Report No.: SZ13030028W04

TESTING
CNAS L3572

# FCC TEST REPORT

*Issued to*

**Corporativo Lanix S.A. de C.V.**

*For*

**GSM Phone**

| | |
|---|---|
| Model Name: | LX7 |
| Trade Name: | Lanix |
| Brand Name: | N/A |
| FCC ID : | ZC4LX7 |
| Standard: | 47 CFR Part 22 Subpart H |
| | 47 CFR Part 24 Subpart E |
| Test date: | 2013-3-5to 2013-3-25 |
| Issue date: | 2013-3-26 |

*By*

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

Products Quality Certification Services Certification MORLAB Certification GSM, System Certification

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*Date* 2013.3.26

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*Date* 2013.3.26

CTIA Authorized Test Lab LAB CODE 200813-0 IEEE 1725 OTA | OFTA 電訊管理局 | ilac-MRA | TAF Testing Laboratory | GCF Official Observer of Global Certification Forum | Bluetooth BQTF | FCC Reg. No. 695796

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| Change History | | |
|---|---|---|
| Issue | Date | Reason for change |
| 1.0 | Mar 26, 2013 | First edition |
| | | |

# 1. GENERAL INFORMATION

## 1.1 EUT Description

| | |
|---|---|
| EUT Type ..... : | GSM Phone |
| Serial No. ..... : | (n.a, marked #1 by test site) |
| Hardware Version ..... : | V1.0 |
| Software Version ..... : | N/A |
| Applicant ..... : | Corporativo Lanix S.A. de C.V.<br>Carretera Internacional Hermosillo-Nogales Km 8.5,Hermosillo Sonora, Mexico |
| Manufacturer ..... : | Shenzhen Tinno Mobile Technology Corp.<br>4/F, H-3 Building, OCT Eastern industrial Park, No.1 XiangShan East Road.,Nan Shan District, Shenzhen, P.R. China. |
| Frequency Range ..... : | GSM 850MHz:<br>Tx: 824.20 - 848.80MHz (at intervals of 200kHz);<br>Rx: 869.20 - 893.80MHz (at intervals of 200kHz)<br>GSM 1900MHz:<br>Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz);<br>Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz) |
| Modulation Type..... : | GSM/GPRS Mode with GMSK Modulation |
| Multislot Class..... : | GPRS: Multislot Class12, |
| Antenna Type..... : | PIFA Antenna |
| Emission Designators ..... : | GSM850:247KGXW,GSM1900: 249KGXW |

*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<=n<=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<=n<=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:* 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 (10-1-09 Edition) | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2 | 47 CFR Part 22 (10-1-09 Edition) | Public Mobile Services |
| 3 | 47 CFR Part 24 (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. | 24.232(d), | Peak to average radio | PASS |
| 2 | 2.1049,22.917 24.238, | 99% Occupied Bandwidth | PASS |
| 3 | 2.1055,22.355 24.235, | Frequency Stability | PASS |
| 4 | 2.1051,2.1057 22.917,24.238 | Conducted Out of Band Emissions | PASS |
| 5 | 2.1051,2.1057 22.917,24.238 | Band Edge | PASS |
| 6 | 22.913,24.232 | Transmitter Radiated Power (EIPR/ERP) | PASS |
| 7 | 2.1053,2.1057 22.917,24.238 | Radiated Out of Band Emissions | PASS |

NOTE：Measurement method according to TIA/EIA 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 FL.1, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District, ShenZhen, GuangDong Province,P. R. China 518101. 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 695796.

### 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 REQUIREMENTS

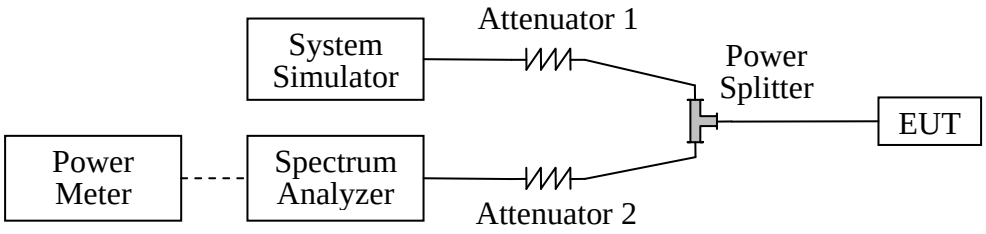
## 2.1 Conducted RF Output Power

### 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.

The Power Meter was just used for the Conducted RF Output Power test of WCDMA Model.

2. Equipments List:

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| System Simulator | Agilent | E5515C | GB43130131 | 2012.05 | 2013.05 |
| Spectrum Analyzer | Agilent | E7405A | US44210471 | 2012.05 | 2013.05 |
| Power Meter | Agilent | E4418B | GB43318055 | 2012.05 | 2013.05 |
| Power Sensor | Agilent | 8482A | MY41091706 | 2012.05 | 2013.05 |
| Power Splitter | Weinschel | 1506A | NW521 | 2012.05 | 2013.05 |
| Attenuator 1 | Resnet | 20dB | (n.a.) | 2012.05 | 2013.05 |
| Attenuator 2 | Resnet | 3dB | (n.a.) | 2012.05 | 2013.05 |

### 2.1.3 Test Results

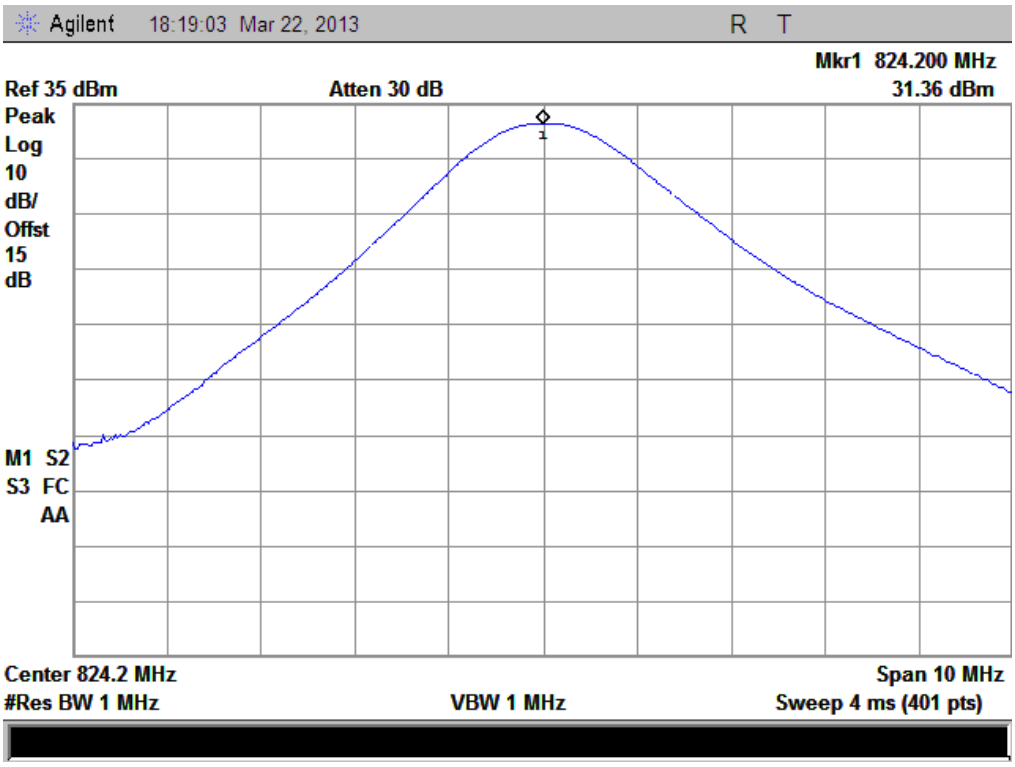
Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

1. GSM Model Test Verdict:

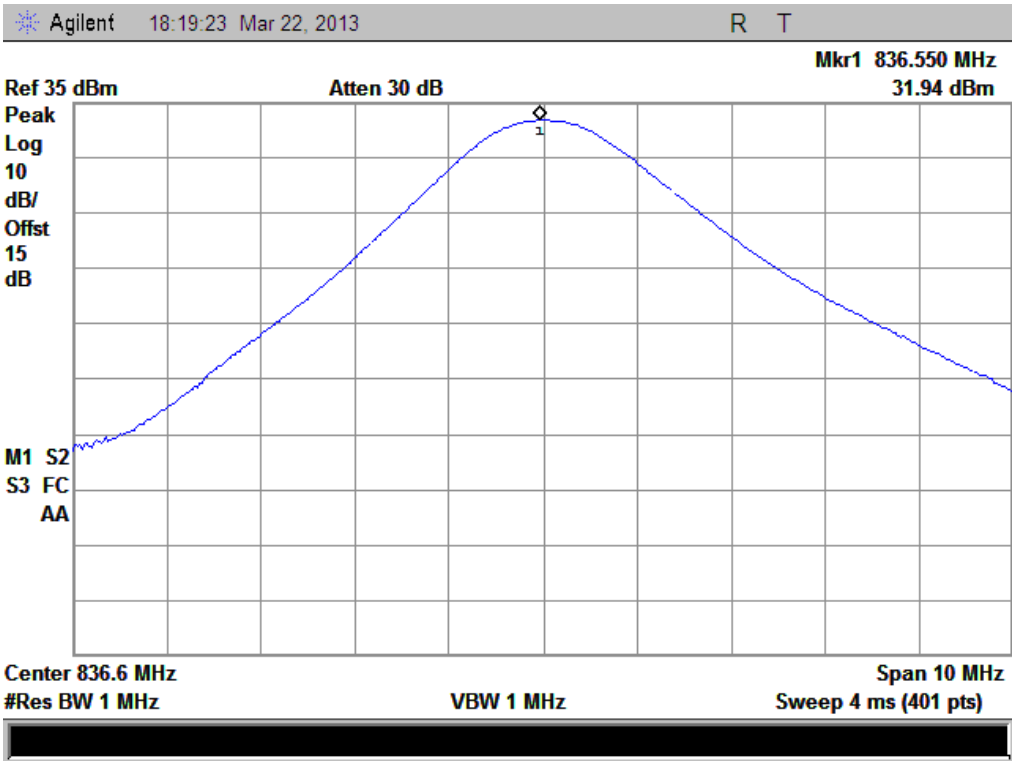
| Band | Channel | Frequency (MHz) | Measured Output Power | | Limit | Verdict |
|---|---|---|---|---|---|---|
| | | | dBm | Refer to Plot | dBm | |
| GSM 850MHz | 128 | 824.2 | 31.36 | Plot A1 to A3 | 35 | PASS |
| | 190 | 836.6 | 31.94 | | | PASS |
| | 251 | 848.8 | 31.28 | | | PASS |
| GSM 1900MHz | 512 | 1850.2 | 30.29 | Plot B1 to B3 | 32 | PASS |
| | 661 | 1880.0 | 31.83 | | | PASS |
| | 810 | 1909.8 | 30.25 | | | PASS |
| GPRS 850MHz | 128 | 824.2 | 31.35 | Plot C1 to C3 Note 1 | 35 | PASS |
| | 190 | 836.6 | 31.72 | | | PASS |
| | 251 | 848.8 | 31.19 | | | PASS |
| GPRS 1900MHz | 512 | 1850.2 | 30.25 | Plot D1 to D3 Note 1 | 32 | PASS |
| | 661 | 1880.0 | 31.68 | | | PASS |
| | 810 | 1909.8 | 30.06 | | | PASS |

Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.

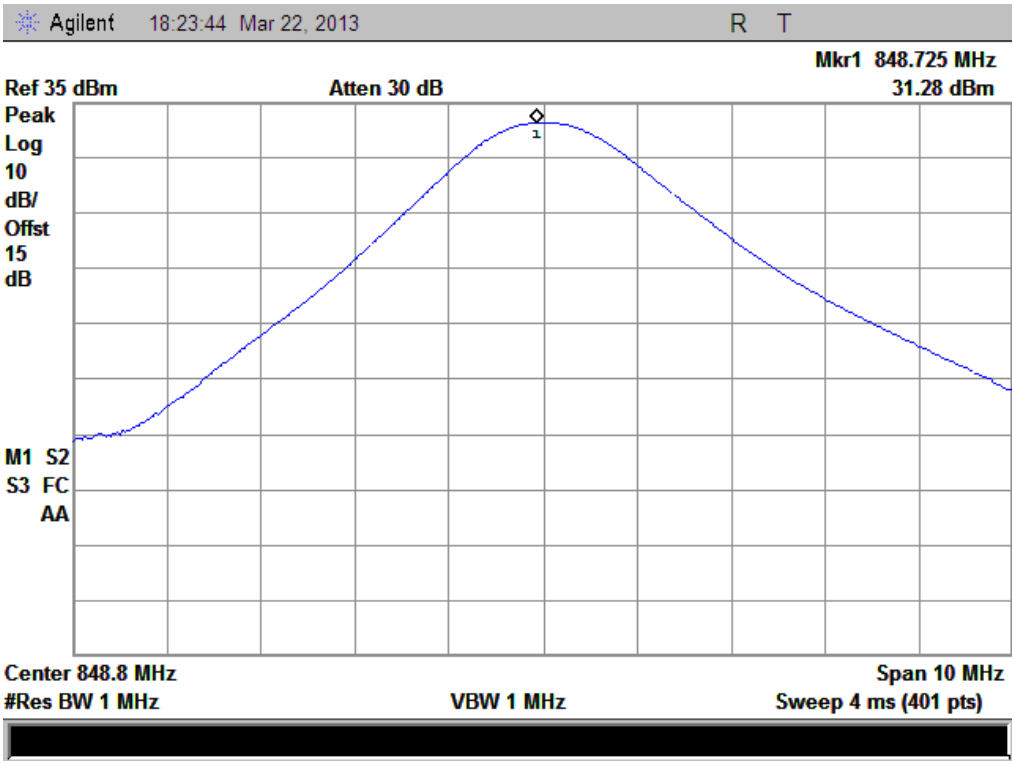
2. GSM Model Test Plots:



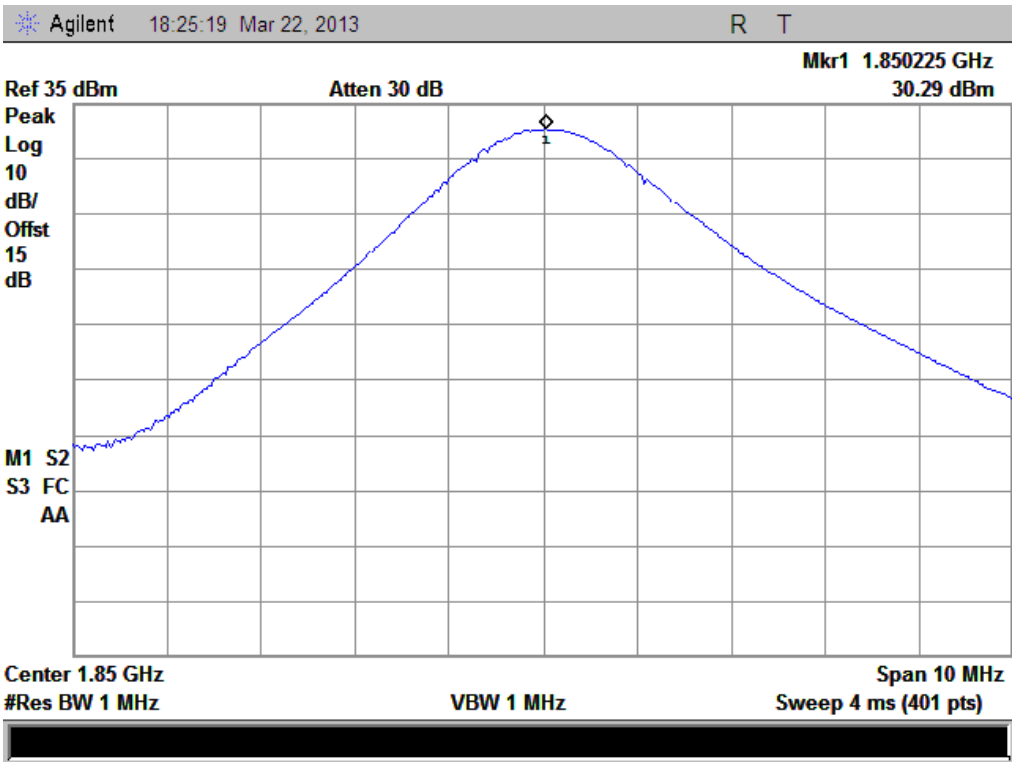

(Plot A1: GSM 850MHz Channel = 128)



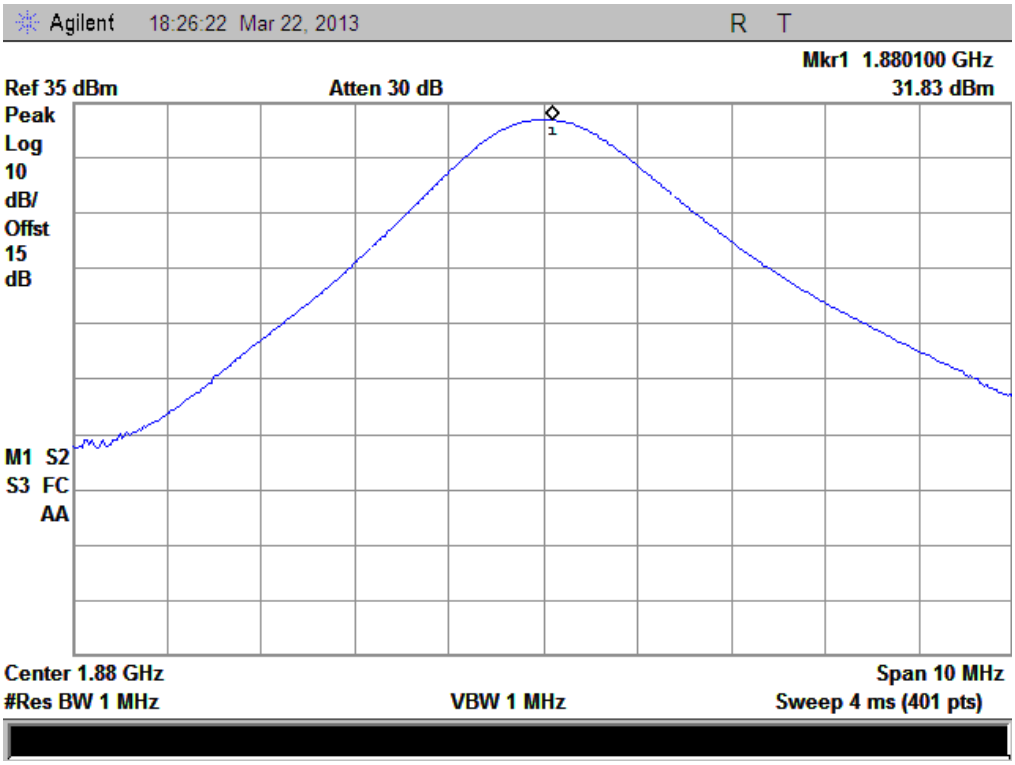

(Plot A2: GSM 850MHz Channel = 190)



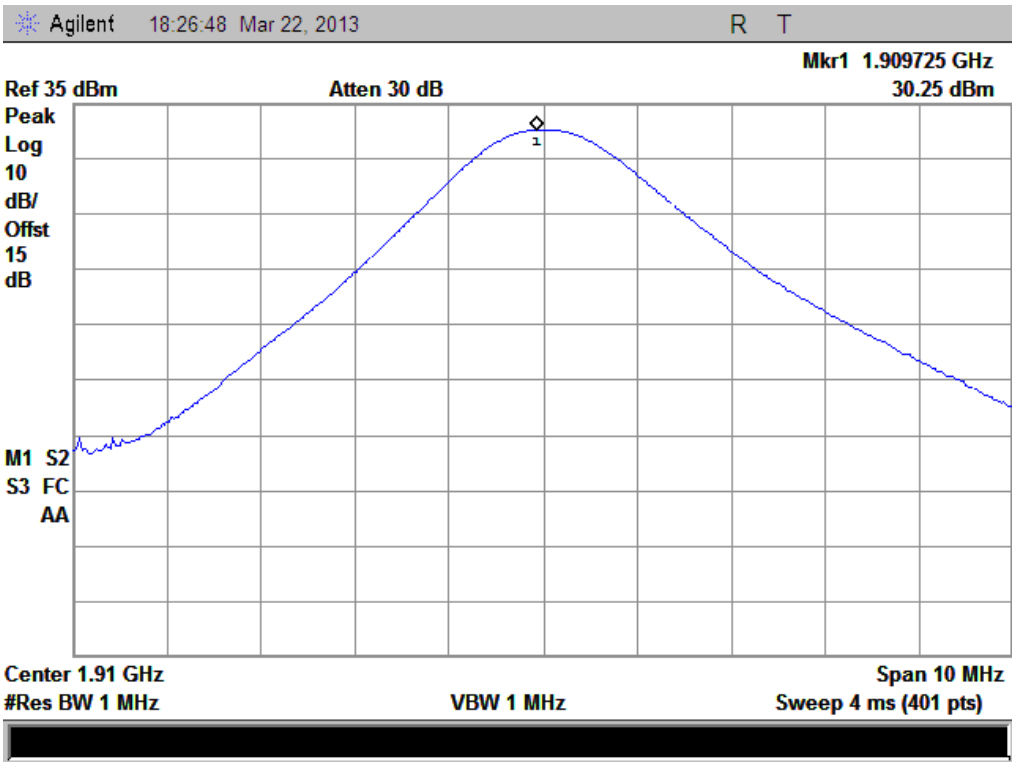

(Plot A3: GSM 850MHz Channel = 251)



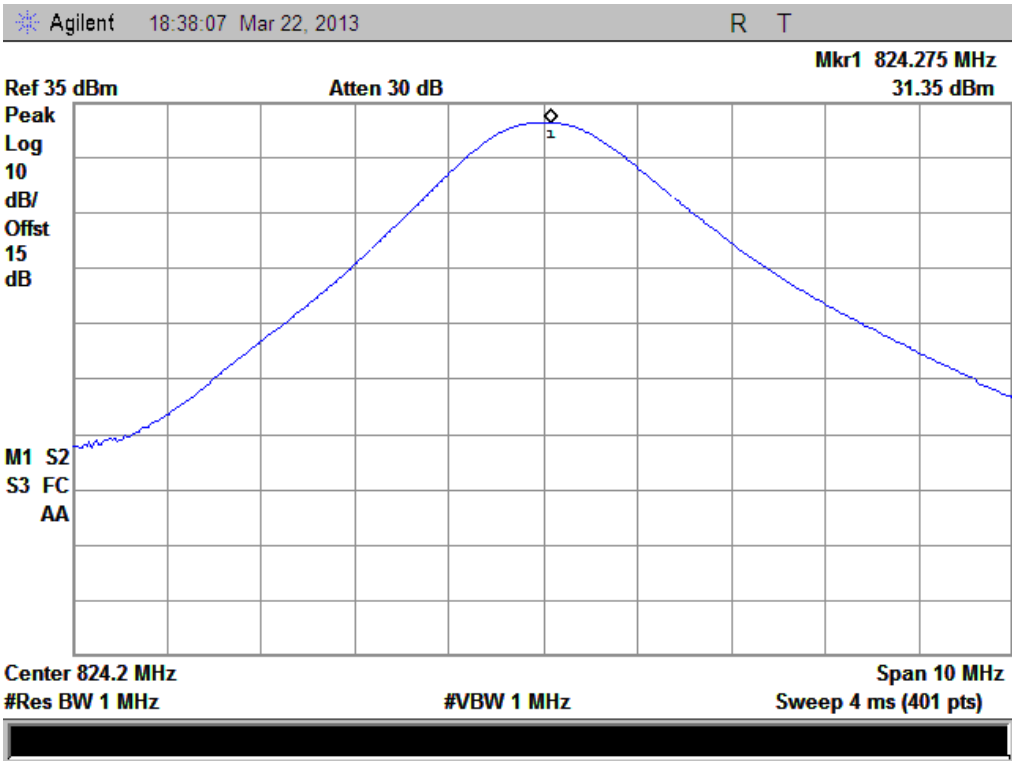

(Plot B1: GSM 1900MHz Channel = 512)



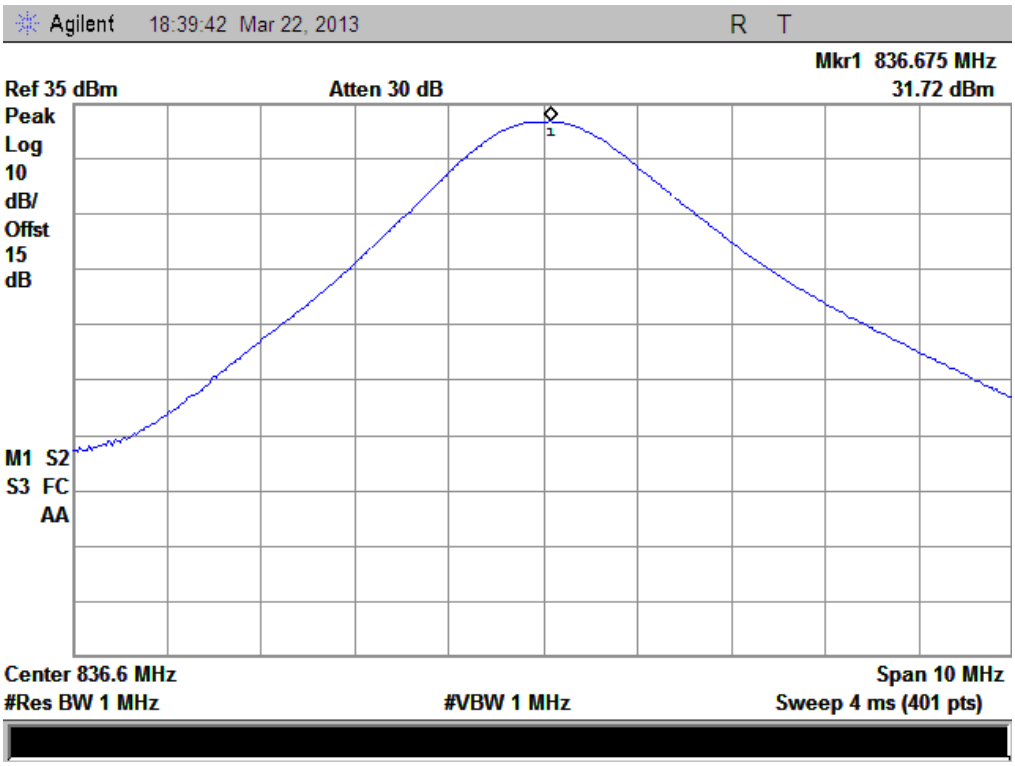

(Plot B2: GSM 1900MHz Channel = 661)



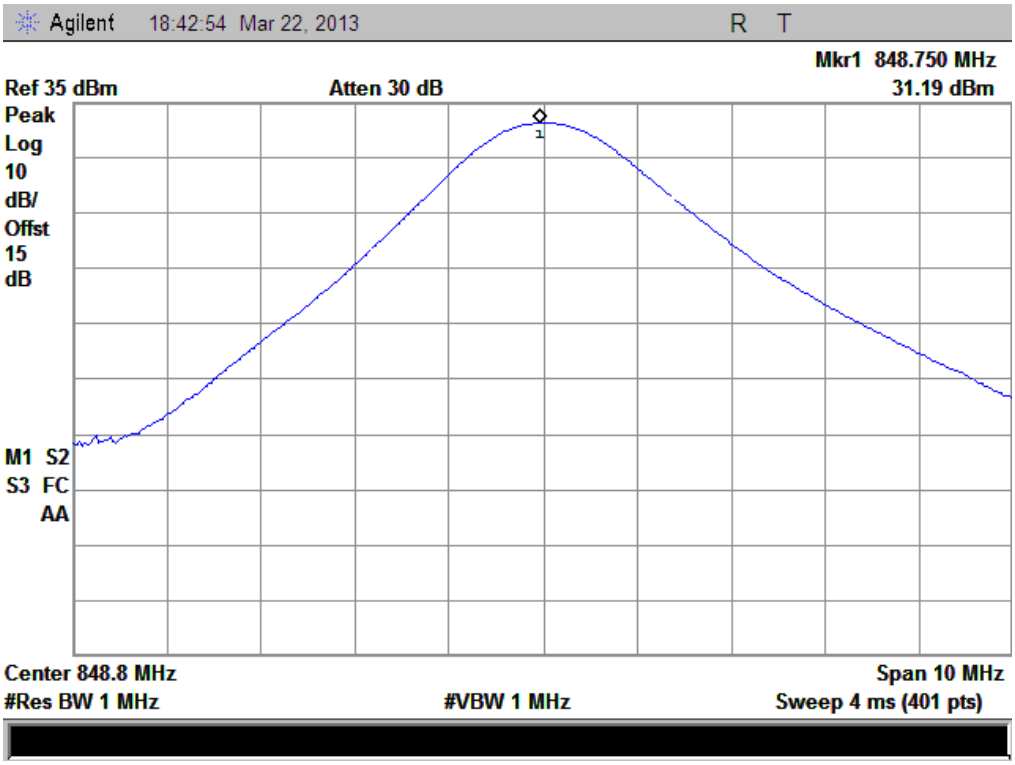

(Plot B3: GSM 1900MHz Channel = 810)



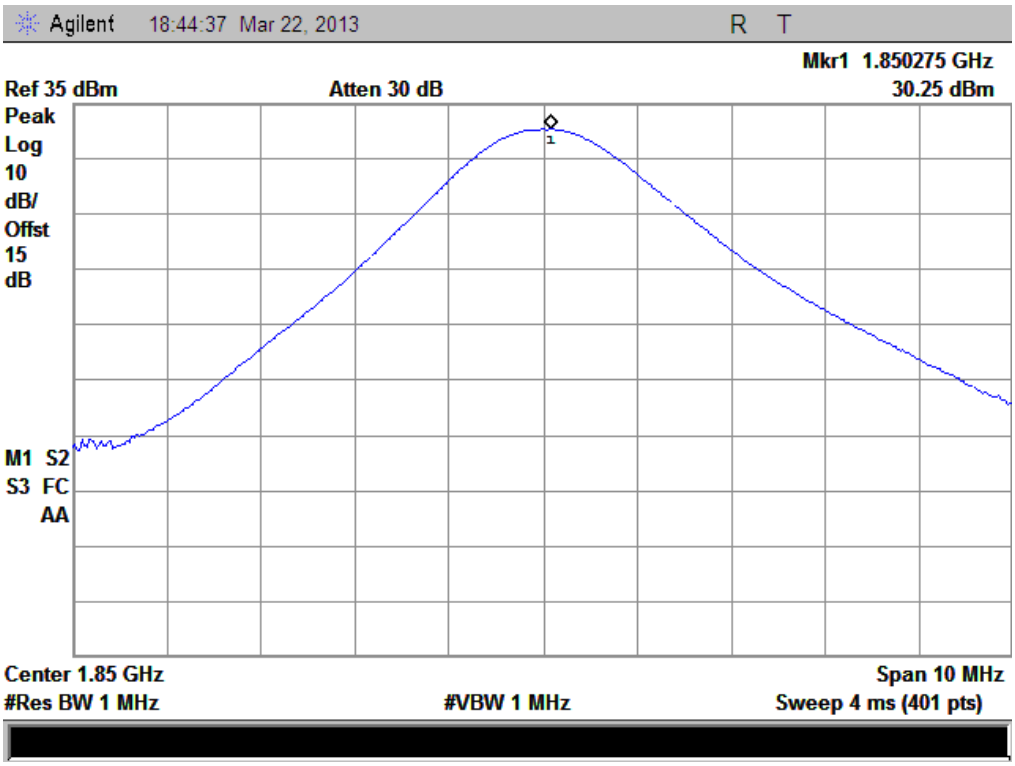

(Plot C1: GPRS 850MHz Channel = 128)



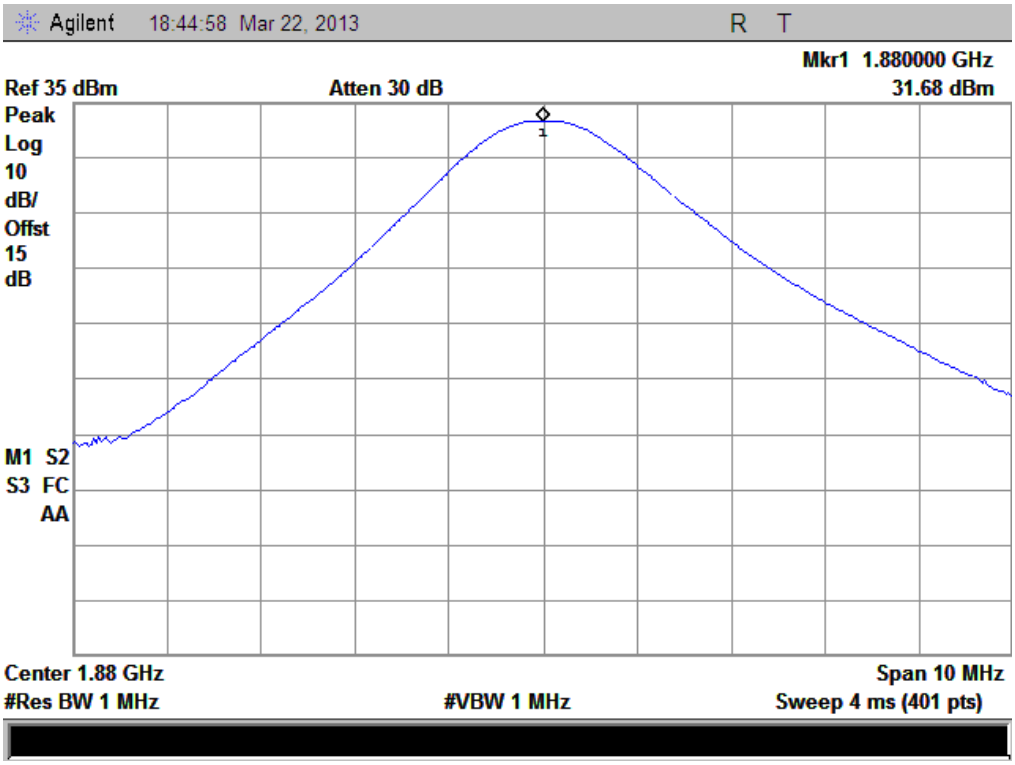

(Plot C2: GPRS 850MHz Channel = 190)



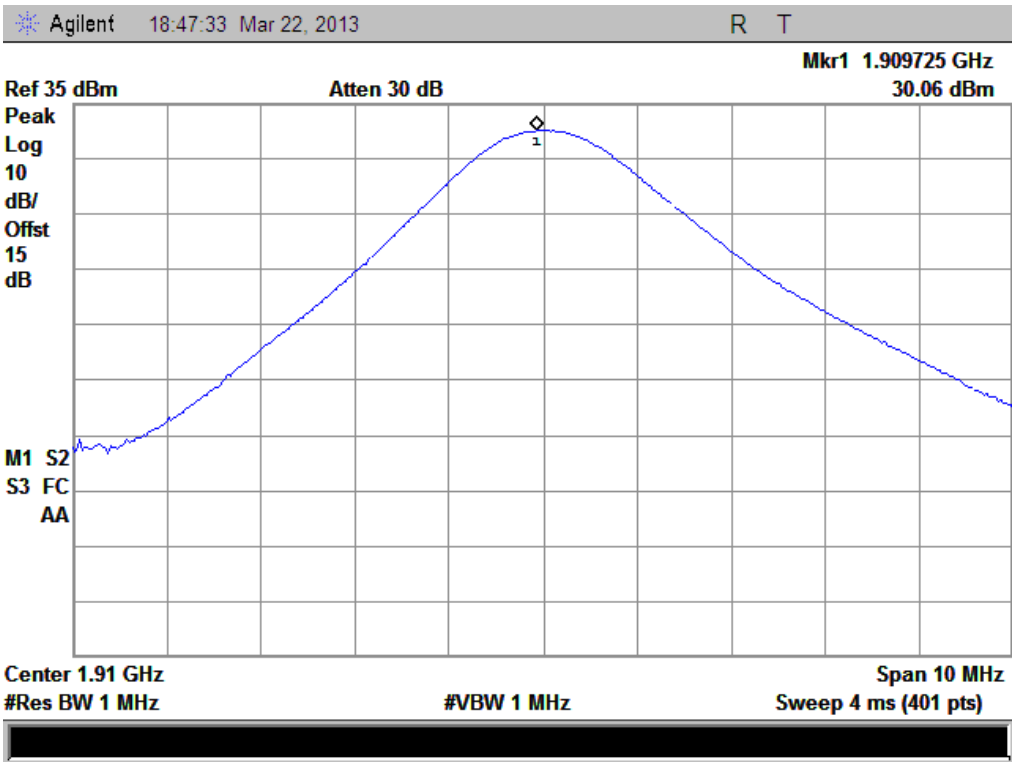

(Plot C3: GPRS 850MHz Channel = 251)




(Plot D1: GPRS 1900MHz Channel = 512)




(Plot D2: GPRS 1900MHz Channel = 661)




(Plot D3: GPRS 1900Hz Channel = 810)

## 2.2 Peak to Average Radio

### 2.2.1 Definition

According to FCC section 2.1049 and FCC 24.232(d) the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 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 selected to perform testing to verify the peak-to-average ratio.

Test procedures:

A .For GSM operating mode:

a. Set RBW=1MHz, VBW=1MHz, peak detector in spectrum analyzer.

b. Set EUT in maximum output power, and triggered the bust signal.

c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

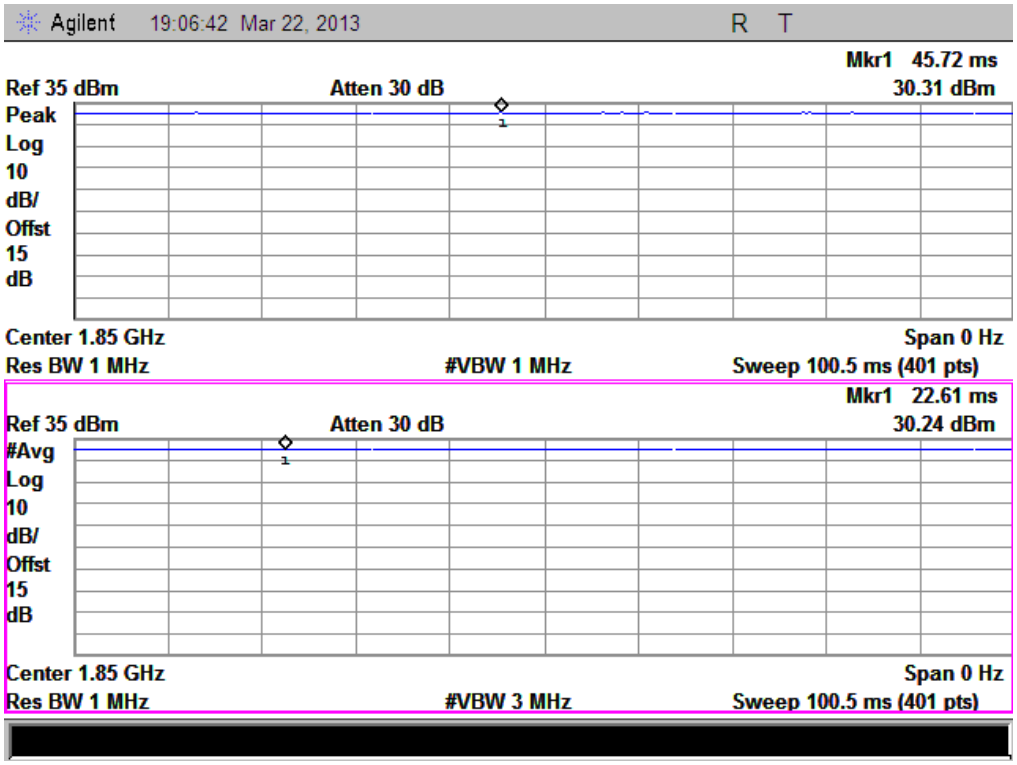
B. For UMTS operating mode:

a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.

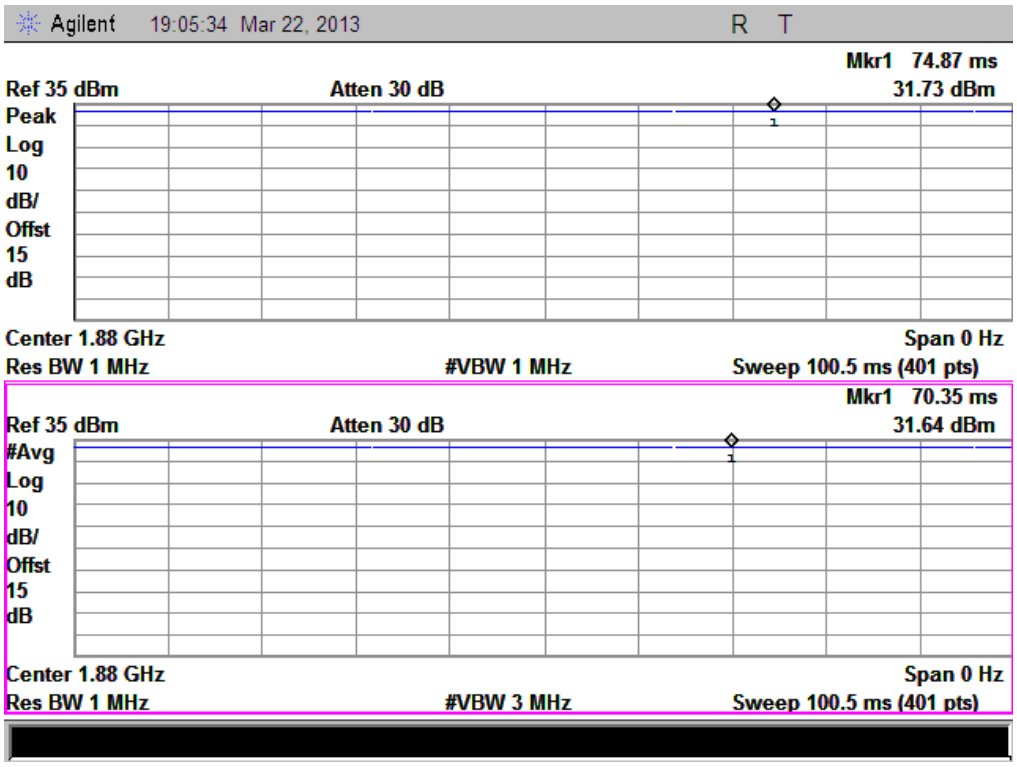
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

1. Test Verdict:

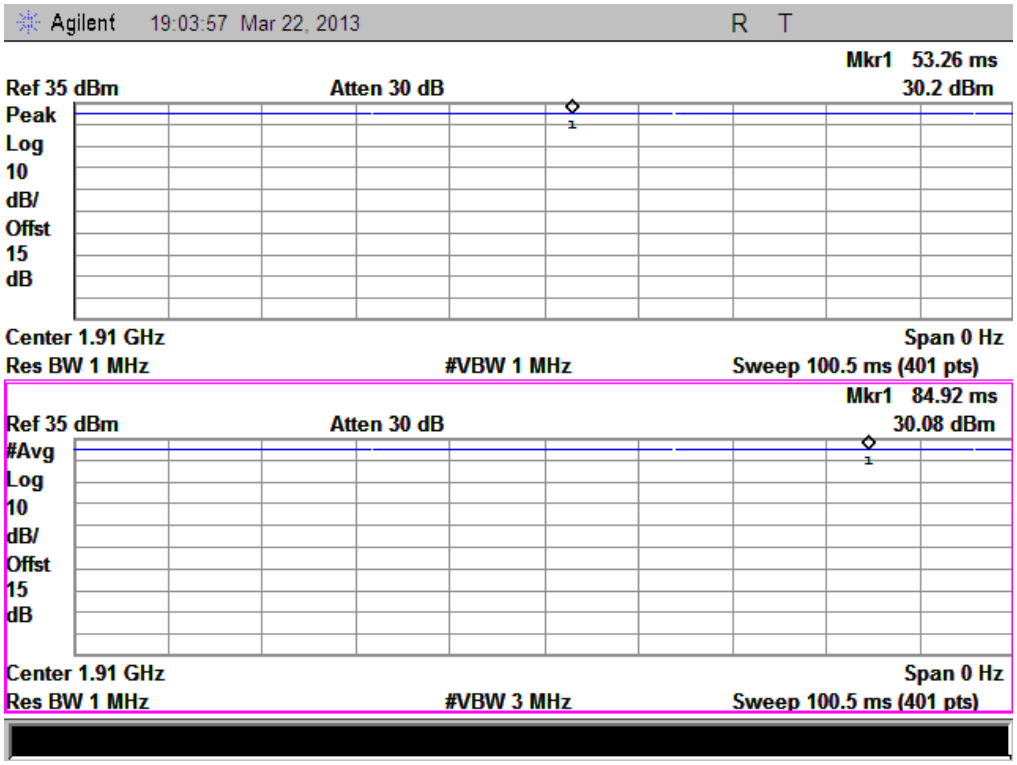
| Band | Channel | Frequency (MHz) | Peak to Average radio | | Limit | Verdict |
|---|---|---|---|---|---|---|
| | | | dBm | Refer to Plot | dBm | |
| GSM 1900MHz | 512 | 1850.2 | 0.07 | Plot A1 to A3 | 13 | PASS |
| | 661 | 1880.0 | 0.09 | | | PASS |
| | 810 | 1909.8 | 0.12 | | | PASS |




(Plot A1: GSM 1900 MHz Channel = 512)




(Plot A2: GSM 1900 MHz Channel = 661)




(Plot A3: GSM 1900MHz Channel = 810)

## 2.3 99% Occupied Bandwidth

### 2.3.1 Definition

According to FCC section 2.1049 and FCC § 22.917 &24.238and27.53(g), 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,

### 2.3.2 Test Description

See section 2.1.2 of this report.

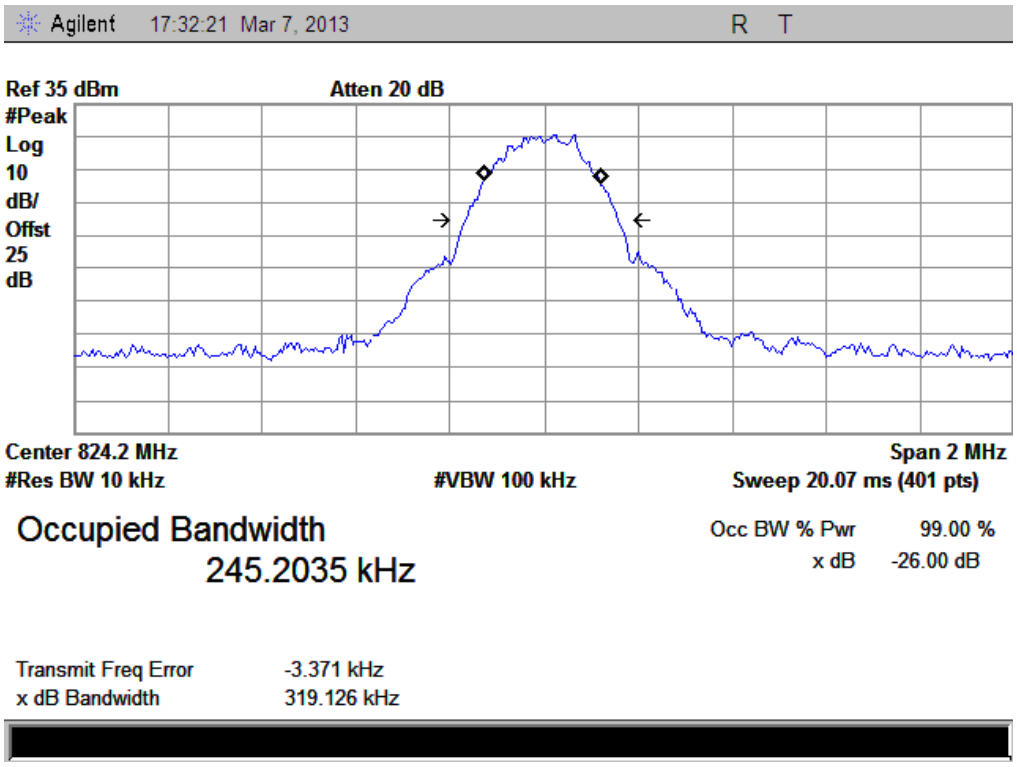
### 2.3.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

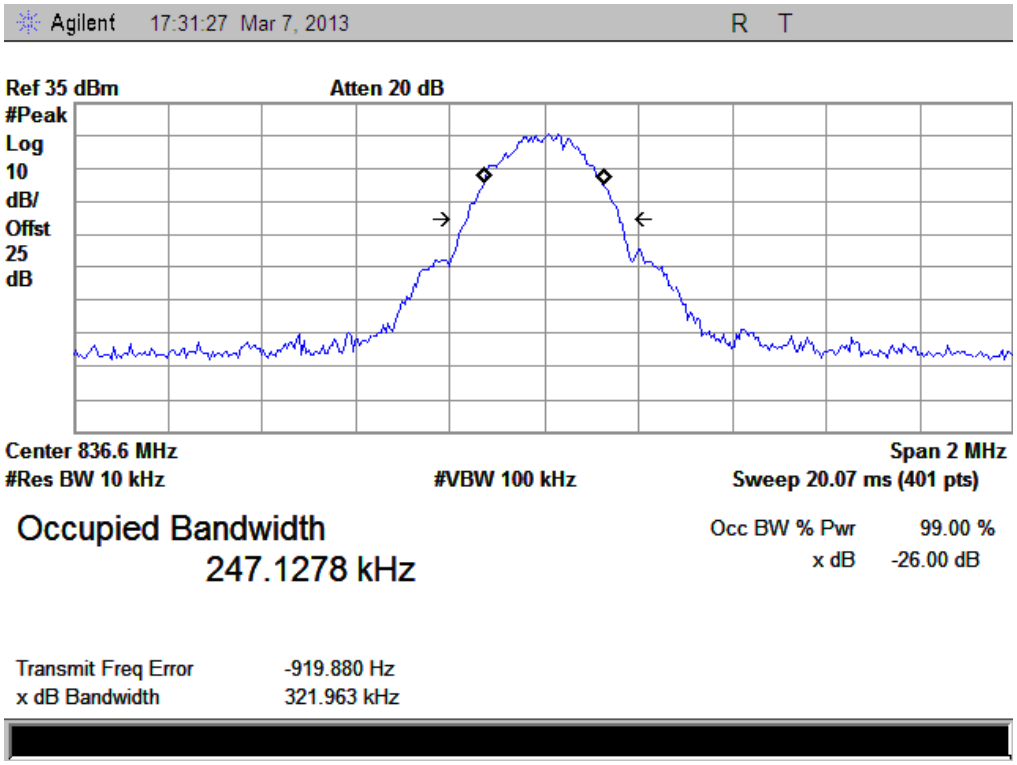
2. Test Verdict:

| Band | Channel | Frequency (MHz) | 26dB bandwidth | 99% Occupied Bandwidth | Refer to Plot |
|---|---|---|---|---|---|
| GSM 850MHz | 128 | 824.2 | 319.126kHz | 245.2035kHz | Plot A |
| | 190 | 836.6 | 321.963kHz | 247.1278kHz | Plot B |
| | 251 | 848.8 | 320.596kHz | 245.1282kHz | Plot C |
| GSM 1900MHz | 512 | 1850.2 | 313.698kHz | 246.2433kHz | Plot D |
| | 661 | 1880.0 | 316.211kHz | 248.3018kHz | Plot E |
| | 810 | 1909.8 | 318.295kHz | 249.0611kHz | Plot F |

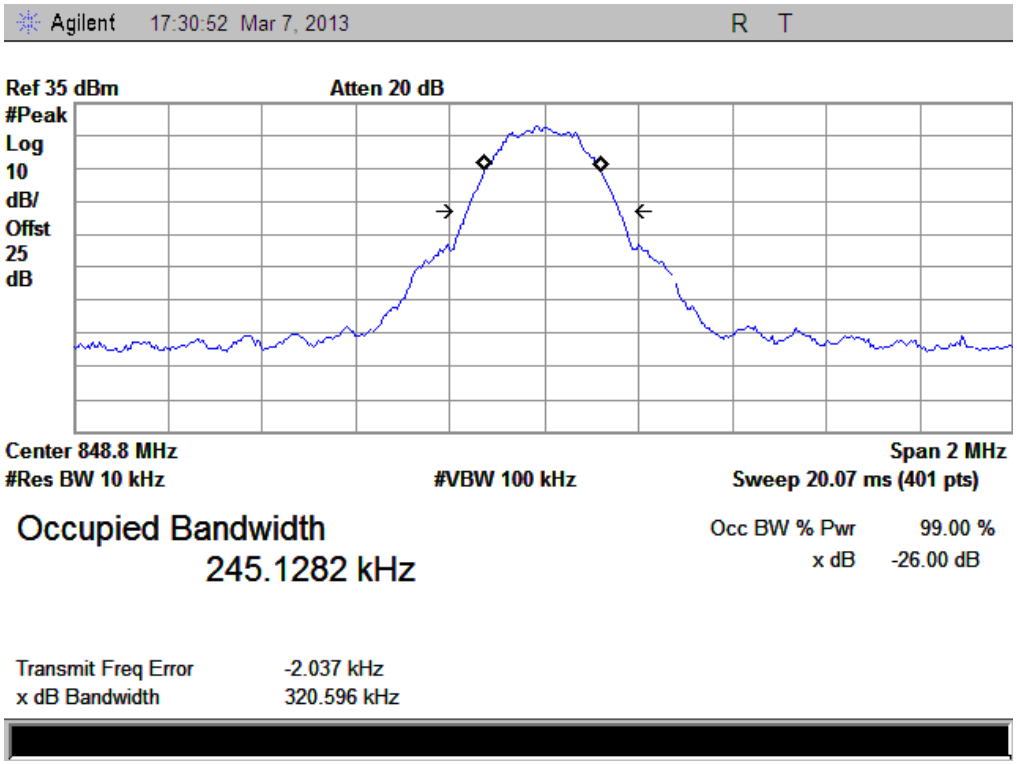
3. Test Plots:



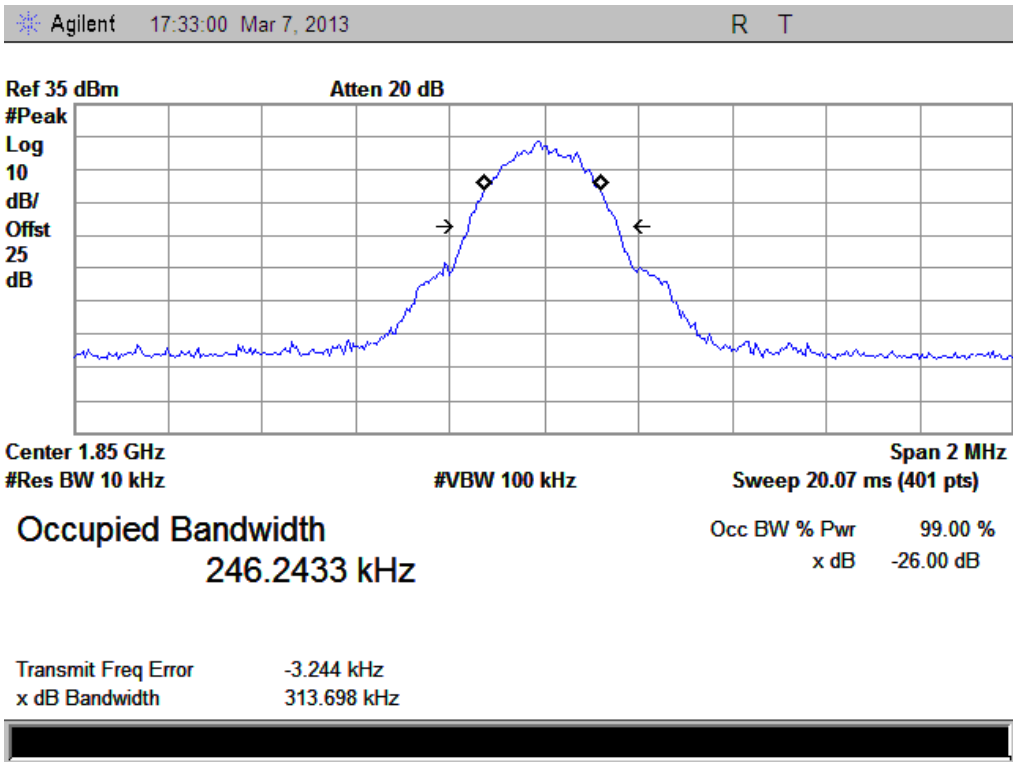

(Plot A: GSM 850MHz Channel = 128)



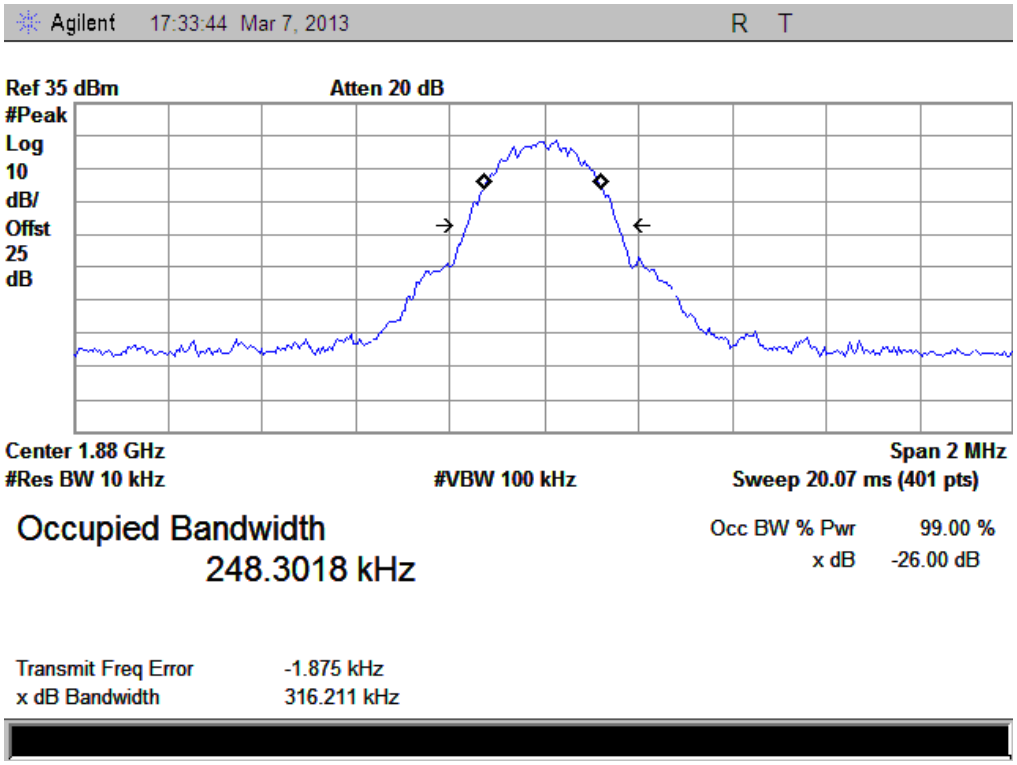

(Plot B: GSM 850MHz Channel = 190)



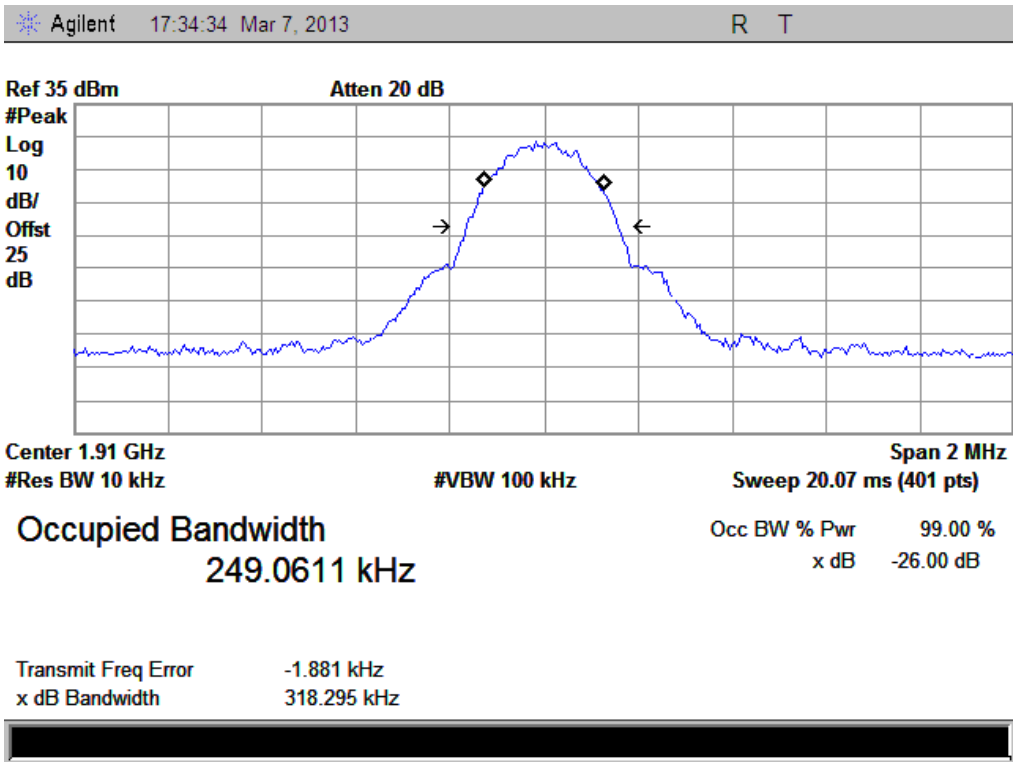

(Plot C: GSM 850MHz Channel = 251)




(Plot D: GSM1900MHz Channel = 512)




(Plot E: GSM 1900MHz Channel = 661)




(Plot F: GSM 1900MHz Channel = 810)

## 2.4 Frequency Stability

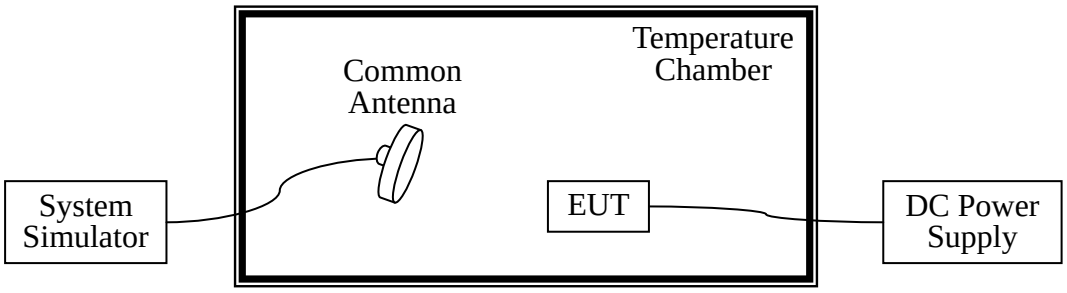
### 2.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, section27.54, 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:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
(b) 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.

### 2.4.2 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 | Cal. Due |
|---|---|---|---|---|---|
| System Simulator | Agilent | E5515C | GB43130131 | 2012.05 | 2013.05 |
| DC Power Supply | Good Will | GPS-3030DD | EF920938 | 2012.05 | 2013.05 |
| Temperature Chamber | YinHe Experimental Equip. | HL4003T | (n.a.) | 2012.05 | 2013.05 |

### 2.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.2VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 25°C. The frequency

deviation limit of 850MHz and AWS1700 band is ±2.5ppm, and 1900MHz is ±1ppm

**1.** GSM 850MHz Band

| Test Conditions | | Frequency Deviation | | | | | | Verdict |
|---|---|---|---|---|---|---|---|---|
| Power (VDC) | Temperature (°C) | Channel = 128 (824.2MHz) | | Channel = 190 (836.6MHz) | | Channel = 251 (848.8MHz) | | |
| | | Hz | Limits | Hz | Limits | Hz | Limits | |
| 3.7 | -30 | -13.11 | ±2060.5 | 23.12 | ±2091.5 | 8.51 | ±2122 | PASS |
| | -20 | 31.08 | | 11.33 | | -12.90 | | |
| | -10 | -12.15 | | -17.55 | | 12.66 | | |
| | 0 | 41.03 | | 38.10 | | 5.05 | | |
| | +10 | 11.09 | | -22.06 | | 3.02 | | |
| | +20 | -19.86 | | -16.11 | | 10.76 | | |
| | +30 | 39.56 | | 17.76 | | -16.51 | | |
| | +40 | 46.60 | | 15.64 | | -2.10 | | |
| | +55 | 39.98 | | 3.67 | | -12.99 | | |
| 4.2 | +25 | -15.71 | | 13.95 | | -7.53 | | |
| 3.6 | +25 | -17.70 | | 6.23 | | 6.78 | | |

2. GSM 1900MHz Band

| Test Conditions | | Frequency Deviation | | | | | | Verdict |
|---|---|---|---|---|---|---|---|---|
| Power (VDC) | Temperature (°C) | Channel = 512 (1850.2MHz) | | Channel = 661 (1880.0MHz) | | Channel = 810 (1909.8MHz) | | |
| | | Hz | Limits | Hz | Limits | Hz | Limits | |
| 3.7 | -30 | -13.77 | ±1850.2 | 23.62 | ±1880.0 | 2.47 | ±1909.8 | PASS |
| | -20 | 0.62 | | 7.23 | | -11.76 | | |
| | -10 | 1.65 | | -24.78 | | -12.21 | | |
| | 0 | 2.47 | | -1.26 | | 13.33 | | |
| | +10 | -10.76 | | -18.68 | | 5.33 | | |
| | +20 | -2.11 | | -21.61 | | 35.26 | | |
| | +30 | 13.33 | | 14.58 | | -26.78 | | |
| | +40 | 5.33 | | -0.68 | | 19.54 | | |
| | +55 | -2.56 | | 36.87 | | -16.67 | | |
| 4.2 | +25 | 17.60 | | 3.88 | | 26.79 | | |
| 3.6 | +25 | -8.09 | | 13.12 | | 19.93 | | |

## 2.5 Conducted Out of Band Emissions

### 2.5.1 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.

### 2.5.2 Test Description

See section 2.1.2 of this report.

### 2.5.3 Test Result

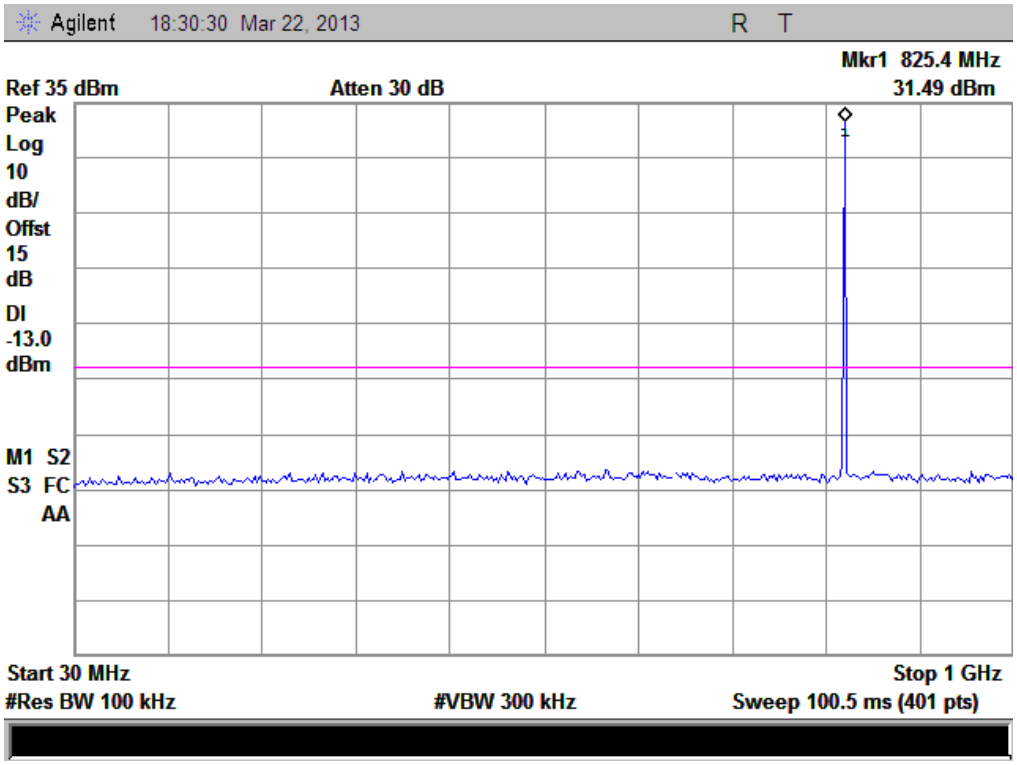
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

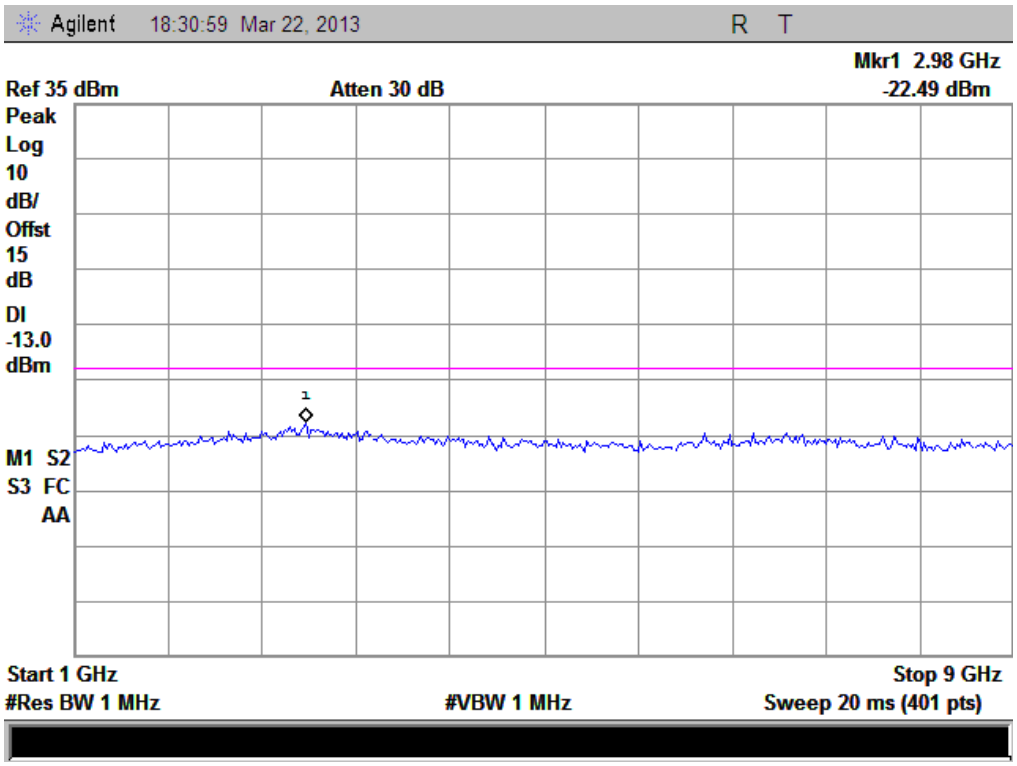
| Band | Channel | Frequency (MHz) | Measured Max. Spurious Emission (dBm) | Refer to Plot | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| GSM 850MHz | 128 | 824.2 | -22.49 | Plot A1toA1.1 | -13 | PASS |
| | 190 | 836.6 | -22.81 | Plot A2toA2.1 | | PASS |
| | 251 | 848.8 | -23.09 | Plot A3toA3.1 | | PASS |
| GSM 1900MHz | 512 | 1850.2 | -21.87 | Plot B1toB1.1 | -13 | PASS |
| | 661 | 1880.0 | -21.25 | Plot B2toB2.1 | | PASS |
| | 810 | 1909.8 | -21.23 | Plot B3toB3.1 | | PASS |

2. Test Plots for the Whole Measurement Frequency Range:

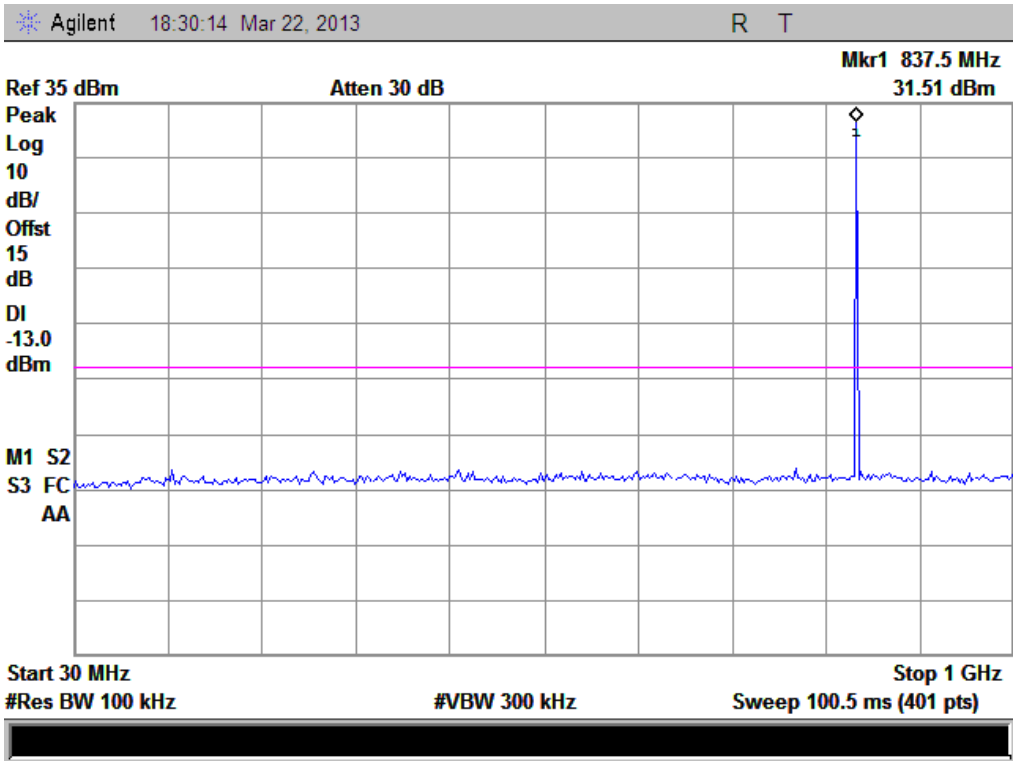
Note: the power of the EUT transmitting frequency should be ignored.



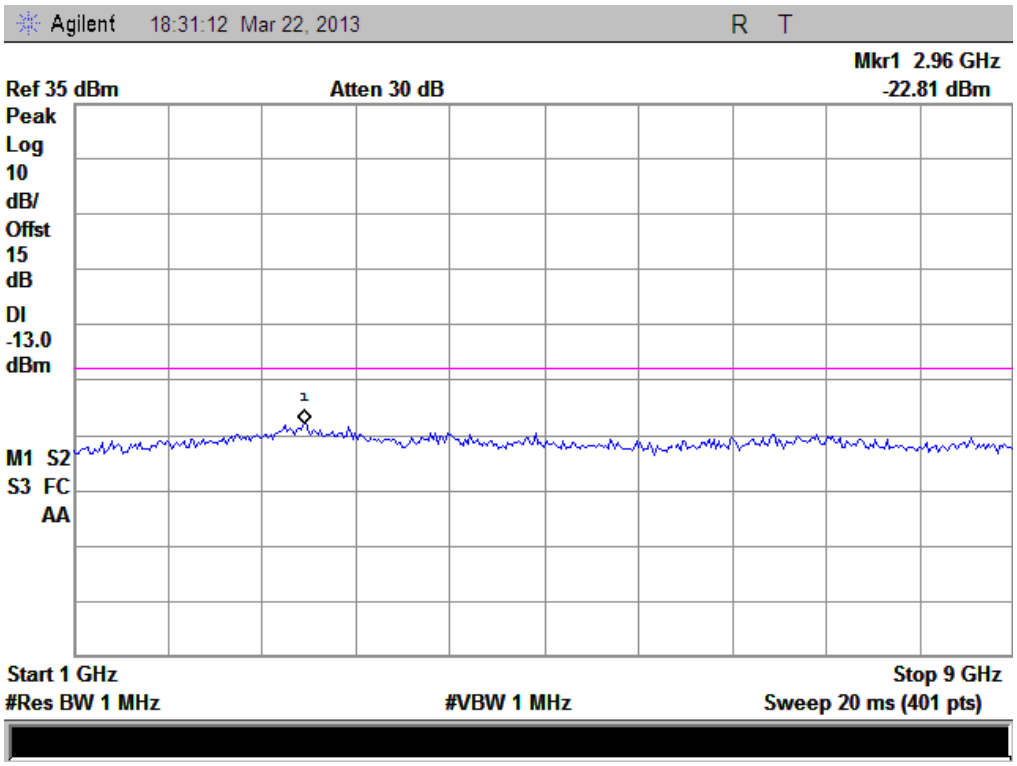

(Plot A1: GSM 850MHz Channel = 128, 30MHz to 1GHz)



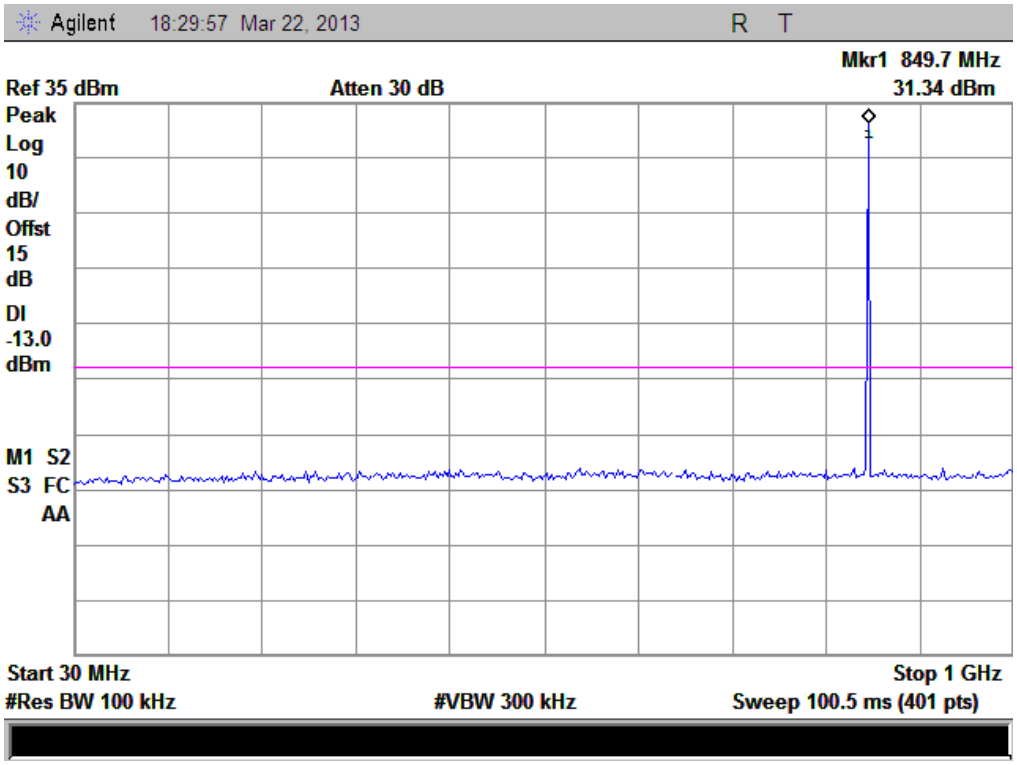

(Plot A1.1: GSM 850MHz Channel = 128, 1GHz to 9GHz)



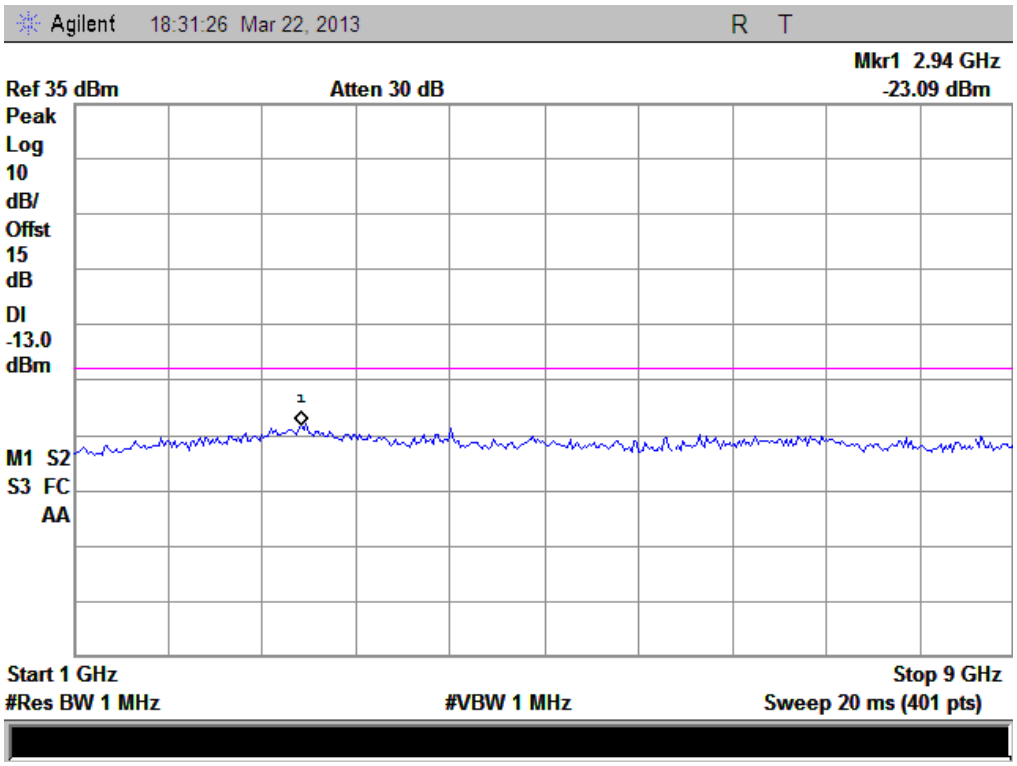

(Plot A2: GSM 850MHz Channel = 190, 30MHz to 1GHz)



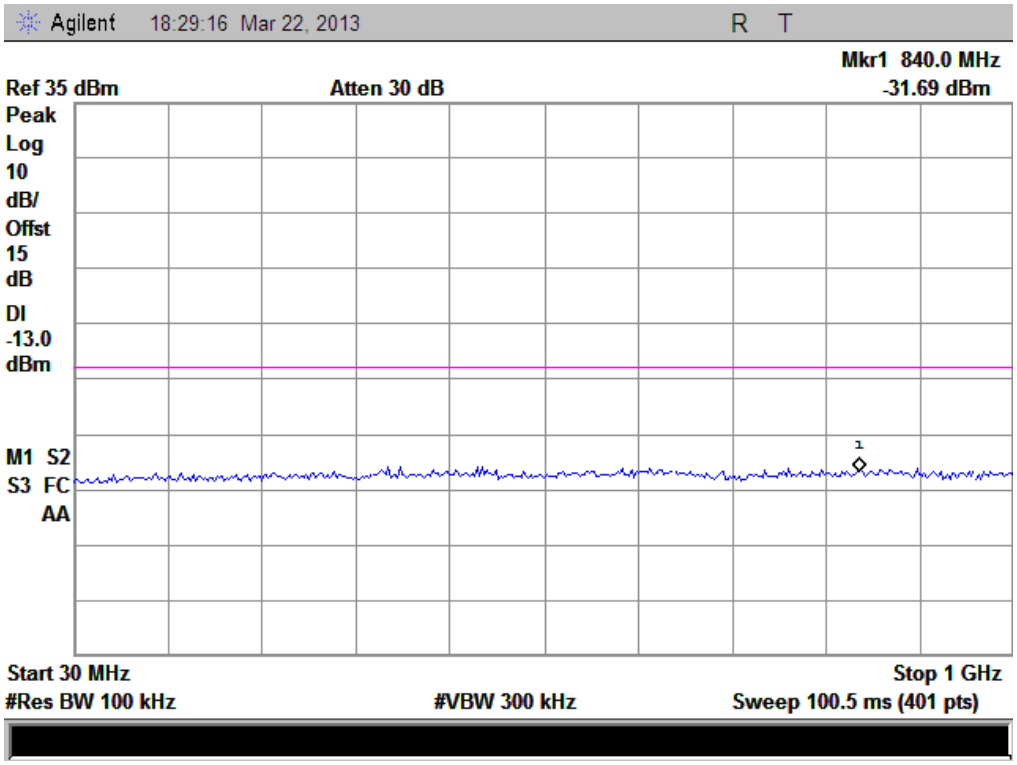

(Plot A2.1: GSM 850MHz Channel = 190, 1GHz to 9GHz)



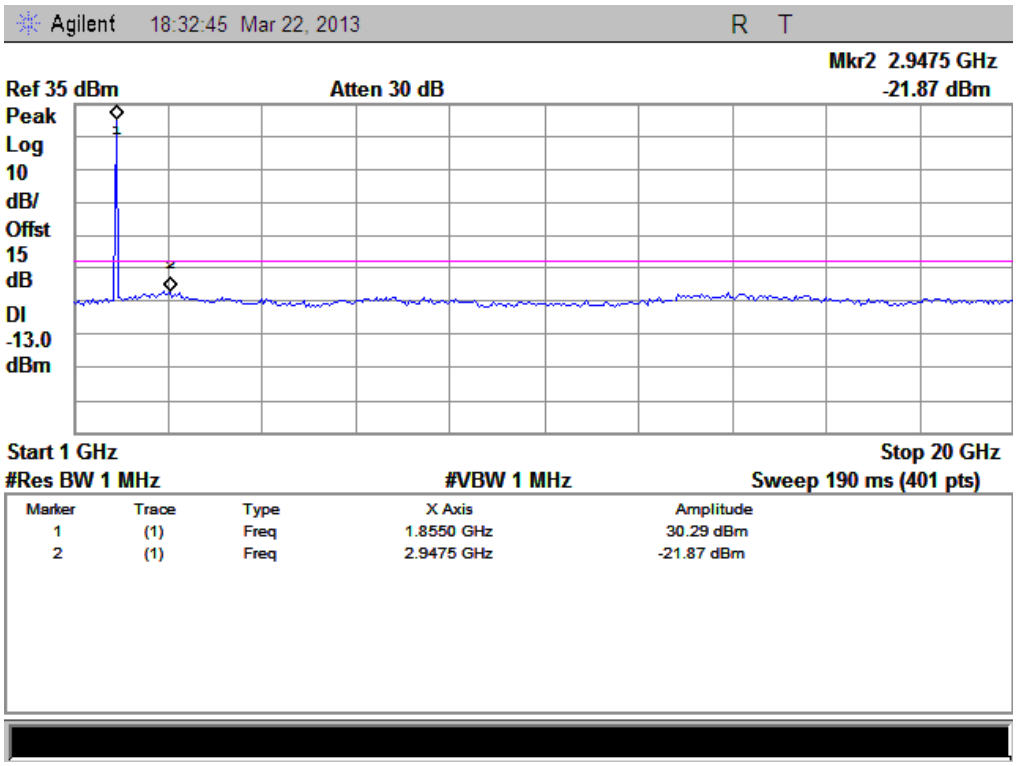

(Plot A3: GSM 850MHz Channel = 251, 30MHz to 1GHz)



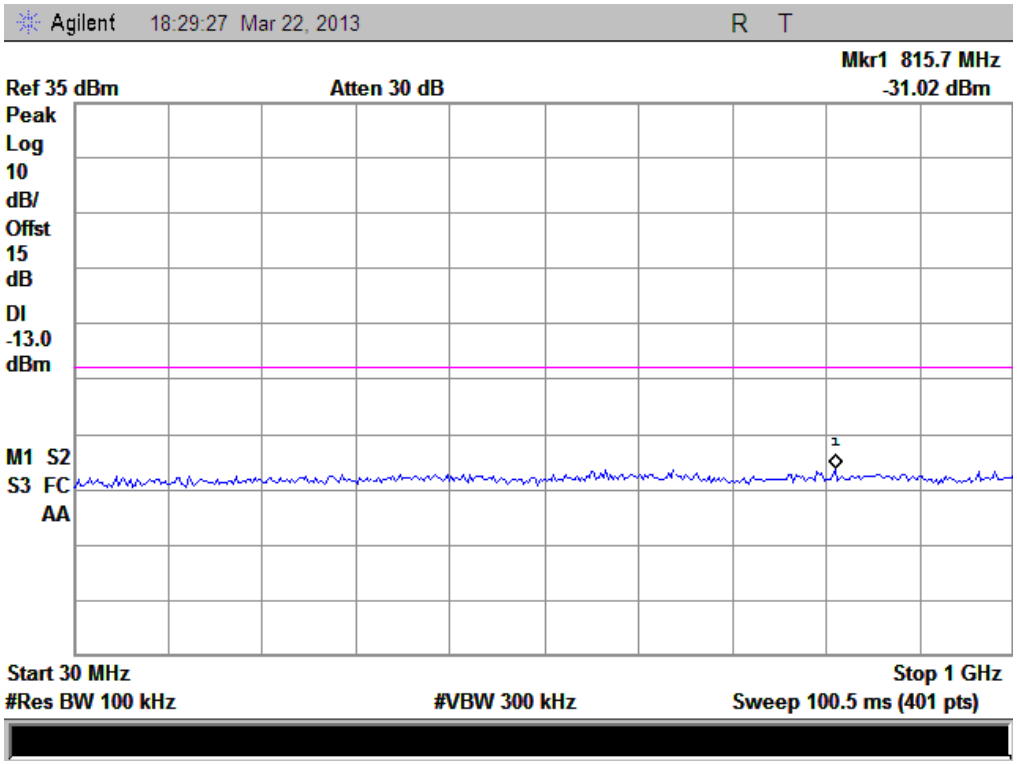

(Plot A3.1: GSM 850MHz Channel = 251, 1GHz to 9GHz)



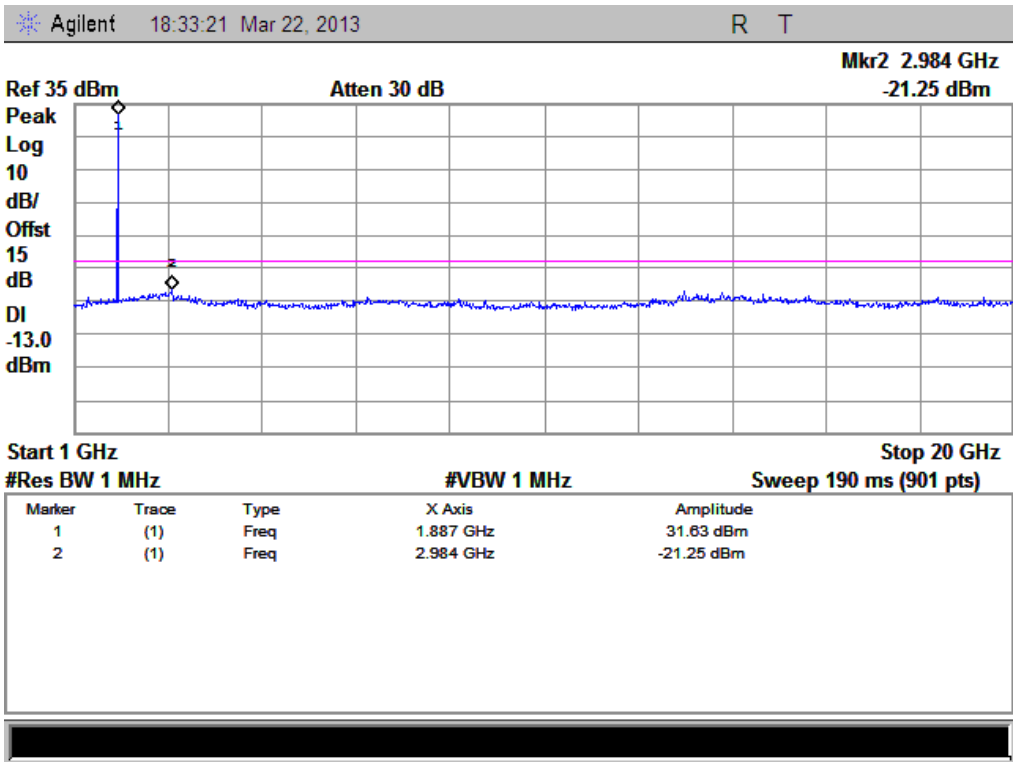

(Plot B1: GSM 1900MHz Channel = 512, 30MHz to 1GHz)



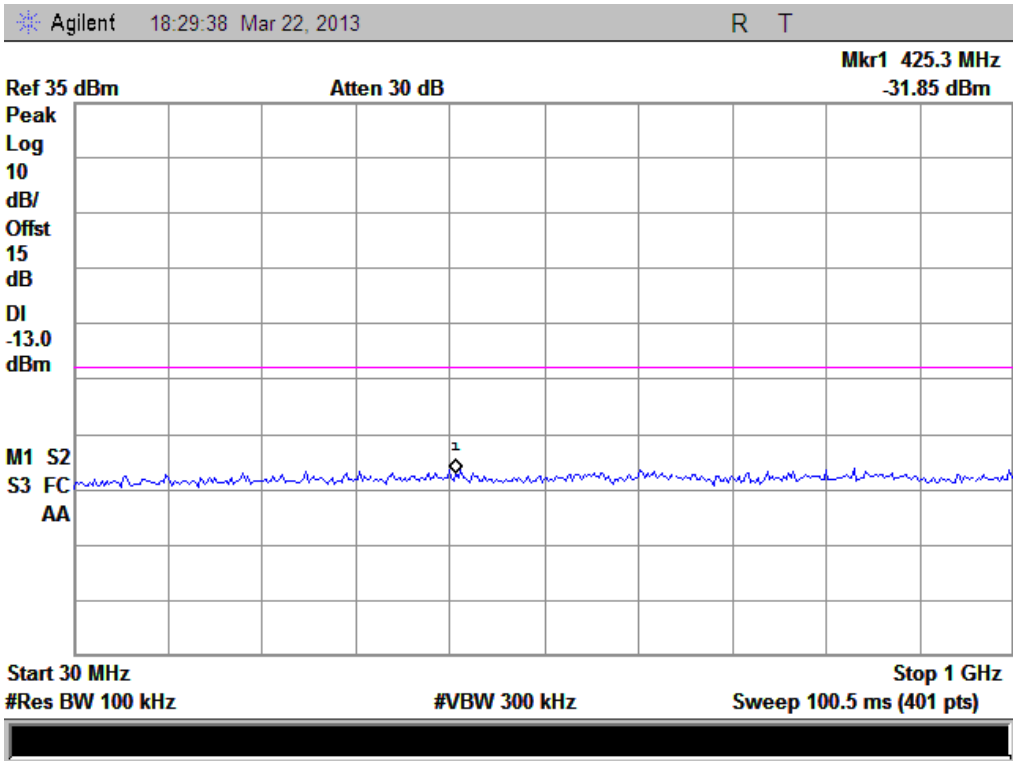

(Plot B1.1: GSM 1900MHz Channel = 512, 1GHz to 20GHz)



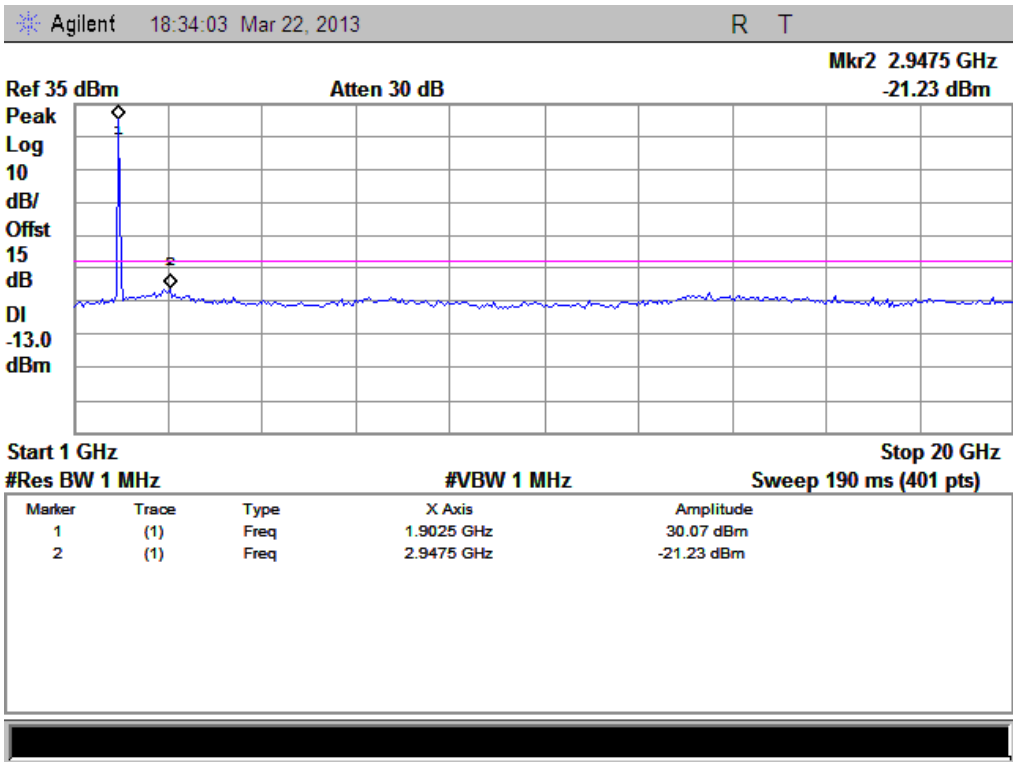

(Plot B2: GSM 1900MHz Channel = 661, 30MHz to 1GHz)




(Plot B2.1: GSM 1900MHz Channel = 661, 1GHz to 20GHz)




(Plot B3: GSM 1900MHz Channel = 810, 30MHz to 1GHz)




(Plot B3.1: GSM 1900MHz Channel = 810, 1GHz to 20GHz)

## 2.6 Band Edge

### 2.6.1 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.

### 2.6.2 Test Description

See section 2.1.2 of this report.

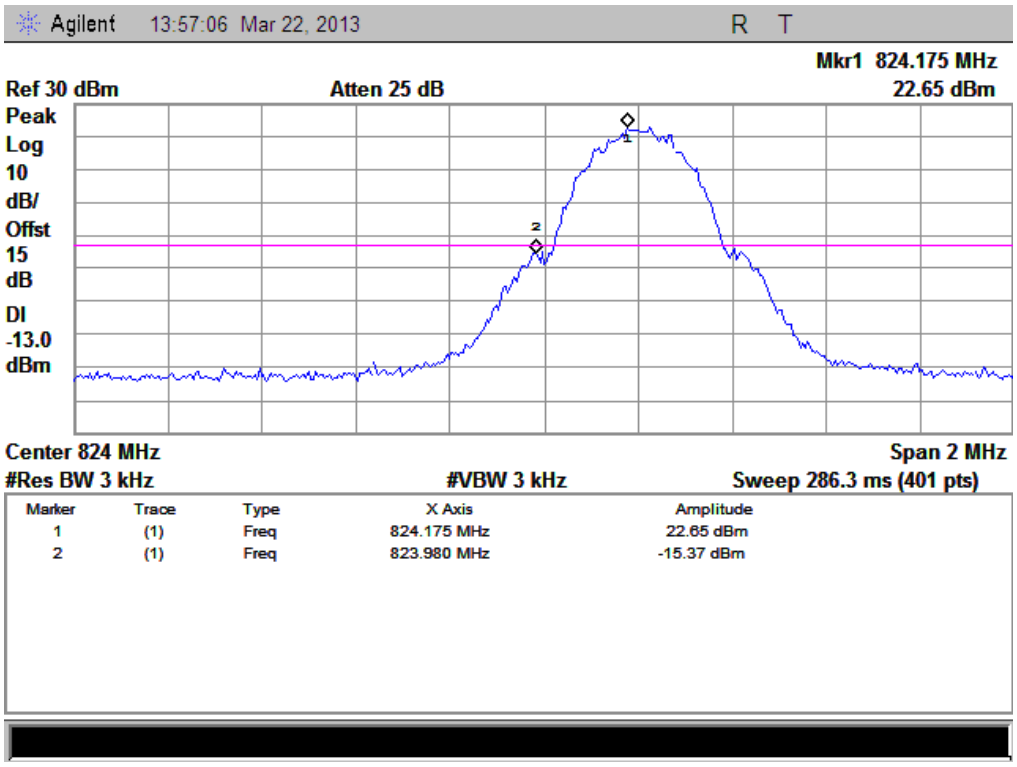
### 2.6.3 Test Result

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

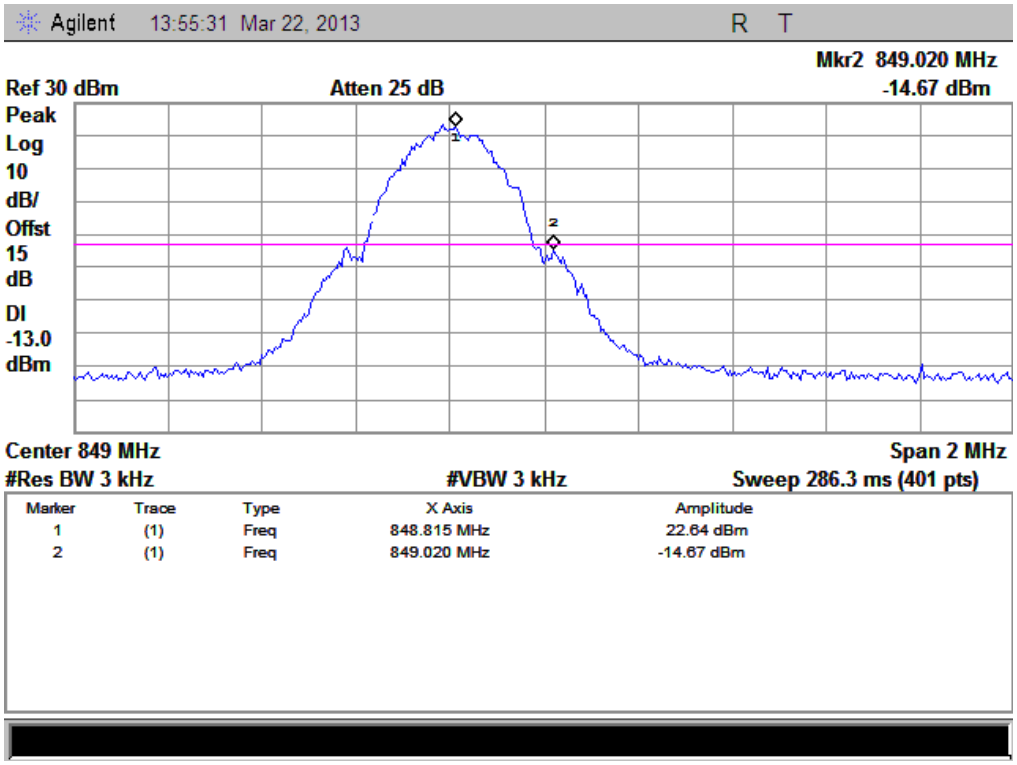
1. Test Verdict:

| Band | Channel | Frequency (MHz) | Measured Max. Band Edge Emission (dBm) | Refer to Plot | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| GSM 850MHz | 128 | 824.2 | -15.37 | Plat A | -13 | PASS |
| | 251 | 848.8 | -14.67 | Plot B | | PASS |
| GSM 1900MHz | 512 | 1850.2 | -14.85 | Plat C | -13 | PASS |
| | 810 | 1909.8 | -14.21 | Plot D | | PASS |

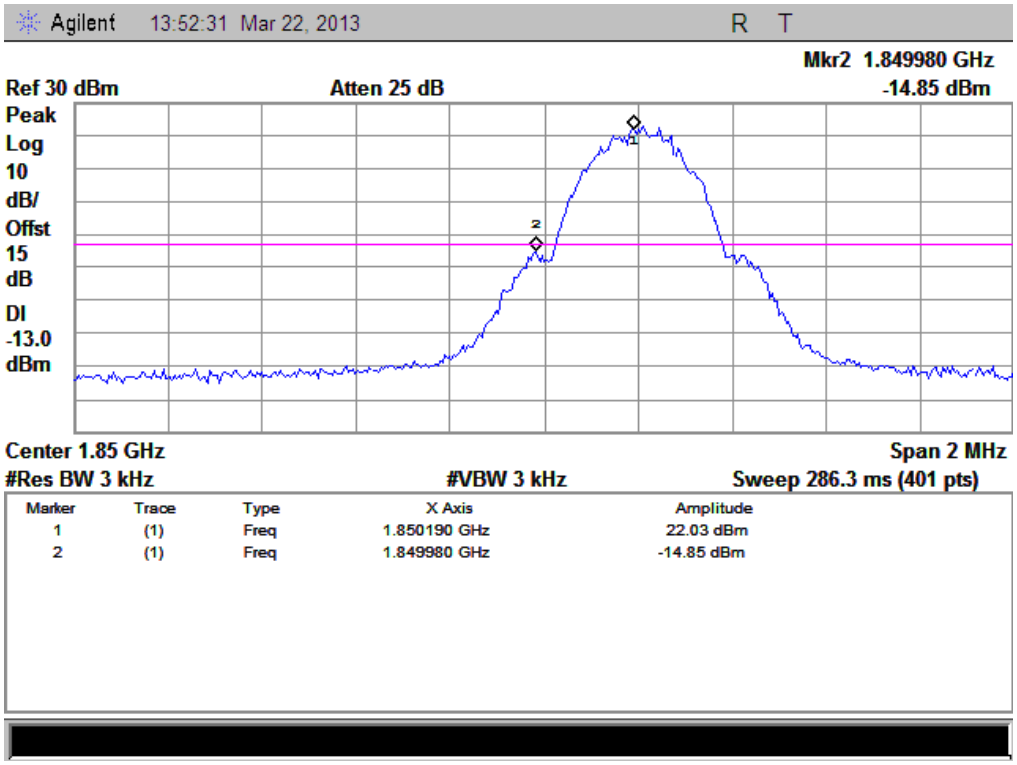
2. Test Plots:



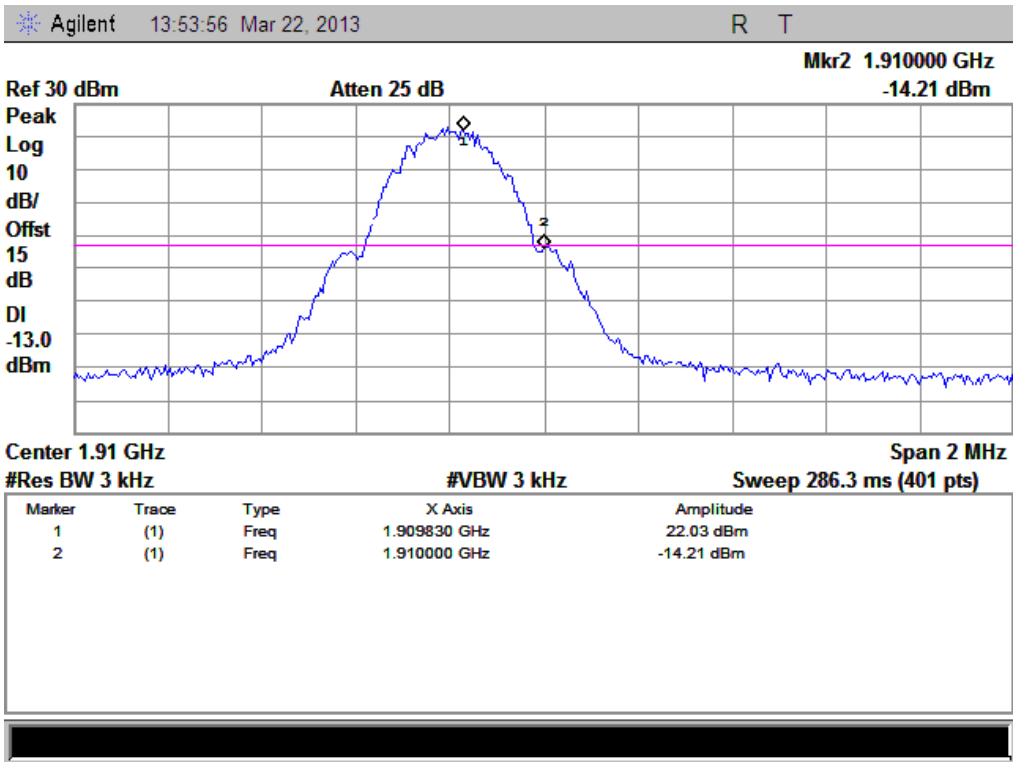

(Plot A: GSM 850 Channel = 128)




(Plot B: GSM 850 Channel = 251)




(Plot C: GSM 1900 Channel = 512)




(Plot D: GSM 1900 Channel = 810)

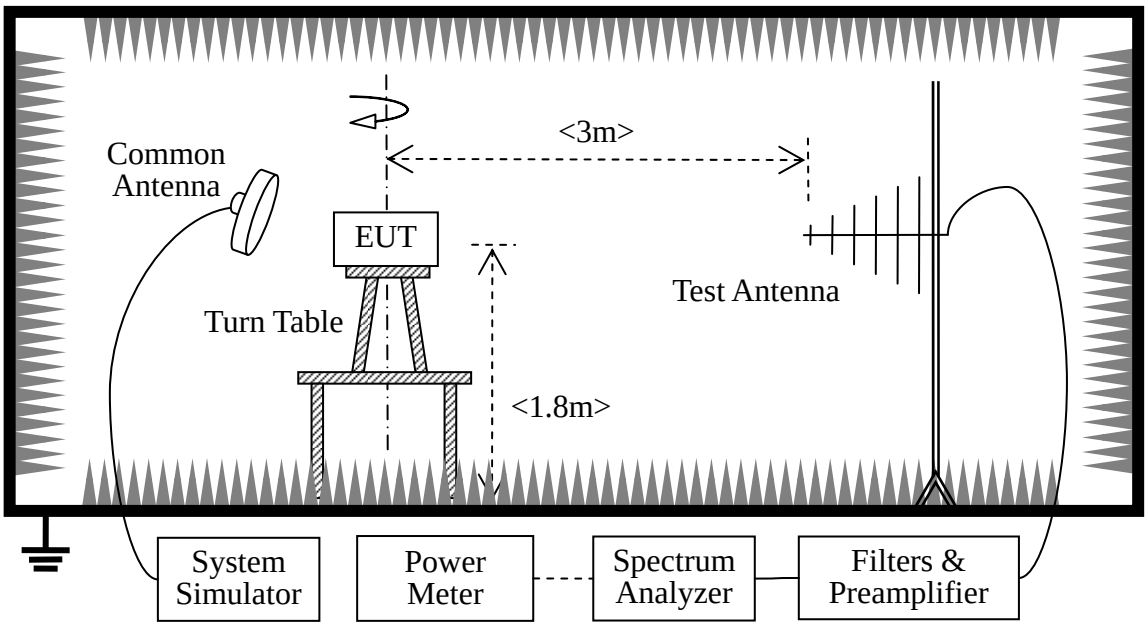
## 2.7 Transmitter Radiated Power (EIRP/ERP)

### 2.7.1 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 2 Watts e.i.r.p. peak power.

### 2.7.2 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.

- GSM Maximum RF output power: GSM850 31.94dBm, GSM 1900 31.83dBm, Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

- Minimum RF power: GSM850 3.0dBm, GSM 1900 0.3dBm

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 | Cal. Due |
|---|---|---|---|---|---|
| System Simulator | Agilent | E5515C | GB43130131 | 2012.05 | 2013.05 |
| Spectrum Analyzer | Agilent | E7405A | US44210471 | 2012.05 | 2013.05 |
| Full-Anechoic Chamber | Albatross | 9m*6m*6m | (n.a.) | 2012.05 | 2013.05 |
| Test Antenna - Bi-Log | Schwarzbeck | VULB 9163 | 9163-274 | 2012.05 | 2013.05 |
| Test Antenna - Horn | Schwarzbeck | BBHA 9120C | 9120C-384 | 2012.05 | 2013.05 |
| Substitution Antenna | Schwarzbeck | BBHA 9120C | 9120C-384 | 2012.05 | 2013.05 |
| Pre-AMPs | lucix | S10M100L3802 | S020180L3203 | 2012.05 | 2013.05 |
| Notch Filter | COM-MW | ZBSF-C836.5-25-X | NA | 2012.05 | 2013.05 |
| Notch Filter | COM-MW | ZBSF-C1747.5-75-X2 | NA | 2012.05 | 2013.05 |
| Notch Filter | COM-MW | ZBSF-C1880-60-X2 | NA | 2012.05 | 2013.05 |

### 2.7.3 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:

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

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

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

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

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

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

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

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

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

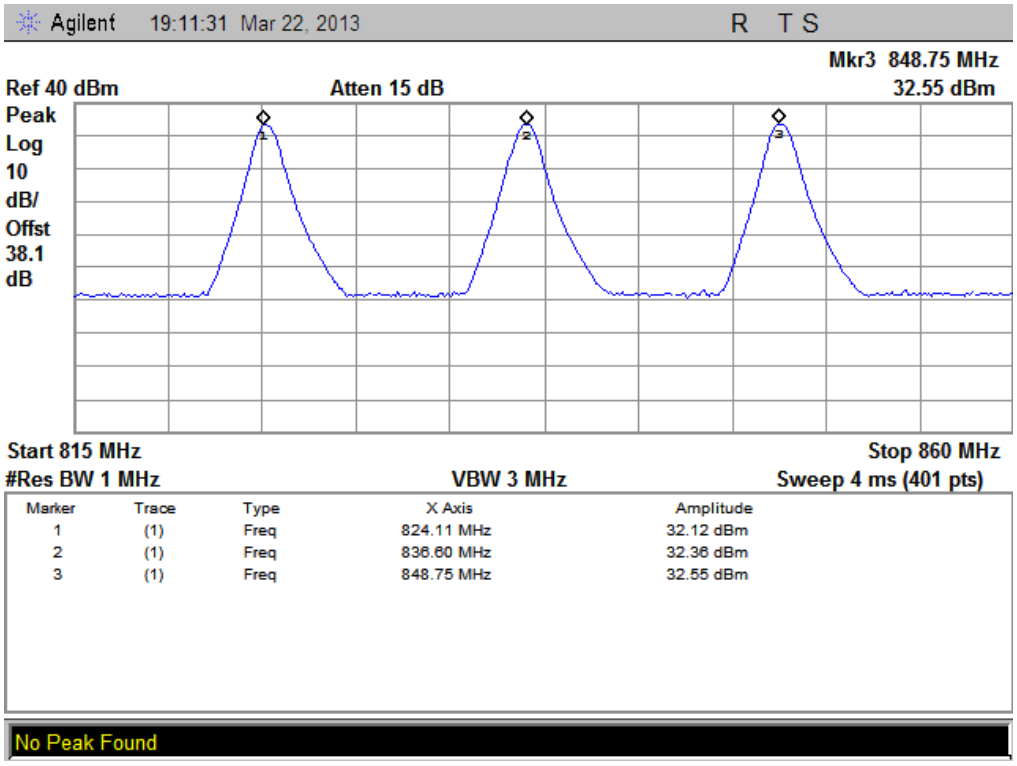
1. GSM Model Test Verdict:

| Band | Channel | Frequency (MHz) | PCL | Measured ERP | | | Limit | | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| | | | | dBm | W | Refer to Plot | dBm | W | |
| GSM 850MHz | 128 | 824.20 | 5 | 32.12 | 1.629 | Plot A | 38.5 | 7 | PASS |
| | 190 | 836.60 | 5 | 32.36 | 1.722 | | | | PASS |
| | 251 | 848.80 | 5 | 32.55 | 1.799 | | | | PASS |
| GPRS 850MHz | 128 | 824.20 | 5 | 31.99 | 1.581 | Plot B Note 1 | 38.5 | 7 | PASS |
| | 190 | 836.60 | 5 | 32.32 | 1.706 | | | | PASS |
| | 251 | 848.80 | 5 | 32.35 | 1.718 | | | | PASS |

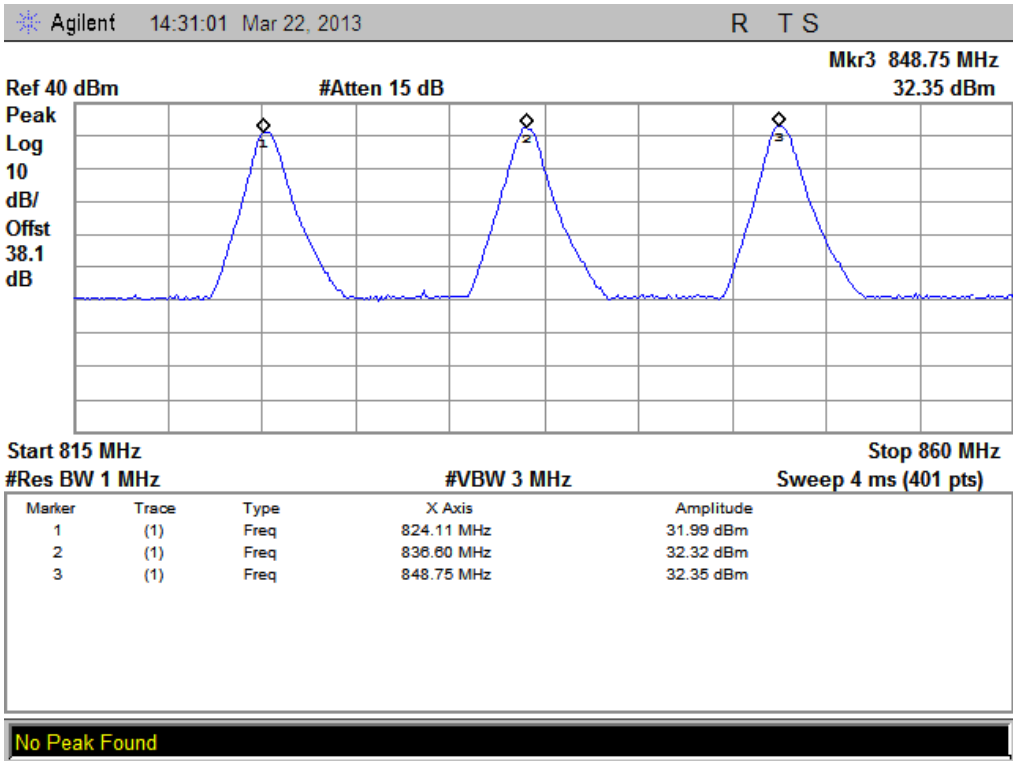
| Band | Channel | Frequency (MHz) | PCL | Measured EIRP | | | Limit | | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| | | | | dBm | W | Refer to Plot | dBm | W | |
| GSM 1900MHz | 512 | 1850.2 | 0 | 30.52 | 1.127 | PlotC | 33 | 2 | PASS |
| | 661 | 1880.0 | 0 | 31.88 | 1.542 | | | | PASS |
| | 810 | 1909.8 | 0 | 30.65 | 1.161 | | | | PASS |
| GPRS 1900MHz | 512 | 1850.2 | 0 | 30.42 | 1.102 | Plot D Note 1 | 33 | 2 | PASS |
| | 661 | 1880.0 | 0 | 31.86 | 1.535 | | | | PASS |
| | 810 | 1909.8 | 0 | 30.56 | 1.138 | | | | PASS |

Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.

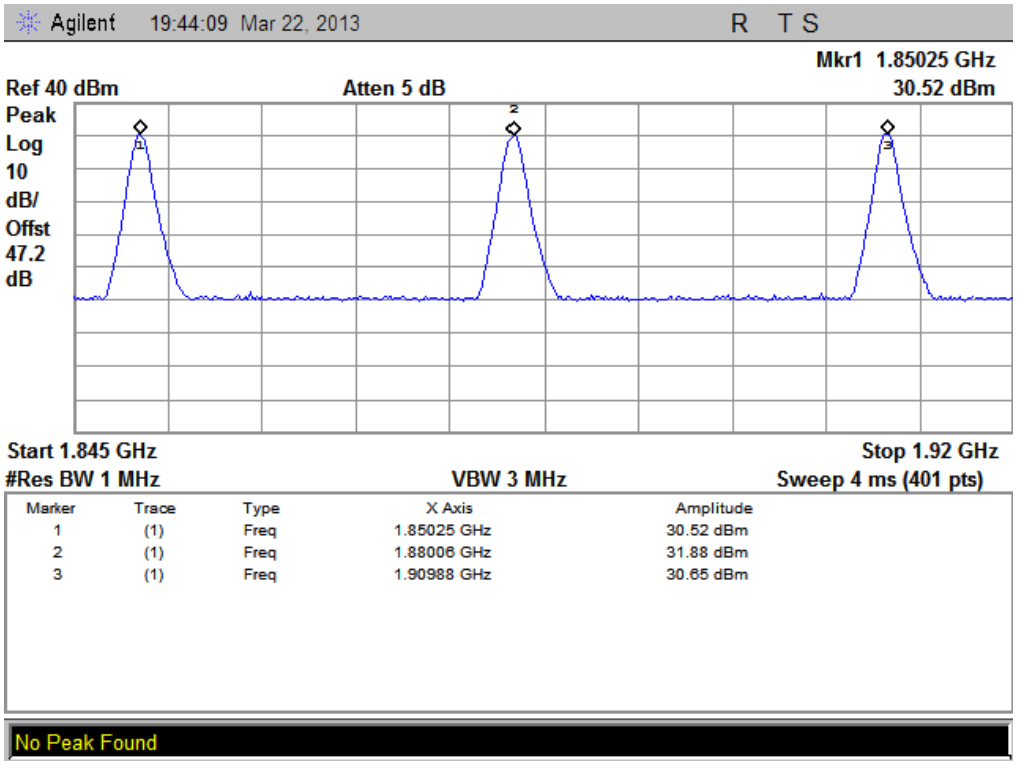
2. Test Plots:



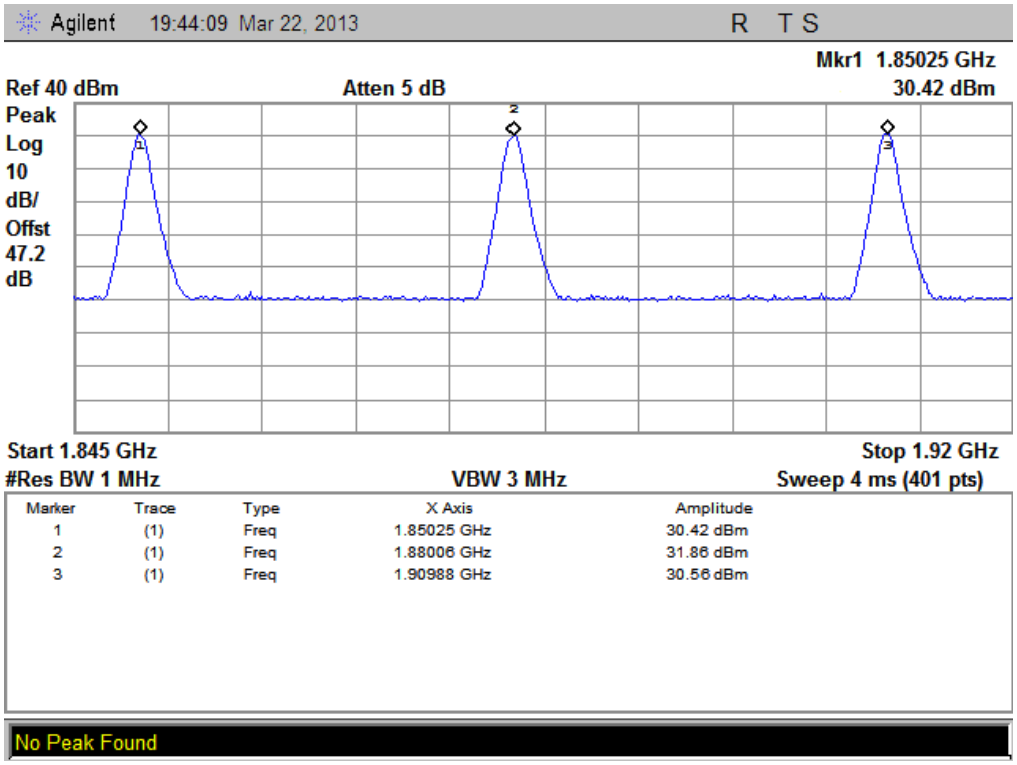

(Plot A: GSM 850MHz Channel = 128, 190, 251)




(Plot B: GPRS 850MHz Channel = 128, 190, 251)




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




(Plot D: GPRS 1900MHz Channel = 512, 661, 810)

## 2.8 Radiated Out of Band Emissions

### 2.8.1 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.

The spurious emission with frequency band 1900 according to FCC section 2.1057.

### 2.8.2 Test Description

See section 2.7.2 of this report.

Equipment

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| System Simulator | Agilent | E5515C | GB43130131 | 2012.05 | 2013.05 |
| Spectrum Analyzer | Agilent | E7405A | US44210471 | 2012.05 | 2013.05 |
| Full-Anechoic Chamber | Albatross | 9m*6m*6m | (n.a.) | 2012.05 | 2013.05 |
| Test Antenna - Bi-Log | Schwarzbeck | VULB 9163 | 9163-274 | 2012.05 | 2013.05 |
| Test Antenna - Horn | Schwarzbeck | BBHA 9120C | 9120C-384 | 2012.05 | 2013.05 |
| Substitution Antenna | Schwarzbeck | BBHA 9120C | 9120C-384 | 2012.05 | 2013.05 |
| Pre-AMPs | lucix | S10M100L3802 | S020180L3203 | 2012.05 | 2013.05 |
| Notch Filter | COM-MW | ZBSF-C836.5-25-X | NA | 2012.05 | 2013.05 |
| Notch Filter | COM-MW | ZBSF-C1747.5-75-X2 | NA | 2012.05 | 2013.05 |
| Notch Filter | COM-MW | ZBSF-C1880-60-X2 | NA | 2012.05 | 2013.05 |

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

### 2.8.3 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.

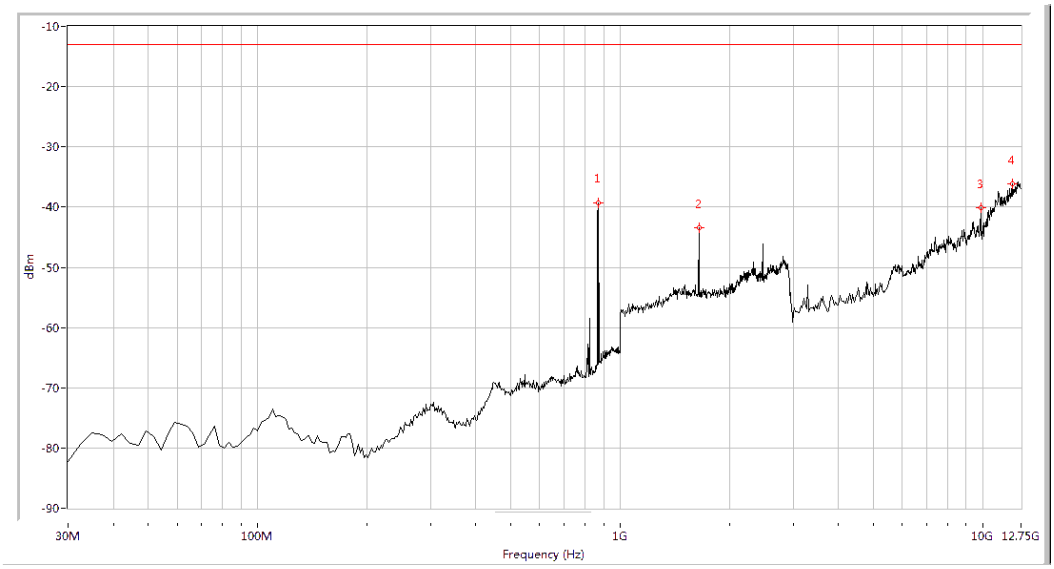
1. Test Verdict:

| 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 | < -25 | < -25 | Plot A.1/A.2 | -13 | PASS |
| | 190 | 836.6 | < -25 | < -25 | Plot A.3/A.4 | | PASS |
| | 251 | 848.8 | < -25 | < -25 | Plot A.5/A.6 | | PASS |
| GSM 1900MHz | 512 | 1850.2 | < -25 | < -25 | Plot B.1/B.2 | -13 | PASS |
| | 661 | 1880.0 | < -25 | < -25 | Plot B.3/B.4 | | PASS |
| | 810 | 1909.8 | < -25 | < -25 | Plot B.5/B.6 | | PASS |

2. Test Plots for the Whole Measurement Frequency Range:

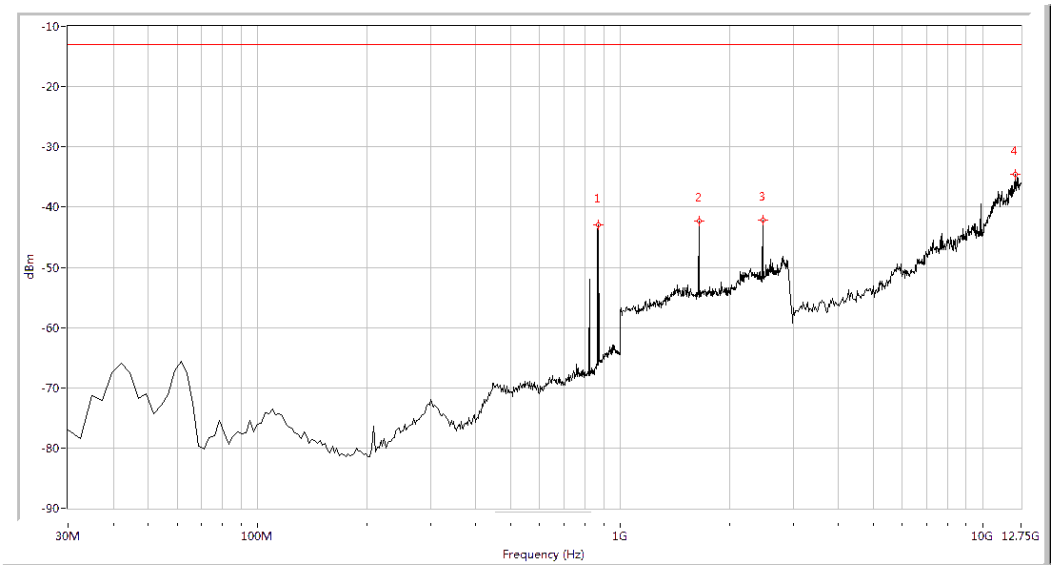
Note1: the power of the EUT transmitting frequency should be ignored.

Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.



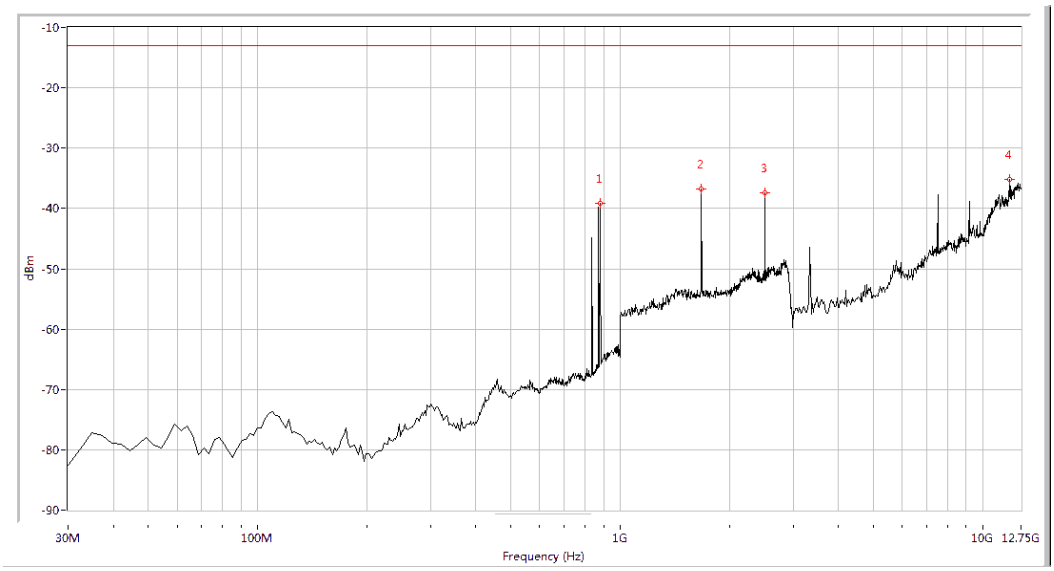

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -39.33 | -13.0 | 26.3 | 310.1 | Horizontal | PASS |
| 1648.379 | -43.39 | -13.0 | 30.4 | 225.8 | Horizontal | PASS |
| 9880.923 | -40.07 | -13.0 | 27.1 | 332.4 | Horizontal | PASS |
| 12044.888 | -36.11 | -13.0 | 23.1 | -0.0 | Horizontal | PASS |

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



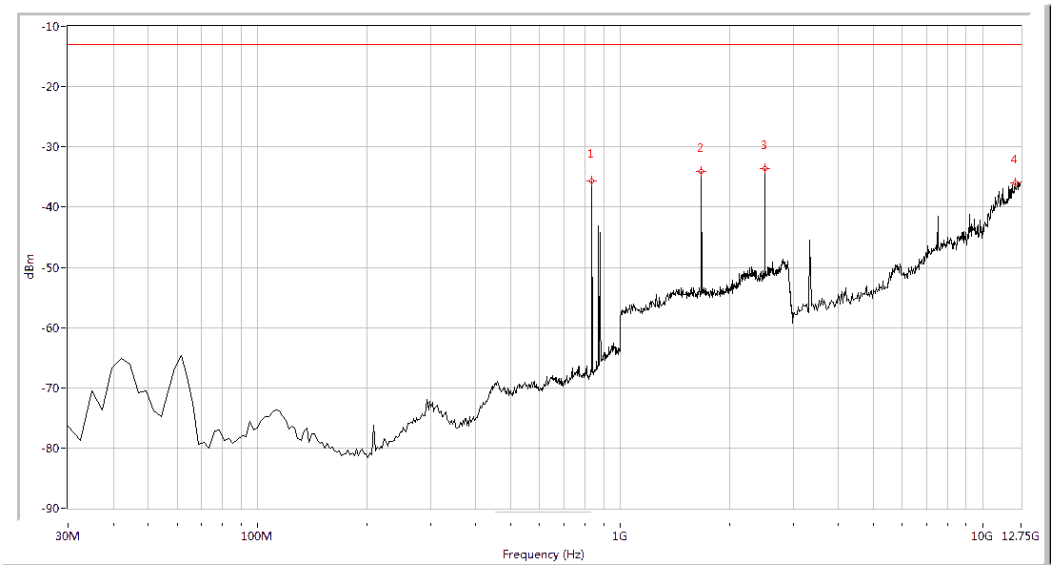

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -42.90 | -13.0 | 29.9 | 49.6 | Vertical | PASS |
| 1648.379 | -42.40 | -13.0 | 29.4 | 2.7 | Vertical | PASS |
| 2471.322 | -42.13 | -13.0 | 29.1 | 246.5 | Vertical | PASS |
| 12263.716 | -34.60 | -13.0 | 21.6 | 263.4 | Vertical | PASS |

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



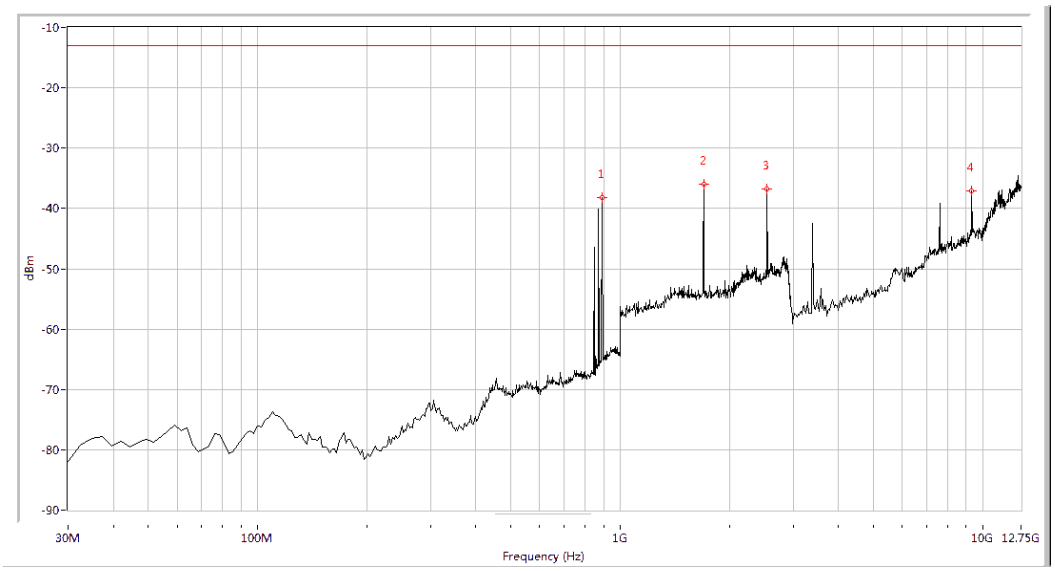

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 879.052 | -39.18 | -13.0 | 26.2 | 316.7 | Horizontal | PASS |
| 1673.317 | -36.70 | -13.0 | 23.7 | 77.1 | Horizontal | PASS |
| 2506.234 | -37.36 | -13.0 | 24.4 | 48.1 | Horizontal | PASS |
| 11874.688 | -35.25 | -13.0 | 22.2 | 189.6 | Horizontal | PASS |

(Plot A.3: GSM 850MHz Channel = 190, Test Antenna Horizontal)



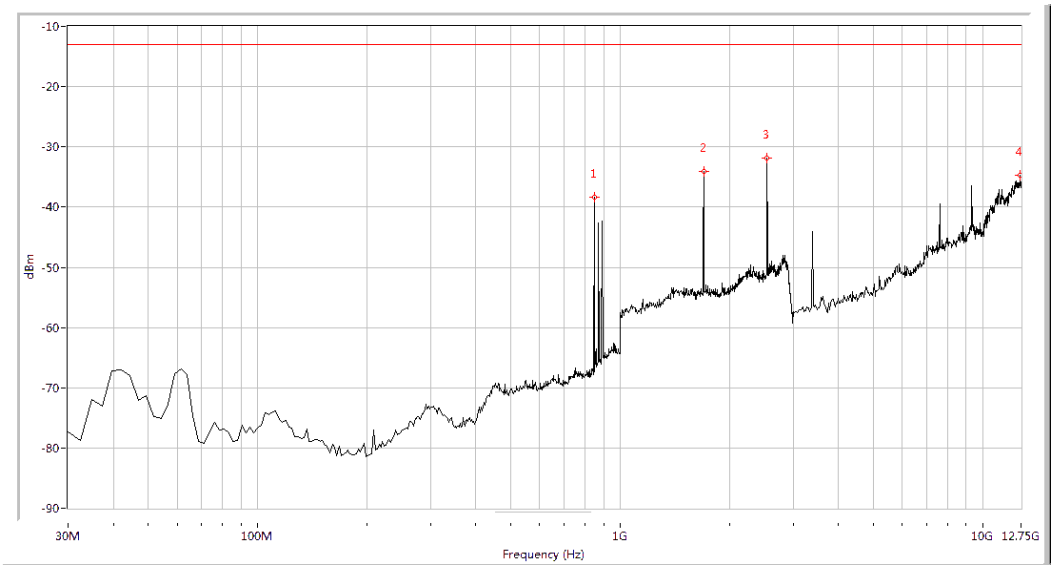

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 835.511 | -35.67 | -13.0 | 22.7 | 86.5 | Vertical | PASS |
| 1673.317 | -34.10 | -13.0 | 21.1 | 335.5 | Vertical | PASS |
| 2506.234 | -33.55 | -13.0 | 20.5 | 229.5 | Vertical | PASS |
| 12263.716 | -36.03 | -13.0 | 23.0 | 271.8 | Vertical | PASS |

(Plot A.4: GSM 850MHz Channel = 190, Test Antenna Vertical)



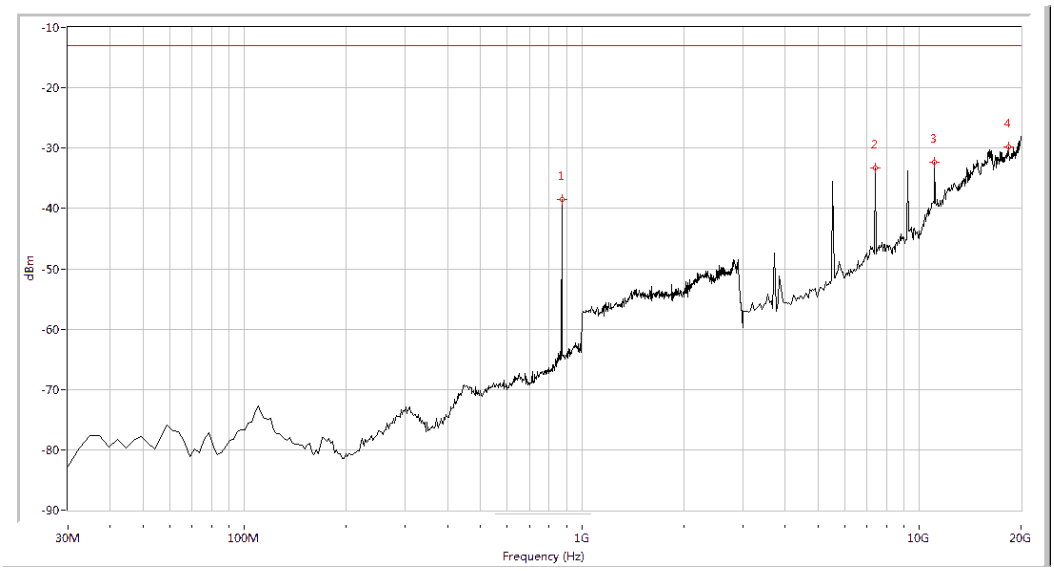

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 891.147 | -38.21 | -13.0 | 25.2 | 286.3 | Horizontal | PASS |
| 1698.254 | -36.02 | -13.0 | 23.0 | 46.0 | Horizontal | PASS |
| 2541.147 | -36.76 | -13.0 | 23.8 | 46.0 | Horizontal | PASS |
| 9321.696 | -37.06 | -13.0 | 24.1 | 13.8 | Horizontal | PASS |

(Plot A.5: GSM MHz Channel = 251, Test Antenna Horizontal)



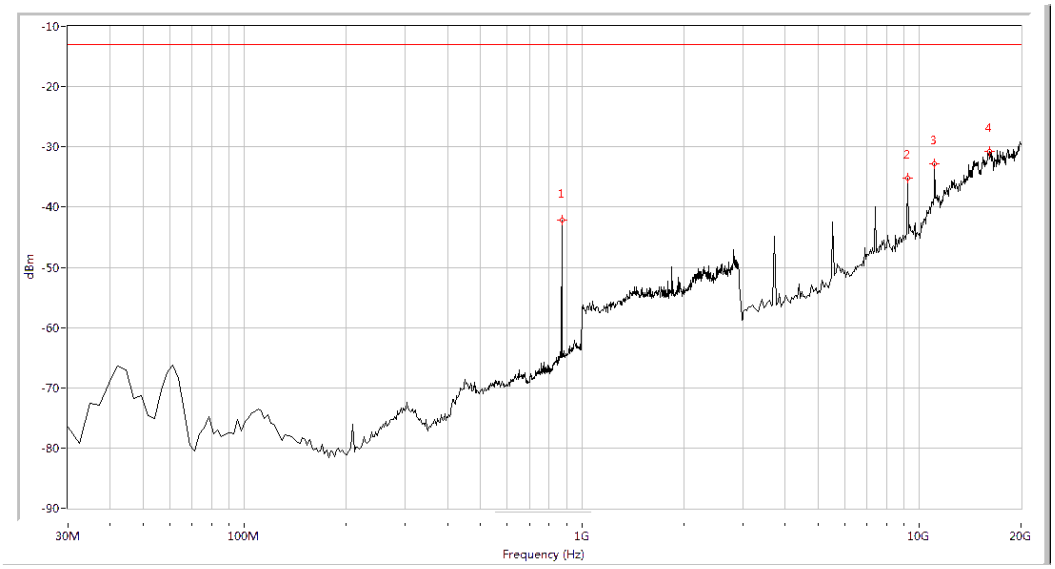

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 847.606 | -38.41 | -13.0 | 25.4 | 106.6 | Vertical | PASS |
| 1698.254 | -34.15 | -13.0 | 21.1 | 92.7 | Vertical | PASS |
| 2541.147 | -31.92 | -13.0 | 18.9 | 309.2 | Vertical | PASS |
| 12701.372 | -34.78 | -13.0 | 21.8 | 0.8 | Vertical | PASS |

(Plot A.6: GSM 850MHz Channel = 251, Test Antenna Vertical)



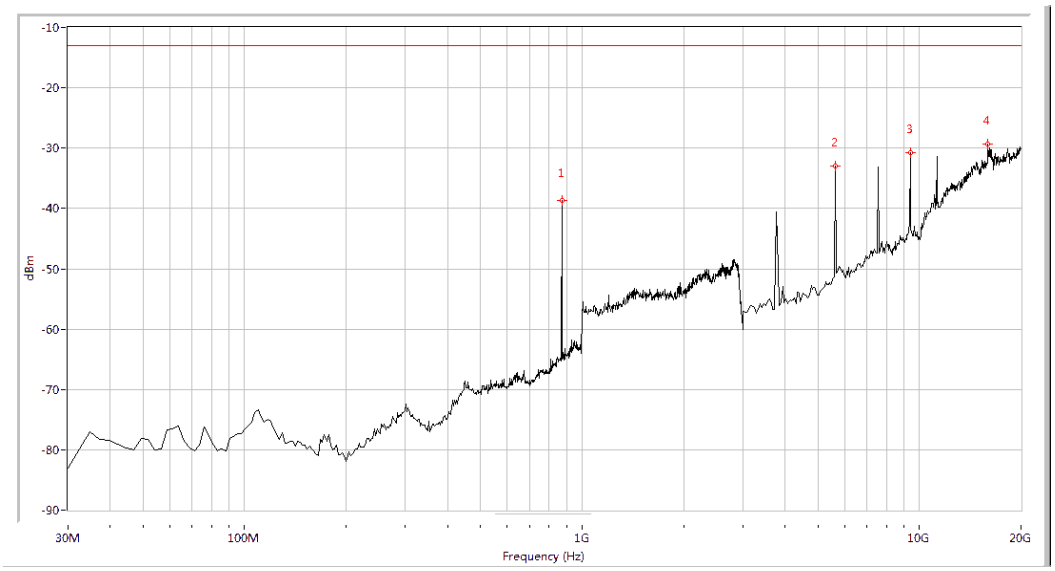

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -38.49 | -13.0 | 25.5 | 306.7 | Horizontal | PASS |
| 7408.978 | -33.27 | -13.0 | 20.3 | 93.2 | Horizontal | PASS |
| 11097.257 | -32.31 | -13.0 | 19.3 | 143.1 | Horizontal | PASS |
| 18346.633 | -29.84 | -13.0 | 16.8 | 192.2 | Horizontal | PASS |

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



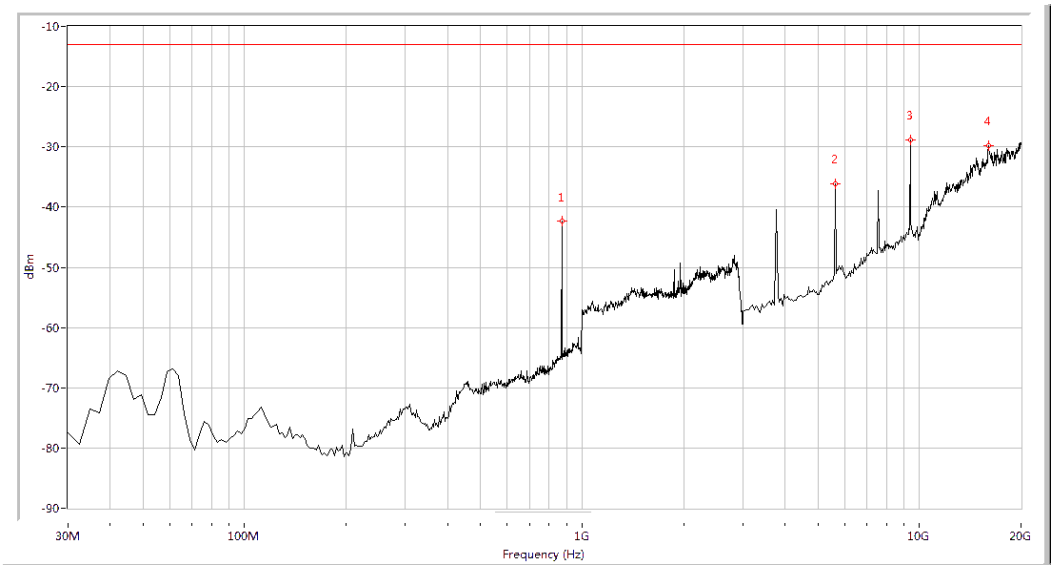

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -42.23 | -13.0 | 29.2 | 47.6 | Vertical | PASS |
| 9231.920 | -35.25 | -13.0 | 22.2 | -0.0 | Vertical | PASS |
| 11097.257 | -32.85 | -13.0 | 19.8 | 156.3 | Vertical | PASS |
| 16099.751 | -30.72 | -13.0 | 17.7 | 148.5 | Vertical | PASS |

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



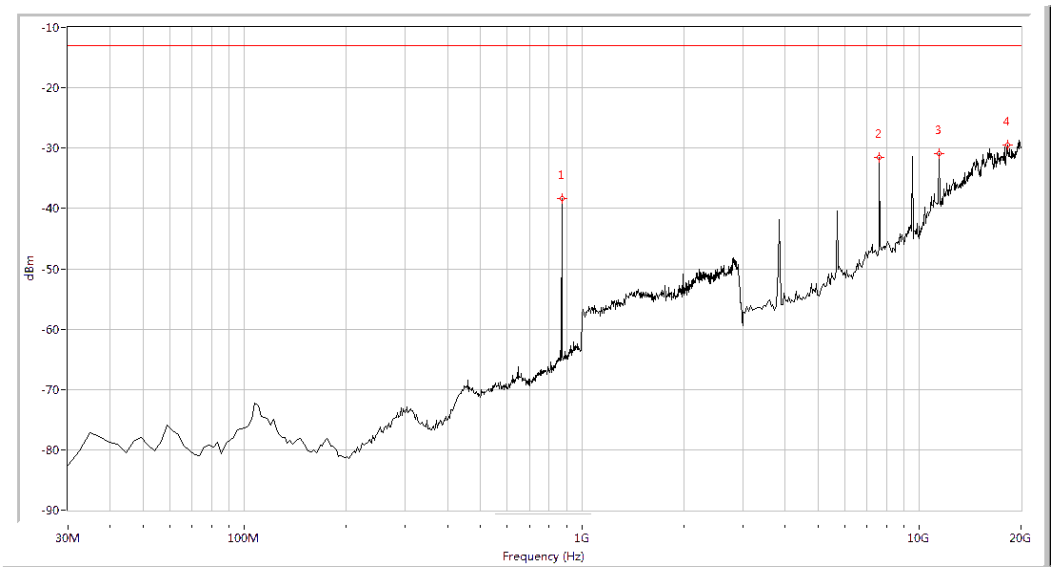

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -38.68 | -13.0 | 25.7 | 318.8 | Horizontal | PASS |
| 5628.429 | -32.99 | -13.0 | 20.0 | 360.0 | Horizontal | PASS |
| 9401.496 | -30.83 | -13.0 | 17.8 | 252.6 | Horizontal | PASS |
| 15930.175 | -29.39 | -13.0 | 16.4 | 360.0 | Horizontal | PASS |

(Plot B.3: GSM 1900MHz Channel = 661, Test Antenna Horizontal)



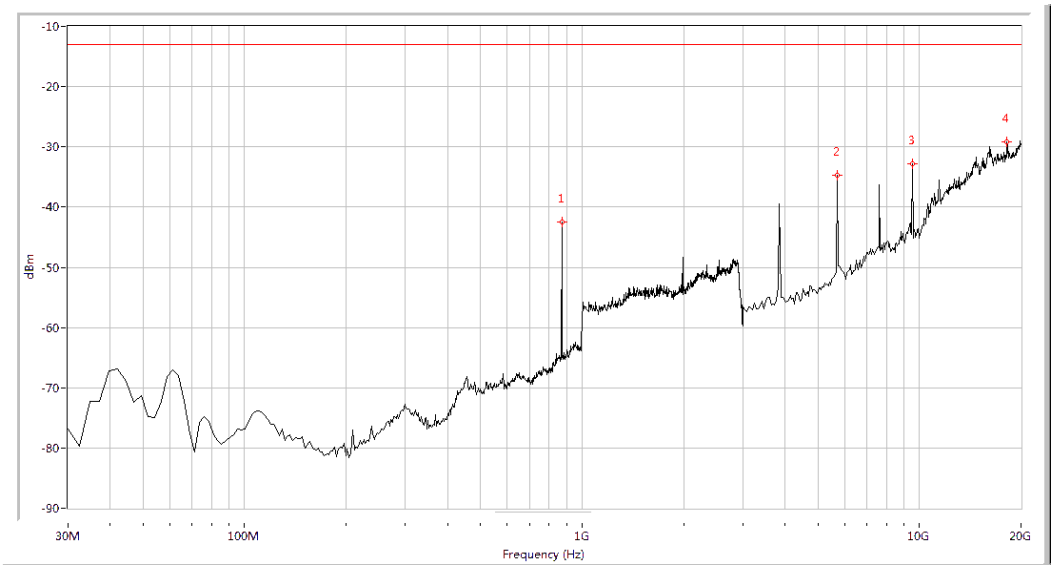

| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -42.28 | -13.0 | 29.3 | 43.8 | Vertical | PASS |
| 5628.429 | -36.11 | -13.0 | 23.1 | 350.9 | Vertical | PASS |
| 9401.496 | -28.85 | -13.0 | 15.8 | 24.7 | Vertical | PASS |
| 16014.963 | -29.75 | -13.0 | 16.8 | -0.0 | Vertical | PASS |

(Plot B.4: GSM 1900MHz Channel = 661, Test Antenna Vertical)




| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -38.42 | -13.0 | 25.4 | 312.7 | Horizontal | PASS |
| 7620.948 | -31.59 | -13.0 | 18.6 | 325.3 | Horizontal | PASS |
| 11436.409 | -30.87 | -13.0 | 17.9 | 80.2 | Horizontal | PASS |
| 18219.451 | -29.55 | -13.0 | 16.6 | -0.0 | Horizontal | PASS |

(Plot B.5: GSM 1900MHz Channel = 810, Test Antenna Horizontal)




| Fre. (MHz) | Peak | Limit(PK) | Margin | Degree | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 871.796 | -42.42 | -13.0 | 29.4 | 52.5 | Vertical | PASS |
| 5713.217 | -34.77 | -13.0 | 21.8 | -0.0 | Vertical | PASS |
| 9528.678 | -32.79 | -13.0 | 19.8 | 360.0 | Vertical | PASS |
| 18177.057 | -29.24 | -13.0 | 16.2 | 76.7 | Vertical | PASS |

(PlotB.6: GSM 1900MHz Channel = 810, Test Antenna Vertical)

** END OF REPORT **