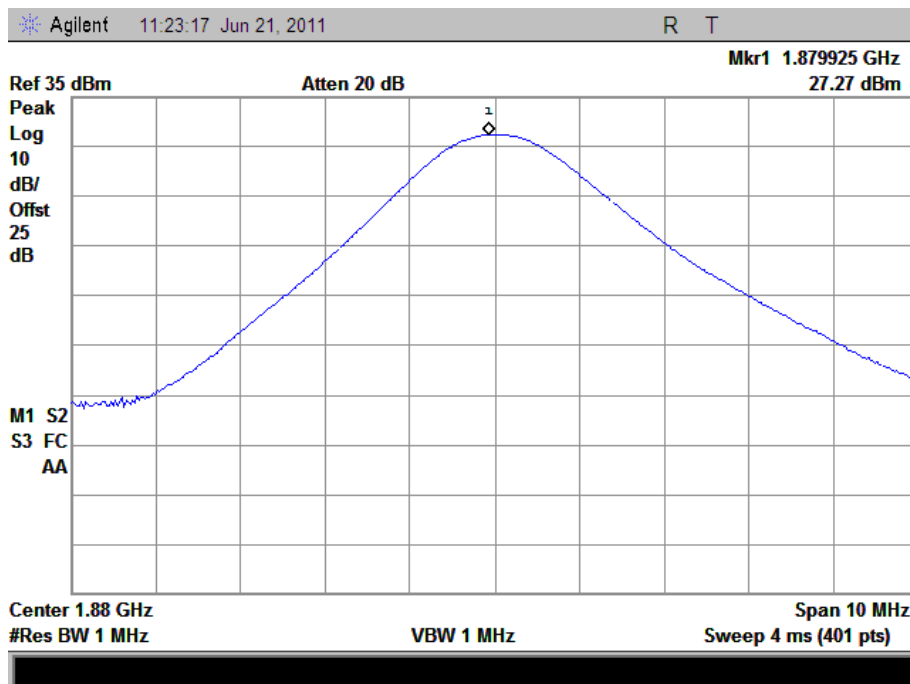
Plot G3: GSM 850MHz Channel = 251-3down link 2up link



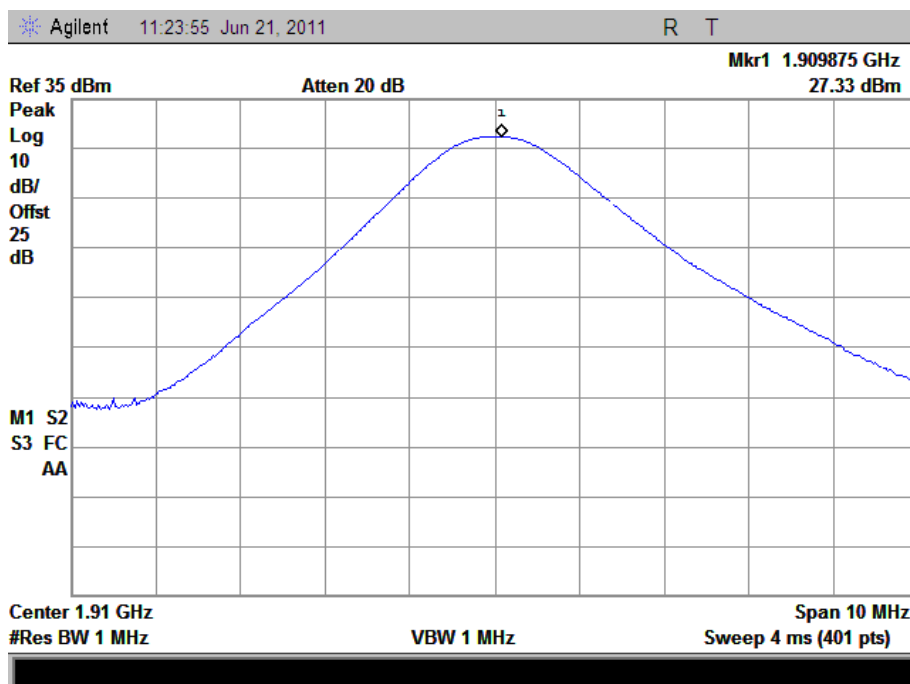
Plot H1: GSM1900MHz Channel = 661-3down link 2up link



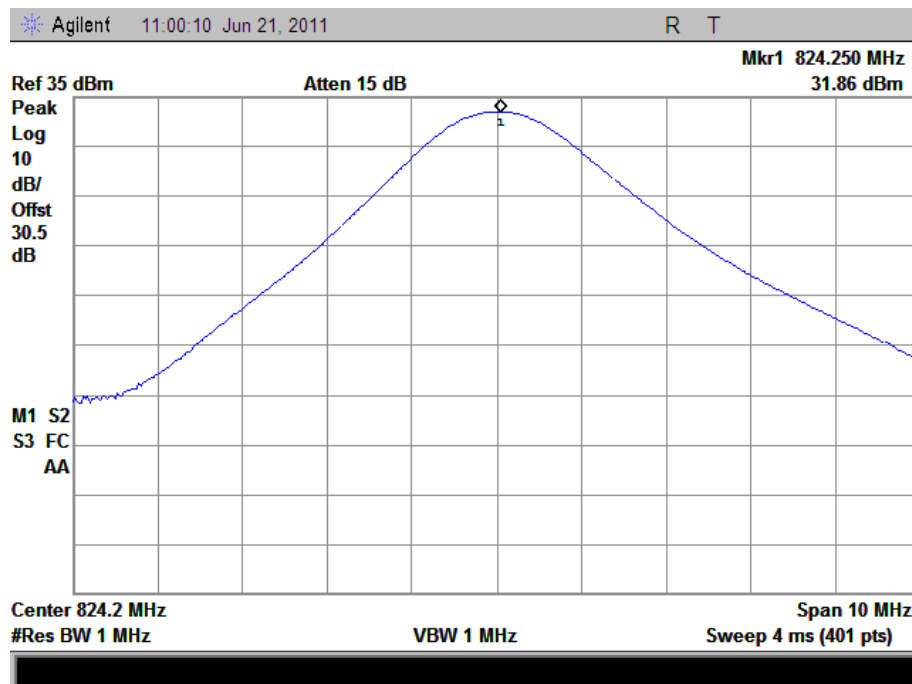
Plot H2: GSM1900MHz Channel = 661-3down link 2up link



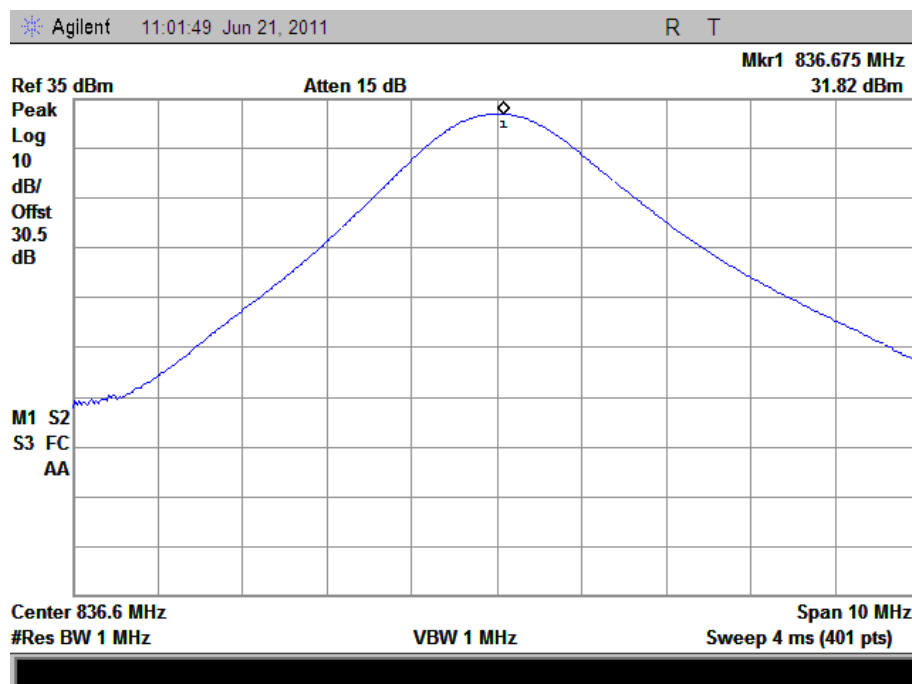
Plot H3: GSM1900MHz Channel = 810-3down link 2up link



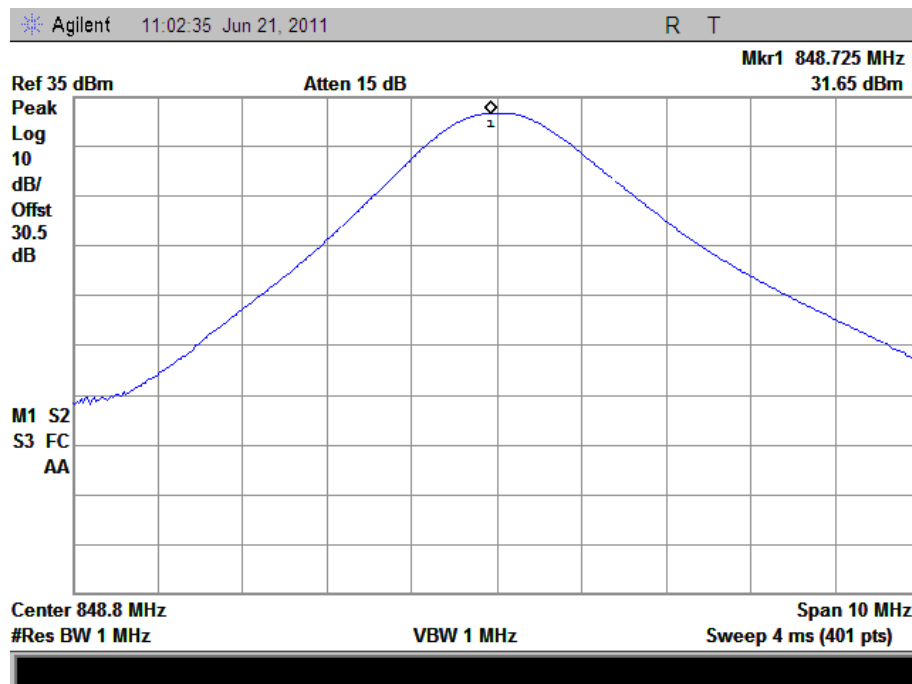
Plot I1: GSM850MHz Channel = 128 -4down link 1up link



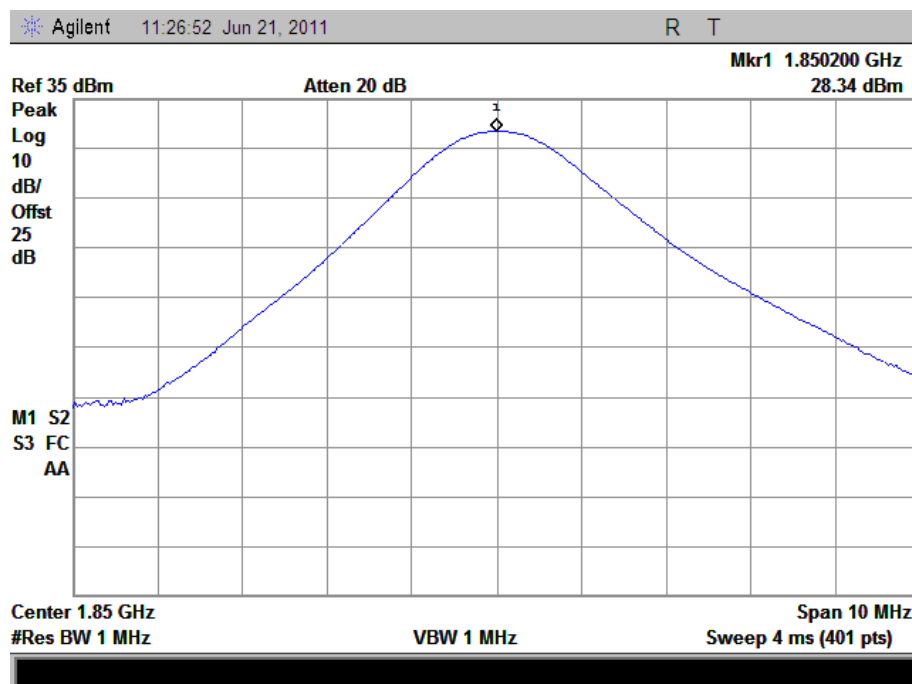
Plot I2: GSM850MHz Channel = 190-4down link 1up link



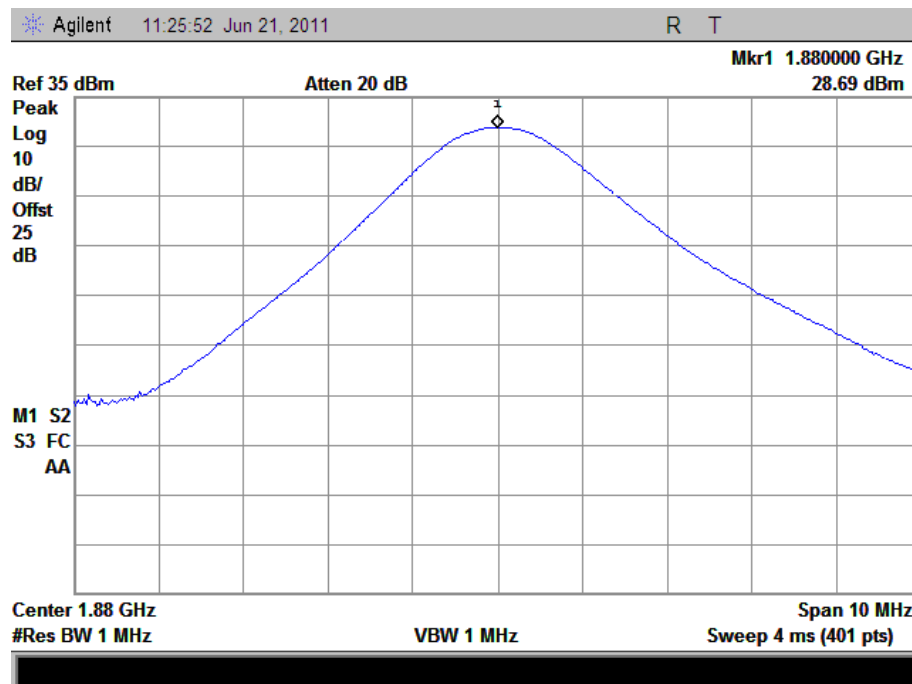
Plot I3: GSM850MHz Channel = 251-4down link 1up link



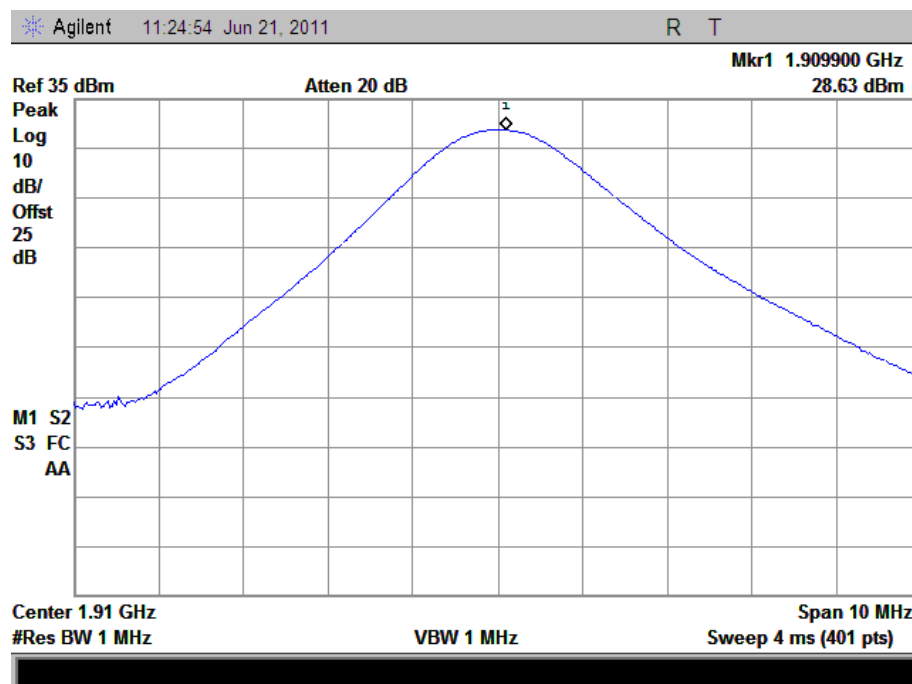
Plot J1: GSM1900MHz Channel = 512-4down link 1up link



Plot J2: GSM1900MHz Channel = 661-4down link 1up link



Plot J3: GSM1900MHz Channel = 810-4down link 1up link



## 2.2 99% Occupied Bandwidth

### 2.2.1 Definition

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth.

### 2.2.2 Test Description

See section 2.1.2 of this report.

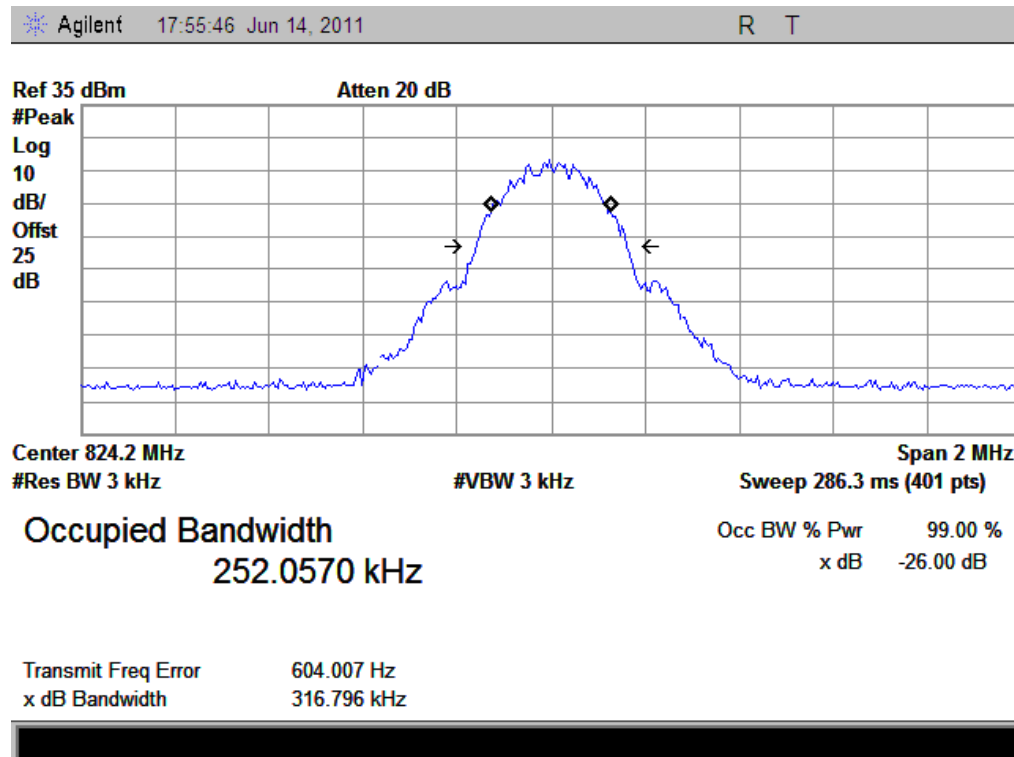
### 2.2.3 Test Verdict

Here the lowest, middle and highest channels are tested to record the 99% occupied bandwidth

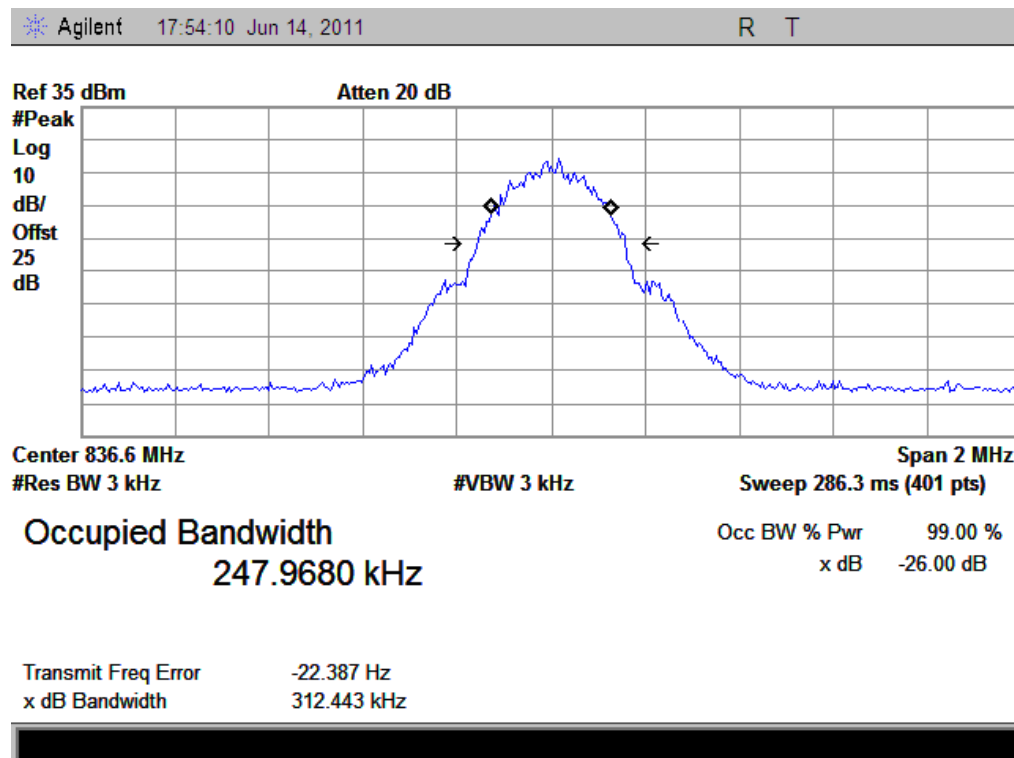
Test Verdict:

| Band           | Channel | Frequency (MHz) | Measured 99% Occupied Bandwidth (kHz) | Refer to Plot |
|----------------|---------|-----------------|---------------------------------------|---------------|
| GSM<br>850MHz  | 128     | 824.2           | 252.0570                              | Plot A        |
|                | 190     | 836.6           | 247.9680                              | Plot B        |
|                | 251     | 848.8           | 253.1092                              | Plot C        |
| GSM<br>1900MHz | 512     | 1850.2          | 248.9185                              | Plot D        |
|                | 661     | 1880.0          | 248.9048                              | Plot E        |
|                | 810     | 1909.8          | 250.0956                              | Plot F        |

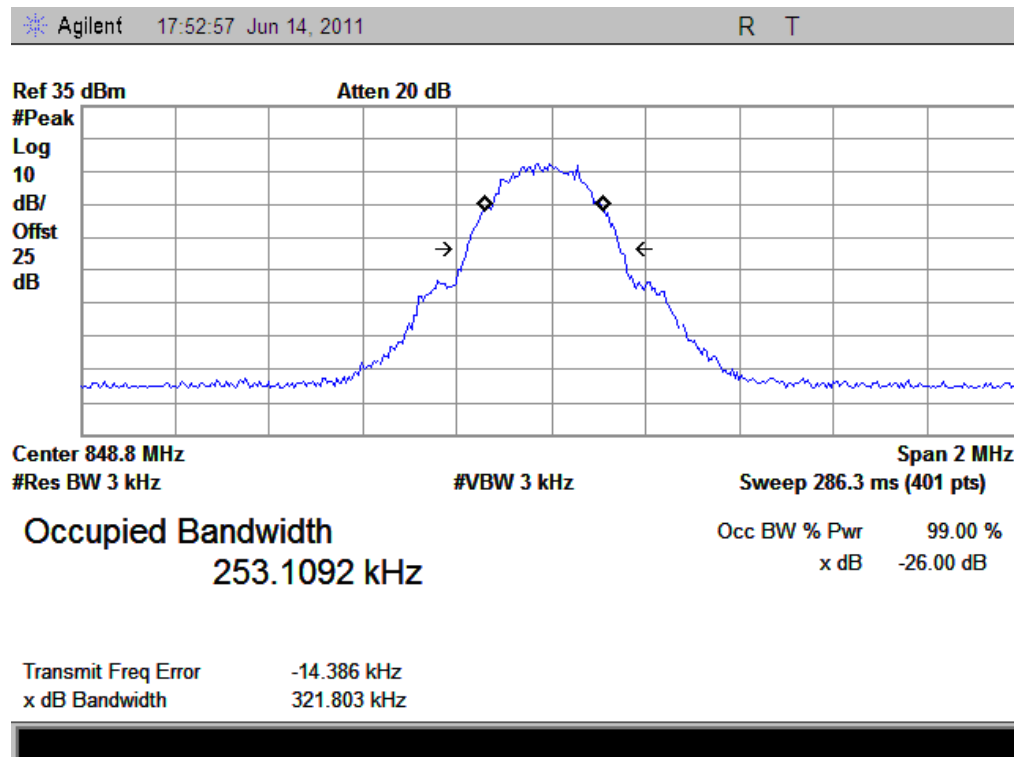
### 3. Test Plots:



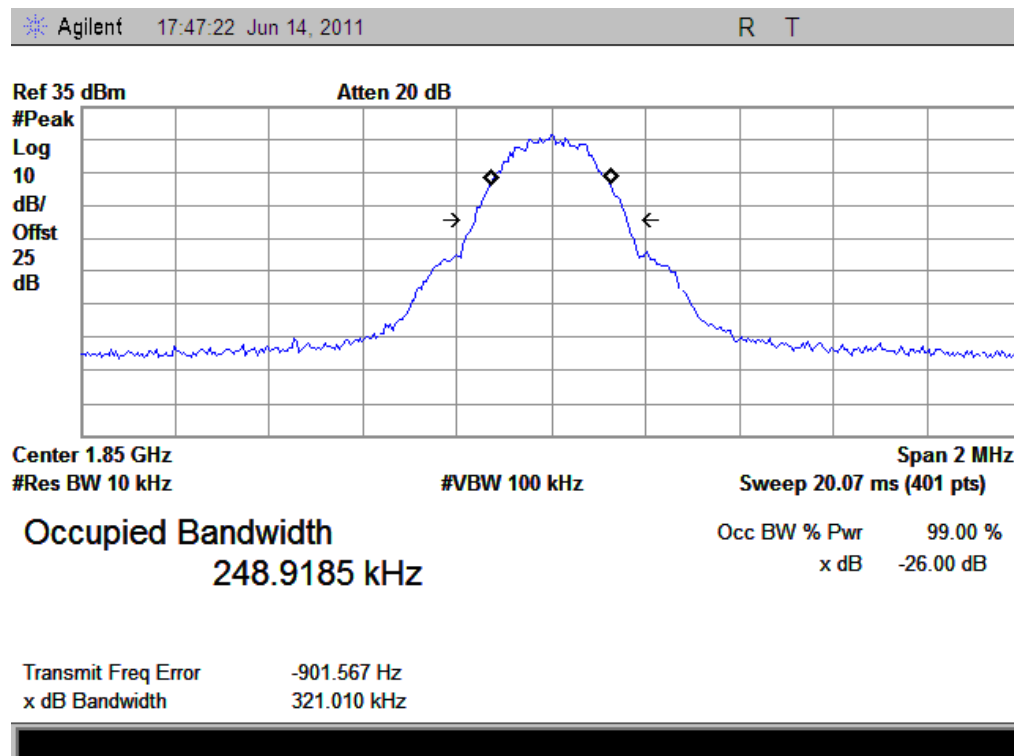
(Plot A: GSM 850MHz Channel = 128)



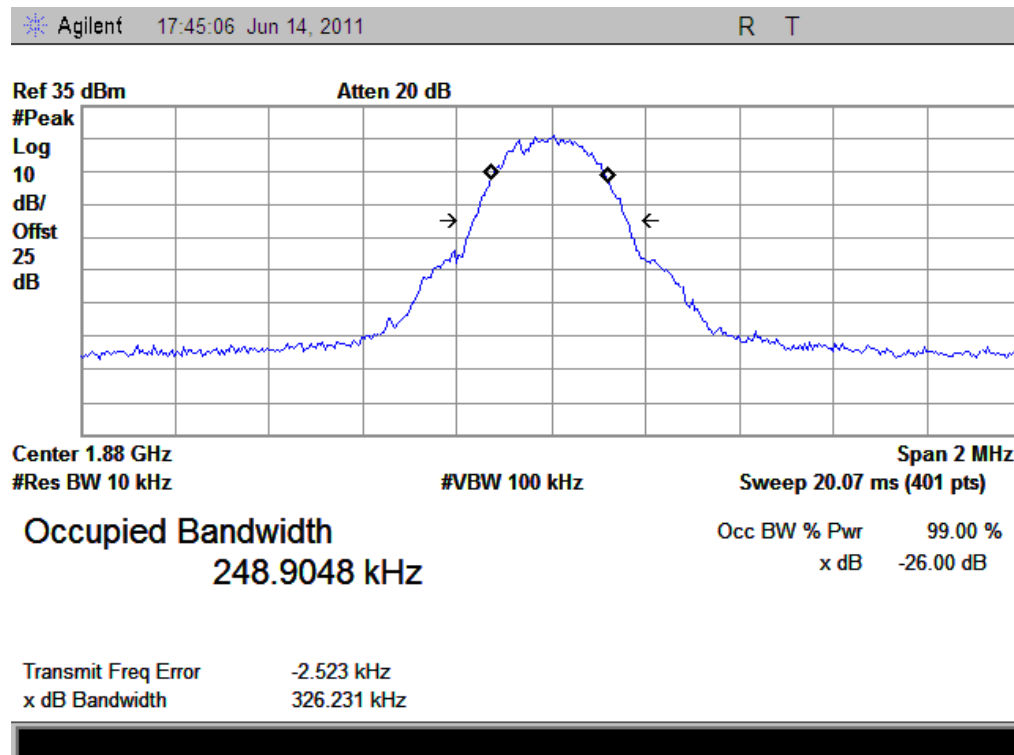
(Plot B: GSM 850MHz Channel = 190)



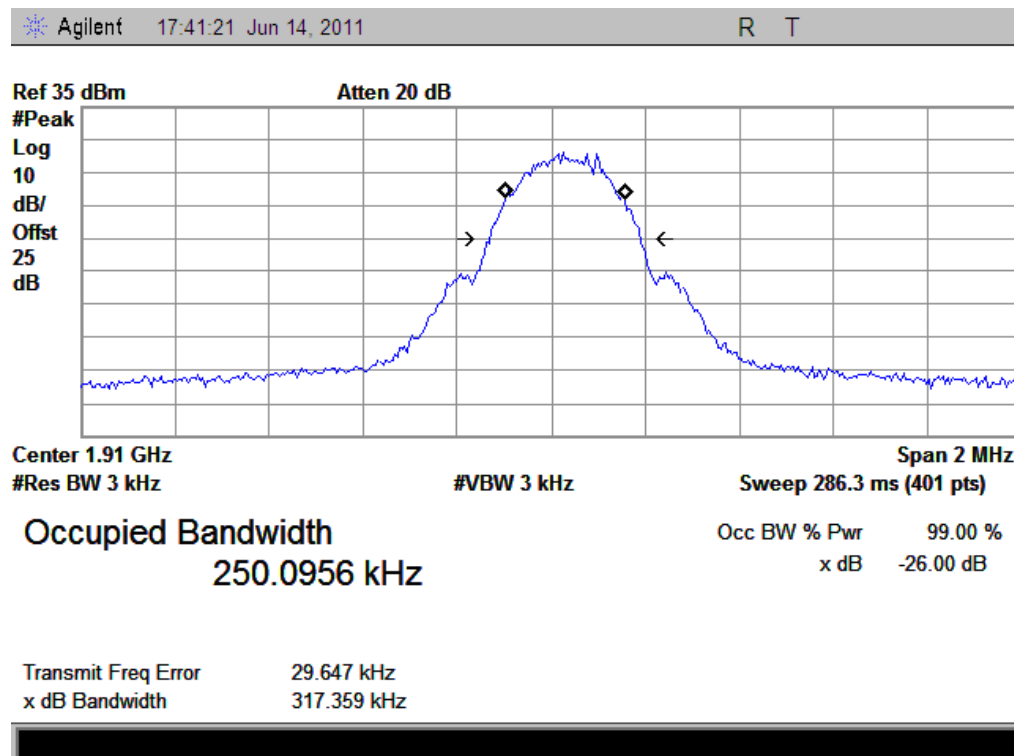
(Plot C: GSM 850MHz Channel = 251)



(Plot D: GSM 1900MHz Channel = 512)



(Plot E: GSM 1900MHz Channel = 661)



(Plot F: GSM 1900MHz Channel = 810)

## 2.3 Frequency Stability

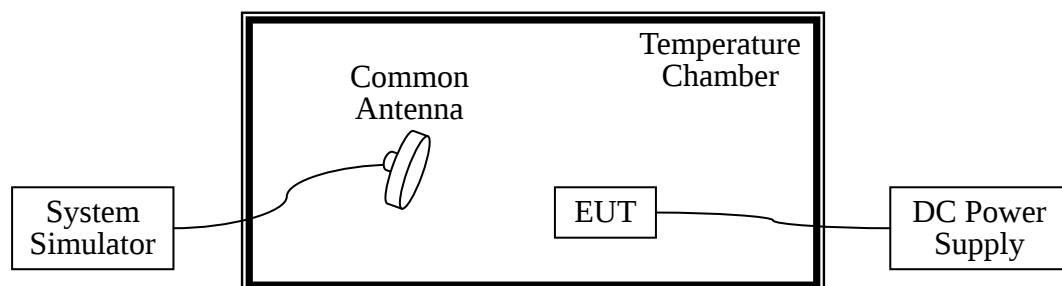
### 2.3.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- The temperature is varied from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

### 2.3.2 Test Description

#### 1. Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

#### 2. Equipments List:

| Description         | Manufacturer              | Model      | Serial No. | Cal. Date |
|---------------------|---------------------------|------------|------------|-----------|
| System Simulator    | Agilent                   | E5515C     | GB43130131 | 2011.05   |
| DC Power Supply     | Good Will                 | GPS-3030DD | EF920938   | 2011.05   |
| Temperature Chamber | YinHe Experimental Equip. | HL4003T    | (n.a.)     | 2011.05   |

### 2.3.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.2VDC and 3.5VDC, which are specified by the applicant; the normal temperature here used is  $25^{\circ}\text{C}$ . The frequency

deviation limit of GSM 850MHz band is  $\pm 2.5$ ppm, and GSM 1900MHz is  $\pm 1$ ppm

| Band        | Test Conditions |                   | Frequency Deviation       |         |                           |         |                           |         | Verdict |
|-------------|-----------------|-------------------|---------------------------|---------|---------------------------|---------|---------------------------|---------|---------|
|             | Power (VDC)     | Temperat ure (°C) | Channel = 128 (824.2MHz)  |         | Channel = 190 (836.6MHz)  |         | Channel = 251 (848.8MHz)  |         |         |
|             |                 |                   | Hz                        | Limits  | Hz                        | Limits  | Hz                        | Limits  |         |
| GSM 850MHz  | 3.7             | -30               | 27.12                     | ±2060.5 | 27.82                     | ±2091.5 | 25.74                     | ±2122   | PASS    |
|             |                 | -20               | 26.83                     |         | 29.70                     |         | 25.74                     |         |         |
|             |                 | -10               | 23.28                     |         | 28.12                     |         | 31.14                     |         |         |
|             |                 | 0                 | 25.11                     |         | 21.06                     |         | 25.17                     |         |         |
|             |                 | +10               | -23.13                    |         | 13.07                     |         | 25.47                     |         |         |
|             |                 | +20               | -10.39                    |         | -12.76                    |         | -7.61                     |         |         |
|             |                 | +30               | 17.75                     |         | -2.05                     |         | 6.09                      |         |         |
|             |                 | +40               | 5.31                      |         | -33.77                    |         | 15.49                     |         |         |
|             |                 | +50               | -12.19                    |         | 5.39                      |         | 10.19                     |         |         |
|             | 4.2             | +25               | 20.74                     | 19.65   | 8.71                      |         |                           |         |         |
|             | 3.6             | +25               | -29.28                    | -26.96  | -25.27                    |         |                           |         |         |
| Band        | Test Conditions |                   | Frequency Deviation       |         |                           |         |                           |         | Verdict |
|             | Power (VDC)     | Temperat ure (°C) | Channel = 512 (1850.2MHz) |         | Channel = 661 (1880.0MHz) |         | Channel = 810 (1909.8MHz) |         |         |
|             |                 |                   | Hz                        | Limits  | Hz                        | Limits  | Hz                        | Limits  |         |
| GSM 1900MHz | 3.7             | -30               | 29.30                     | ±1850.2 | 27.82                     | ±1880.0 | 29.47                     | ±1909.8 | PASS    |
|             |                 | -20               | 29.22                     |         | 29.45                     |         | 29.30                     |         |         |
|             |                 | -10               | 25.19                     |         | 28.17                     |         | 27.12                     |         |         |
|             |                 | 0                 | 29.37                     |         | -3.20                     |         | 11.82                     |         |         |
|             |                 | +10               | 13.97                     |         | 20.04                     |         | 19.77                     |         |         |
|             |                 | +20               | 22.42                     |         | -14.29                    |         | -22.73                    |         |         |
|             |                 | +30               | 18.57                     |         | -27.62                    |         | -22.22                    |         |         |
|             |                 | +40               | -19.93                    |         | -17.97                    |         | 22.21                     |         |         |
|             |                 | +50               | 23.76                     |         | -18.23                    |         | -22.22                    |         |         |
|             | 4.2             | +25               | -11.20                    | 21.16   | 22.63                     |         |                           |         |         |
|             | 3.6             | +25               | -11.17                    | -15.31  | -15.15                    |         |                           |         |         |

## 2.4 Conducted Out of Band Emissions

### 2.4.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43+10*\log(P)$ dB. This calculated to be -13dBm.

### 2.4.2 Test Description

See section 2.1.2 of this report.

### 2.4.3 Test Result

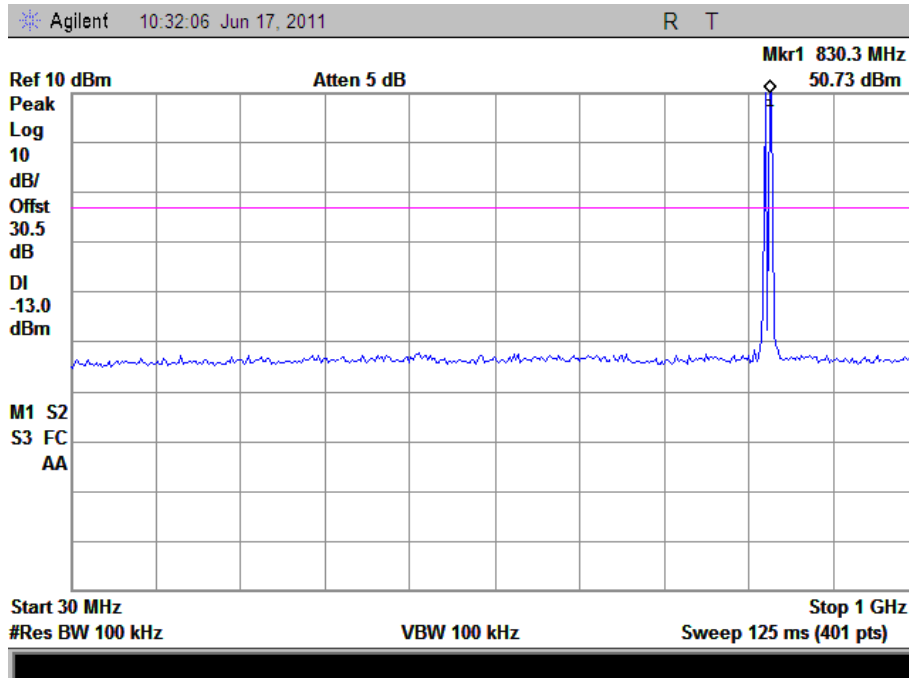
The measurement frequency range is from 30MHz to the 10<sup>th</sup> harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

#### 1. Test Verdict:

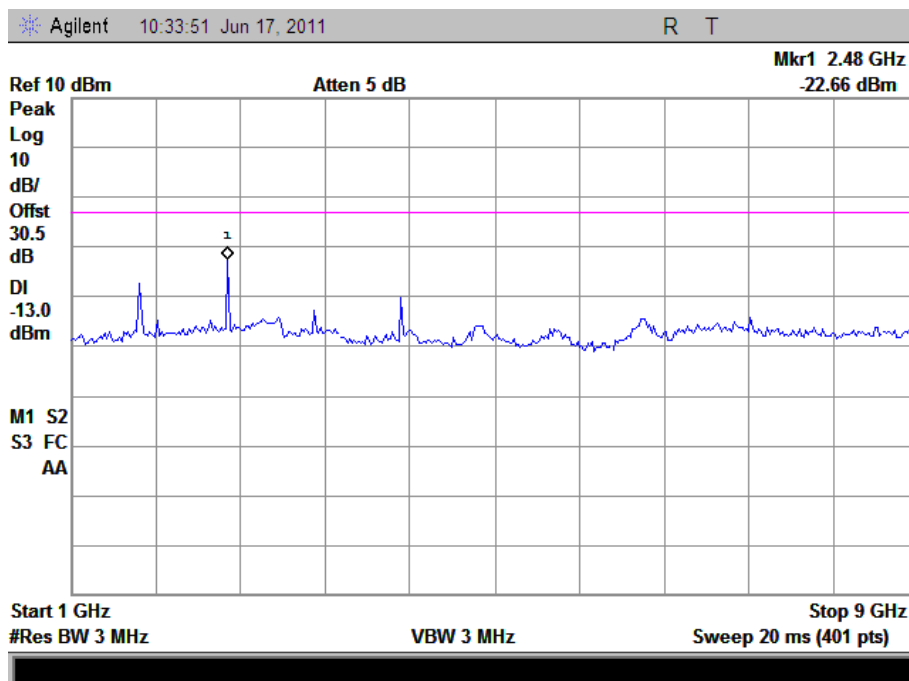
| Band           | Channel | Frequency (MHz) | Refer to Plot | Limit (dBm) | Verdict |
|----------------|---------|-----------------|---------------|-------------|---------|
| GSM<br>850MHz  | 128     | 824.2           | Plot A        | -13         | PASS    |
|                | 190     | 836.6           | Plot B        |             | PASS    |
|                | 251     | 848.8           | Plot C        |             | PASS    |
| GSM<br>1900MHz | 512     | 1850.2          | Plot D        | -13         | PASS    |
|                | 661     | 1880.0          | Plot E        |             | PASS    |
|                | 810     | 1909.8          | Plot F        |             | PASS    |

## 2. Test Plots for the Whole Measurement Frequency Range:

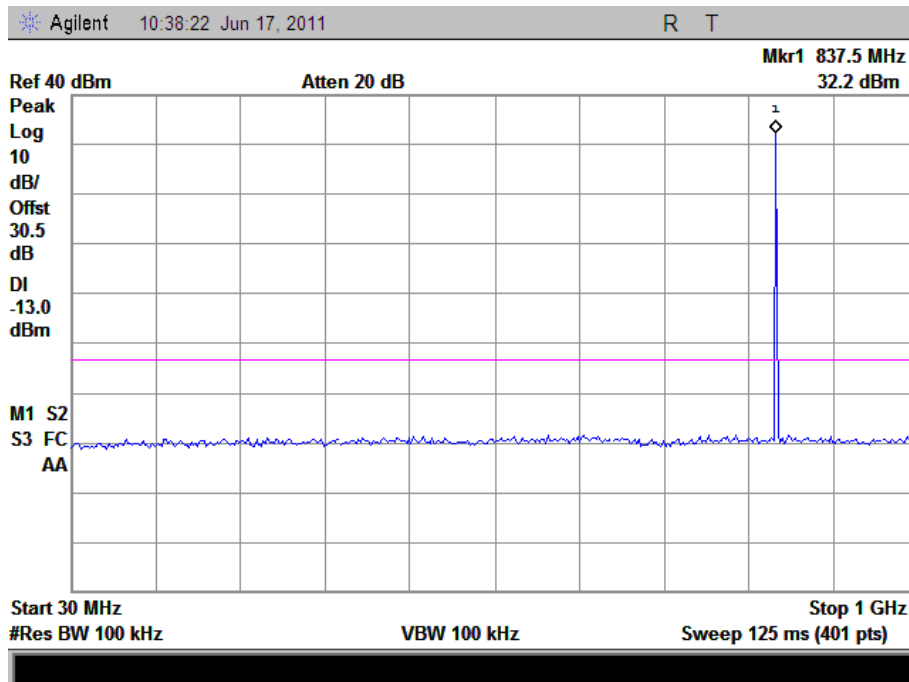
Note: the power of the EUT transmitting frequency should be ignored.



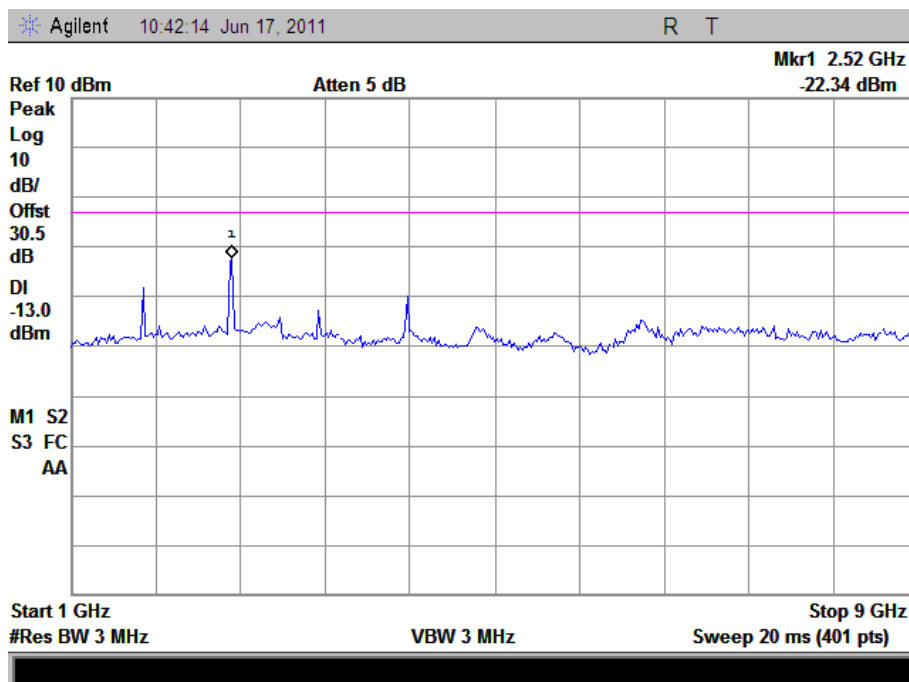
(Plot A: GSM 850MHz Channel = 128,30Hz to 1GHz)



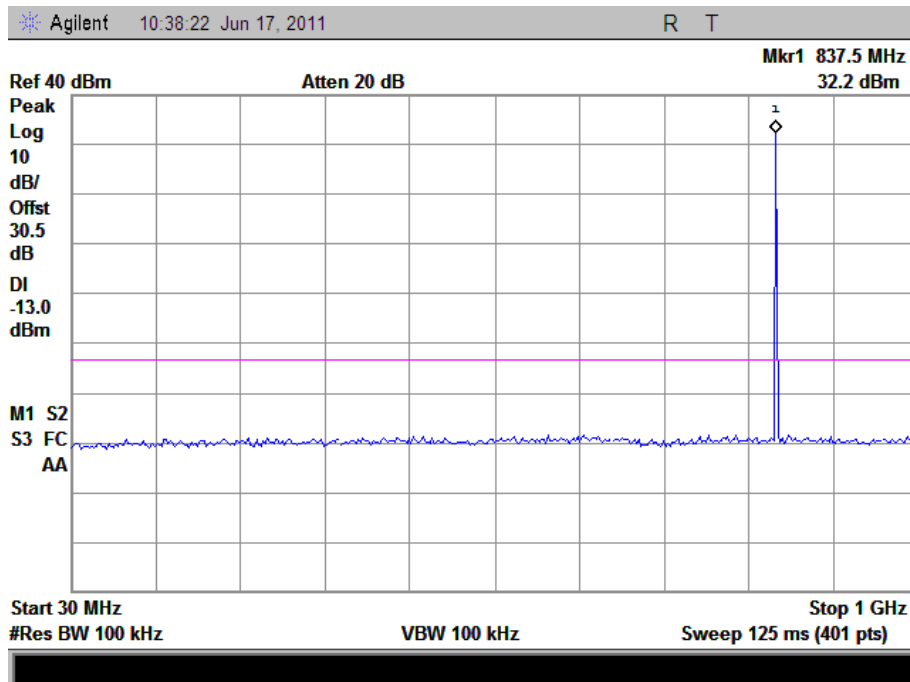
(Plot A: GSM 850MHz Channel = 128, 1GHz to 9GHz)



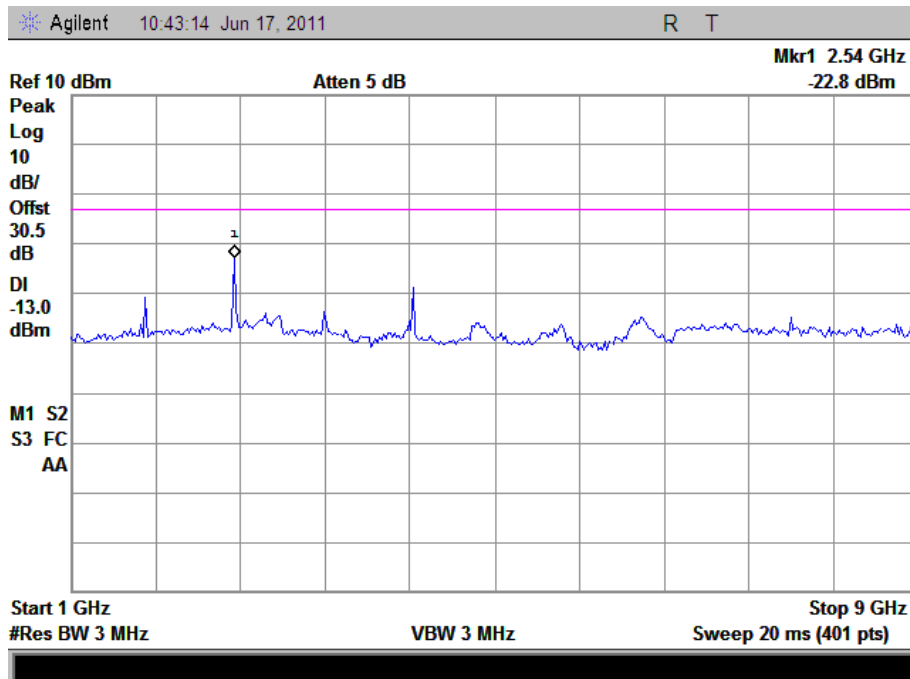
(Plot B: GSM 850MHz Channel = 190, 30MHz to 1GHz)



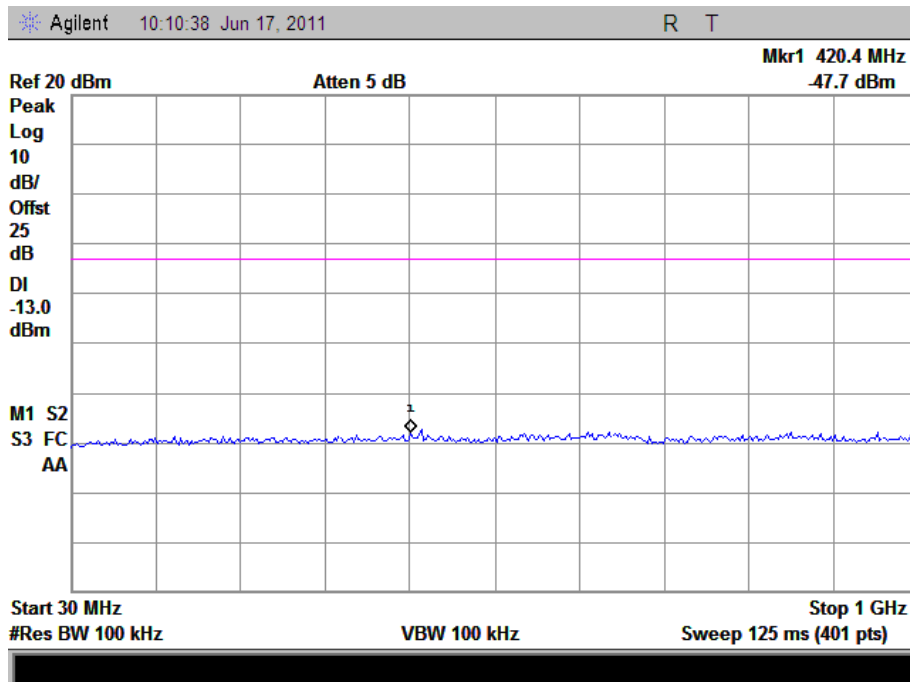
(Plot B: GSM 850MHz Channel = 190, 1GHz to 9GHz)



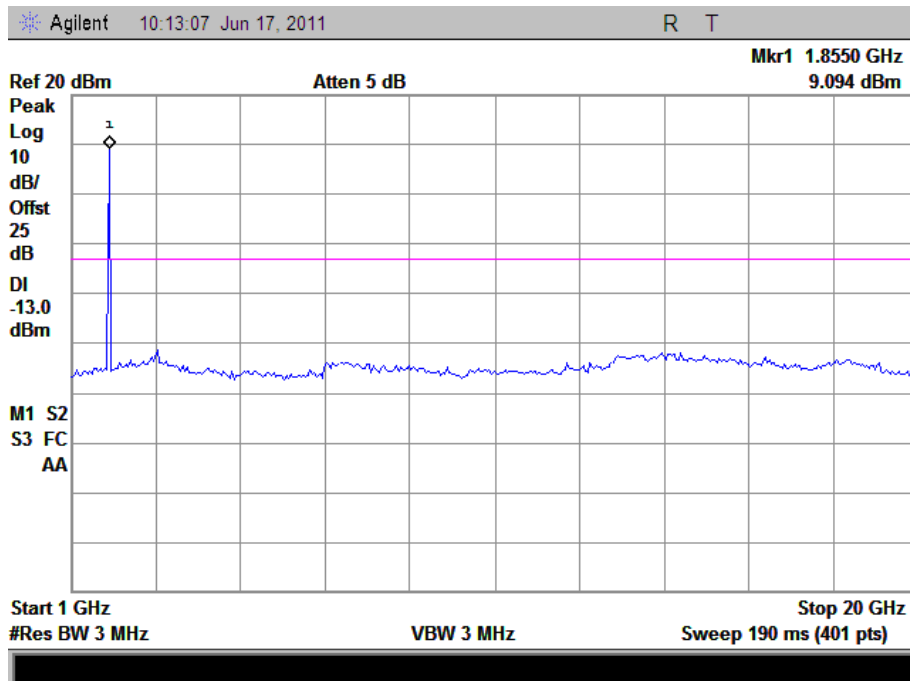
(Plot C: GSM 1900MHz Channel = 251, 30MHz to 1GHz)



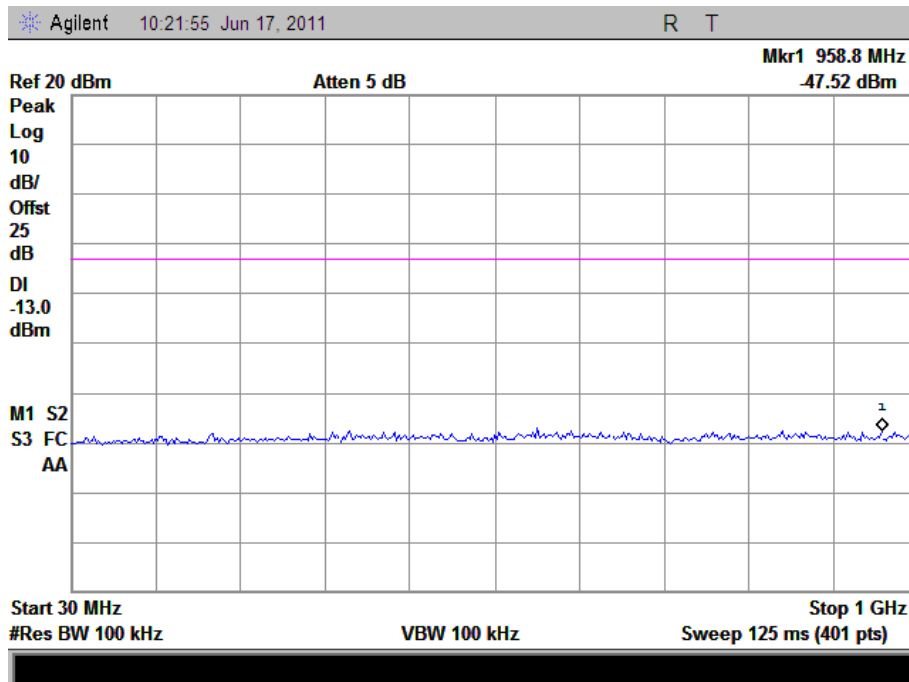
(Plot C: GSM 1900MHz Channel = 251, 1GHz to 9GHz)



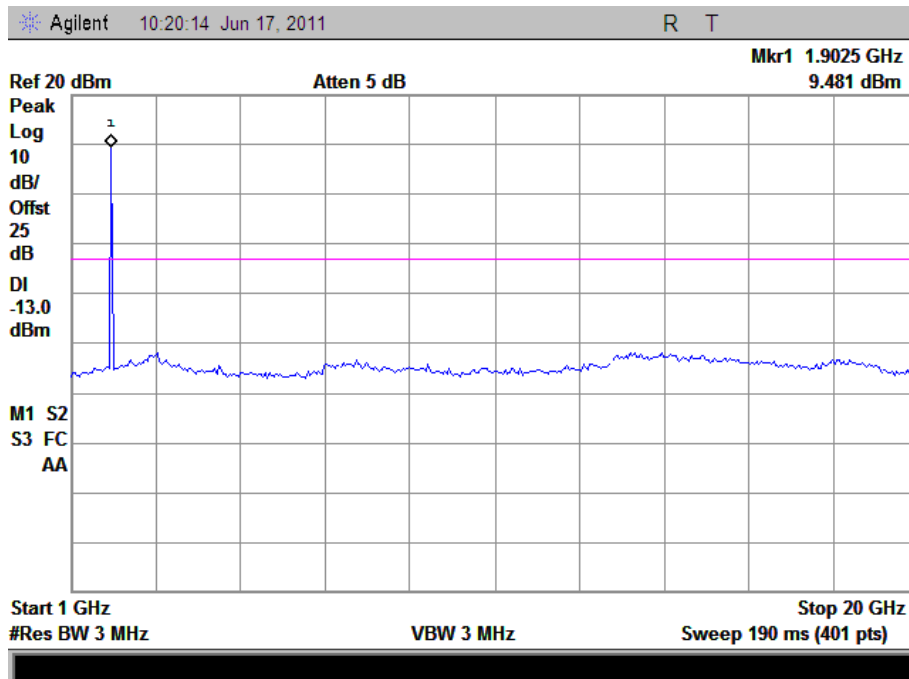
(Plot D: GSM 1900MHz Channel = 512, 30MHz to 1GHz)



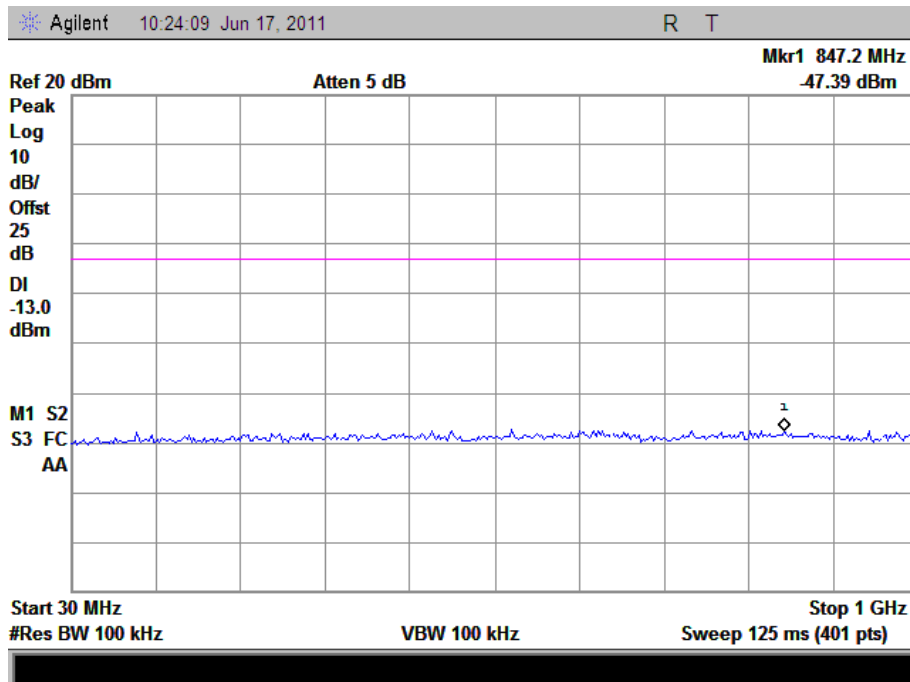
(Plot D: GSM 1900MHz Channel = 512, 1GHz to 20GHz)



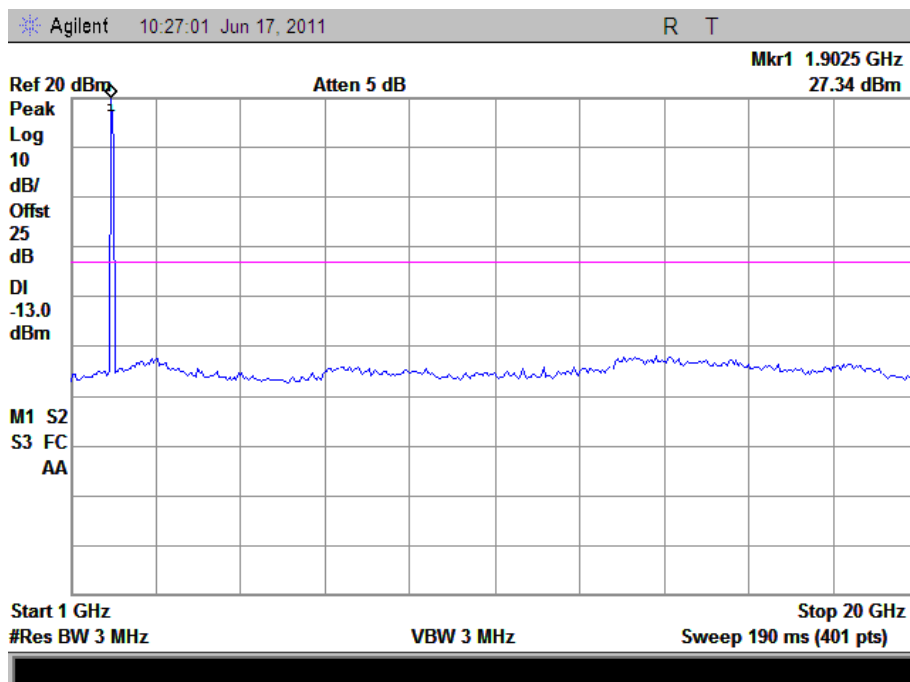
(Plot E: GSM 1900MHz Channel = 661, 30MHz to 1GHz)



(Plot E: GSM 1900MHz Channel = 661, 1GHz to 20GHz)



(Plot F: GSM 1900MHz Channel = 810, 30MHz to 1GHz)



(Plot F: GSM 1900MHz Channel = 810, 1GHz to 20GHz)

## 2.5 Band Edge

### 2.5.1 Requirement

According to FCC section 22.917(b) and FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

### 2.5.2 Test Description

See section 2.1.2 of this report.

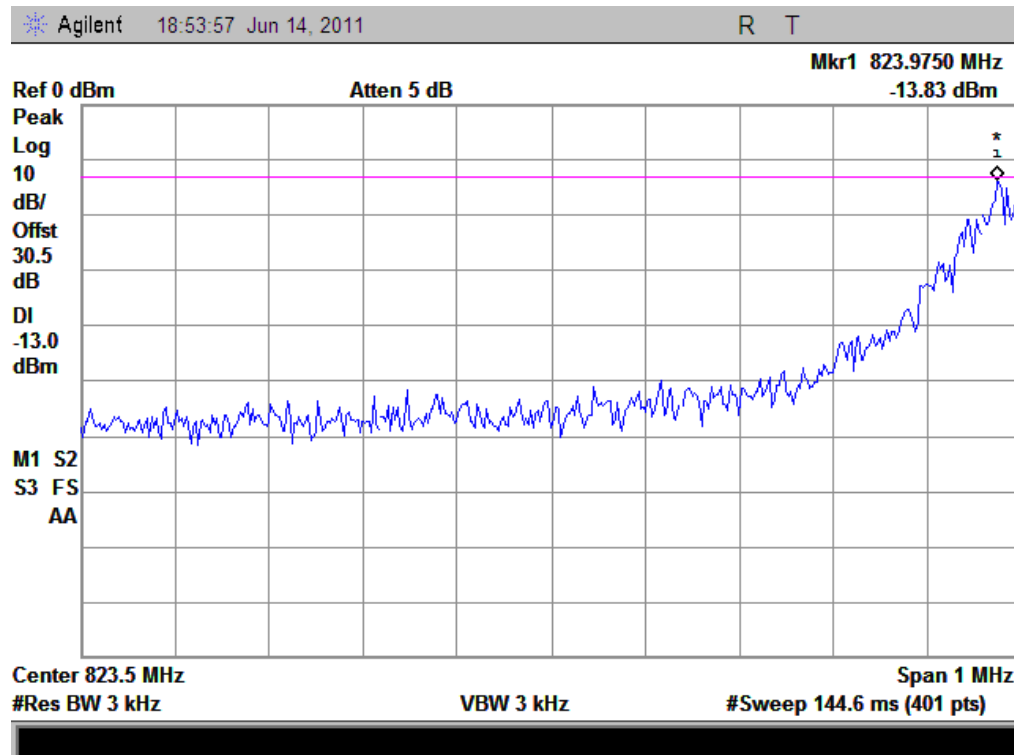
### 2.5.3 Test Result

The lowest and highest channels are tested to verify the band edge emissions.

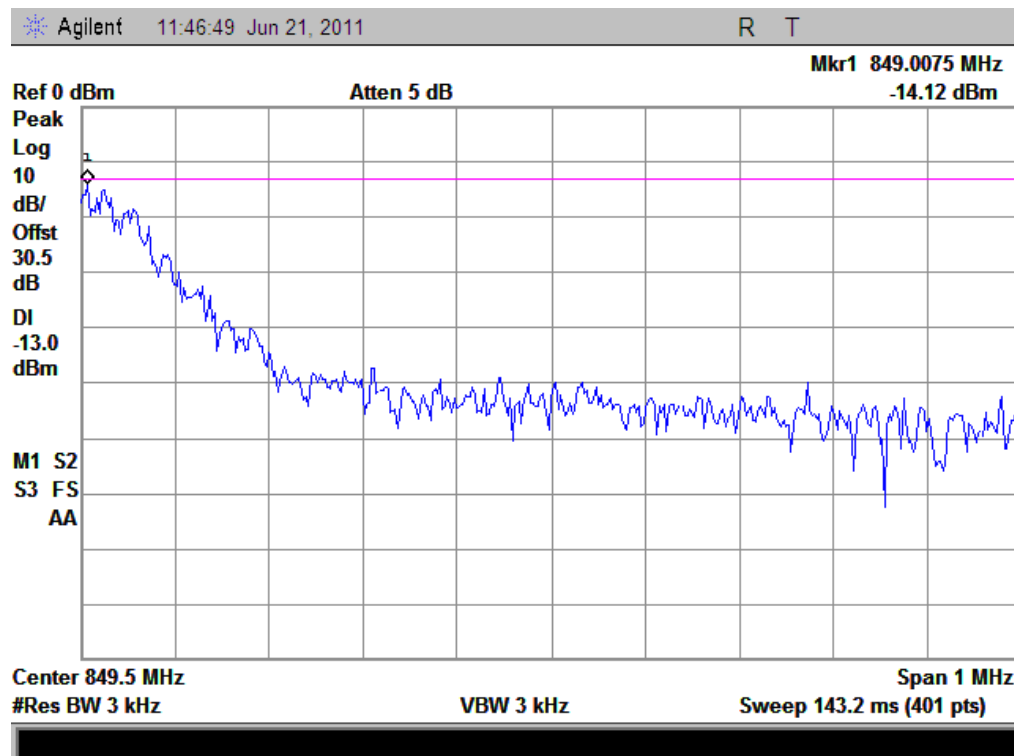
#### 1. Test Verdict:

| Band        | Channel | Frequency (MHz) | Measured Max. Band Edge Emission (dBm) | Refer to Plot | Limit (dBm) | Verdict |
|-------------|---------|-----------------|----------------------------------------|---------------|-------------|---------|
| GSM 850MHz  | 128     | 824.2           | -13.83                                 | Plot A        | -13         | PASS    |
|             | 251     | 848.8           | -14.12                                 | Plot B        |             | PASS    |
| GSM 1900MHz | 512     | 1850.2          | -16.69                                 | Plot C        | -13         | PASS    |
|             | 810     | 1909.8          | -17.67                                 | Plot D        |             | PASS    |

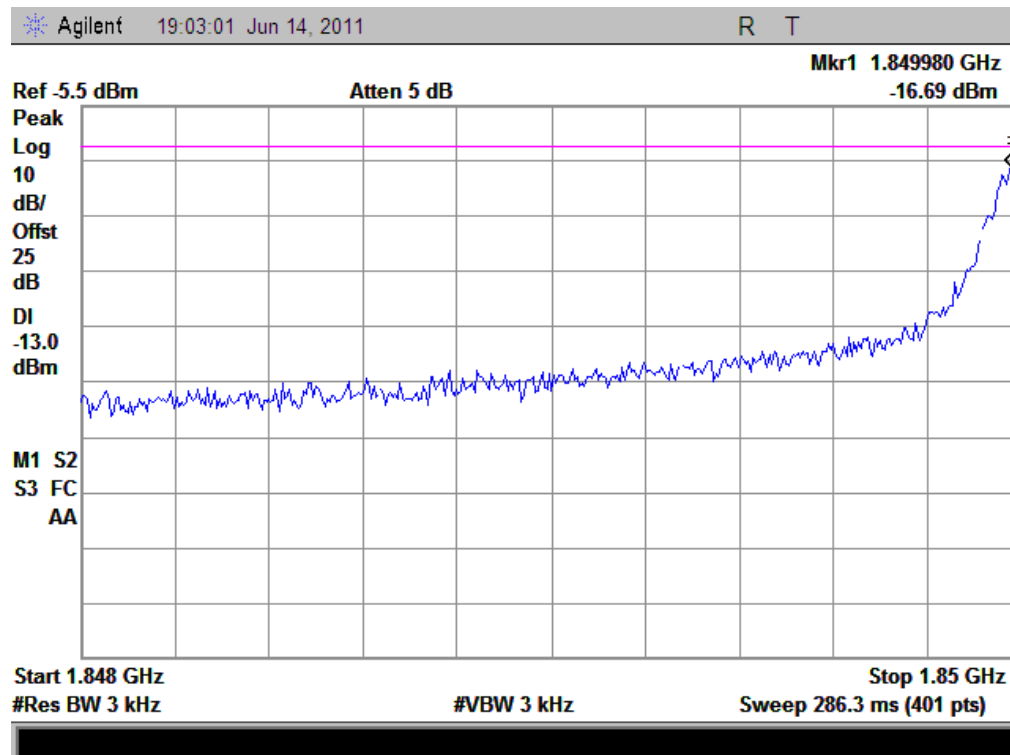
## 2. Test Plots:



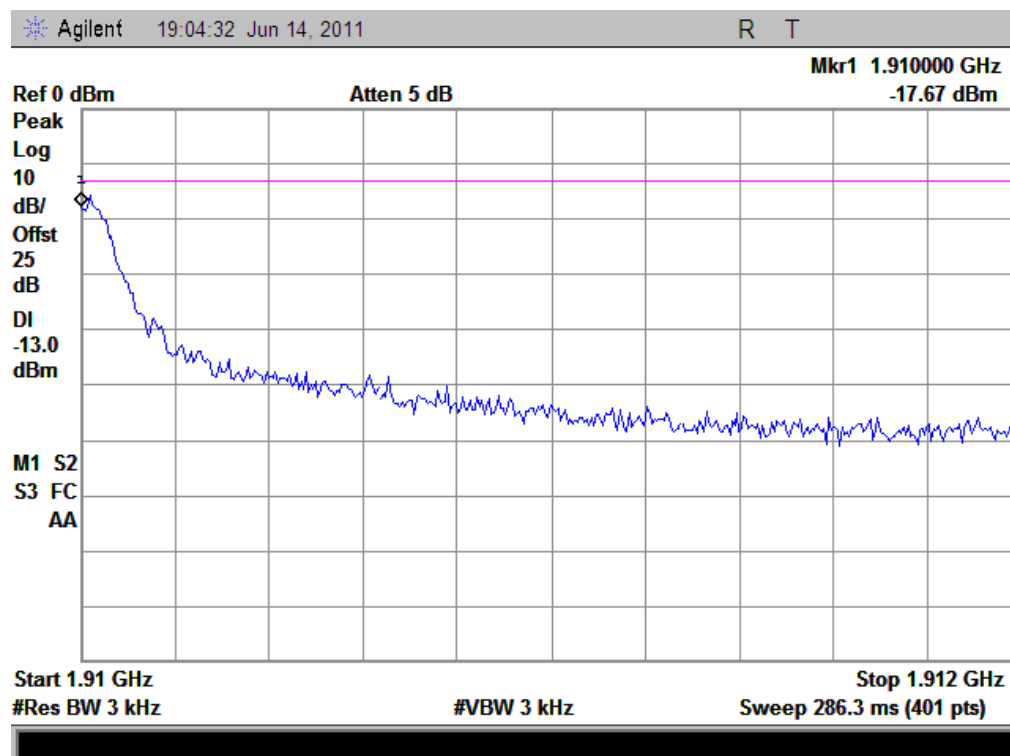
(Plot A: Channel = 128)



(Plot B: Channel = 251)



(Plot C: Channel = 512)



(Plot D: Channel = 810)

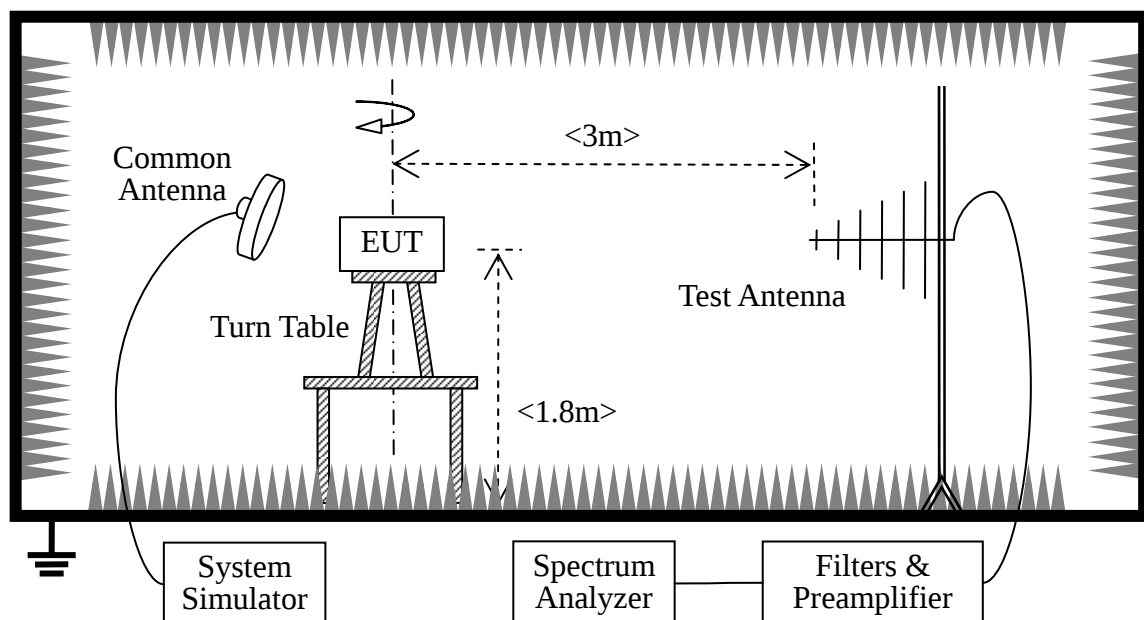
## 2.6 Transmitter Radiated Power (EIRP/ERP)

### 2.6.1 Requirement

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2Watts e.i.r.p. peak power.

### 2.6.2 Test Description

#### 1. Test Setup:



The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded.

-Maximum RF output power: GSM850 31.82dBm, GSM 1900 29.26dBm, Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

- Minimum RF power: GSM850 -4.2dBm, GSM 1900 -10.16dBm

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), and it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

## 2. Equipments List:

| Description           | Manufacturer | Model      | Serial No. | Cal. Date |
|-----------------------|--------------|------------|------------|-----------|
| System Simulator      | Agilent      | E5515C     | GB43130131 | 2011.05   |
| Spectrum Analyzer     | Agilent      | E7405A     | US44210471 | 2011.05   |
| Full-Anechoic Chamber | Albatross    | 9m*6m*6m   | (n.a.)     | 2011.05   |
| Test Antenna - Bi-Log | Schwarzbeck  | VULB 9163  | 9163-274   | 2011.05   |
| Test Antenna - Horn   | Schwarzbeck  | BBHA 9120C | 9120C-384  | 2011.05   |

### 2.6.3 Test Result

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested.

The substitution corrections are obtained as described below:

$$A_{\text{SUBST}} = P_{\text{SUBST\_TX}} - P_{\text{SUBST\_RX}} - L_{\text{SUBST\_CABLES}} + G_{\text{SUBST\_TX\_ANT}}$$

$$A_{\text{TOT}} = L_{\text{CABLES}} + A_{\text{SUBST}}$$

Where  $A_{\text{SUBST}}$  is the final substitution correction including receive antenna gain.

$P_{\text{SUBST\_TX}}$  is signal generator level,

$P_{\text{SUBST\_RX}}$  is receiver level,

$L_{\text{SUBST\_CABLES}}$  is cable losses including TX cable,

$G_{\text{SUBST\_TX\_ANT}}$  is substitution antenna gain.

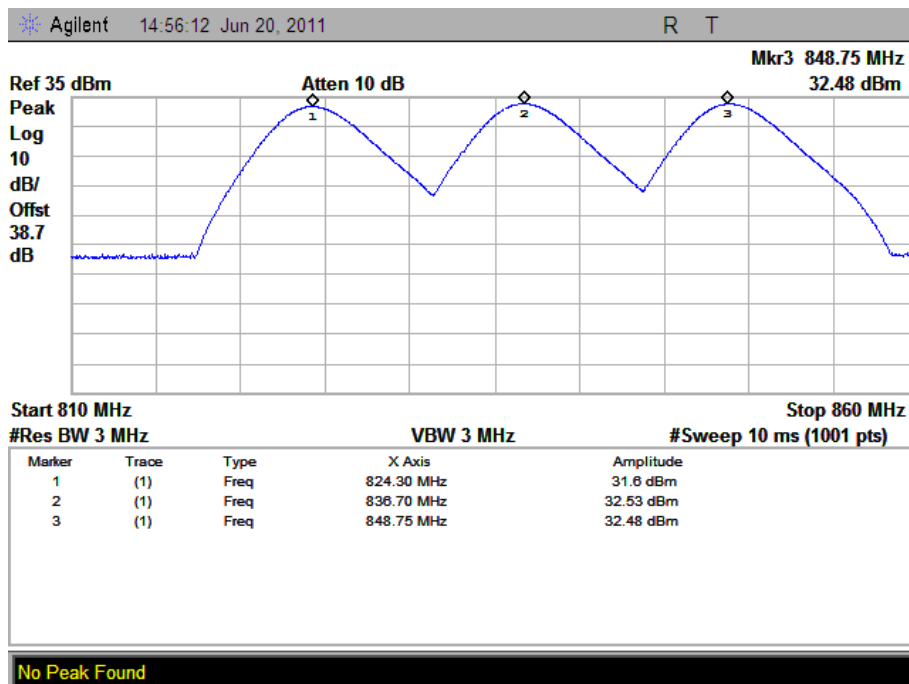
$A_{\text{TOT}}$  is total correction factor including cable loss and substitution correction

During the test, the data of  $A_{\text{TOT}}$  was added in the Test Spectrum Analyze, so Spectrum Analyze reading is the final values which contain the data of  $A_{\text{TOT}}$ .

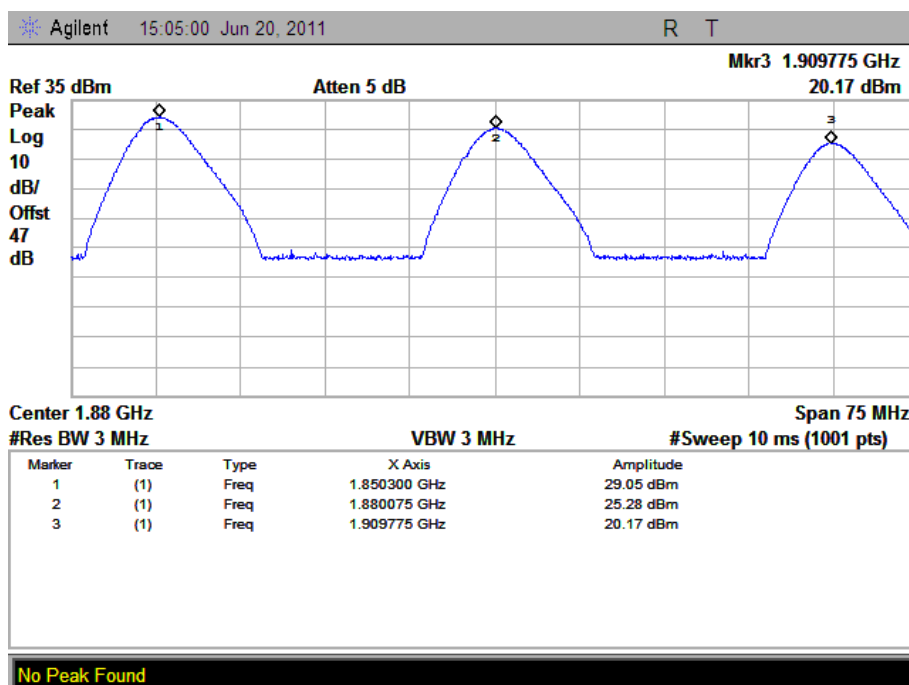
## 1. Test Verdict:

| Band            | Channel | Frequency (MHz) | PCL | Measured ERP/EIRP |      |                                  | Limit |   | Verdict |
|-----------------|---------|-----------------|-----|-------------------|------|----------------------------------|-------|---|---------|
|                 |         |                 |     | dBm               | W    | Refer to Plot                    | dBm   | W |         |
| GSM<br>850MHz   | 128     | 824.20          | 5   | 31.6              | 1.45 | Plot A                           | 38.45 | 7 | PASS    |
|                 | 190     | 836.60          | 5   | 32.53             | 1.79 |                                  |       |   | PASS    |
|                 | 251     | 848.80          | 5   | 32.48             | 1.77 |                                  |       |   | PASS    |
| GSM<br>1900MHz  | 512     | 1850.2          | 0   | 29.05             | 0.80 | Plot B                           | 33    | 2 | PASS    |
|                 | 661     | 1880.0          | 0   | 25.28             | 0.34 |                                  |       |   | PASS    |
|                 | 810     | 1909.8          | 0   | 20.17             | 0.10 |                                  |       |   | PASS    |
| GPRS<br>850MHz  | 128     | 824.20          | 5   | 25.25             | 0.33 | Plot C<br>1down link<br>4up link | 38.45 | 7 | PASS    |
|                 | 190     | 836.60          | 5   | 26.32             | 0.43 |                                  |       |   | PASS    |
|                 | 251     | 848.80          | 5   | 26.29             | 0.43 |                                  |       |   | PASS    |
| GPRS<br>1900MHz | 512     | 1850.2          | 0   | 23.73             | 0.24 | Plot D<br>1down link<br>4up link | 33    | 2 | PASS    |
|                 | 661     | 1880.0          | 0   | 20.77             | 0.12 |                                  |       |   | PASS    |
|                 | 810     | 1909.8          | 0   | 15.03             | 0.03 |                                  |       |   | PASS    |
| GPRS<br>850MHz  | 128     | 824.20          | 5   | 28.07             | 0.64 | Plot E<br>2down link<br>3up link | 38.45 | 7 | PASS    |
|                 | 190     | 836.60          | 5   | 29.05             | 0.80 |                                  |       |   | PASS    |
|                 | 251     | 848.80          | 5   | 28.98             | 0.79 |                                  |       |   | PASS    |
| GPRS<br>1900MHz | 512     | 1850.2          | 0   | 26.66             | 0.46 | Plot F<br>2down link<br>3up link | 33    | 2 | PASS    |
|                 | 661     | 1880.0          | 0   | 23.6              | 0.23 |                                  |       |   | PASS    |
|                 | 810     | 1909.8          | 0   | 17.89             | 0.06 |                                  |       |   | PASS    |
| GPRS<br>850MHz  | 128     | 824.20          | 5   | 29.89             | 0.97 | Plot G<br>3down link<br>2up link | 38.45 | 7 | PASS    |
|                 | 190     | 836.60          | 5   | 30.8              | 1.20 |                                  |       |   | PASS    |
|                 | 251     | 848.80          | 5   | 30.74             | 1.19 |                                  |       |   | PASS    |
| GPRS<br>1900MHz | 512     | 1850.2          | 0   | 28.01             | 0.63 | Plot H<br>3down link<br>2up link | 33    | 2 | PASS    |
|                 | 661     | 1880.0          | 0   | 24.94             | 0.31 |                                  |       |   | PASS    |
|                 | 810     | 1909.8          | 0   | 19.95             | 0.10 |                                  |       |   | PASS    |
| GPRS<br>850MHz  | 128     | 824.20          | 5   | 31.63             | 1.45 | Plot I<br>4down link<br>1up link | 38.45 | 7 | PASS    |
|                 | 190     | 836.60          | 5   | 32.48             | 1.77 |                                  |       |   | PASS    |
|                 | 251     | 848.80          | 5   | 32.24             | 1.67 |                                  |       |   | PASS    |
| GPRS<br>1900MHz | 512     | 1850.2          | 0   | 29.35             | 0.86 | Plot J<br>4down link<br>1up link | 33    | 2 | PASS    |
|                 | 661     | 1880.0          | 0   | 26.34             | 0.43 |                                  |       |   | PASS    |
|                 | 810     | 1909.8          | 0   | 20.39             | 0.11 |                                  |       |   | PASS    |

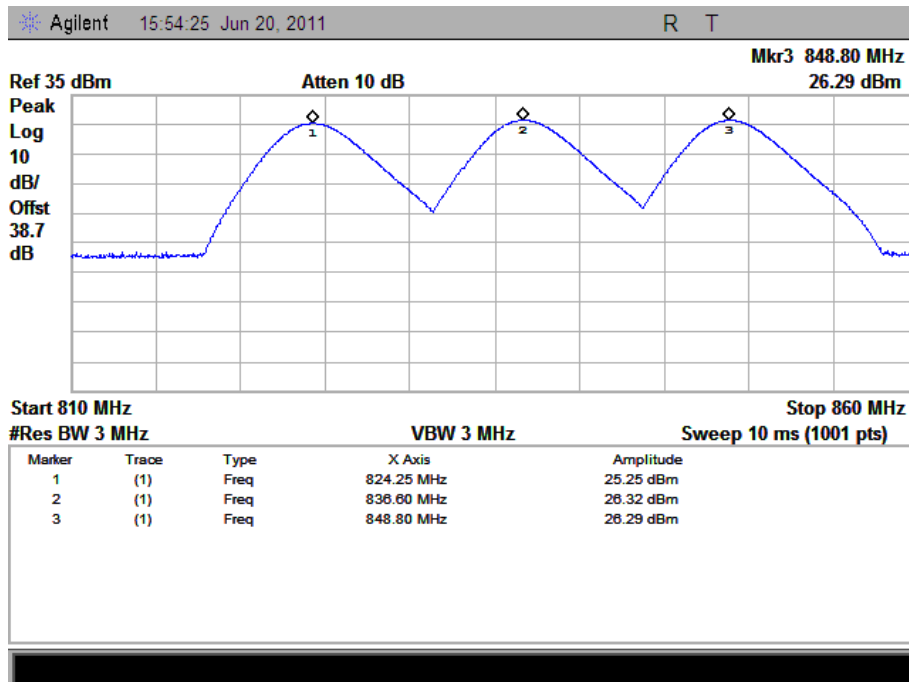
## 2. Test Plots:



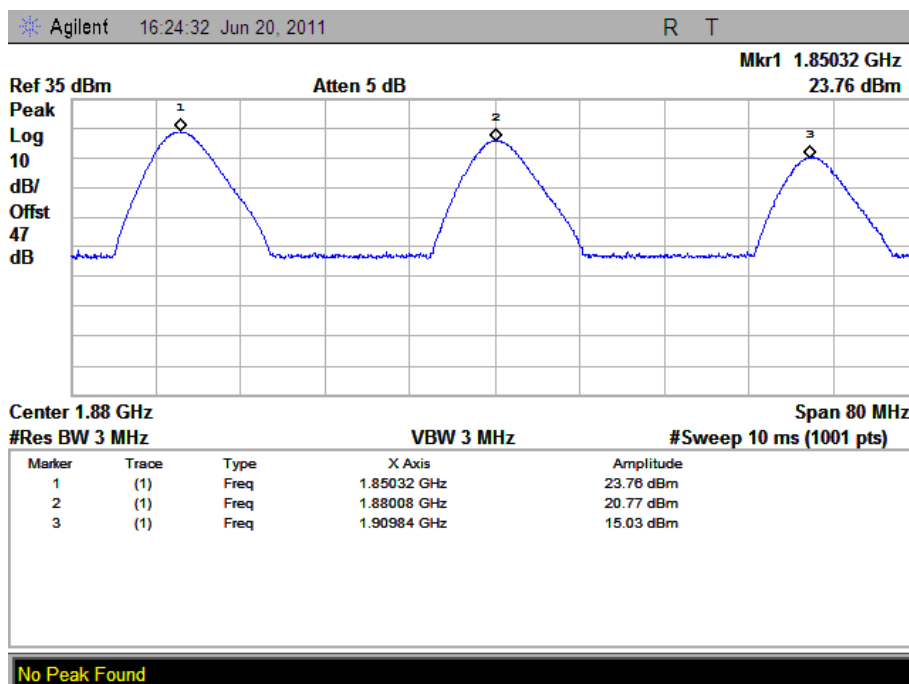
(Plot A: GSM 850MHz Channel = 128,190,251)



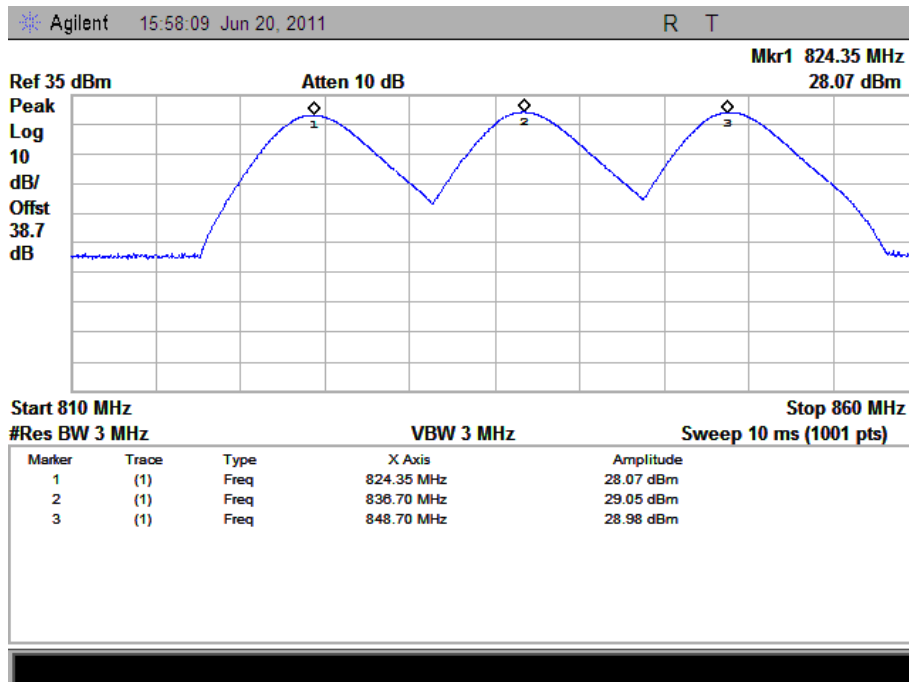
(Plot B: GSM 1900MHz Channel = 512, 661, 810)



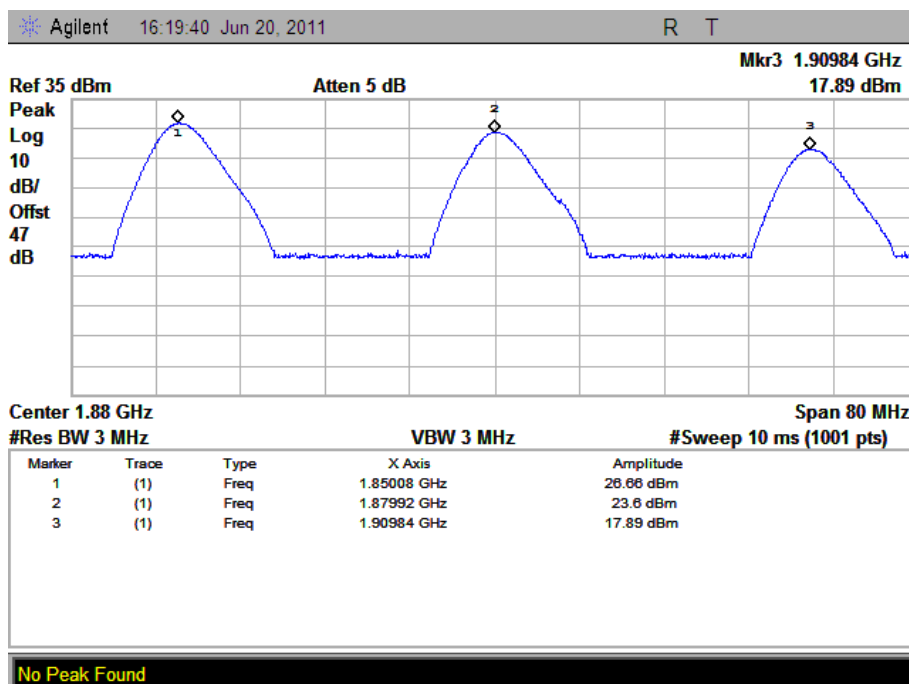
(Plot C: GPRS 850MHz Channel = 128,190,251-1down link 4up link)



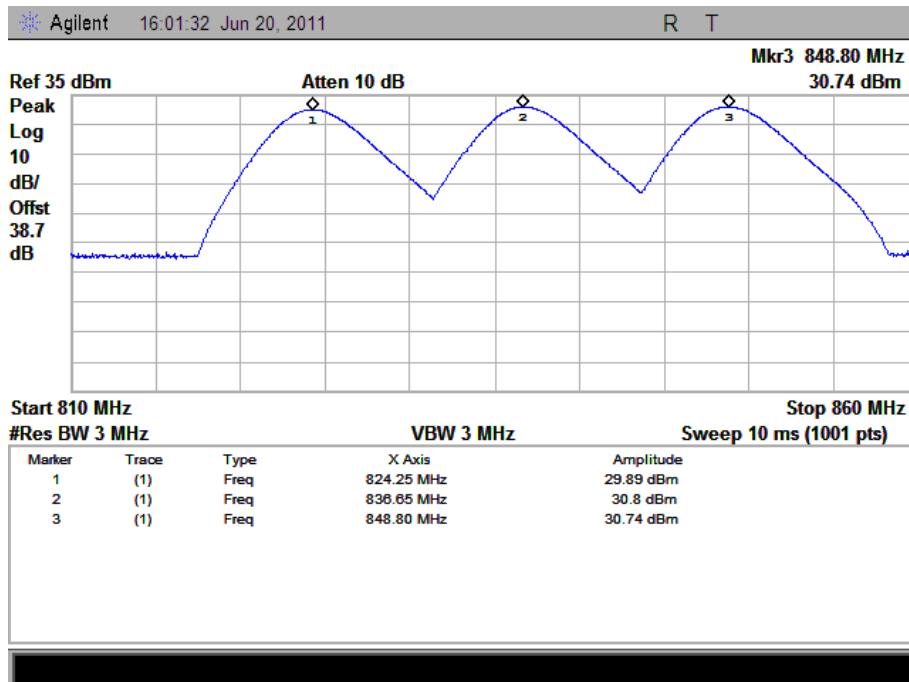
(Plot D: GPRS 1900MHz Channel = 512, 661, 810-1down link 4up link)



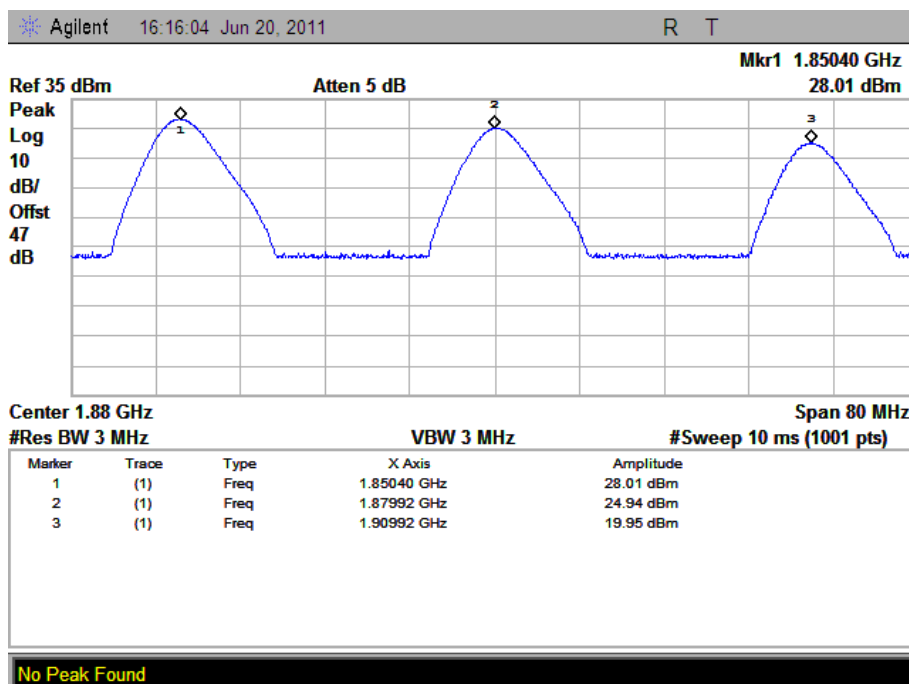
(Plot E: GPRS 850MHz Channel = 128,190,251-2down link 3up link)



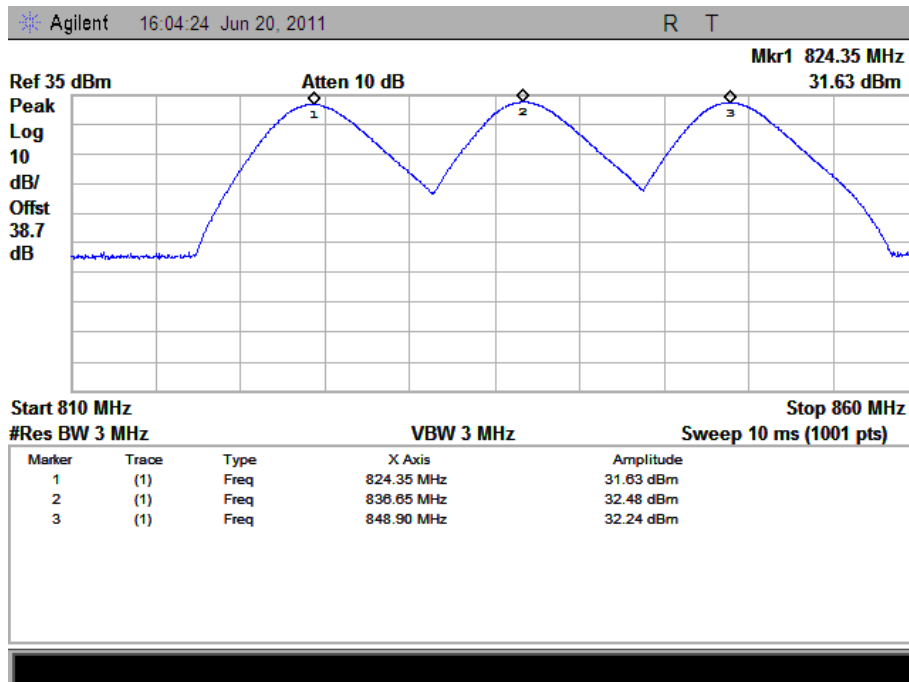
(Plot F: GPRS 850MHz Channel = 512,661,810-2down link 3up link)



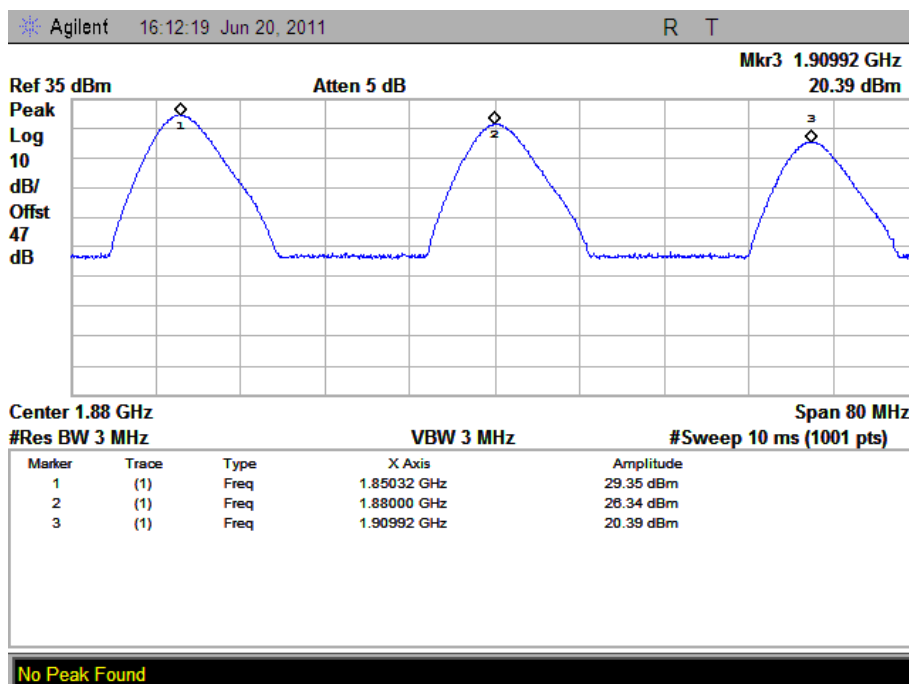
(Plot G: GPRS 850MHz Channel = 128,190,251-3down link 2up link)



(Plot H: GPRS 1900MHz Channel = 521,661,810-3down link 2up link)



(Plot I: GPRS 850MHz Channel = 128,190,251-4down link 1up link)



(Plot J: GPRS 1900MHz Channel = 512,661,810-4down link 1up link)

## 2.7 Radiated Out of Band Emissions

### 2.7.1 Requirement

According to FCC section 22.917(a) and section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43+10*\log(P)$ dB. This calculated to be -13dBm.

### 2.7.2 Test Description

See section 2.6.2 of this report.

Note: when doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

### 2.7.3 Test Result

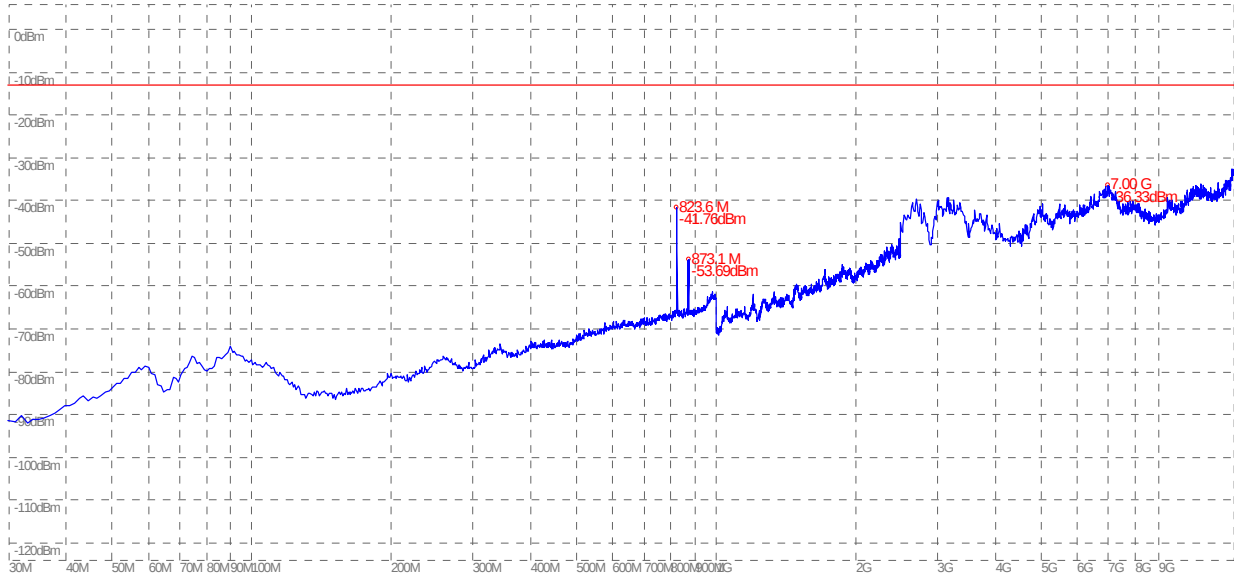
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

#### 1. Test Verdict:

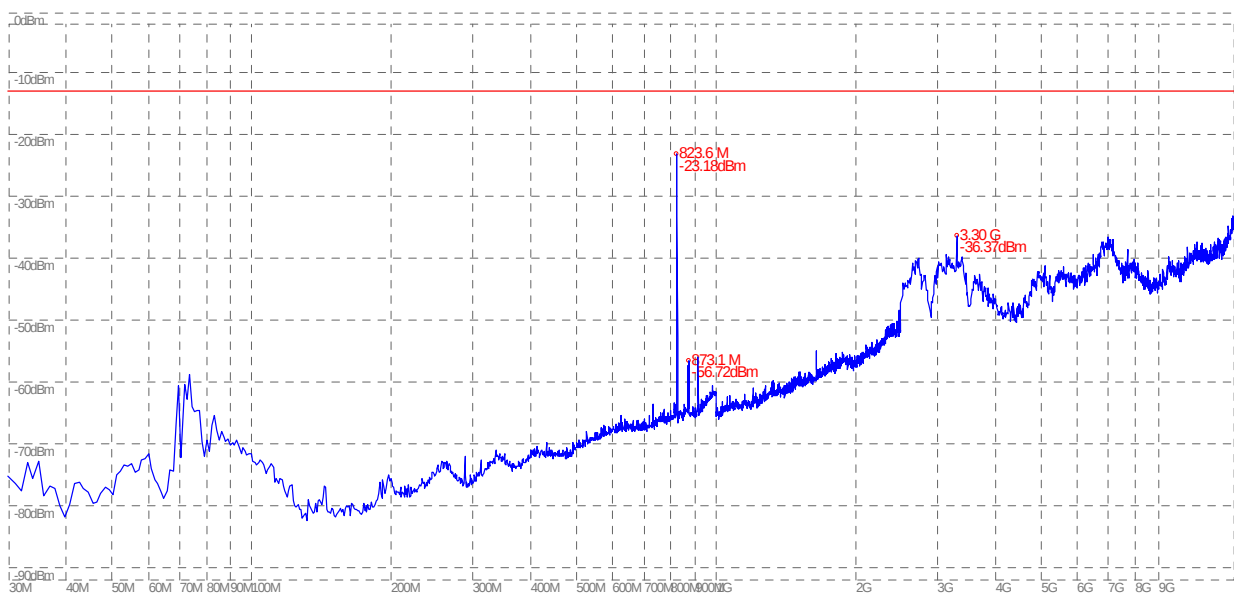
| Band        | Channel | Frequency (MHz) | Measured Max. Spurious Emission (dBm) |                       | Refer to Plot | Limit (dBm) | Verdict |
|-------------|---------|-----------------|---------------------------------------|-----------------------|---------------|-------------|---------|
|             |         |                 | Test Antenna Horizontal               | Test Antenna Vertical |               |             |         |
| GSM 850MHz  | 128     | 824.2           | -36.33                                | -36.37                | Plot A.1/A.2  | -13         | PASS    |
|             | 190     | 836.6           | -35.97                                | -48.03                | Plot B.1/B.2  |             | PASS    |
|             | 251     | 848.8           | -35.98                                | -35.69                | Plot C.1/C.2  |             | PASS    |
| GSM 1900MHz | 512     | 1850.2          | 22.21                                 | -17.49                | Plot D.1/D.2  | -13         | PASS    |
|             | 661     | 1880.0          | -20.23                                | -16.64                | Plot E.1/E.2  |             | PASS    |
|             | 810     | 1909.8          | -20.42                                | -14.29                | Plot F.1/F.2  |             | PASS    |

## 2. Test Plots for the Whole Measurement Frequency Range:

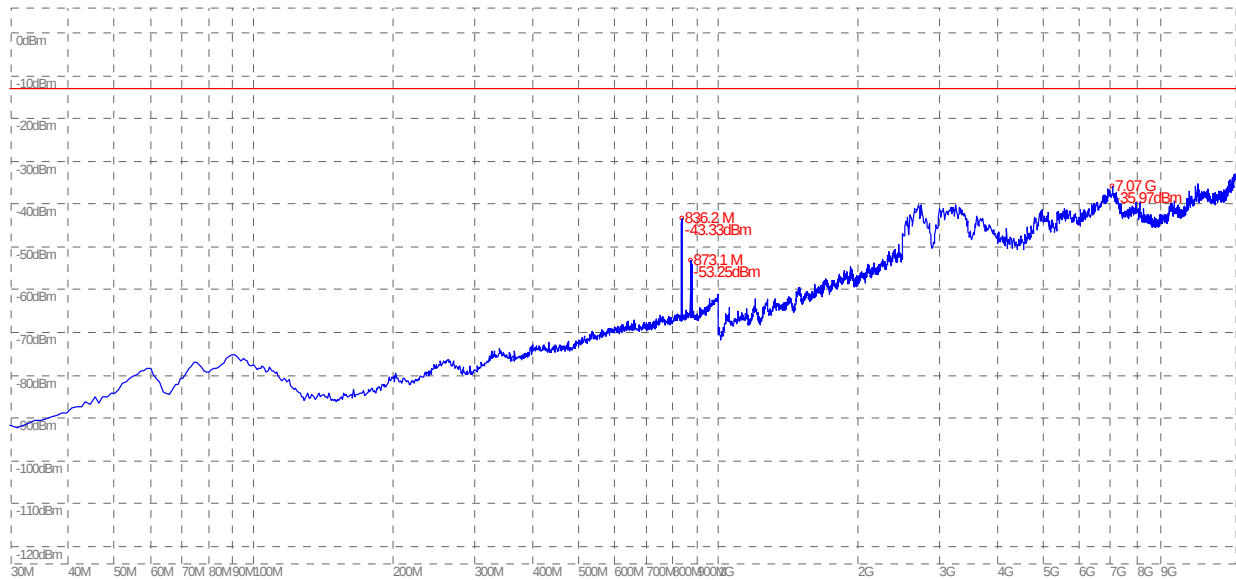
Note: the power of the EUT transmitting frequency should be ignored.



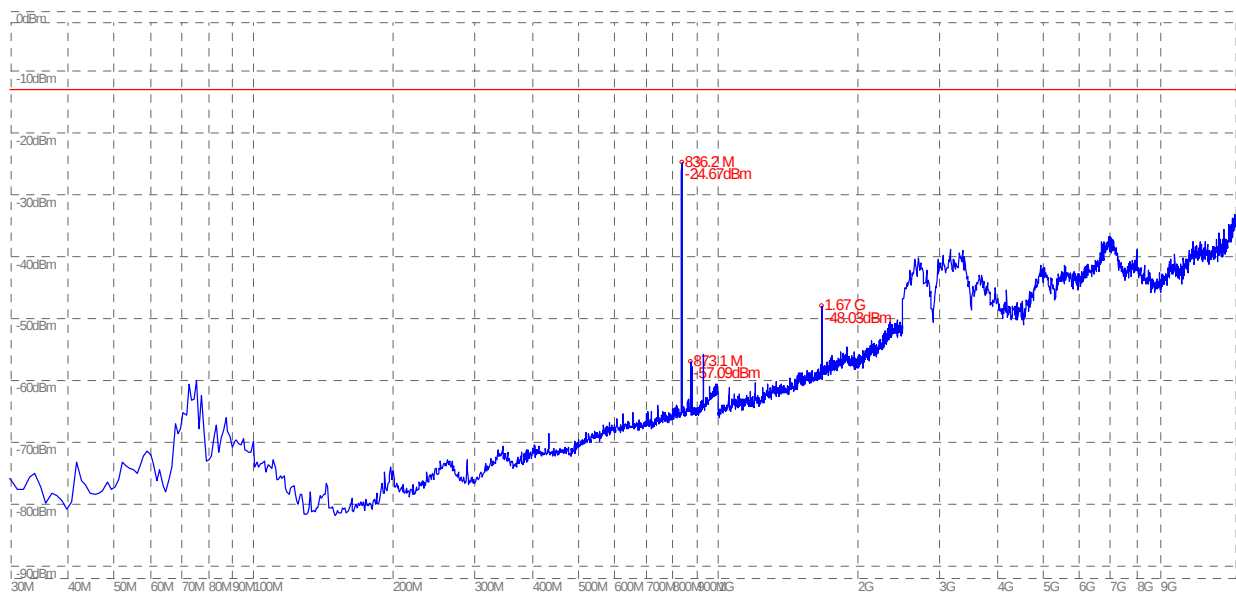
(Plot A.1: GSM 850MHz Channel = 128, Test Antenna Horizontal)



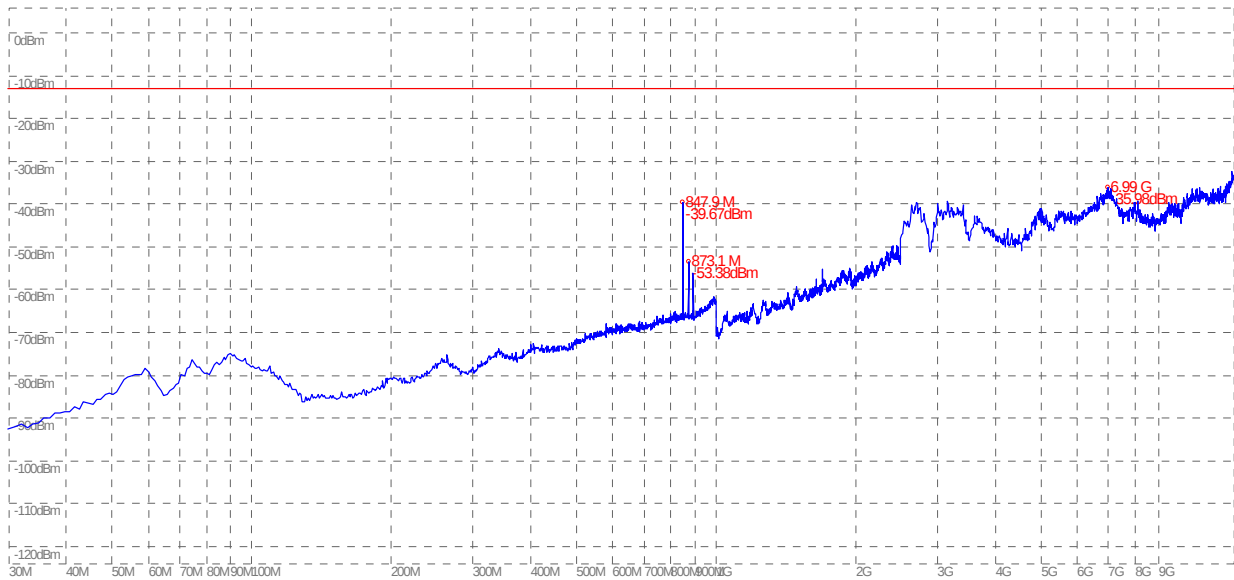
(Plot A.2: GSM 850MHz Channel = 128, Test Antenna Vertical)



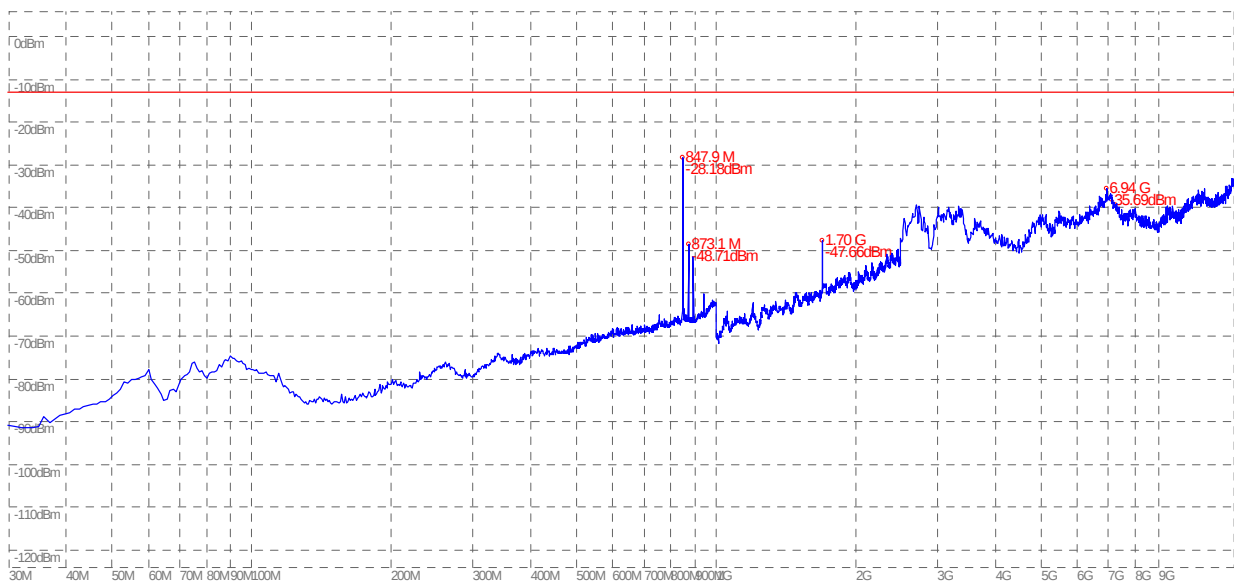
(Plot B.1: GSM 850MHz Channel = 190, Test Antenna Horizontal)



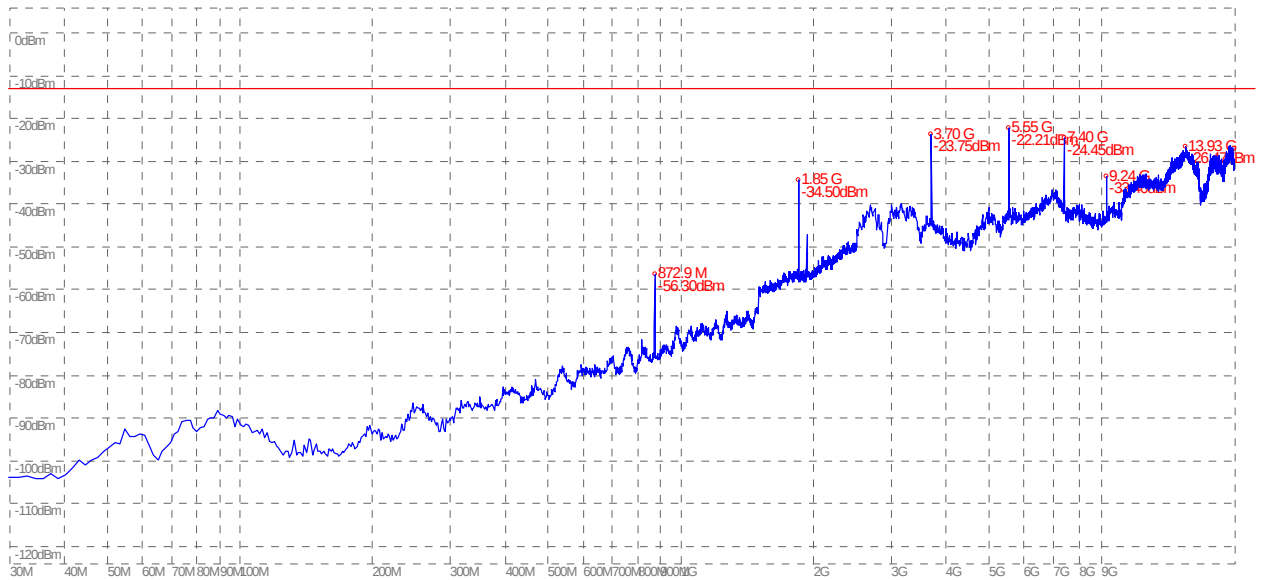
(Plot B.2: GSM 850MHz Channel = 190, Test Antenna Vertical)



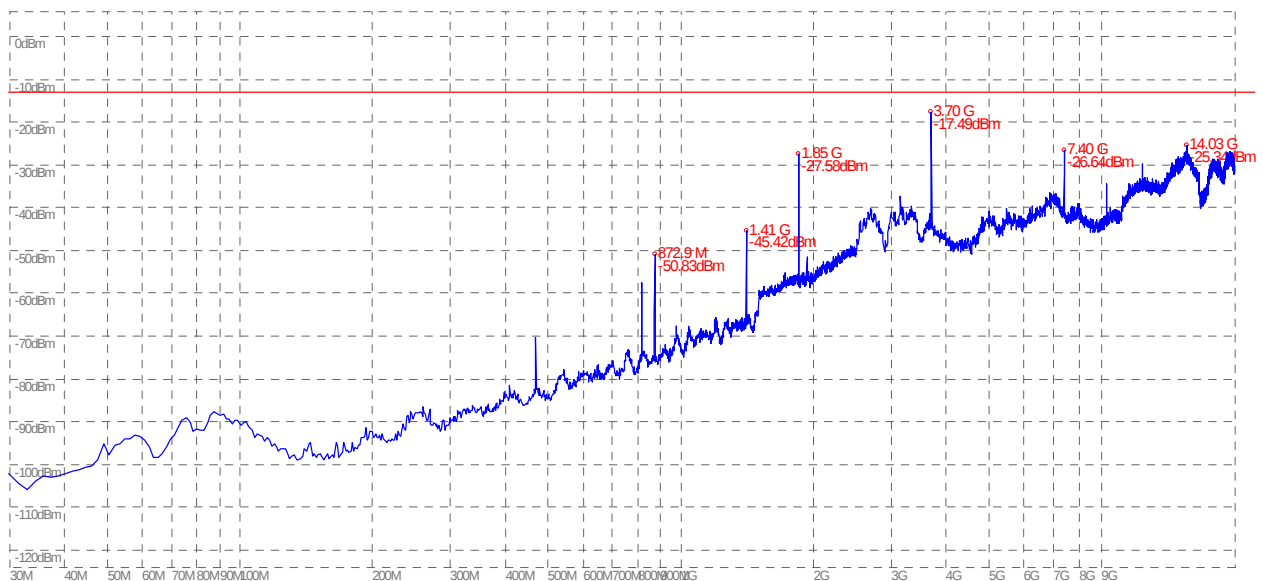
(Plot C.1: GSM 850MHz Channel = 251, Test Antenna Horizontal)



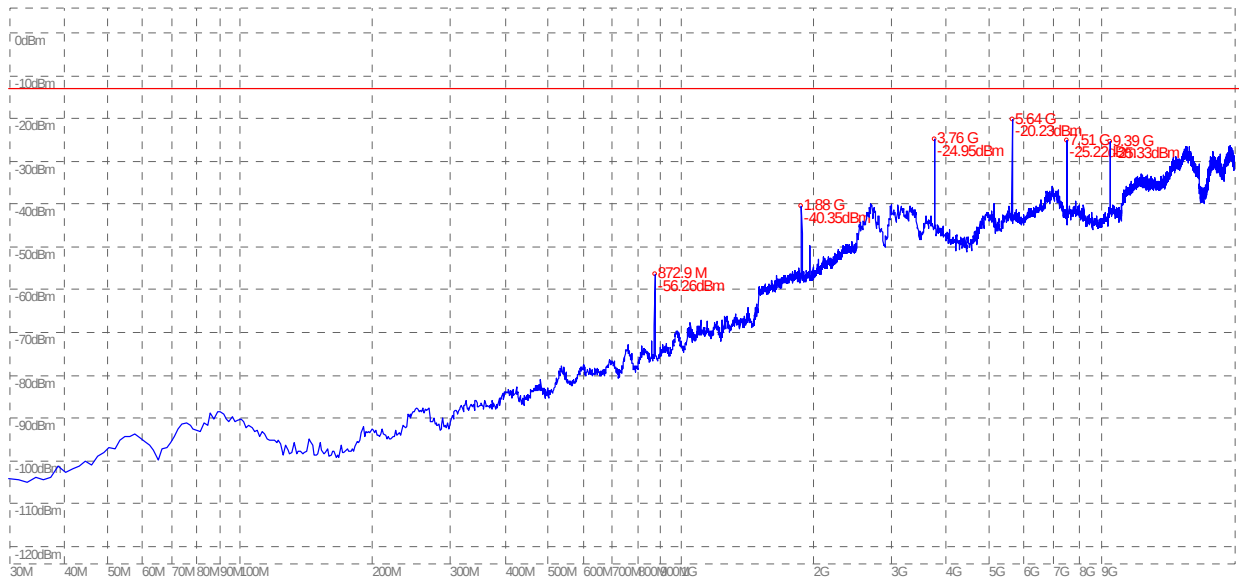
(Plot C.2: GSM 850MHz Channel = 251, Test Antenna Vertical)



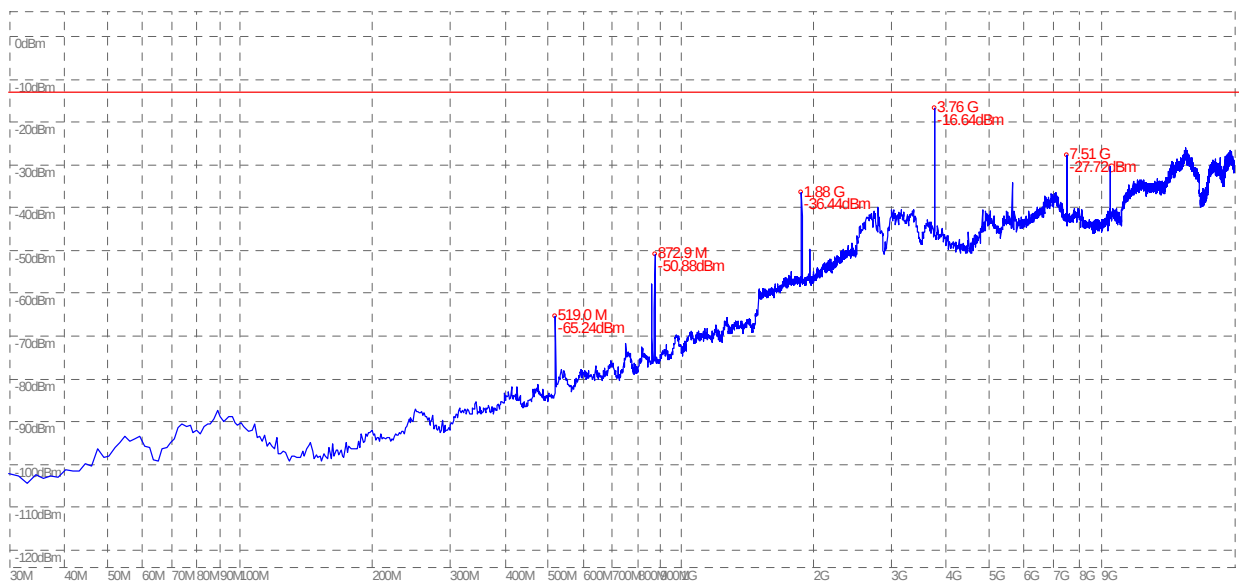
(Plot D.1: GSM 1900MHz Channel = 512, Test Antenna Horizontal)



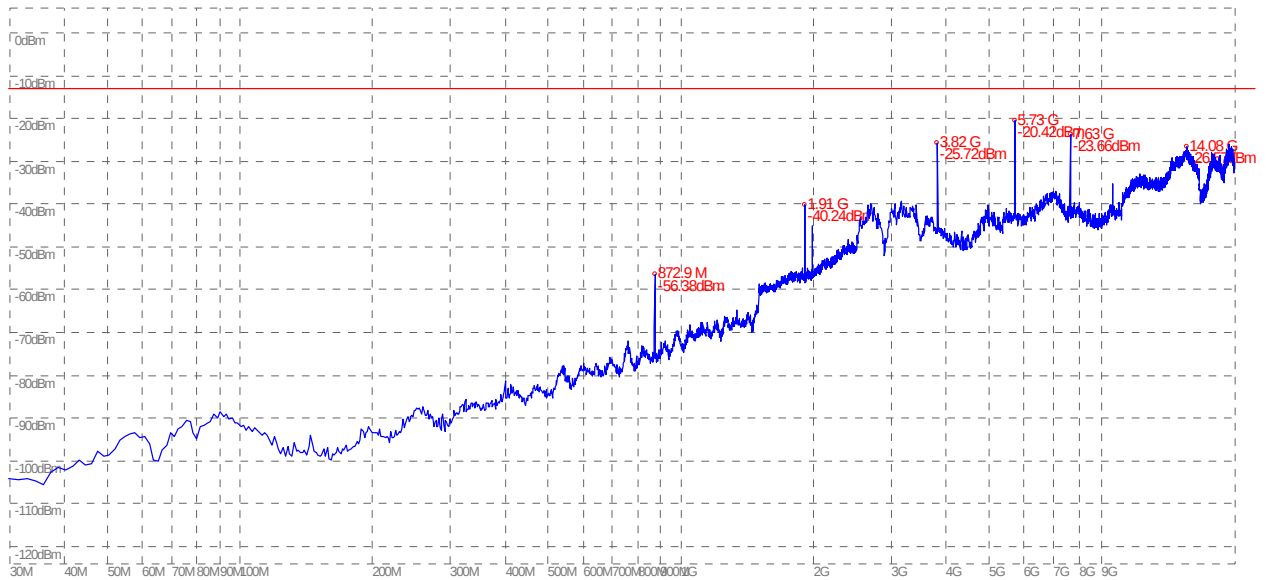
(Plot D.2: GSM 1900MHz Channel = 512, Test Antenna Vertical)



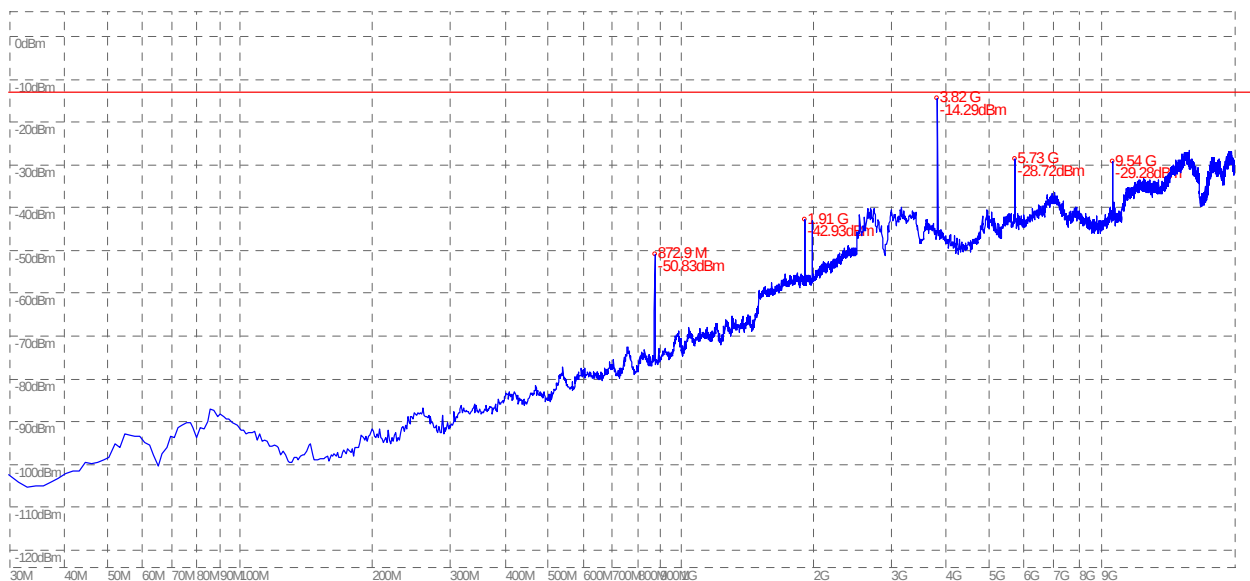
(Plot E.1: GSM 1900MHz Channel = 661, Test Antenna Horizontal)



(Plot E.2: GSM 1900MHz Channel = 661, Test Antenna Vertical)



(Plot F.1: GSM 1900MHz Channel = 810, Test Antenna Horizontal)



(Plot F.2: GSM 1900MHz Channel = 810, Test Antenna Vertical)

**\*\* END OF REPORT \*\***