



47 CFR PART 22 SUBPART H & 24 SUBPART E

TEST REPORT

of

GPS TRACKER

Model Name: GS200
Brand Name: QUECTEL
Report No.: SH10010035R01
FCC ID: XMR-16182010001

prepared for

Quectel Wireless Solutions Co.,Ltd
Room 801, Building E, No.1618 Yishan Road, Shanghai,China,201103



Shenzhen Electronic Product Quality Testing Center

Morlab Laboratory

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

Tel: +86 755 86130398

Fax: +86 755 86130218



Bluetooth®

CTIA Authorized Test Lab

LAB CODE 20081223-00

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1. TEST CERTIFICATION

Equipment under Test: GPS TRACKER

Brand Name: QUECTEL

Model Name: GS200

FCC ID: XMR-16182010001

Applicant: Quectel Wireless Solutions Co.,Ltd

Room 801, Building E, No 1618 Yishan Road,
Shanghai, China, 201103

Manufacturer: Quectel Wireless Solutions Co.,Ltd

Room 801, Building E, No 1618 Yishan Road,
Shanghai, China, 201103

Test Standards: 47 CFR Part 2
47 CFR Part 22 Subpart H
47 CFR Part 24 Subpart E

Test Date(s): Jan 25, 2010 – Jan 27, 2010

Test Result: PASS

* We Hereby Certify That:

The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: Zhang Wenjie Dated: 2010.2.1
Zhang Wenjie

Reviewed by: Zhang Jun Dated: 2010.2.1
Zhang Jun

Approved by: Su Feng Dated: 2010.2.1
Su Feng



2. GENERAL INFORMATION

2.1 EUT Description

EUT Type: GPS TRACKER
Model Name: GS200
Serial No.....: (n.a)
IMEI: 0000000000000000

Hardware Version: V1.02
Software Version: B03
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
Power Supply: Battery
Brand name: Jiade
Mode Name.: GS200
Capacitance: 1150mAh
Rated voltage: 3.7V
Charge limited: 4.2V
Manufacturer: Jiade Energy Technology(ZHUHAI)Co.,Ltd.
2/F,Helping Industrial Center Building,#209
Shihua Road West, Jida Area Zhuhai, China

Ancillary Equipments.....: AC Adapter (Charger for Battery)
Brand name: SOMETHING
Mode Name.: P-051B-050050
Rated Input: AC 100/240V,200mA,50/60Hz
Rated Output: DC 5V,500mA,Max 2.5W
Manufacturer: SOMETHING HIGH ELECTRIC (XIAMEN)
Co.,Ltd.
No.421, Xiahushe, Houkengshe Area, Huli
Industrial Park, Xiamen, China

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

2.2 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 (10-1-05 Edition) | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2 | 47 CFR Part 22 (10-1-05 Edition) | Public Mobile Services |
| 3 | 47 CFR Part 24 (10-1-05 Edition) | Personal Communications Services |

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

| No. | Section | Description | Result |
|-----|--------------------------------------|---------------------------------------|--------|
| 1 | 2.106 22.905 24.229 | Frequencies | PASS |
| 2 | 2.1046 | Conducted RF Output Power | PASS |
| 3 | 2.1049 | 20dB Occupied Bandwidth | PASS |
| 4 | 2.1055 22.355 24.235 | Frequency Stability | PASS |
| 5 | 2.1051 2.1057 22.917 24.238 | Conducted Out of Band Emissions | PASS |
| 6 | 2.1051 2.1057 22.917 24.238 | Band Edge | PASS |
| 7 | 22.913 24.232 | Transmitter Radiated Power (EIPR/ERP) | PASS |
| 8 | 2.1053 2.1057 22.917 24.238 | Radiated Out of Band Emissions | PASS |

2.3 Facilities and Accreditations

2.3.1 Facilities

Shenzhen Electronic Product Quality Testing Center Morlab Laboratory is a testing organization accredited by China National Accreditation Board for Laboratories (CNAL) according to ISO/IEC 17025. The accreditation certificate number is L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 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.

2.3.2 Test Environment Conditions

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

| | |
|-----------------------------|---------|
| Temperature (°C): | 20 - 25 |
| Relative Humidity (%): | 40 - 60 |
| Atmospheric Pressure (kPa): | 96 |

3. 47 CFR PART 2, PART 22H & 24E REQUIREMENTS

3.1 Frequencies

3.1.1 Requirement

According to FCC section 22.905, the frequency blocks assignment for the cellular radiotelephone service is listed as below:

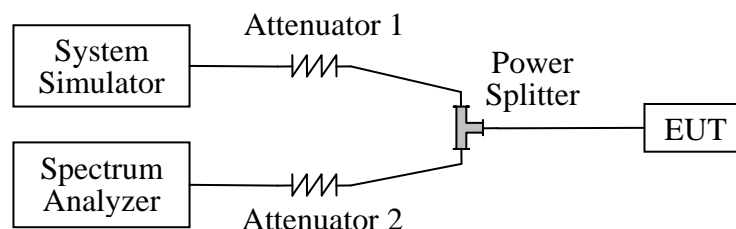
- (a) Channel Block A:
Mobile 824 - 835MHz, Base 869 - 880MHz;
Mobile 845 - 846.5MHz, Base 890 - 891.5MHz
- (b) Channel Block B:
Mobile 835 - 845 MHz, Base 880 - 890MHz;
Mobile 846.5 - 849 MHz, Base 891.5 - 894MHz

According to FCC section 24.229, the frequencies available in the Broadband PCS services are listed as below, in accordance with the frequency allocations table of FCC section 2.106.

- (a) The following frequency blocks are available for assignment on an MTA basis:
Block A: 1850 - 1865MHz paired with 1930 - 1945MHz;
Block B: 1870 - 1885MHz paired with 1950 - 1965MHz.
- (b) The following frequency blocks are available for assignment on a BTA basis:
Block C: 1895 - 1910 MHz paired with 1975 - 1990MHz;
Block D: 1865 - 1870 MHz paired with 1945 - 1950MHz;
Block E: 1885 - 1890 MHz paired with 1965 - 1970MHz;
Block F: 1890 - 1895 MHz paired with 1970 - 1975MHz.

3.1.2 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 | Cal. Due |
|-------------------|--------------|--------|------------|-----------|----------|
| SS | Agilent | E5515C | GB46040102 | 2009.10 | 1year |
| Spectrum Analyzer | Agilent | E4440A | MY46187763 | 2009.10 | 1year |
| Power Splitter | HP | 11667B | 00164 | (n.a.) | (n.a.) |
| Attenuator 1 | Resnet | 10dB | (n.a.) | (n.a.) | (n.a.) |
| Attenuator 2 | Resnet | 10dB | (n.a.) | (n.a.) | (n.a.) |

3.1.3 Test Result

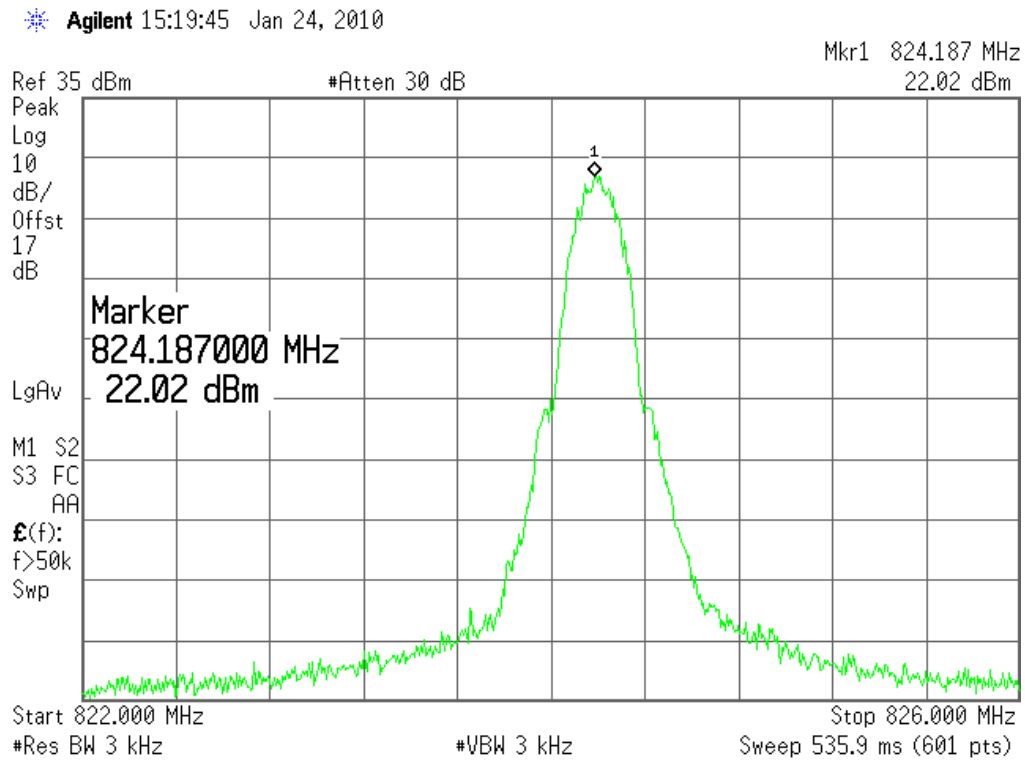
The Tx frequency arrangement of the Cellular 850MHz band employed by the EUT should be from 824.2MHz to 848.8MHz (the corresponding frequency block is from 824MHz to 849MHz), and Tx frequency arrangement of the PCS 1900MHz band employed by the EUT should be from 1850.2MHz to 1909.8MHz (the corresponding frequency block is from 1850MHz to 1910MHz). Here the lowest and highest channels are tested to verify the EUT's using the frequency block required.

1. Test Verdict:

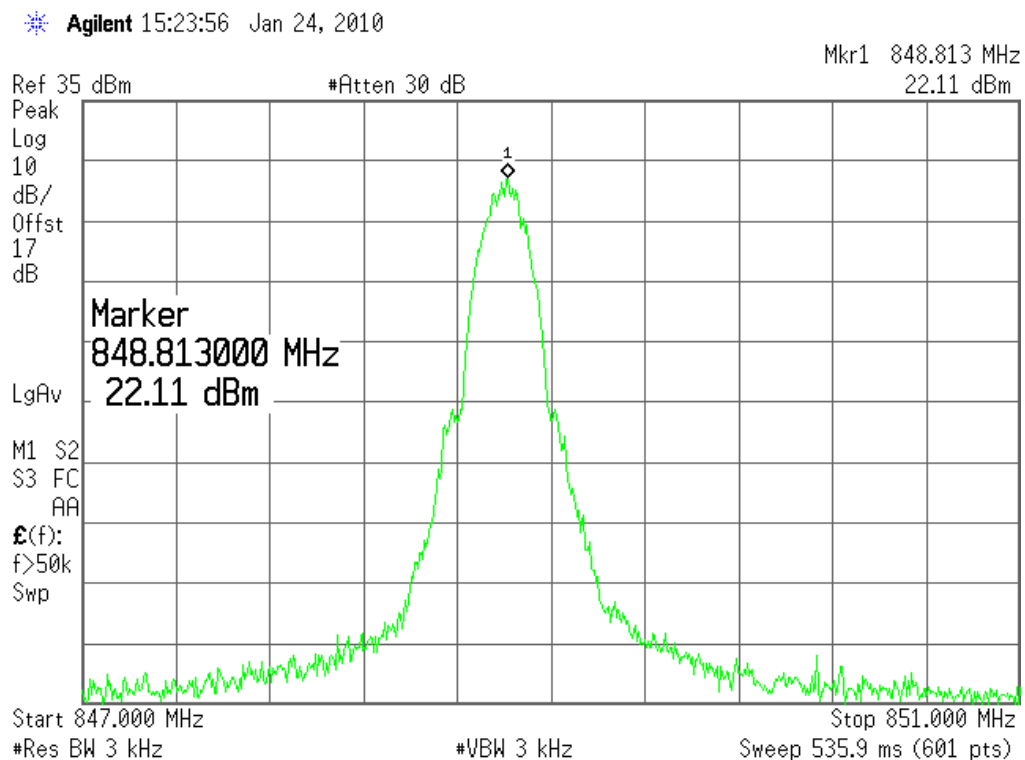
The required frequency block is employed legally, the verdict is PASS.

| Band | Channel | Frequency (MHz) | Measured Carrier (dBm) | Refer to Plot |
|-----------------|---------|-----------------|------------------------|---------------|
| GSM 850MHz | 128 | 824.18 | 22.02 | Plot A1 |
| | 251 | 848.81 | 22.11 | Plot B1 |
| GSM 1900MHz | 512 | 1850.18 | 18.15 | Plot C1 |
| | 810 | 1909.78 | 19.05 | Plot D1 |
| GPRS 850MHz | 128 | 824.21 | 23.00 | Plot E1 |
| | 251 | 848.76 | 21.67 | Plot F1 |
| GPRS 1900MHz | 512 | 1850.18 | 17.74 | Plot G1 |
| | 810 | 1909.86 | 18.60 | Plot H1 |

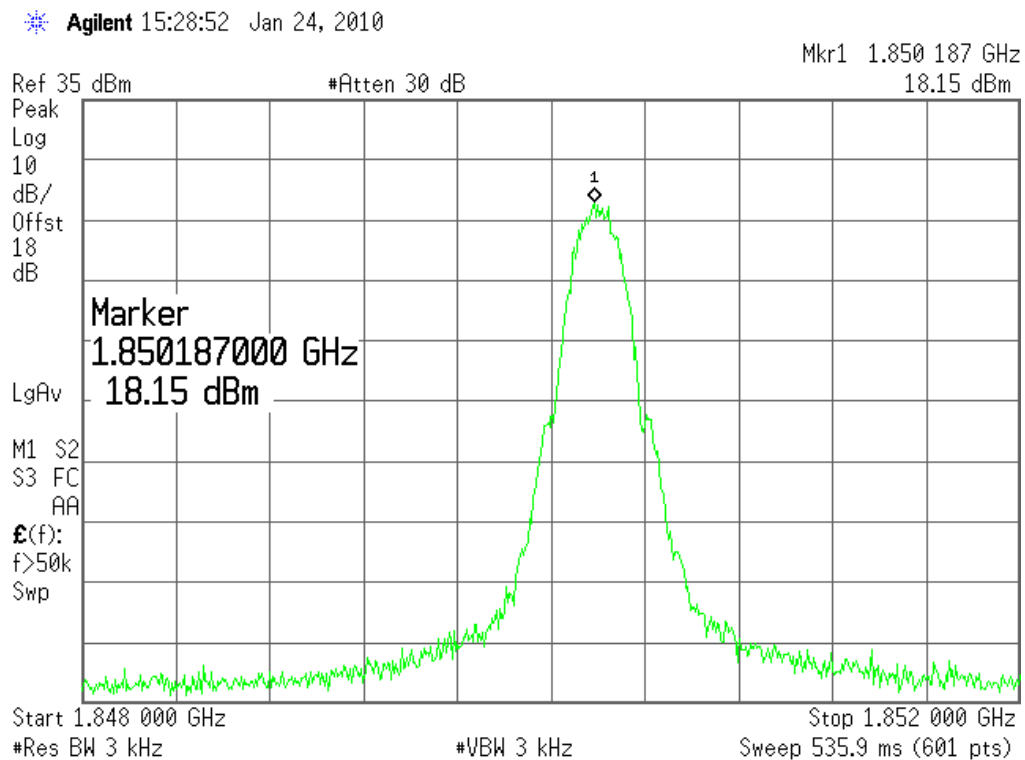
2. Test Plot:



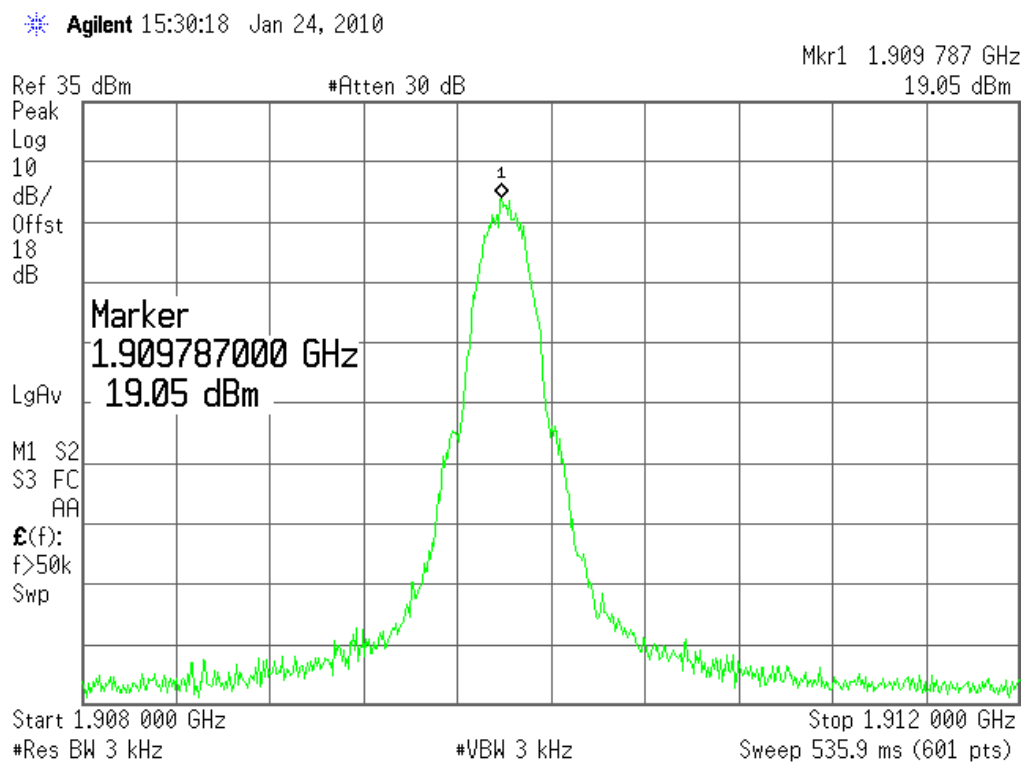
(Plot A1: GSM 850MHz Channel = 128)



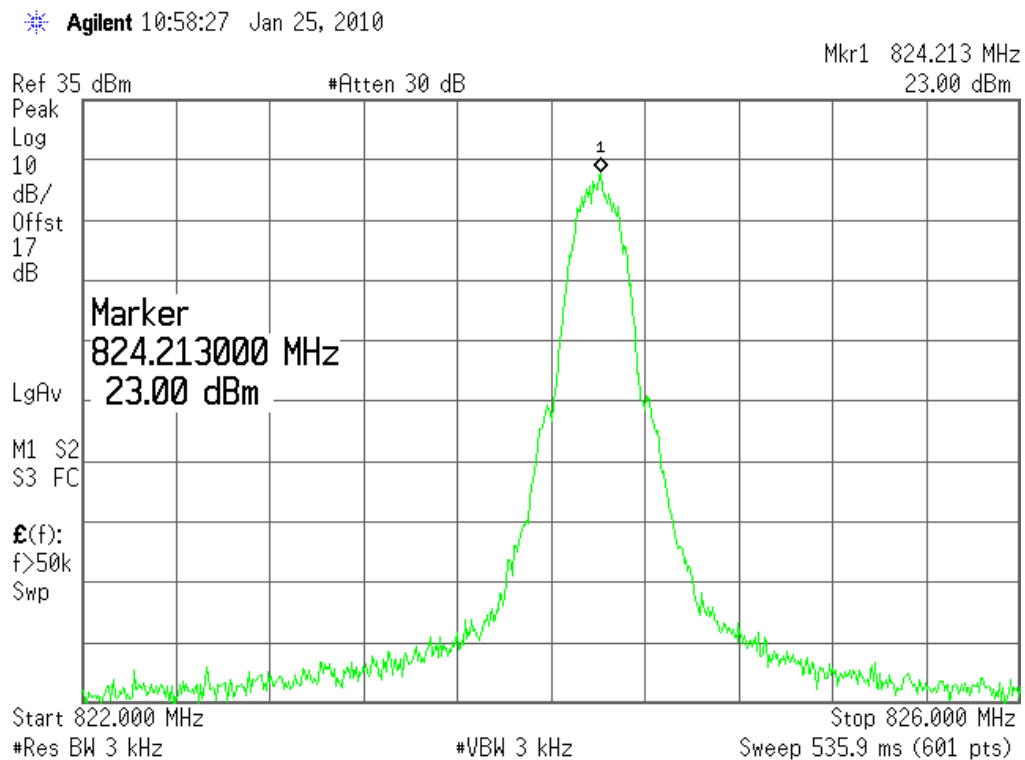
(Plot B1: GSM 850MHz Channel = 251)



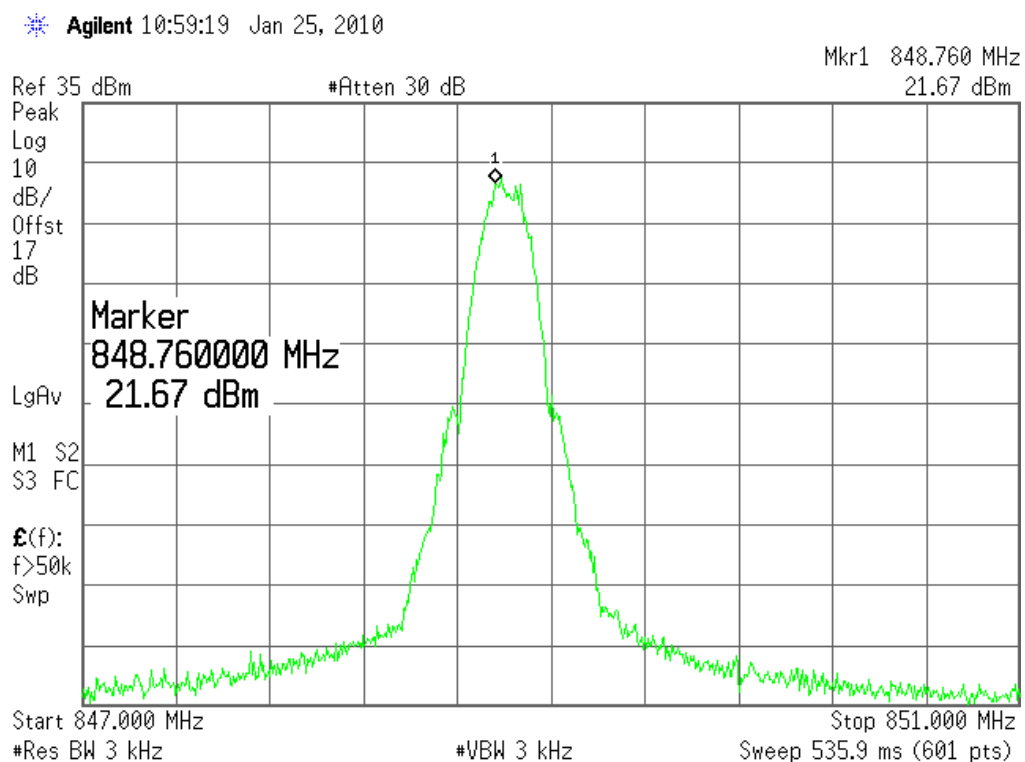
(Plot C1: GSM 1900MHz Channel = 512)



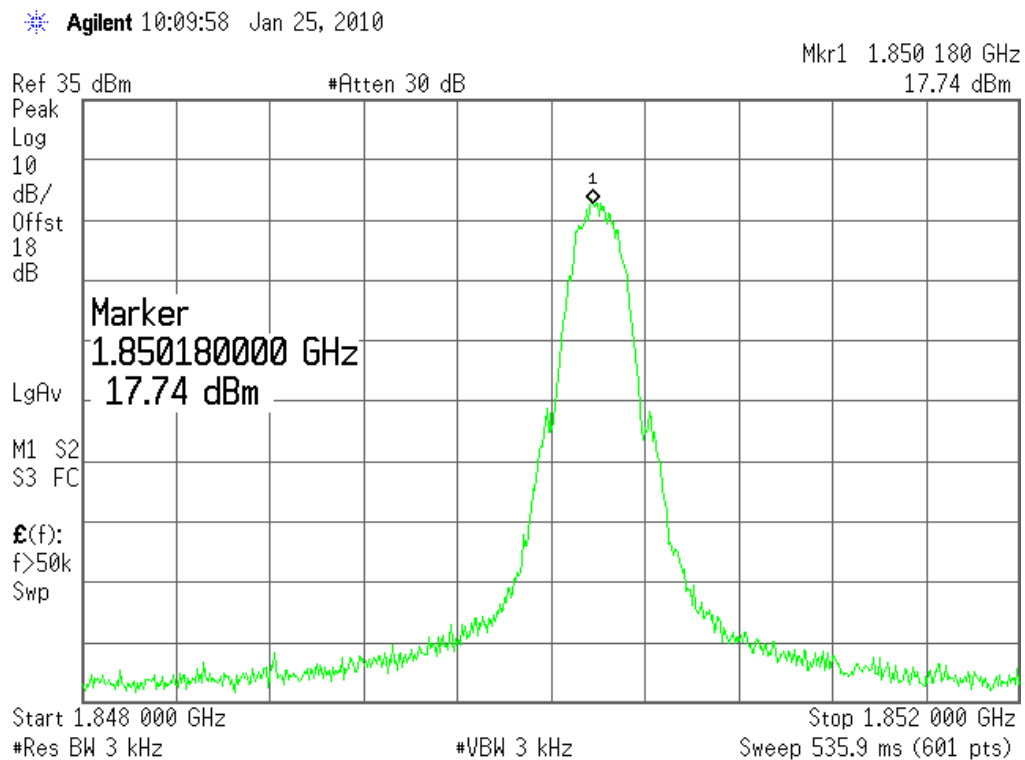
(Plot D1: GSM 1900MHz Channel = 810)



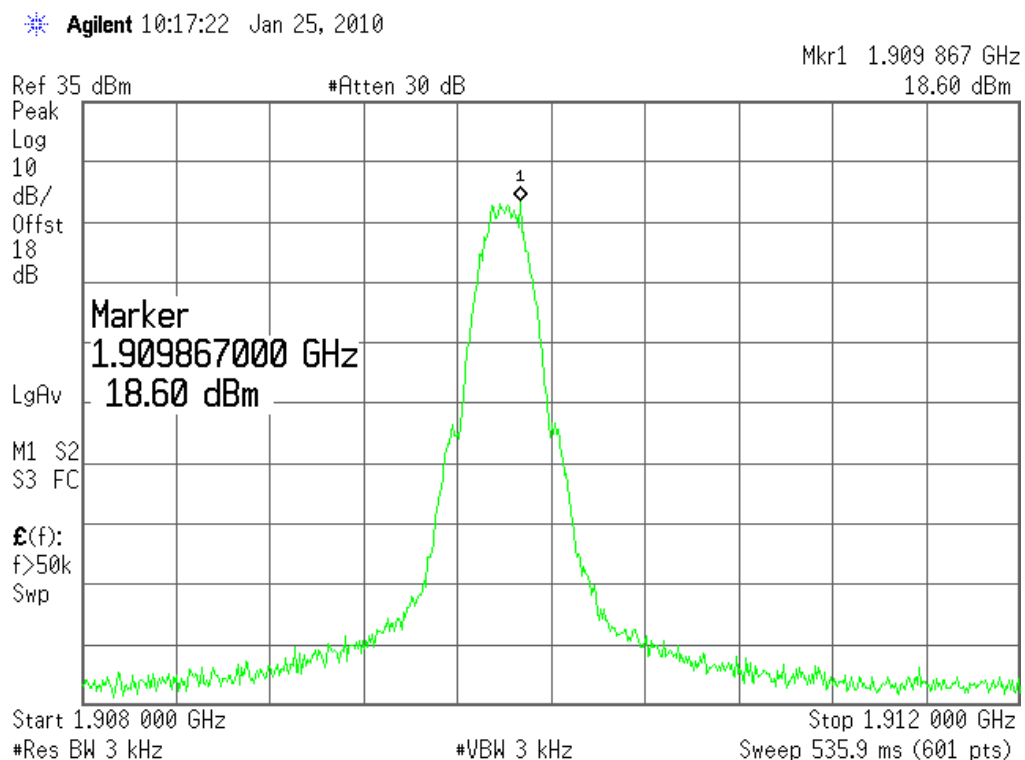
(Plot E1: GPRS 850MHz Channel = 128)



(Plot F1: GPRS 850MHz Channel = 251)



(Plot G1: GPRS 1900MHz Channel = 512)



(Plot H1: GPRS 1900MHz Channel = 810)

3.2 Conducted RF Output Power

3.2.1 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).

3.2.2 Test Description

See section 3.1.2 of this report.

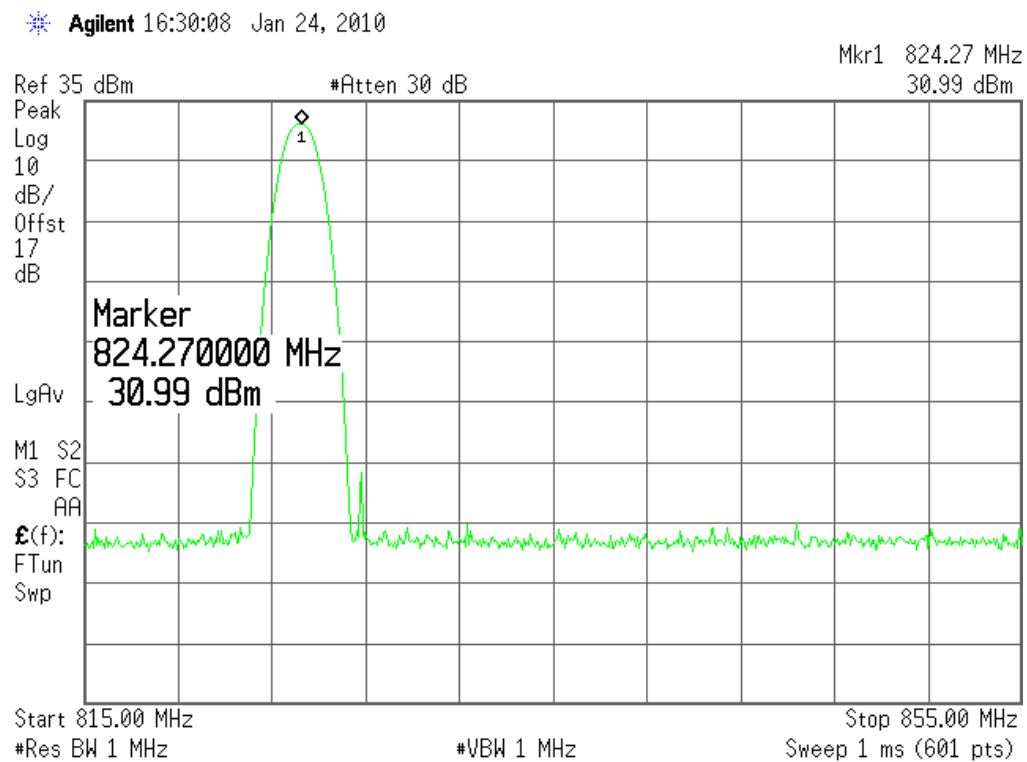
3.2.3 Test Result

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 within the tolerance of ± 3 dB, and For the GSM 1900MHz operates at PCL=0 (where Power Class is 1), the rated conducted RF output power is 30dBm within the tolerance of ± 3 dB.

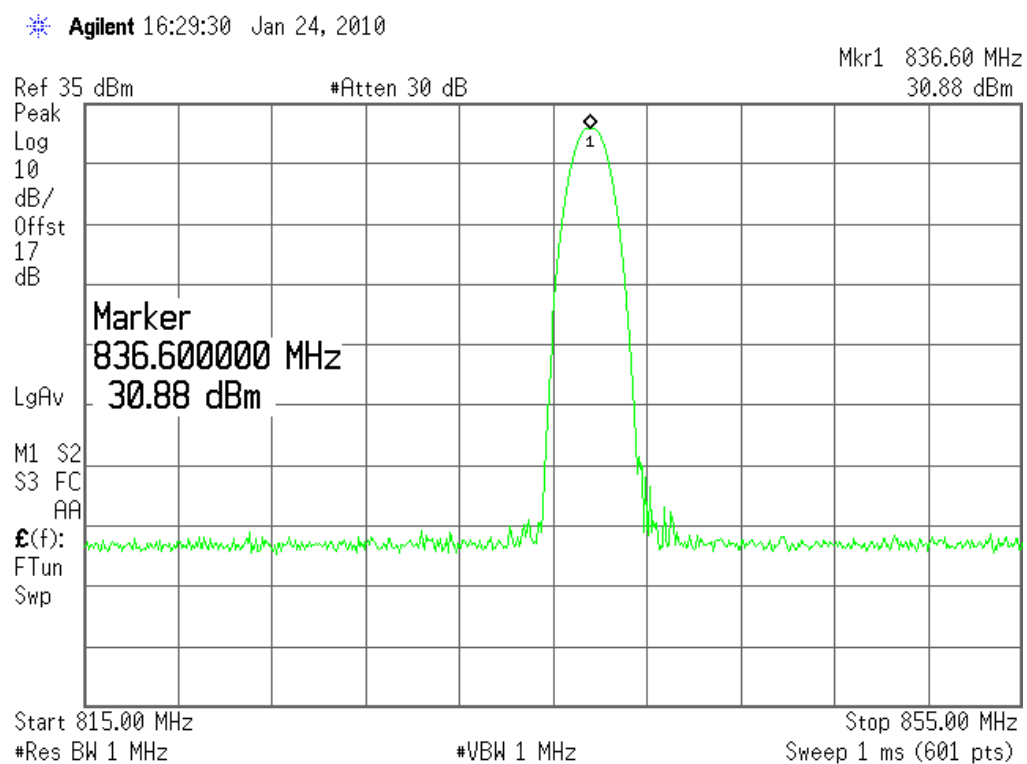
1. Test Verdict:

| Band | Channel | Frequency (MHz) | Measured Output Power | | Rated Output Power | | Verdict |
|--------------|---------|-----------------|-----------------------|---------------|--------------------|----------------|---------|
| | | | dBm | Refer to Plot | dBm | Tolerance (dB) | |
| GSM 850MHz | 128 | 824.27 | 30.99 | Plot A2 | 33 | ± 3 | PASS |
| | 190 | 836.60 | 30.88 | Plot B2 | | | PASS |
| | 251 | 848.87 | 30.81 | Plot C2 | | | PASS |
| GSM 1900MHz | 512 | 1850.13 | 27.55 | Plot D2 | 30 | ± 3 | PASS |
| | 661 | 1880.00 | 27.79 | Plot E2 | | | PASS |
| | 810 | 1909.73 | 27.61 | Plot F2 | | | PASS |
| GPRS 850MHz | 128 | 824.13 | 30.65 | Plot G2 | 33 | ± 3 | PASS |
| | 190 | 836.53 | 30.55 | Plot H2 | | | PASS |
| | 251 | 848.80 | 30.47 | Plot I2 | | | PASS |
| GPRS 1900MHz | 512 | 1850.13 | 27.05 | Plot J2 | 30 | ± 3 | PASS |
| | 661 | 1880.00 | 27.35 | Plot K2 | | | PASS |
| | 810 | 1909.73 | 27.11 | Plot L2 | | | PASS |

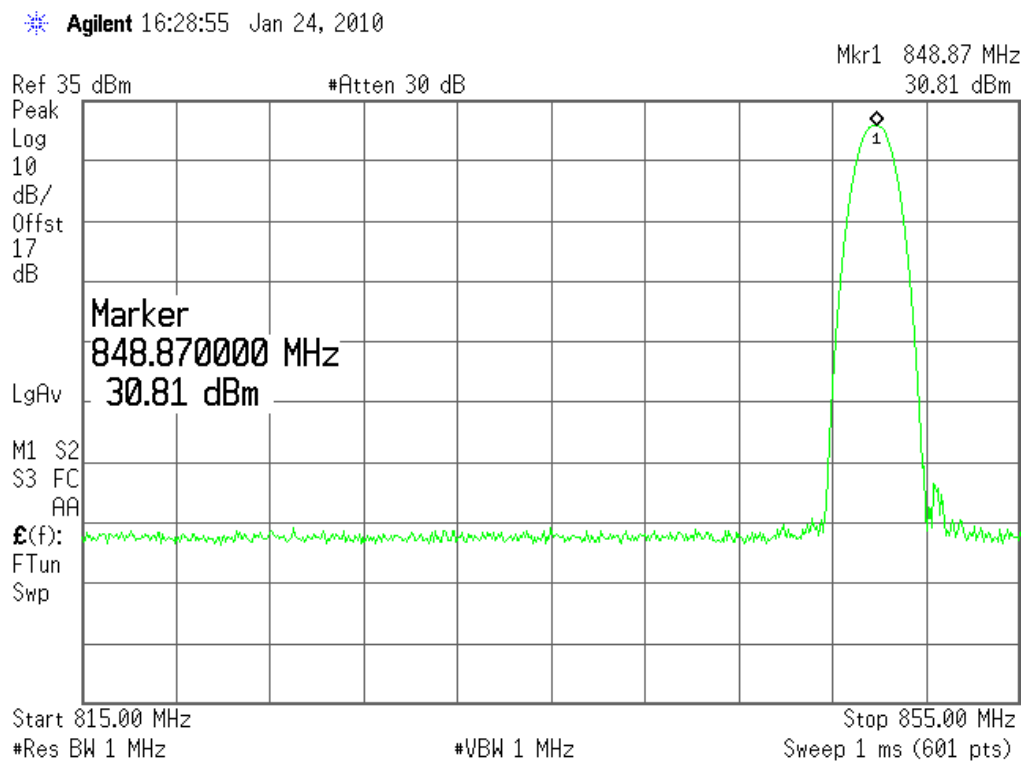
2. Test Plot:



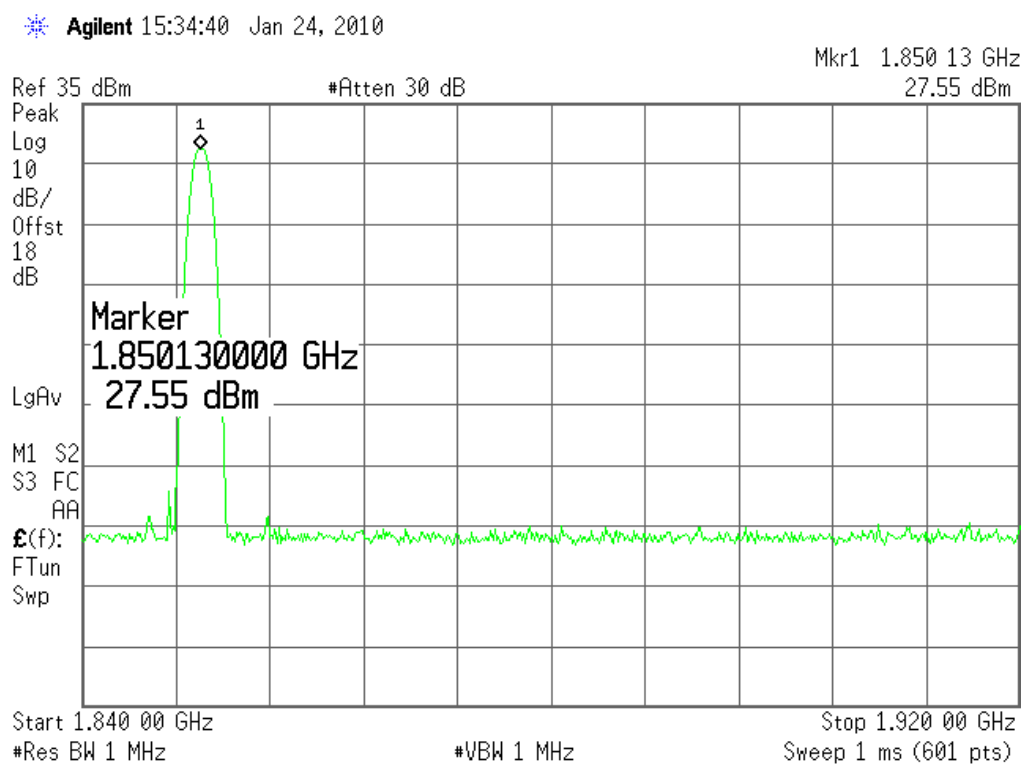
(Plot A2: GSM 850MHz Channel = 128)



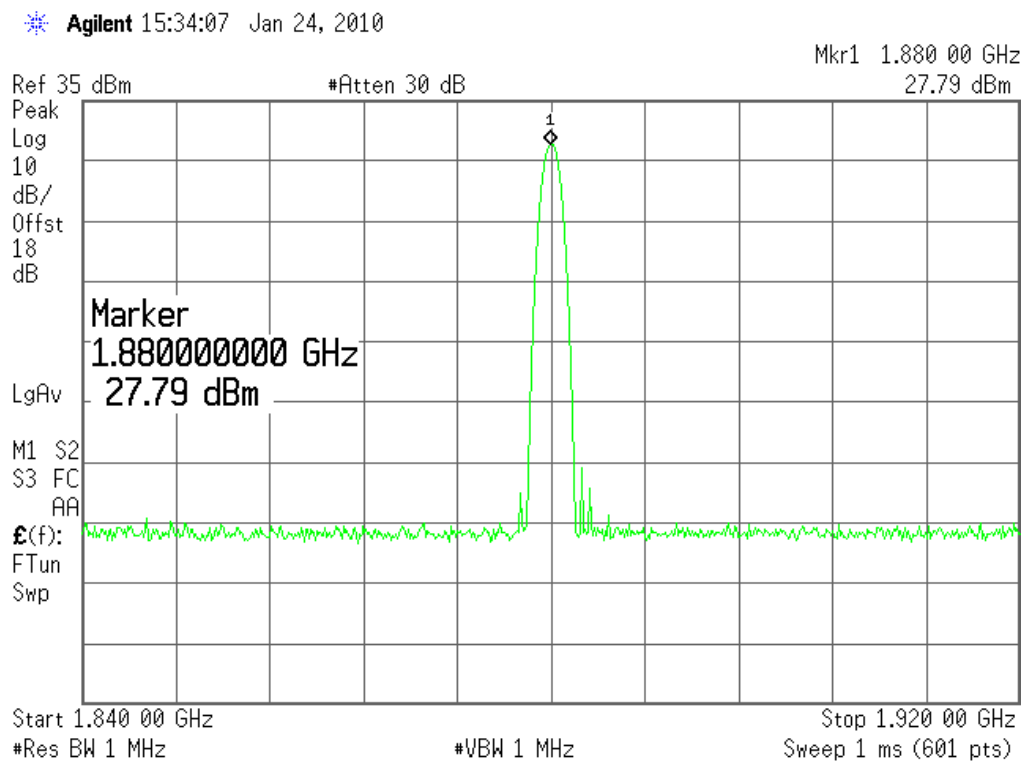
(Plot B2: GSM 850MHz Channel = 190)



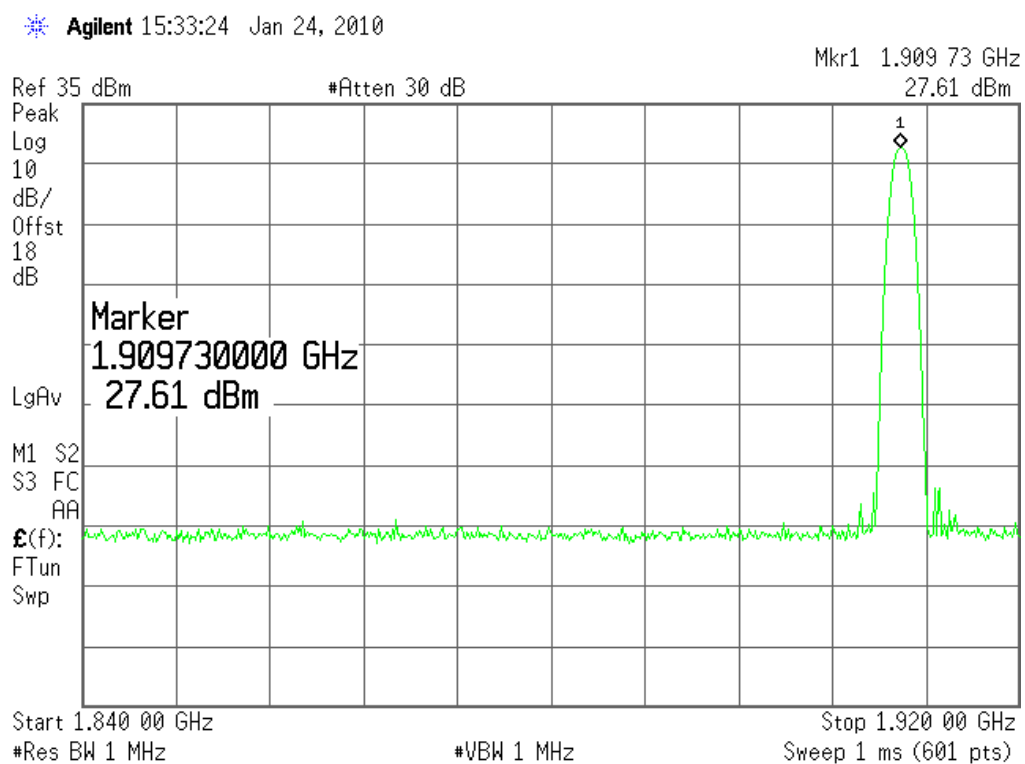
(Plot C2: GSM 850MHz Channel = 251)



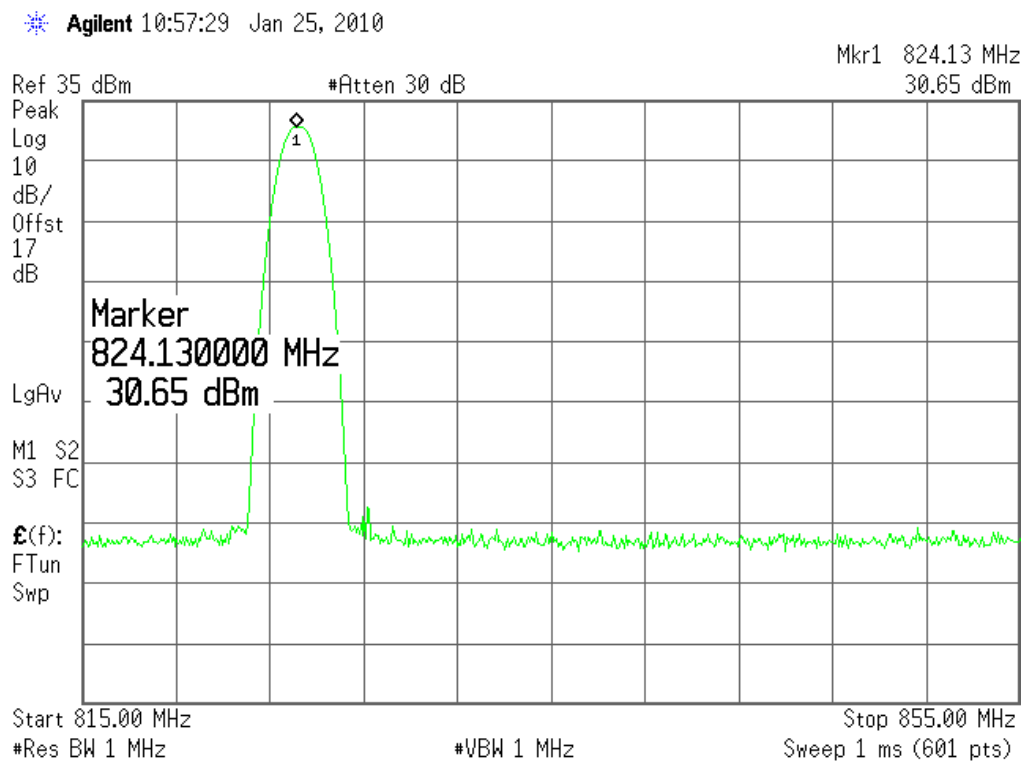
(Plot D2: GSM 1900MHz Channel = 512)



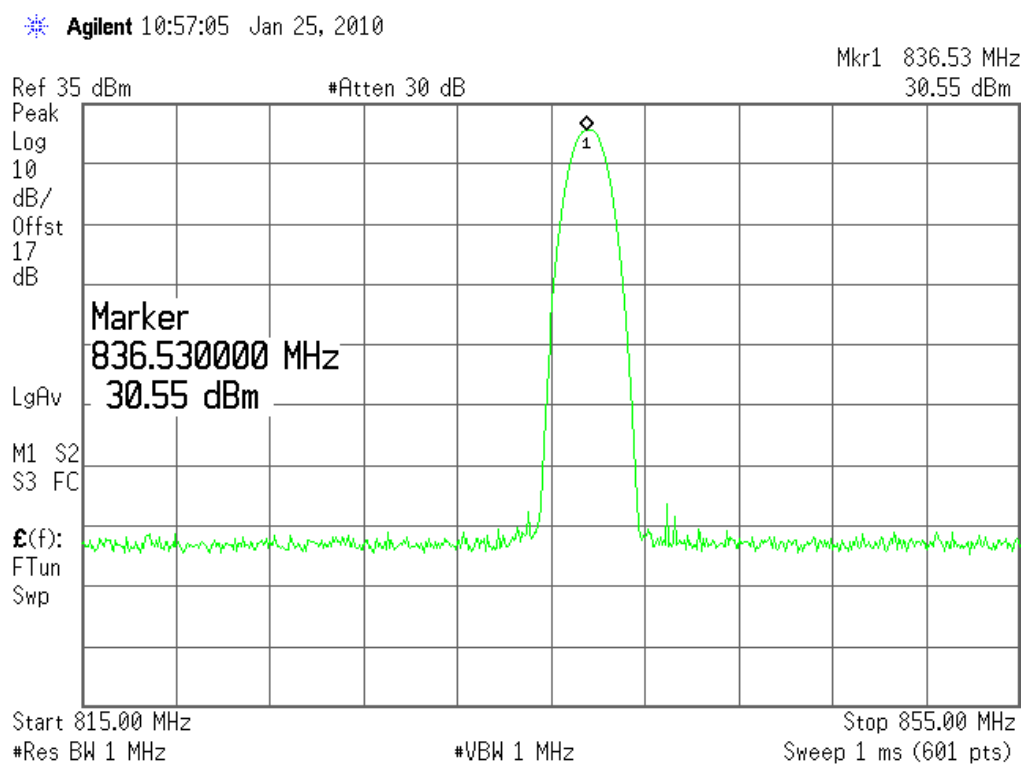
(Plot E2: GSM 1900MHz Channel = 661)



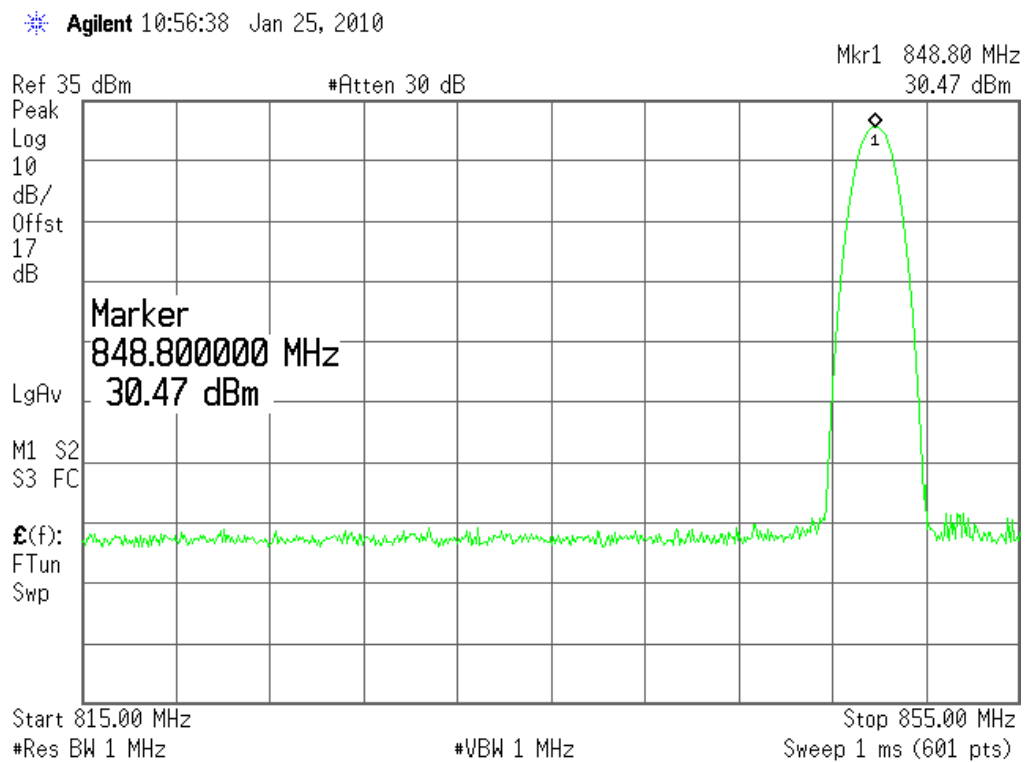
(Plot F2: GSM 1900MHz Channel = 810)



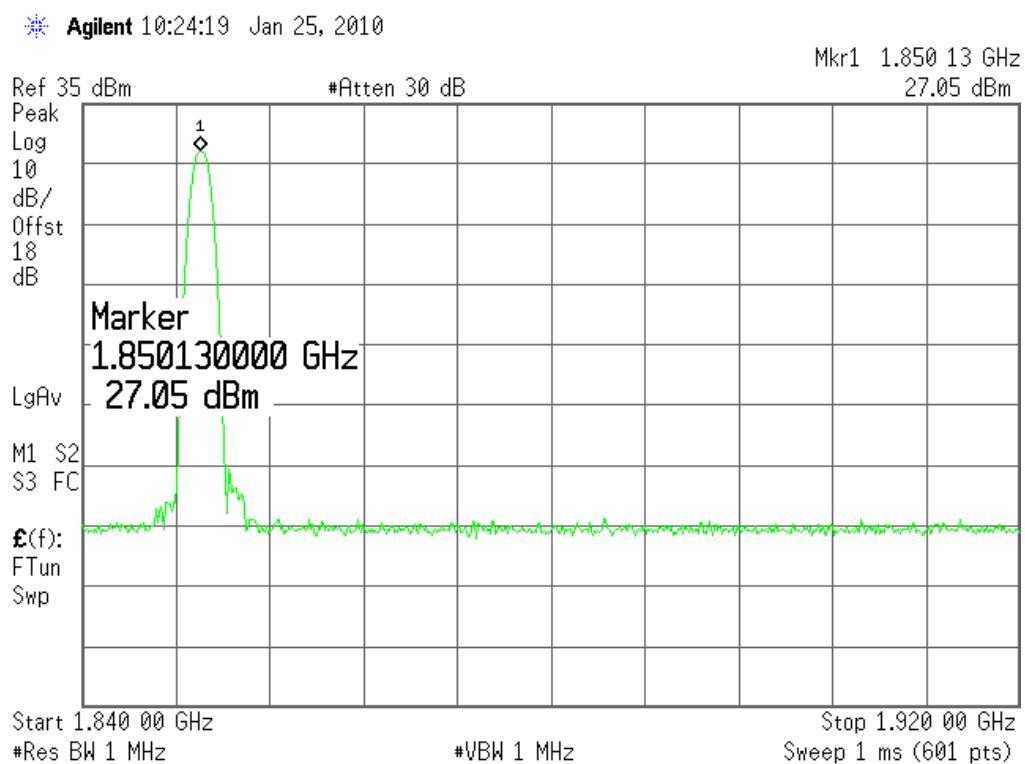
(Plot G2:GPRS 850MHz Channel = 128)



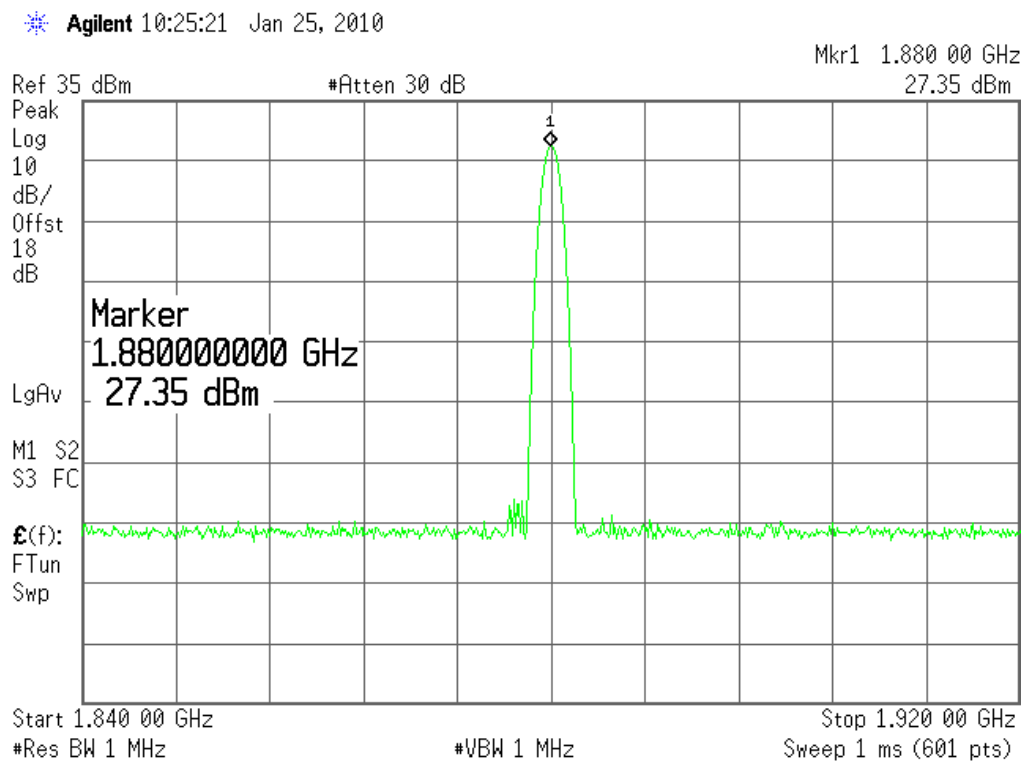
(Plot H2: GPRS 850MHz Channel = 190)



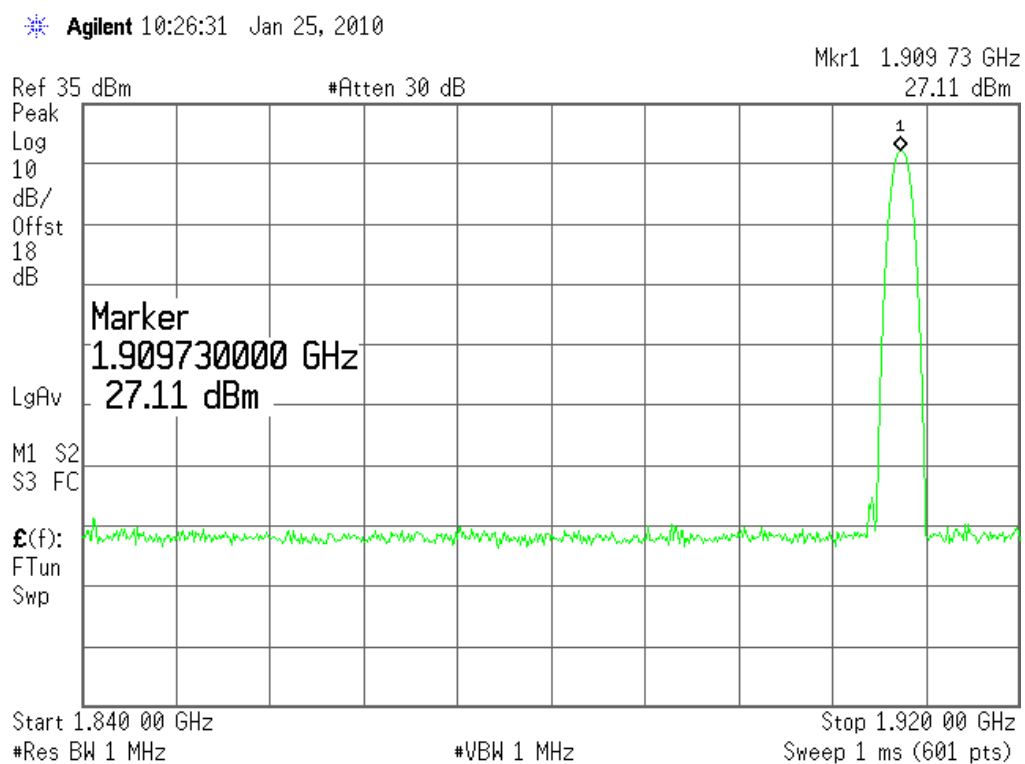
(Plot I2: GPRS 850MHz Channel = 251)



(Plot J2: GPRS 1900MHz Channel = 512)



(Plot K2: GPRS 1900MHz Channel = 661)



(Plot L2: GPRS 1900MHz Channel = 810)

3.3 20dB Occupied Bandwidth

3.3.1 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, or 20dB bandwidth ($10 \cdot \log 1\% = 20\text{dB}$) taking the total RF output power as reference.

3.3.2 Test Description

See section 3.1.2 of this report.

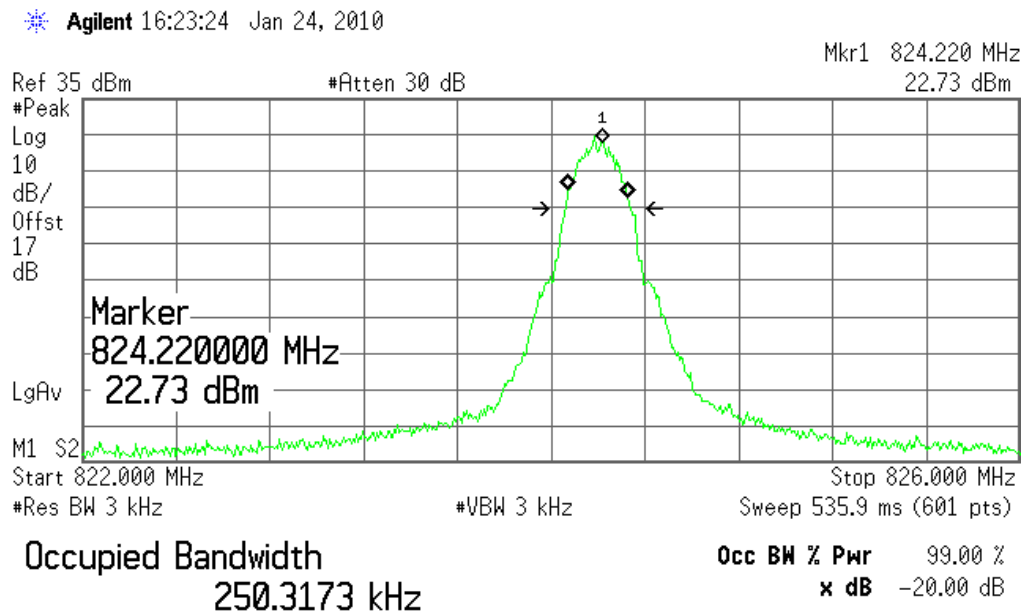
3.3.3 Test Verdict

Here the lowest, middle and highest channels are tested to record the 20dB occupied bandwidth, it's about 300kHz.

1. Test Verdict:

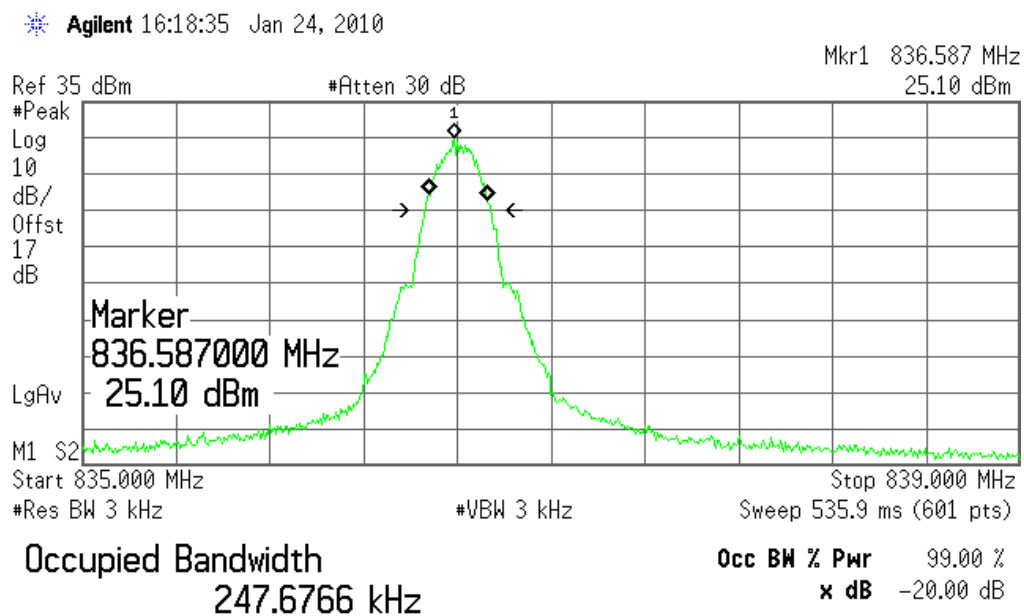
| Band | Channel | Frequency (MHz) | Measured 20dB Occupied Bandwidth (kHz) | Refer to Plot |
|--------------|---------|-----------------|--|---------------|
| GSM 850MHz | 128 | 824.22 | 250.3173 | Plot A3 |
| | 190 | 836.58 | 247.6766 | Plot B3 |
| | 251 | 848.81 | 266.6435 | Plot C3 |
| GSM 1900MHz | 512 | 1850.20 | 244.4706 | Plot D3 |
| | 661 | 1880.01 | 260.5780 | Plot E3 |
| | 810 | 1909.77 | 256.0993 | Plot F3 |
| GPRS 850MHz | 128 | 824.22 | 243.8432 | Plot G3 |
| | 190 | 836.62 | 255.1031 | Plot H3 |
| | 251 | 848.78 | 246.9023 | Plot I3 |
| GPRS 1900MHz | 512 | 1850.17 | 243.2314 | Plot J3 |
| | 661 | 1879.98 | 246.8038 | Plot K3 |
| | 810 | 1909.84 | 247.9707 | Plot L3 |

2. Test Plot:



Transmit Freq Error 201.125 kHz
x dB Bandwidth 276.983 kHz

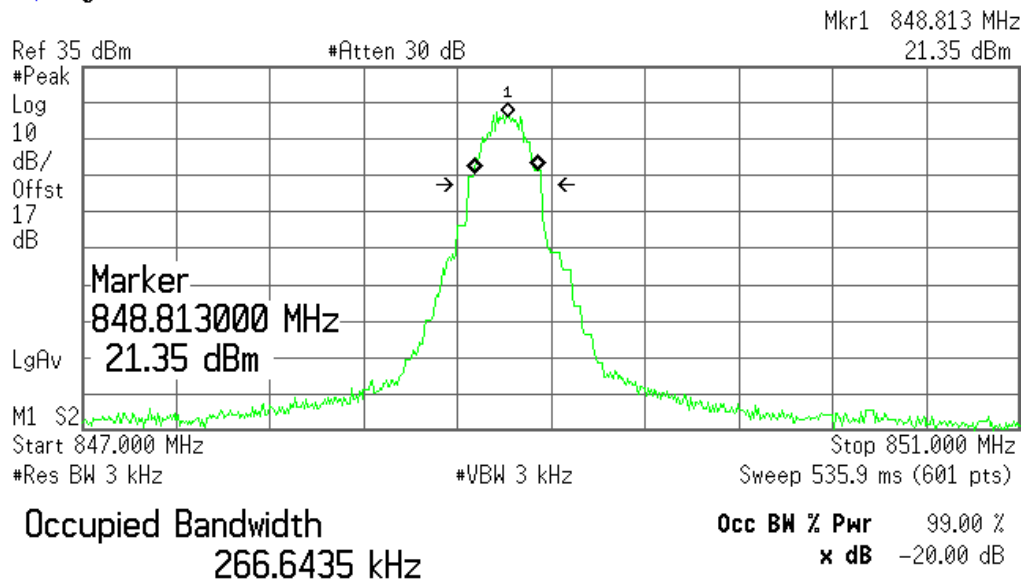
(Plot A3: GSM 850MHz Channel = 128)



Transmit Freq Error -398.349 kHz
x dB Bandwidth 280.866 kHz

(Plot B3: GSM 850MHz Channel = 190)

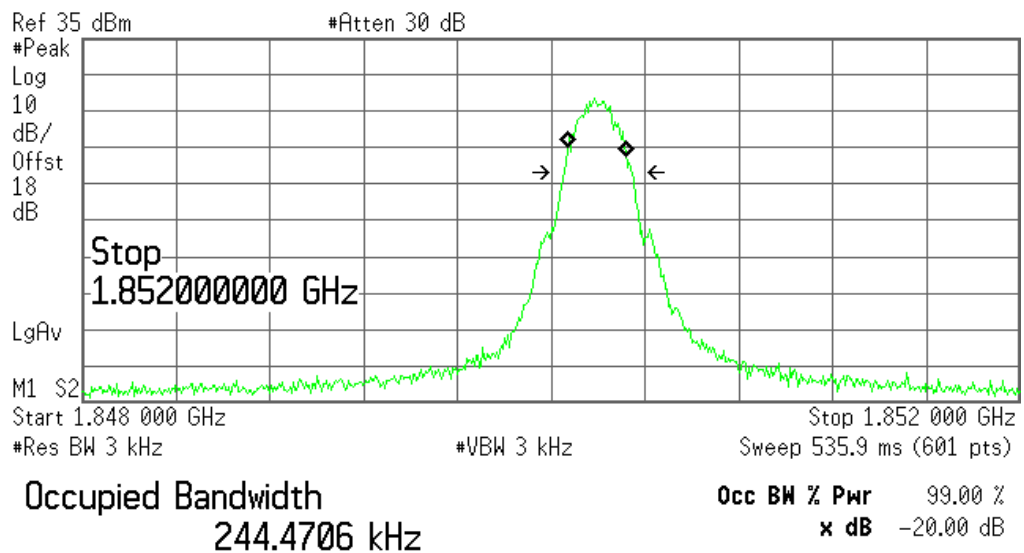
Agilent 16:26:46 Jan 24, 2010



Transmit Freq Error -194.737 kHz
x dB Bandwidth 313.447 kHz

(Plot C3: GSM 850MHz Channel = 251)

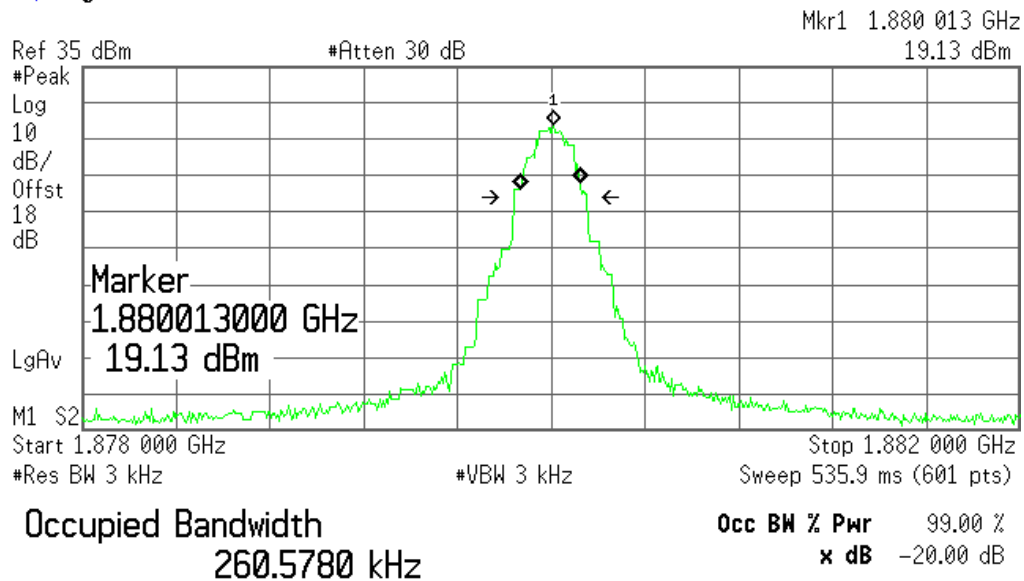
Agilent 15:42:50 Jan 24, 2010



Transmit Freq Error 196.851 kHz
x dB Bandwidth 285.329 kHz

(Plot D3: GSM 1900MHz Channel = 512)

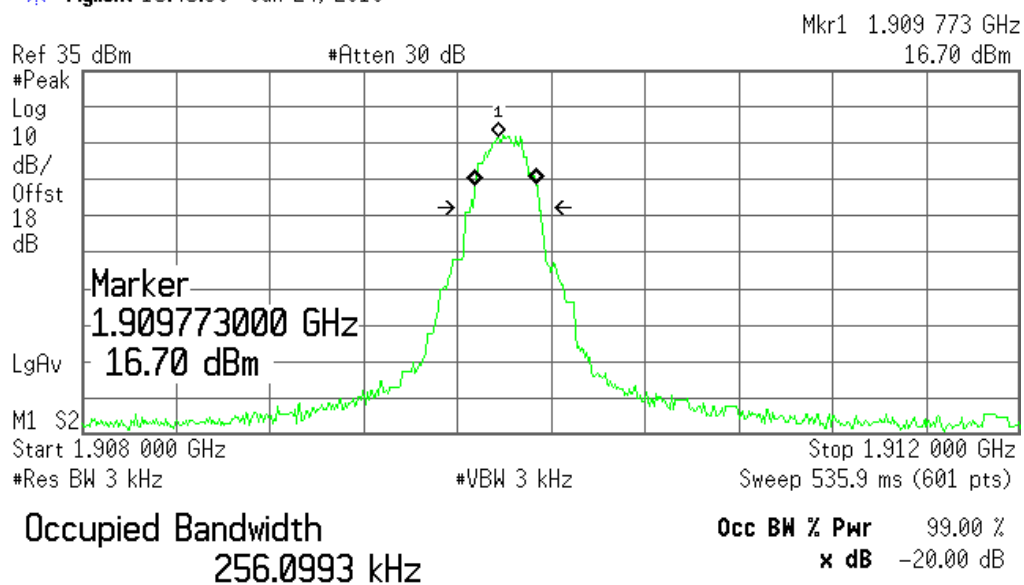
Agilent 15:44:19 Jan 24, 2010



Transmit Freq Error -6.026 kHz
x dB Bandwidth 317.302 kHz

(Plot E3: GSM 1900MHz Channel = 661)

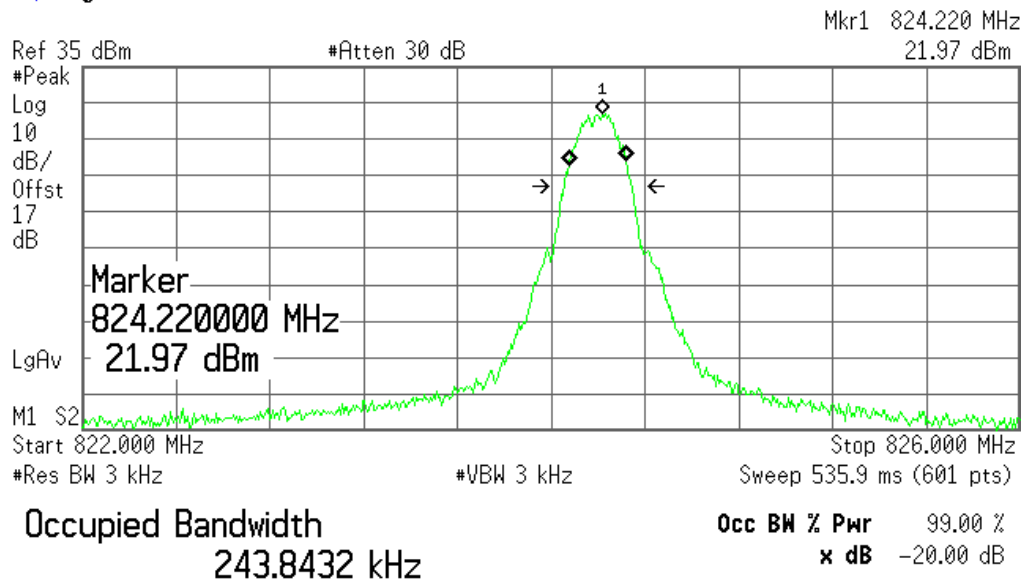
Agilent 15:45:38 Jan 24, 2010



Transmit Freq Error -195.603 kHz
x dB Bandwidth 291.296 kHz

(Plot F3: GSM 1900MHz Channel = 810)

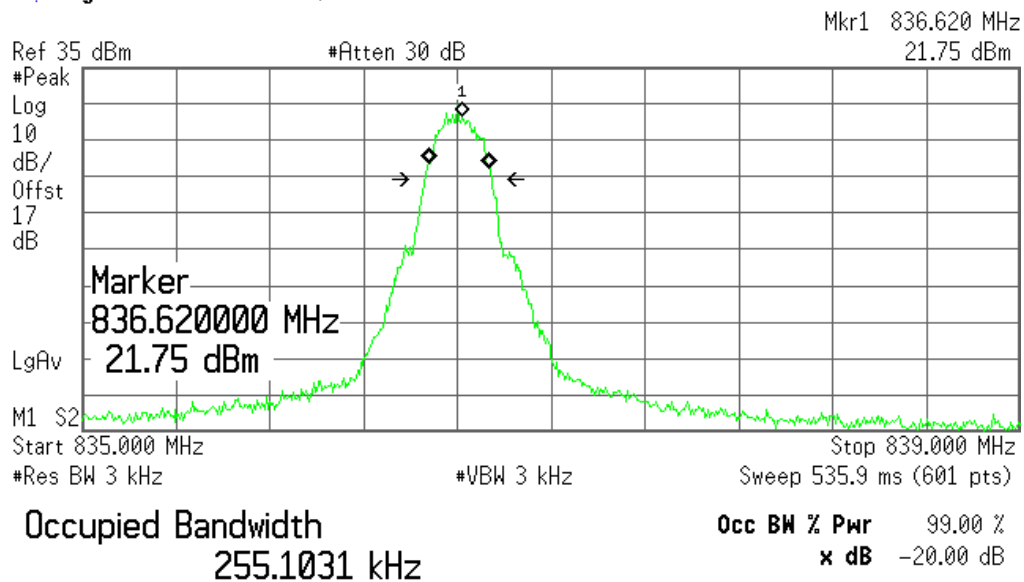
Agilent 10:53:07 Jan 25, 2010



Transmit Freq Error 199.658 kHz
x dB Bandwidth 287.312 kHz

(Plot G3:GPRS 850MHz Channel = 128)

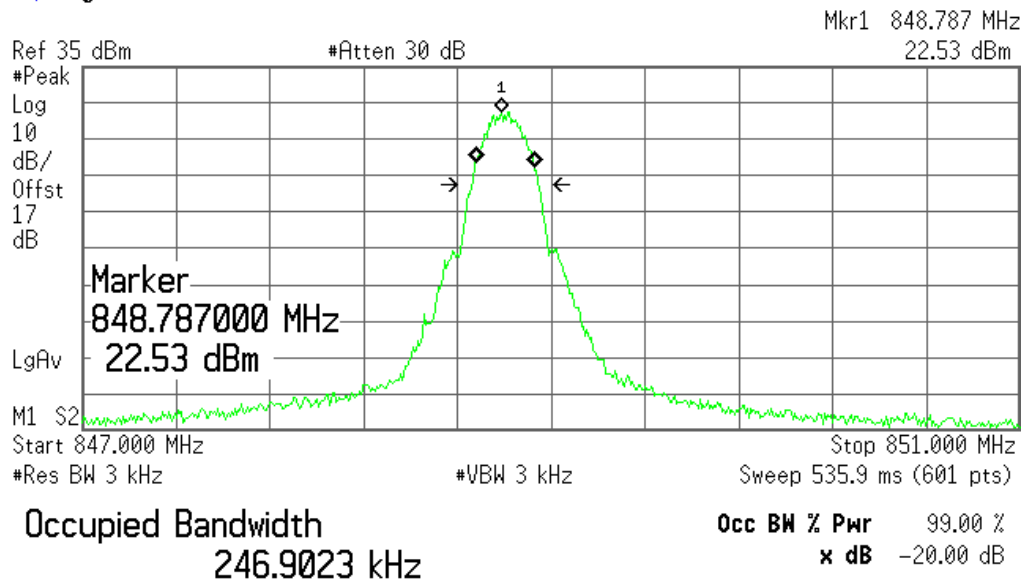
Agilent 10:54:21 Jan 25, 2010



Transmit Freq Error -395.429 kHz
x dB Bandwidth 282.537 kHz

(Plot H3: GPRS 850MHz Channel = 190)

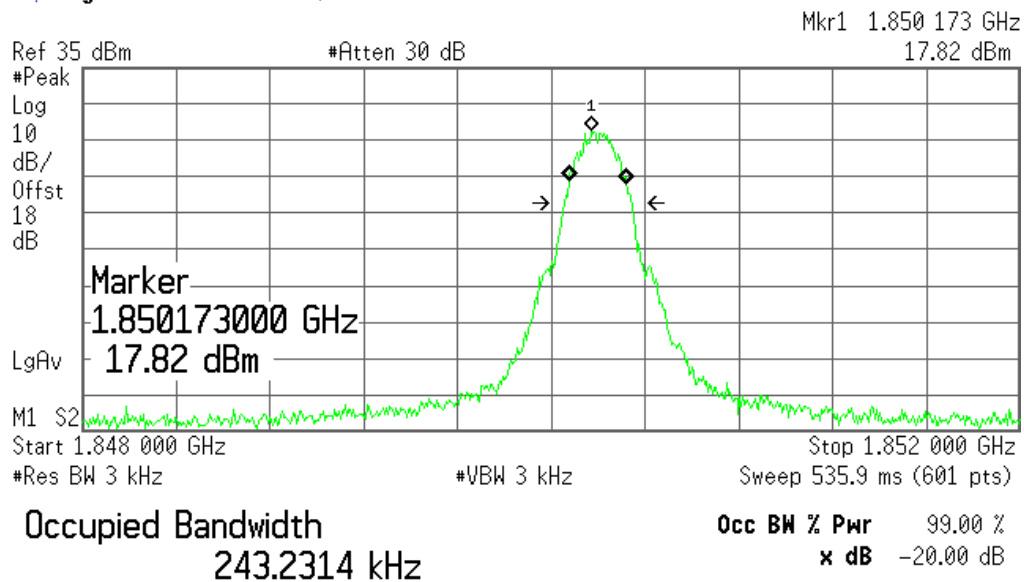
Agilent 10:55:29 Jan 25, 2010



Transmit Freq Error -199.182 kHz
x dB Bandwidth 278.159 kHz

(Plot I3: GPRS 850MHz Channel = 251)

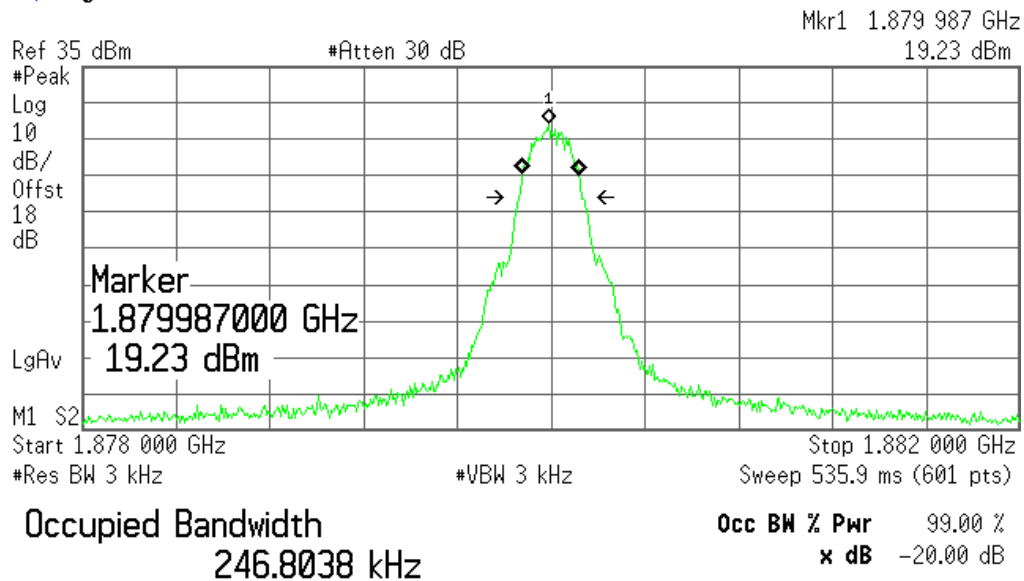
Agilent 10:33:36 Jan 25, 2010



Transmit Freq Error 200.204 kHz
x dB Bandwidth 285.647 kHz

(Plot J3: GPRS 1900MHz Channel = 512)

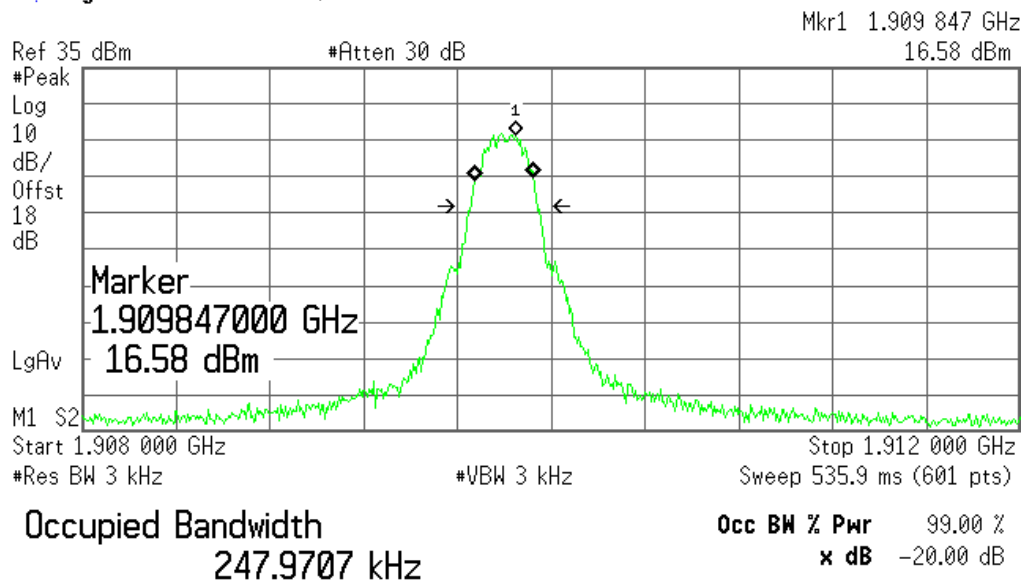
Agilent 10:30:59 Jan 25, 2010



Transmit Freq Error -1.343 kHz
x dB Bandwidth 273.491 kHz

(Plot K3: GPRS 1900MHz Channel = 661)

Agilent 10:34:57 Jan 25, 2010



Transmit Freq Error -202.098 kHz
x dB Bandwidth 282.376 kHz

(Plot L3: GPRS 1900MHz Channel = 810)

3.4 Frequency Stability

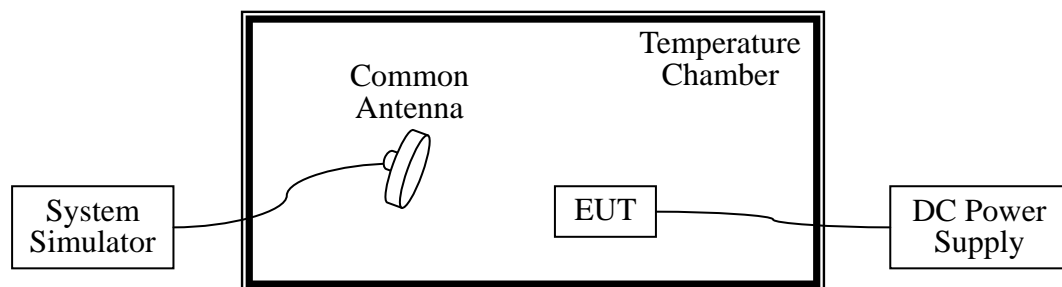
3.4.1 Requirement

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°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°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.

3.4.2 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 |
|---------------------|---------------------------|------------|------------|-----------|----------|
| CMU200 | Rohde&Schwarz | FSP30 | 101020 | 2009.10 | 1year |
| DC Power Supply | Good Will | GPS-3030DD | EF920938 | 2009.10 | 2year |
| Temperature Chamber | YinHe Experimental Equip. | HL4003T | (n.a.) | 2009.10 | 1year |

3.4.3 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 is ± 2.5 ppm.

| Band | Test Conditions | | Frequency Deviation | | | | | | Verdict |
|-------------|-----------------|------------------|--------------------------|---------|--------------------------|---------|--------------------------|---------|---------|
| | Power (VDC) | Temperature (°C) | Channel = 128 (824.2MHz) | | Channel = 190 (836.6MHz) | | Channel = 251 (848.8MHz) | | |
| | | | Hz | Limit | Hz | Limit | Hz | Limit | |
| GSM 850MHz | 3.7 | -30 | -14.17 | ±2060.5 | 14.52 | ±2091.5 | 13.24 | ±2122.0 | PASS |
| | | -20 | 12.50 | | -13.37 | | 16.54 | | |
| | | -10 | -10.09 | | 9.27 | | -13.24 | | |
| | | 0 | -14.33 | | 11.49 | | 13.86 | | |
| | | +10 | 11.27 | | 12.26 | | 11.27 | | |
| | | +20 | -11.32 | | -12.50 | | -11.32 | | |
| | | +30 | 14.22 | | 10.21 | | 14.22 | | |
| | | +40 | -19.11 | | -13.69 | | -19.11 | | |
| | | +50 | -12.53 | | -20.28 | | 11.20 | | |
| | 4.2 | +25 | -14.13 | -13.24 | -10.59 | | | | |
| | 3.6 | +25 | -13.18 | -18.88 | 21.33 | | | | |
| GSM 1900MHz | 3.7 | -30 | 15.31 | ±1550.2 | 15.64 | ±1550.0 | 24.54 | ±1707.5 | PASS |
| | | -20 | 18.64 | | -5.86 | | 12.14 | | |
| | | -10 | 10.54 | | 14.13 | | -12.19 | | |
| | | 0 | 17.58 | | 11.80 | | -16.16 | | |
| | | +10 | -11.23 | | 17.56 | | 15.45 | | |
| | | +20 | -15.54 | | 19.24 | | -20.12 | | |
| | | +30 | 13.38 | | 10.91 | | -10.12 | | |
| | | +40 | 18.33 | | 20.14 | | 14.79 | | |
| | | +50 | -13.54 | | 24.42 | | -12.17 | | |
| | 4.2 | +25 | -14.89 | 13.78 | -15.83 | | | | |
| | 3.6 | +25 | 16.56 | -12.53 | 15.50 | | | | |
| GPRS 850MHz | 3.7 | -30 | -15.17 | ±2060.5 | -14.13 | ±2091.5 | -16.45 | ±2122.0 | PASS |
| | | -20 | 13.10 | | -13.18 | | -10.17 | | |
| | | -10 | 14.22 | | -12.21 | | 16.67 | | |
| | | 0 | -14.13 | | -8.73 | | 16.12 | | |
| | | +10 | -19.11 | | -16.45 | | 10.22 | | |
| | | +20 | -12.53 | | -10.17 | | 15.20 | | |
| | | +30 | 11.27 | | 16.67 | | 13.78 | | |
| | | +40 | -11.32 | | 16.12 | | 13.24 | | |
| | | +50 | -13.18 | | 10.22 | | 12.27 | | |
| | 4.2 | +25 | -10.09 | 15.20 | 13.92 | | | | |

| Band | Test Conditions | | Frequency Deviation | | | | | | Verdict |
|-------------|-----------------|------------------|--------------------------|---------|--------------------------|---------|--------------------------|---------|---------|
| | Power (VDC) | Temperature (°C) | Channel = 128 (824.2MHz) | | Channel = 190 (836.6MHz) | | Channel = 251 (848.8MHz) | | |
| | | | Hz | Limit | Hz | Limit | Hz | Limit | |
| | | 3.6 | +25 | 14.92 | | -18.88 | | 12.14 | |
| GPRS1900MHz | 3.7 | -30 | -14.17 | ±1550.2 | -16.16 | ±1550.0 | 24.54 | ±1707.5 | PASS |
| | | -20 | 12.50 | | 15.45 | | 12.14 | | |
| | | -10 | -10.09 | | -20.12 | | -20.12 | | |
| | | 0 | -14.33 | | -10.12 | | -14.17 | | |
| | | +10 | 12.27 | | 14.79 | | 12.50 | | |
| | | +20 | 13.92 | | -12.17 | | -10.09 | | |
| | | +30 | 12.14 | | -15.83 | | -14.17 | | |
| | | +40 | 24.54 | | 15.50 | | -10.12 | | |
| | | +50 | 12.14 | | 18.69 | | 14.79 | | |
| | 4.2 | +25 | -12.19 | -21.44 | -12.17 | | | | |
| | 3.6 | +25 | 14.92 | -18.54 | -10.12 | | | | |

3.5 Conducted Out of Band Emissions

3.6 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.

3.6.1 Test Description

See section 3.1.2 of this report.

3.6.2 Test Result

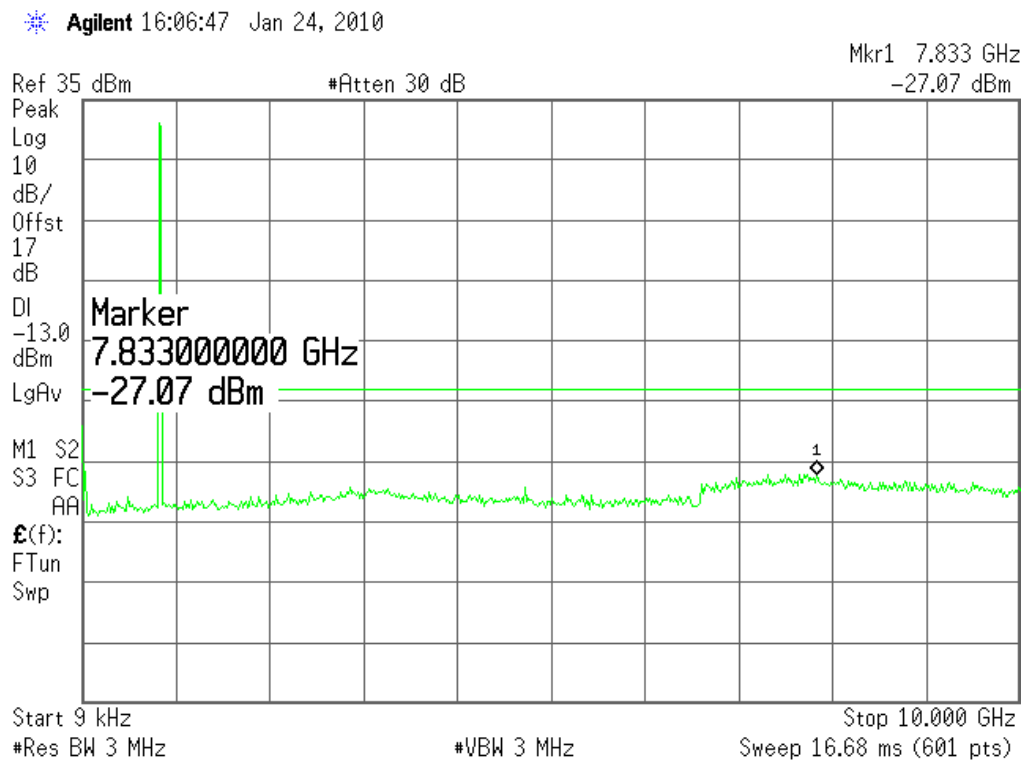
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

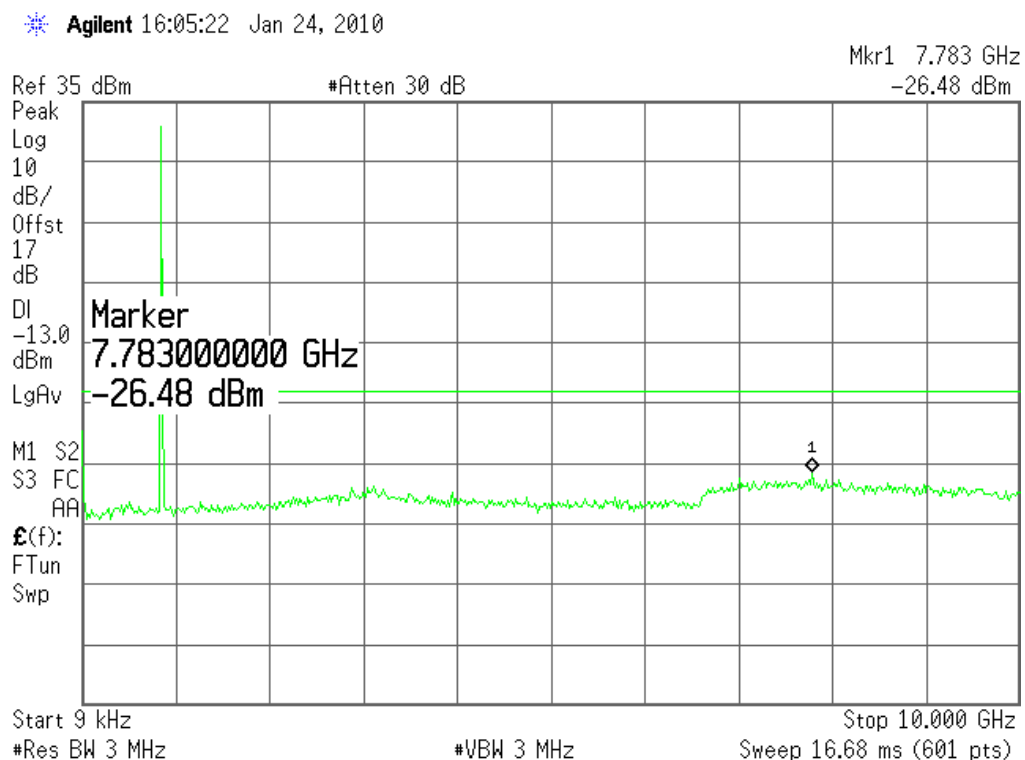
| Band | Channel | Frequency (GHz) | Measured Max. Spurious Emission (dBm) | Refer to Plot | Limit (dBm) | Verdict |
|--------------|---------|-----------------|---------------------------------------|---------------|-------------|---------|
| GSM 850MHz | 128 | 7.833 | -27.07 | Plot A4 | -13 | PASS |
| | 190 | 7.783 | -26.48 | Plot B4 | | PASS |
| | 251 | 7.750 | -26.57 | Plot C4 | | PASS |
| GSM 1900MHz | 512 | 13.63 | -24.00 | Plot D4 | -13 | PASS |
| | 661 | 15.27 | -23.74 | Plot E4 | | PASS |
| | 810 | 13.30 | -23.99 | Plot F4 | | PASS |
| GPRS 850MHz | 128 | 7.333 | -25.97 | Plot G4 | -13 | PASS |
| | 190 | 7.717 | -27.06 | Plot H4 | | PASS |
| | 251 | 7.217 | -26.81 | Plot I4 | | PASS |
| GPRS 1900MHz | 512 | 14.87 | -23.10 | Plot J4 | -13 | PASS |
| | 661 | 13.77 | -23.29 | Plot K4 | | PASS |
| | 810 | 13.63 | -23.77 | Plot L | | PASS |

2. Test Plot for the Whole Measurement Frequency Range:

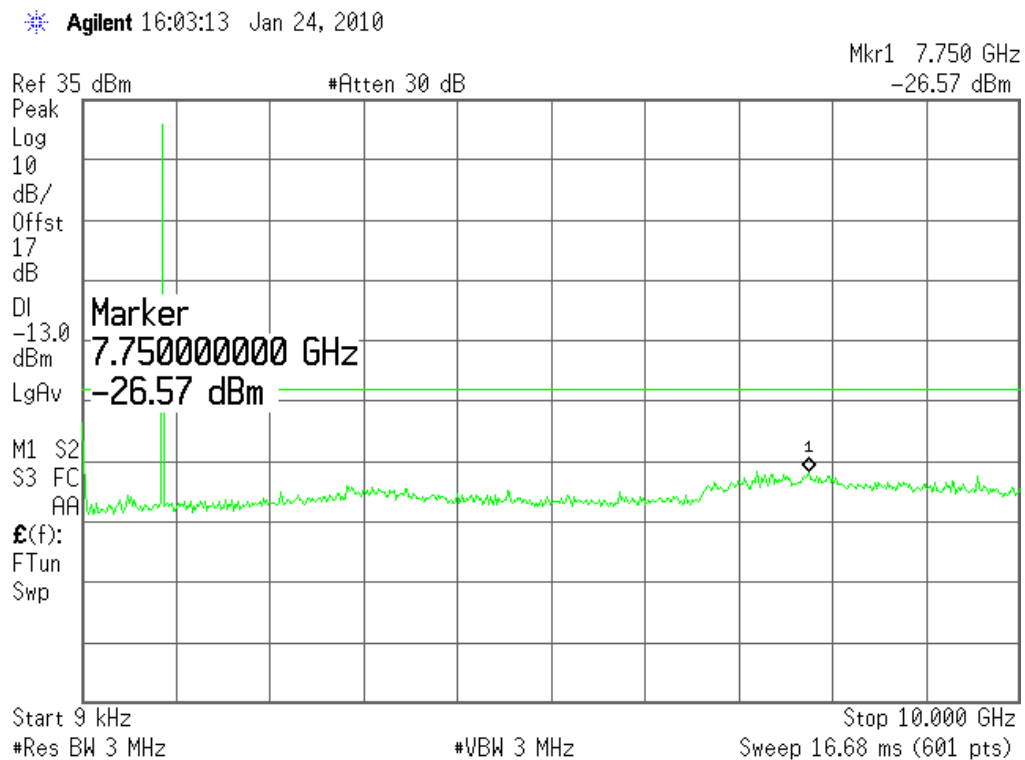
Note: the power of the EUT transmitting frequency should be ignored.



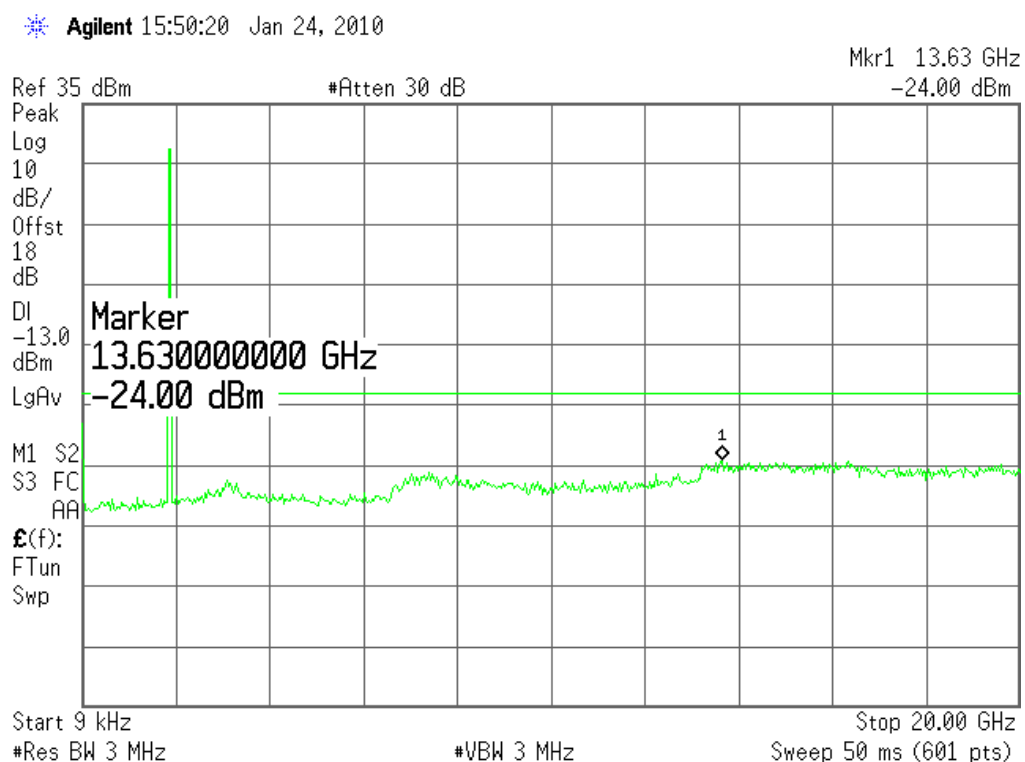
(Plot A4.:GSM 850MHz Channel = 128, 9KHz to 10GHz)



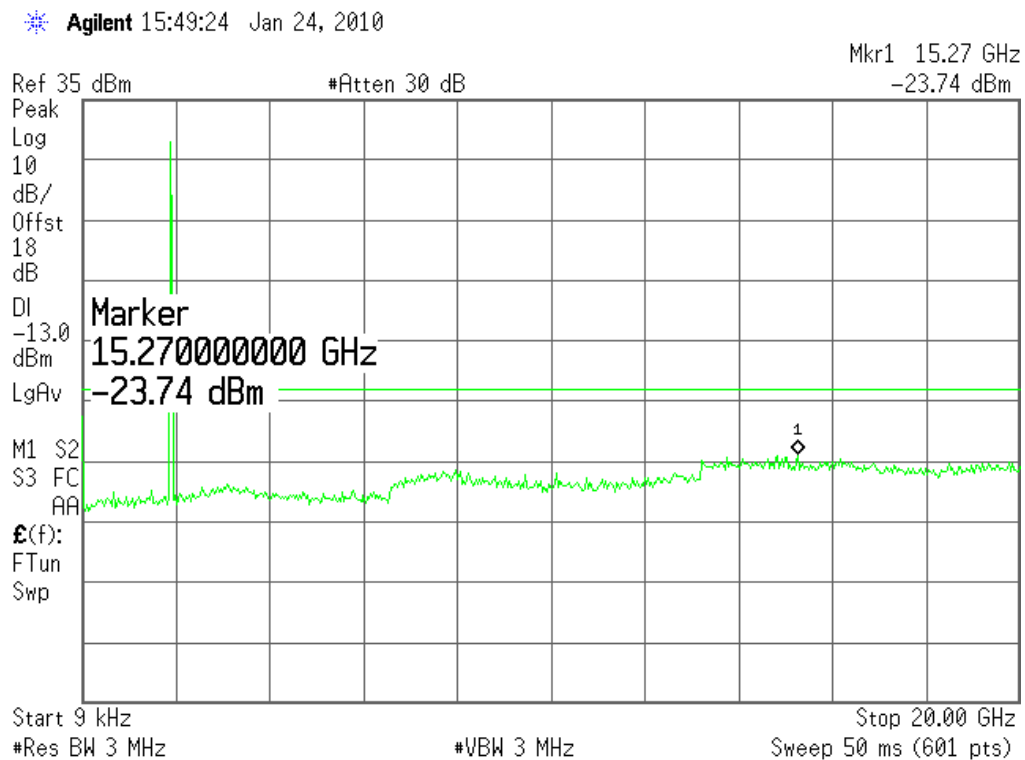
(Plot B4.:GSM 850MHz Channel = 190, 9KHz to 10GHz)



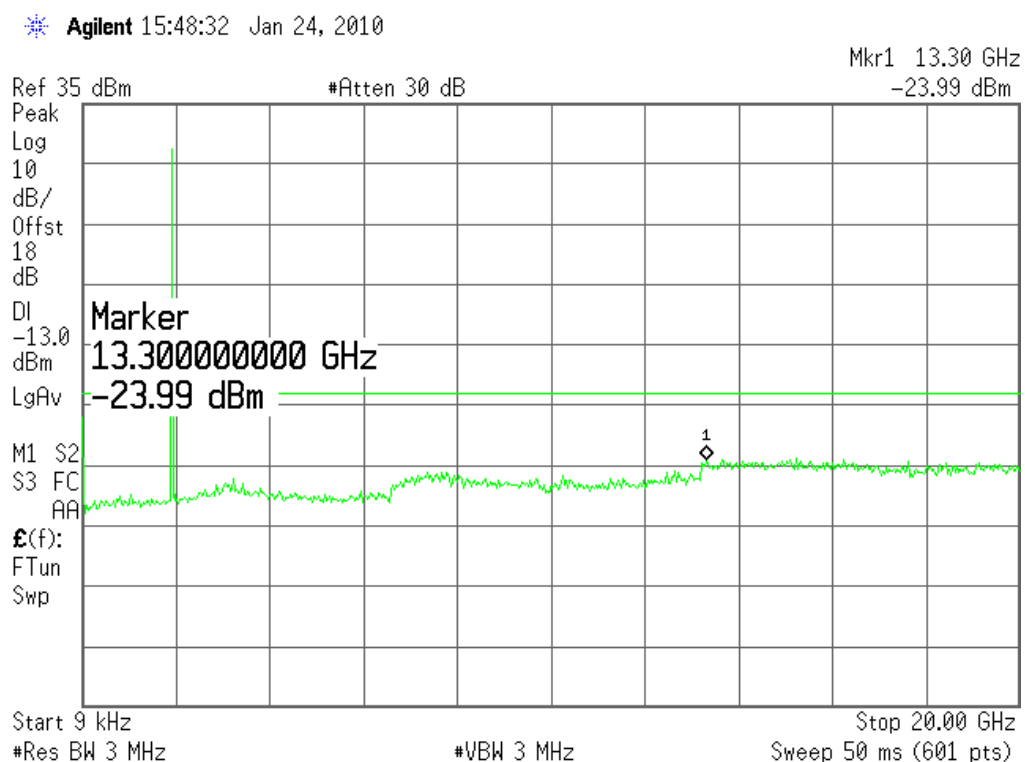
(Plot C4.:GSM 850MHz Channel = 251, 9KHz to 10GHz)



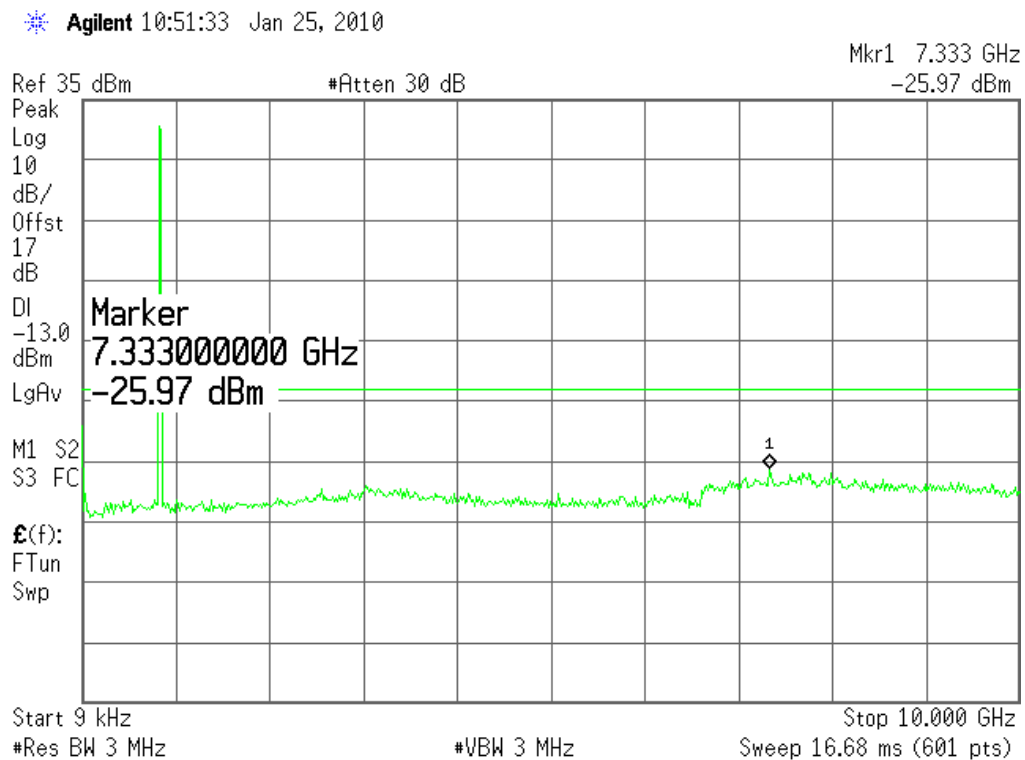
(Plot D4.:GSM 1900MHz Channel = 512, 9KHz to 20GHz)



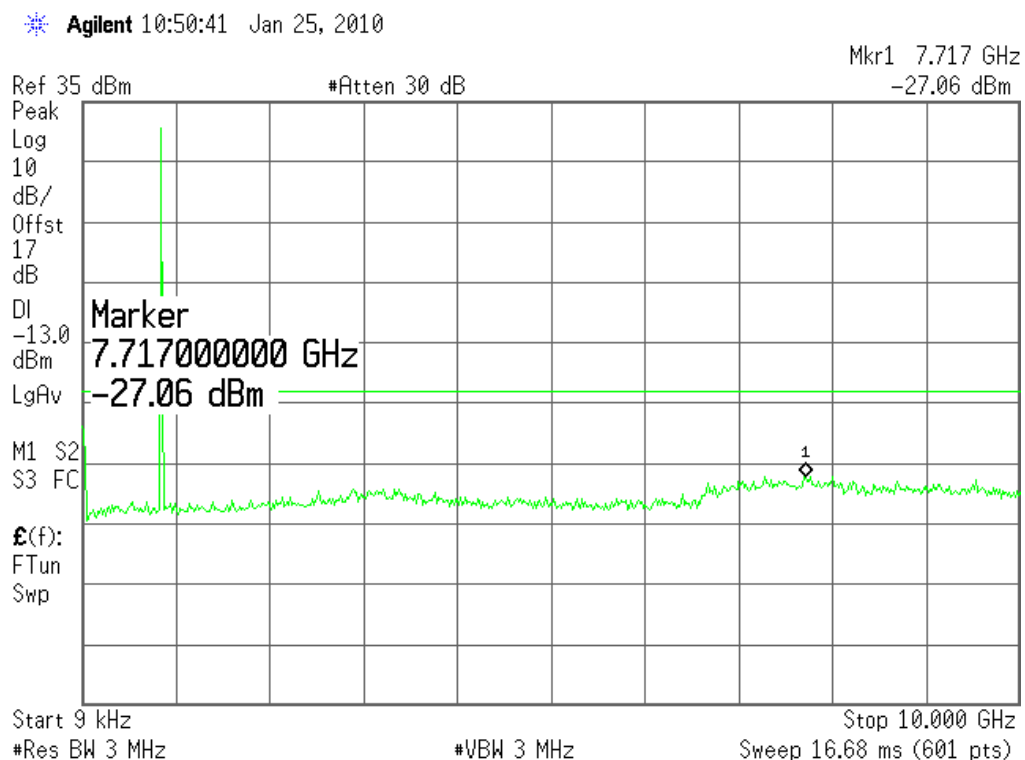
(Plot E4.: GSM 1900MHz Channel = 661, 9KHz to 20GHz)



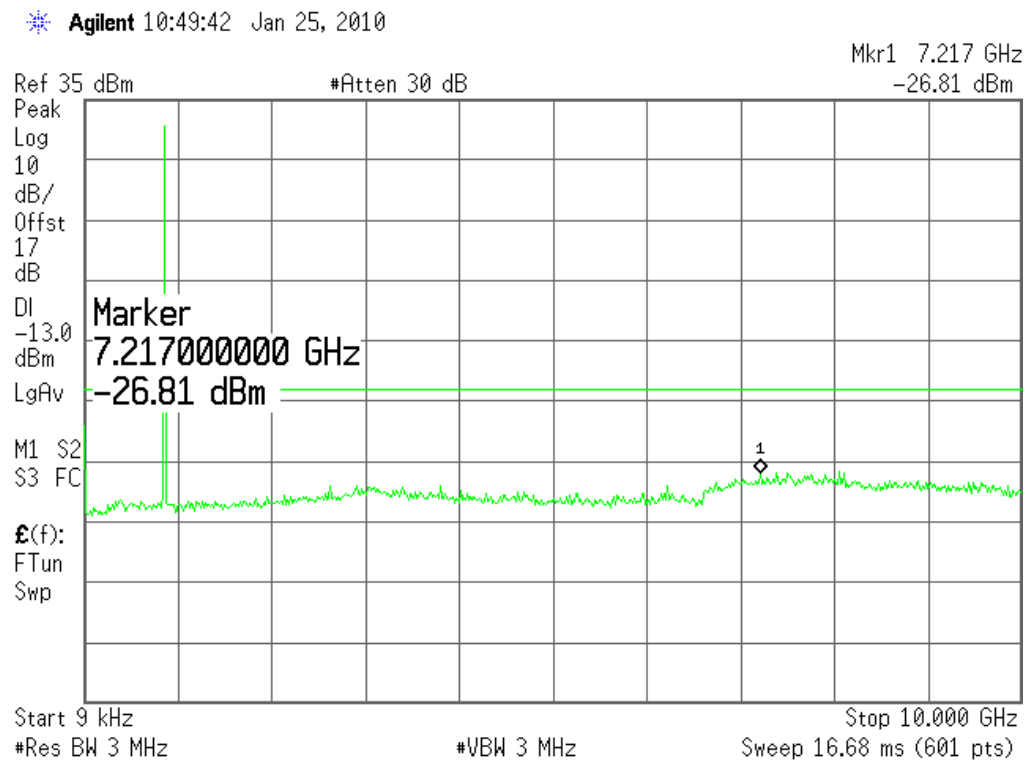
(Plot F4.: GSM 1900MHz Channel = 810, 9KHz to 20GHz)



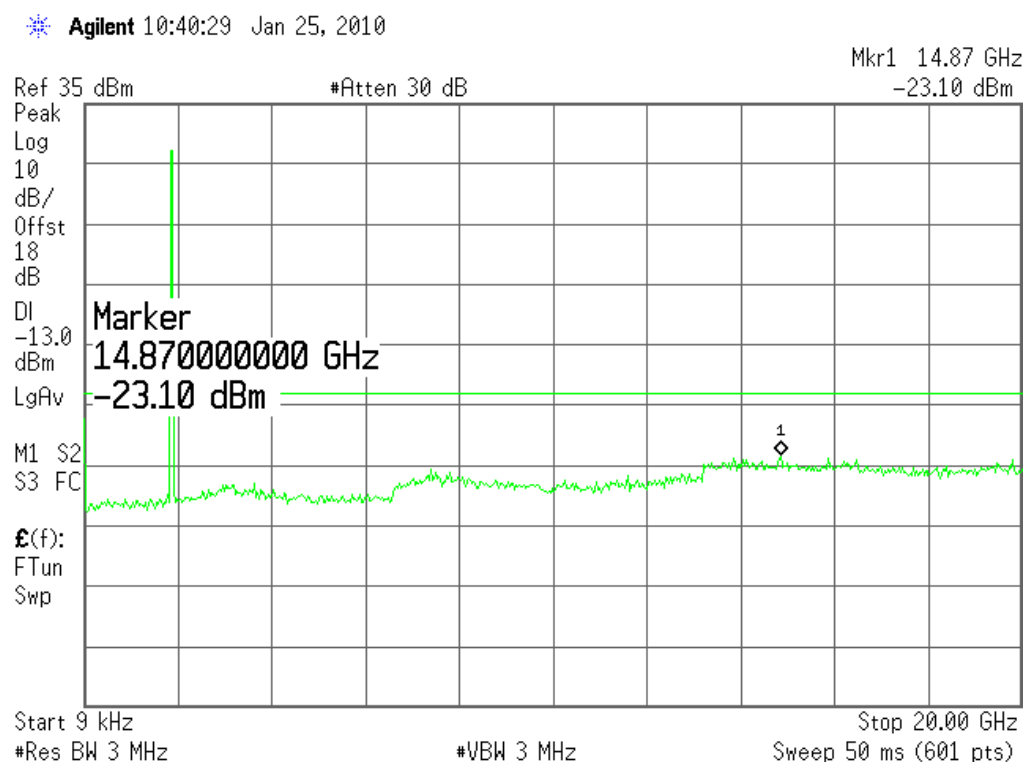
(Plot G4.:GPRS 850MHz Channel = 128, 9KHz to 10GHz)



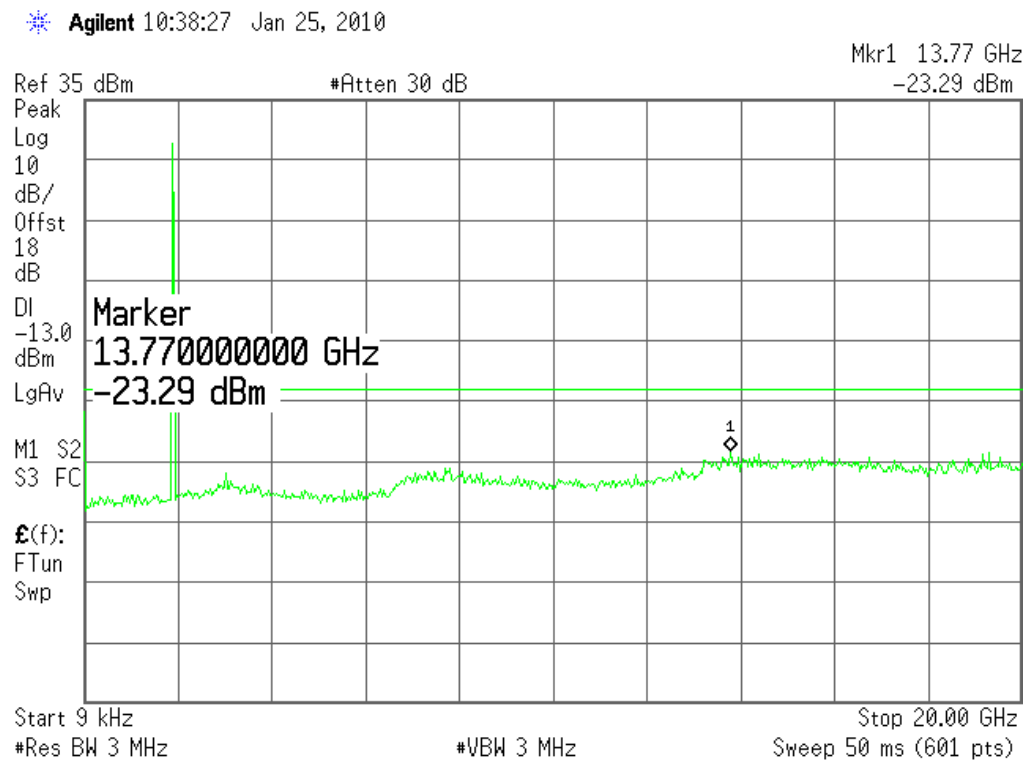
(Plot H4.: GPRS 850MHz Channel = 190, 9KHz to 10GHz)



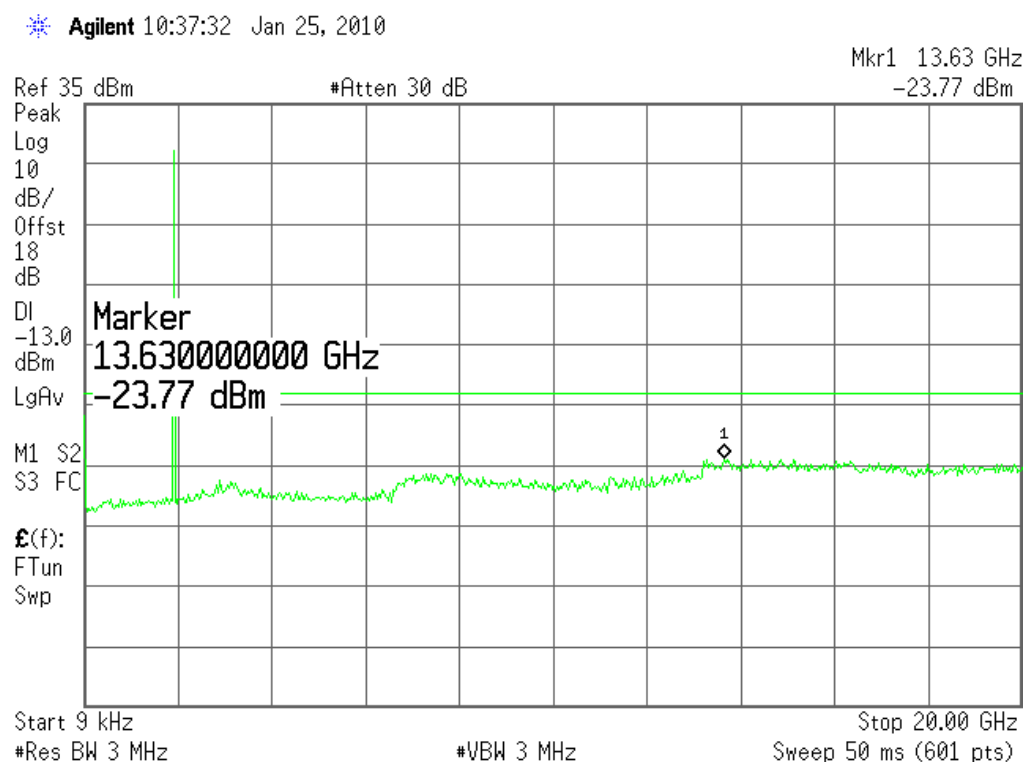
(Plot I4.: GPRS 850MHz Channel = 251, 9KHz to 10GHz)



(Plot J4.: GPRS 1900MHz Channel = 512, 9KHz to 20GHz)



(Plot K4.: GPRS 1900MHz Channel = 661, 9KHz to 20GHz)



(Plot L4.: GPRS 1900MHz Channel = 810, 9KHz to 20GHz)

3.6 Band Edge

3.6.1 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.

3.6.2 Test Description

See section 3.1.2 of this report.

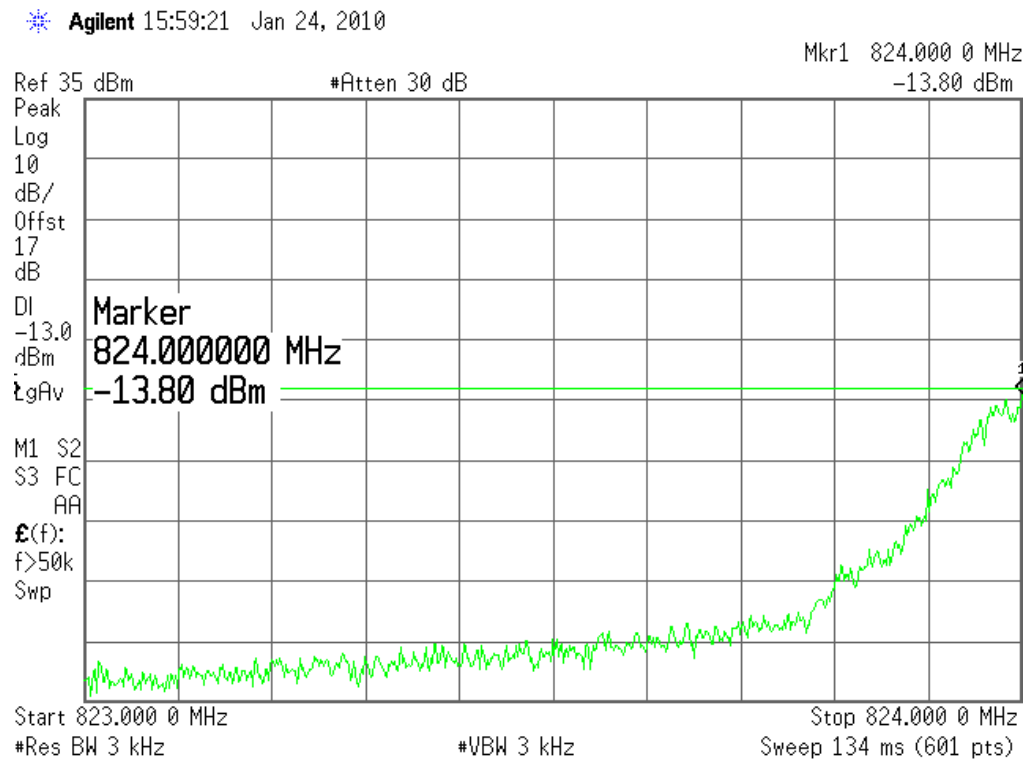
3.6.3 Test Result

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

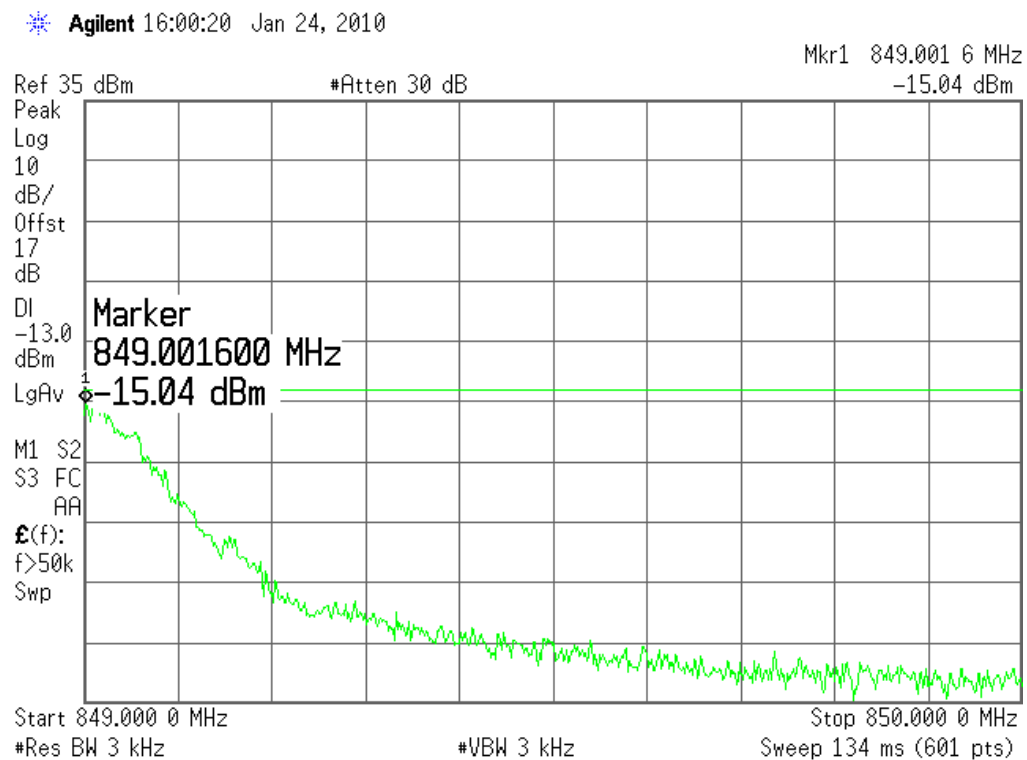
1. Test Verdict:

| Band | Channel | Frequency (MHz) | Measured Max. Band Edge Emission (dBm) | Refer to Plot | Limit (dBm) | Verdict |
|--------------|---------|-----------------|--|---------------|-------------|---------|
| GSM 850MHz | 128 | 824.00 | -13.80 | Plat A5 | -13 | PASS |
| | 251 | 849.00 | -15.04 | Plot B5 | | PASS |
| GSM 1900MHz | 512 | 1849.99 | -15.90 | Plat C5 | -13 | PASS |
| | 810 | 1910.00 | -18.26 | Plot D5 | | PASS |
| GPRS 850MHz | 128 | 823.97 | -14.11 | Plat E5 | -13 | PASS |
| | 251 | 849.01 | -13.58 | Plot F5 | | PASS |
| GPRS 1900MHz | 512 | 1850.00 | -16.99 | Plat G5 | -13 | PASS |
| | 810 | 1910.01 | -20.19 | Plot H5 | | PASS |

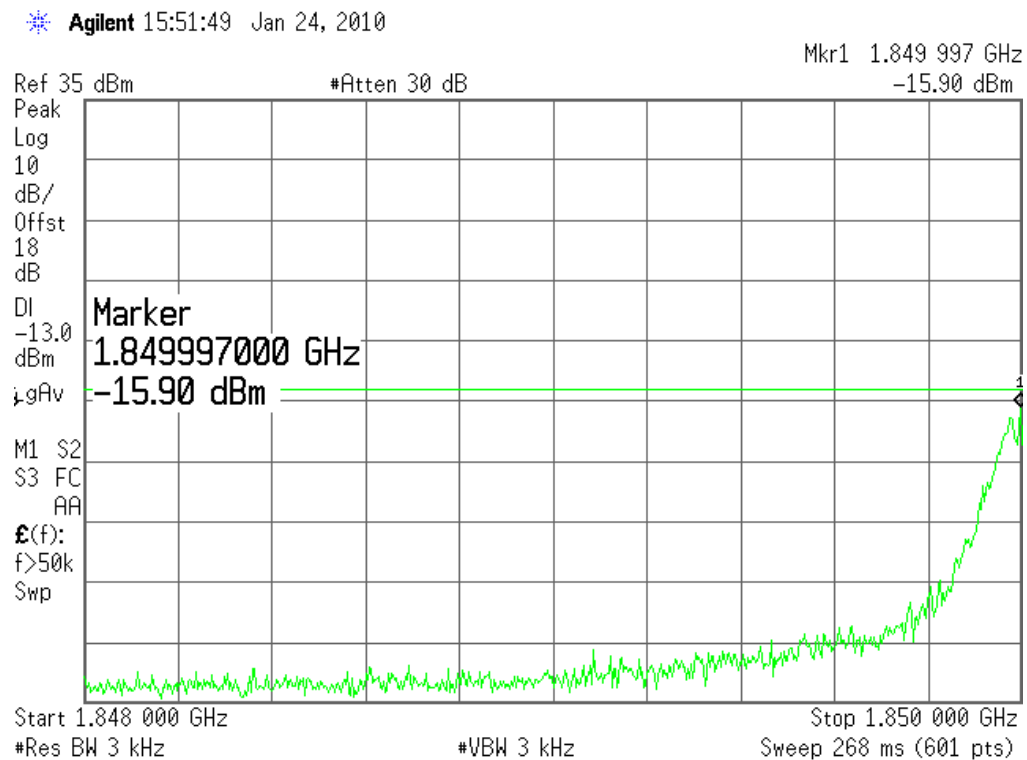
2. Test Plot:



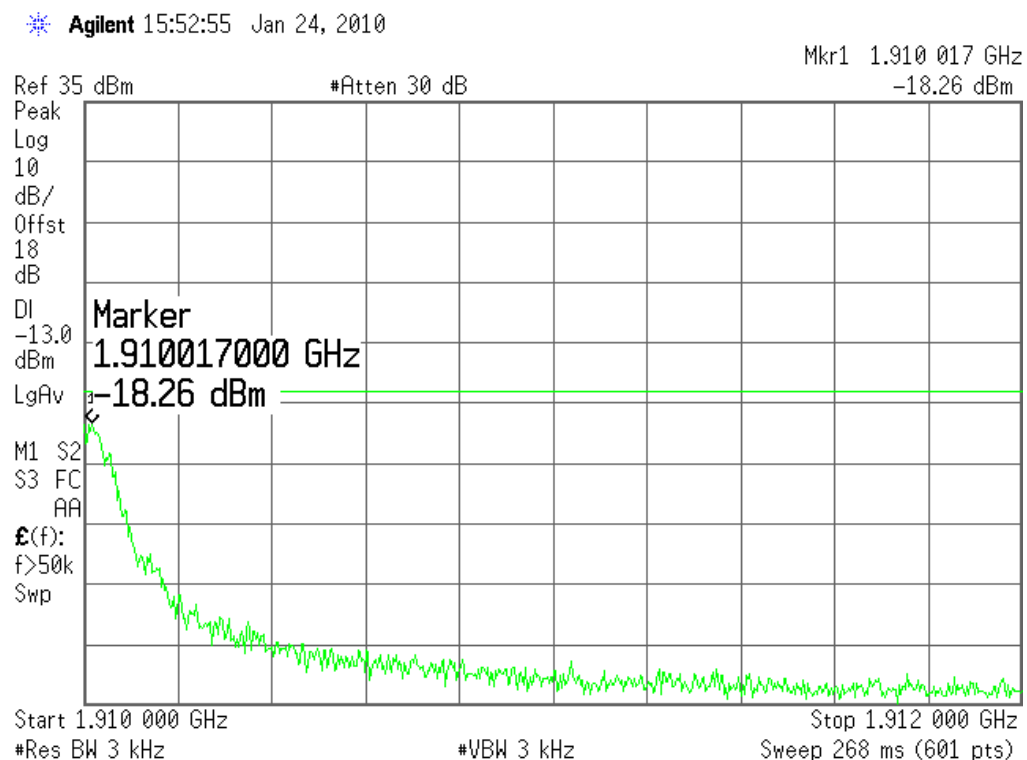
(Plot A5: GSM 850MHz Channel = 128)



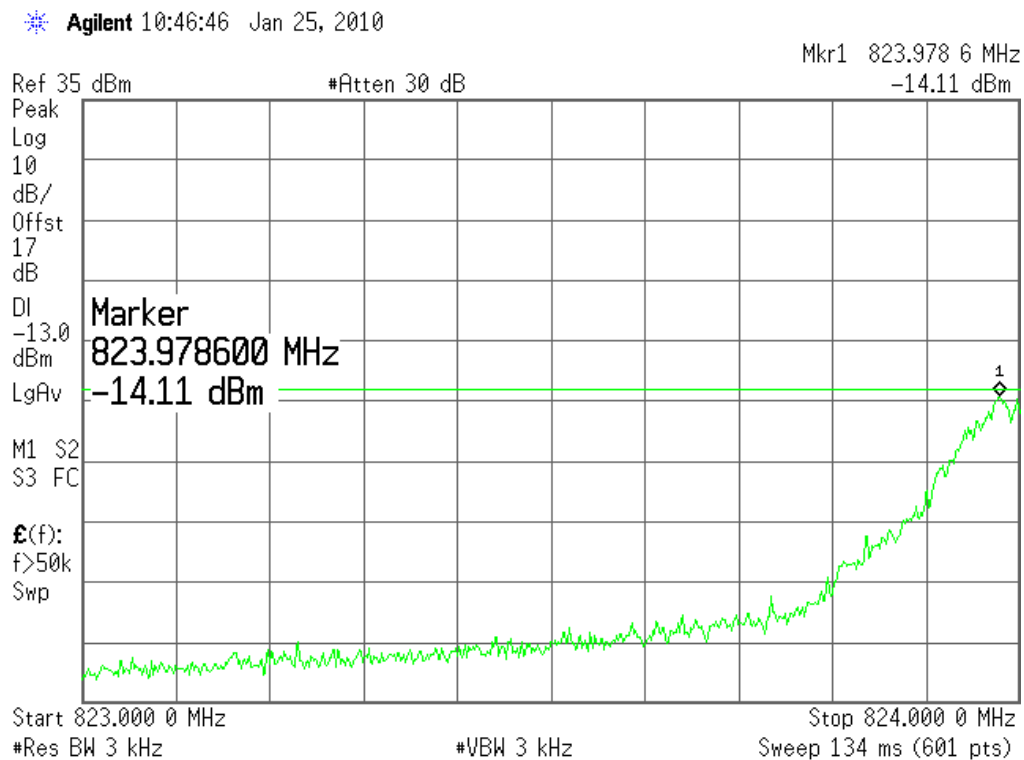
(Plot B5: GSM 850MHz Channel = 251)



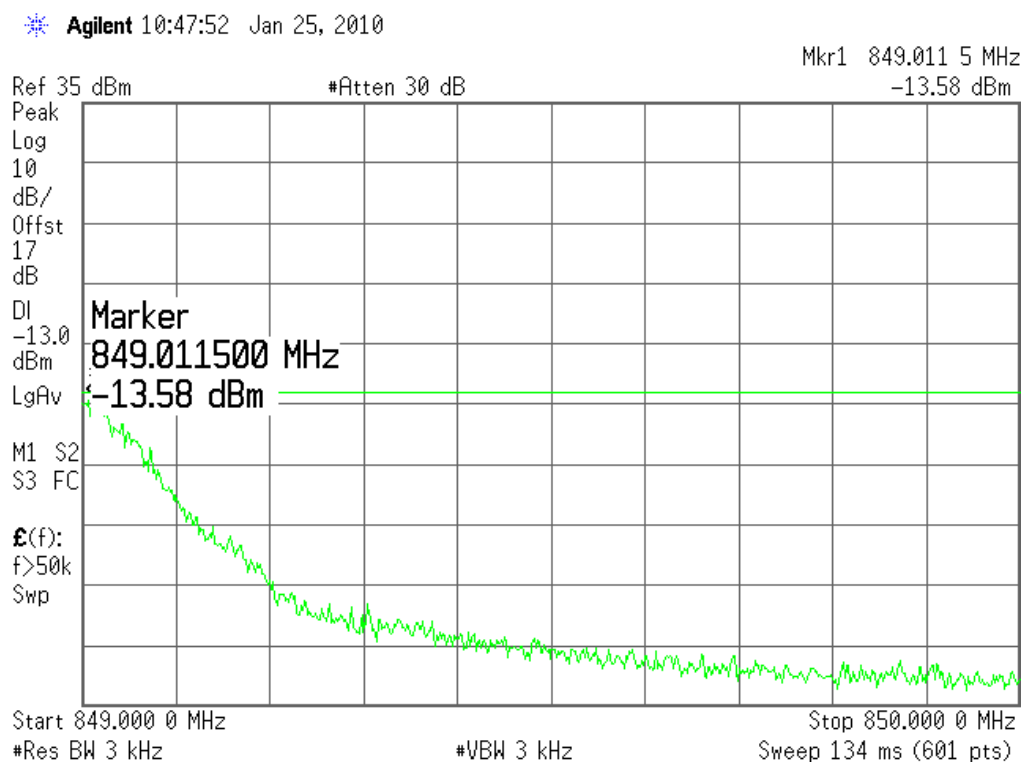
(Plot C5: GSM 1900MHz Channel = 512)



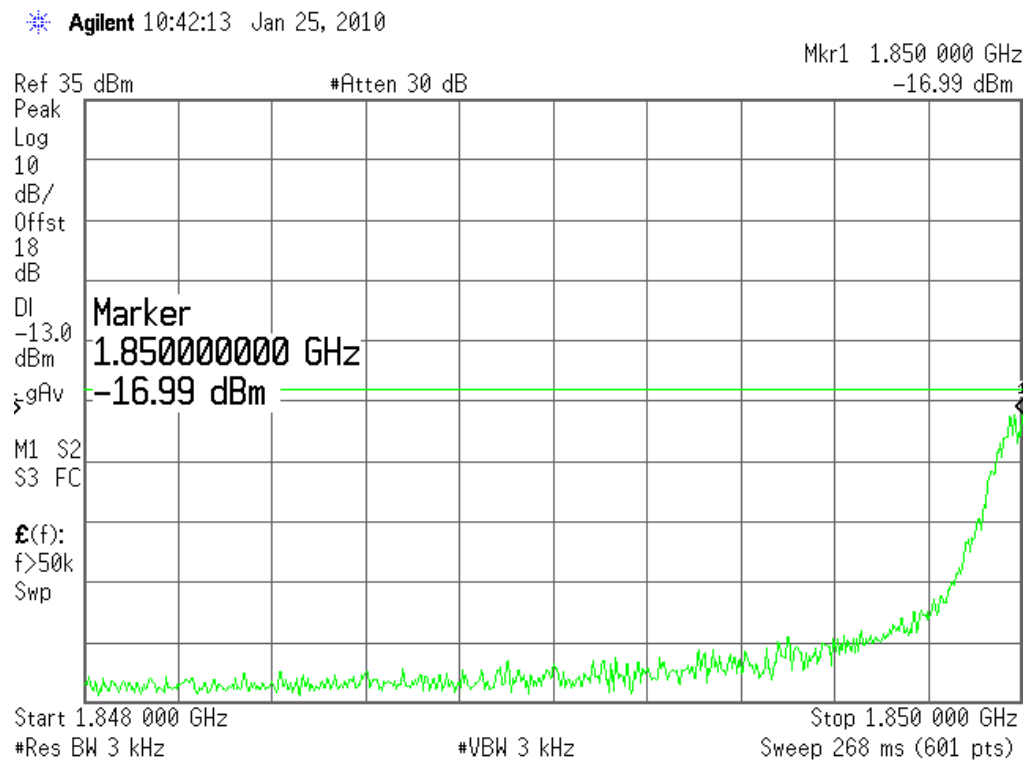
(Plot D5: GSM 1900MHz Channel = 810)



(Plot E5: GPRS 850MHz Channel = 128)



(Plot F5: GPRS 850MHz Channel = 251)



(Plot G5: GPRS 1900MHz Channel = 512)



(Plot H5: GPRS 1900MHz Channel = 810)

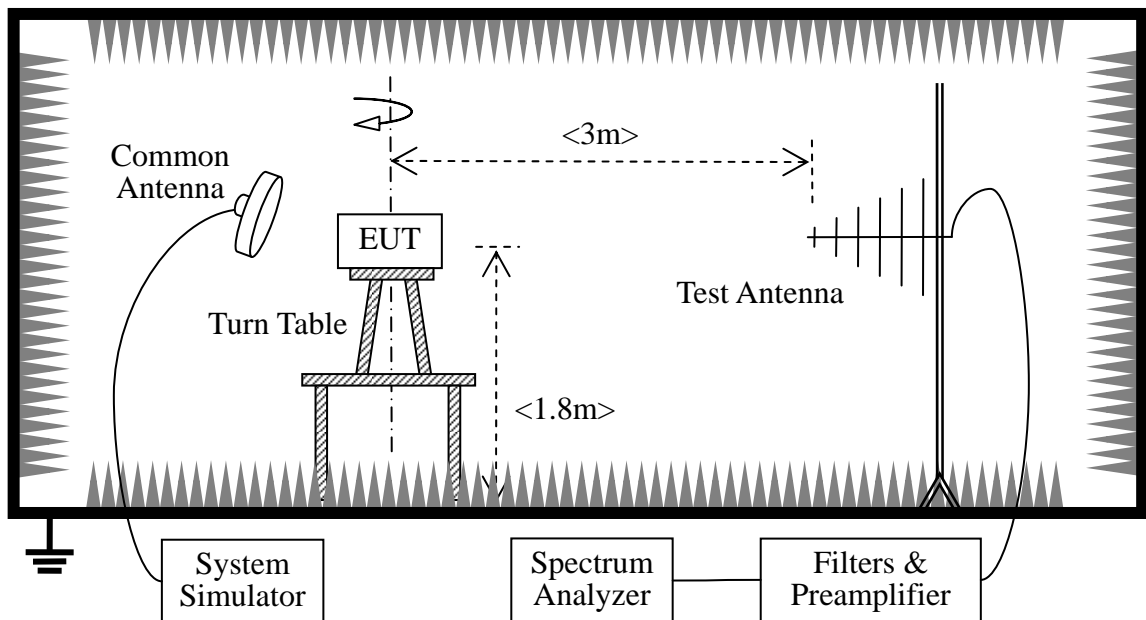
3.7 Transmitter Radiated Power (EIRP/ERP)

3.7.1 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 2Watts e.i.r.p. peak power.

3.7.2 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. The EUT is commanded by the SS to operate at the maximum output power i.e. GSM850MHz band Power Control Level (PCL) = 5 and Power Class = 4 and GSM1900MHz band Power Control Level (PCL) = 0 and Power Class = 1. A call is established between the EUT and the SS via a Common Antenna.

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 |
|-----------------------|---------------|----------|------------|-----------|----------|
| SS | Agilent | E5515C | GB46040102 | 2009.10 | 1year |
| Spectrum Analyzer | Agilent | E4440A | MY46187763 | 2009.10 | 1year |
| Full-Anechoic Chamber | Albatross | 9m*6m*6m | (n.a.) | 2009.10 | 2year |
| Test Antenna - Bi-Log | Rohde&Schwarz | HL562 | 100385 | 2009.10 | 1year |
| Test Antenna - Horn | Rohde&Schwarz | HF906 | 100565 | 2009.10 | 1year |

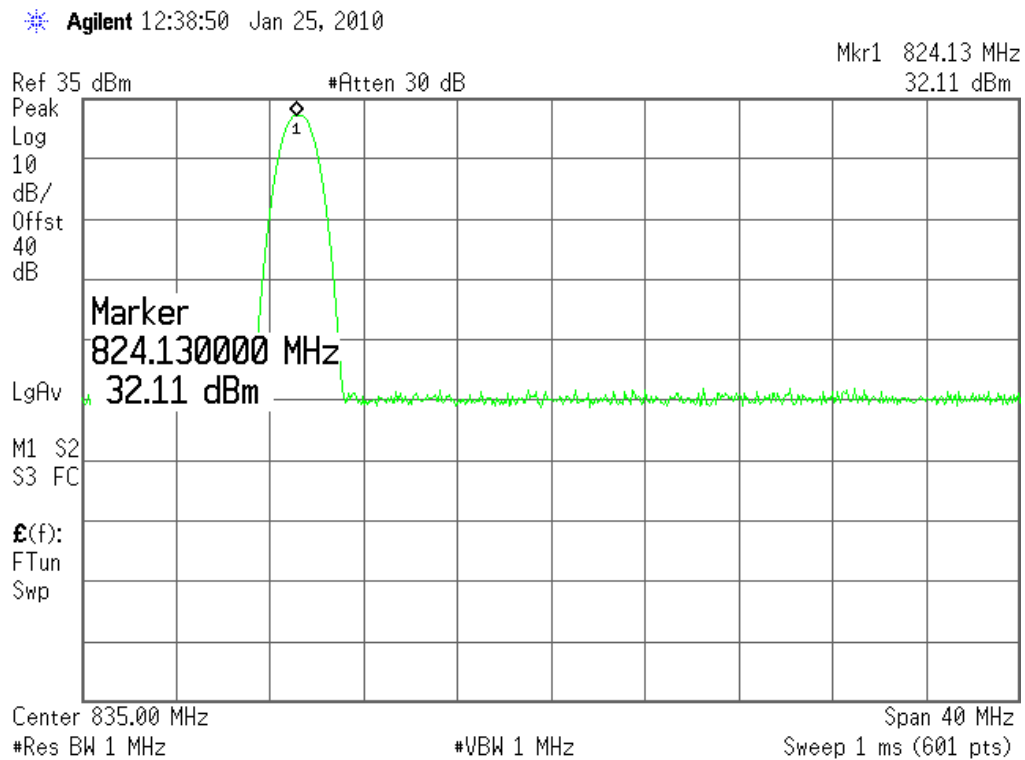
3.7.3 Test Result

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.

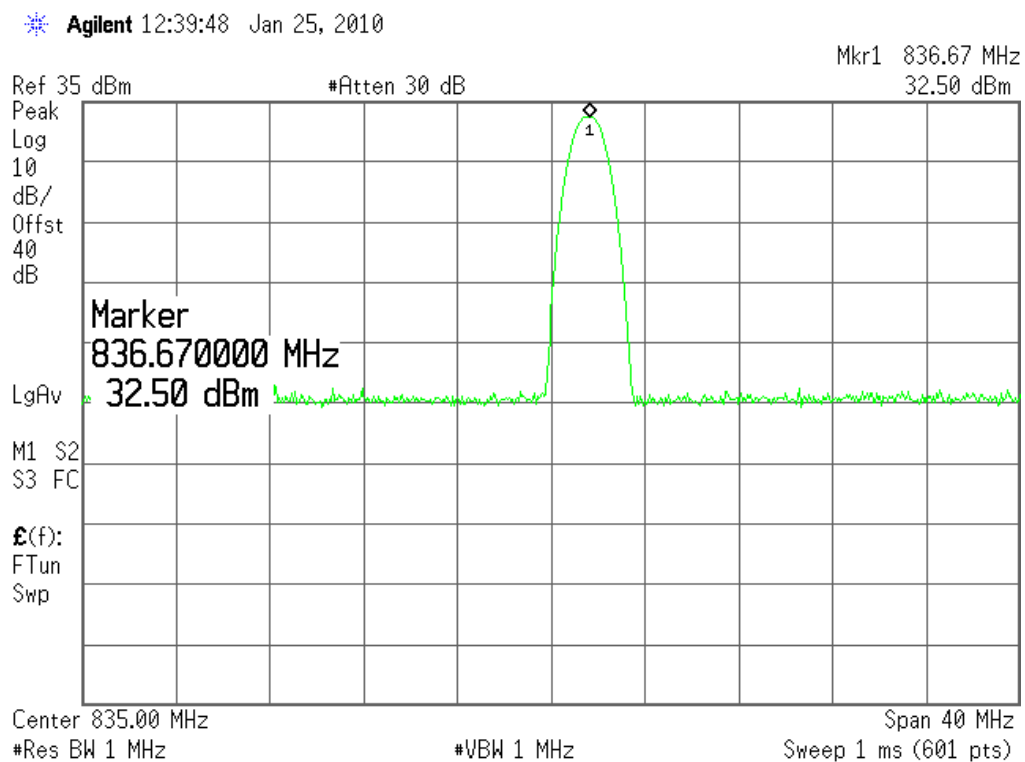
1. Test Verdict:

| Band | Channel | Frequency (MHz) | Measured ERP | | | Limit | | Verdict |
|--------------|---------|-----------------|--------------|-------|---------------|-------|----|---------|
| | | | dBm | W | Refer to Plot | dBm | W | |
| GSM 850MHz | 128 | 824.13 | 32.11 | 1.625 | Plot A6 | <38.5 | <7 | PASS |
| | 190 | 836.67 | 32.50 | 1.778 | Plot B6 | | | PASS |
| | 251 | 848.73 | 31.43 | 1.389 | Plot C6 | | | PASS |
| GSM 1900MHz | 512 | 1850.00 | 31.29 | 1.345 | Plot D6 | <33.0 | <2 | PASS |
| | 661 | 1880.00 | 30.93 | 1.238 | Plot E6 | | | PASS |
| | 810 | 1909.87 | 30.67 | 1.116 | Plot F6 | | | PASS |
| GPRS 850MHz | 128 | 824.20 | 29.66 | 0.924 | Plot G6 | <38.5 | <7 | PASS |
| | 190 | 836.60 | 29.94 | 0.986 | Plot H6 | | | PASS |
| | 251 | 848.80 | 29.65 | 0.922 | Plot I6 | | | PASS |
| GPRS 1900MHz | 512 | 1850.13 | 27.49 | 0.561 | Plot J6 | <33.0 | <2 | PASS |
| | 661 | 1880.13 | 27.52 | 0.564 | Plot K6 | | | PASS |
| | 810 | 1909.87 | 27.77 | 0.598 | Plot L6 | | | PASS |

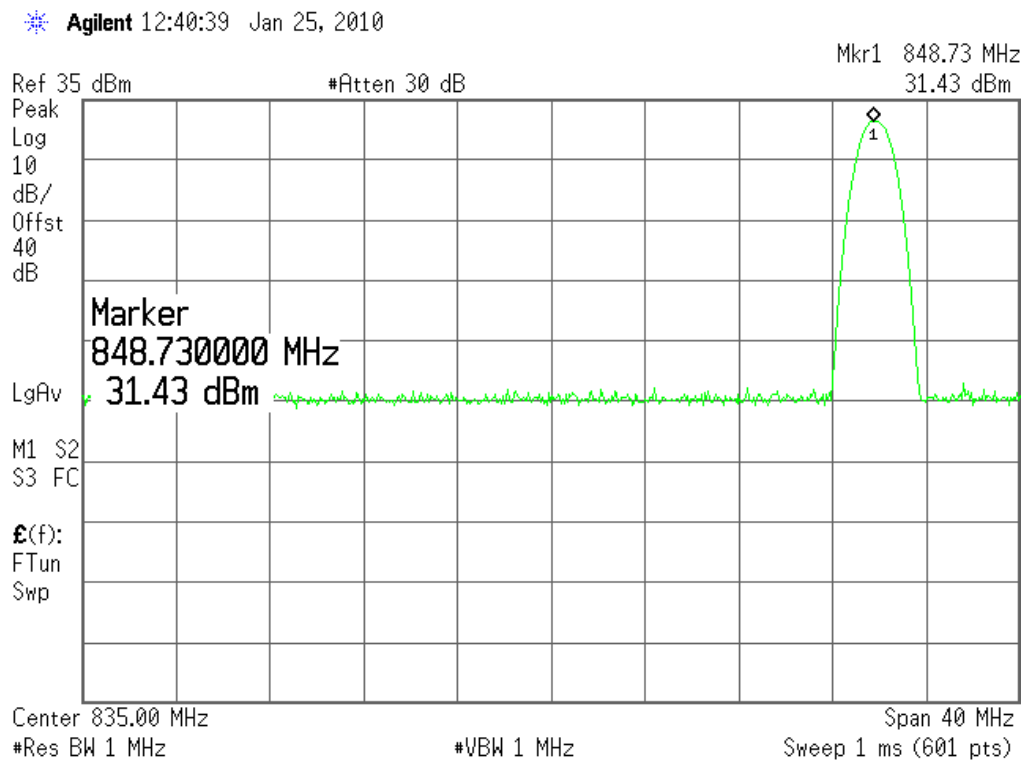
2. Test Plot



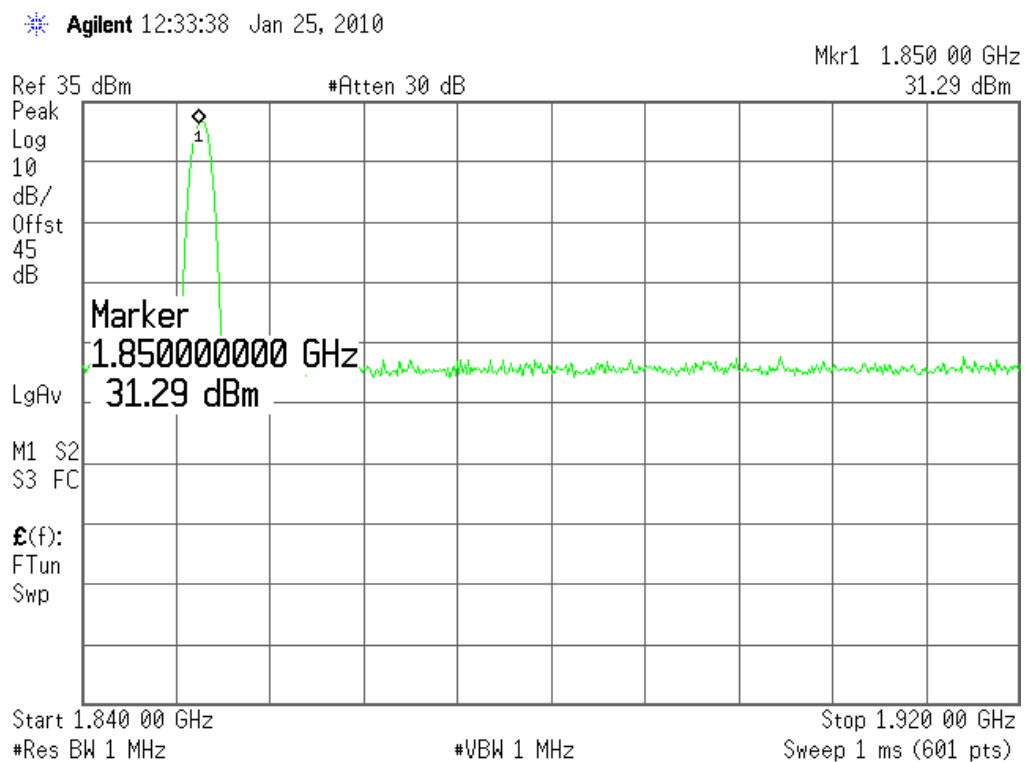
(Plot A6:GSM 850MHz Channel = 128)



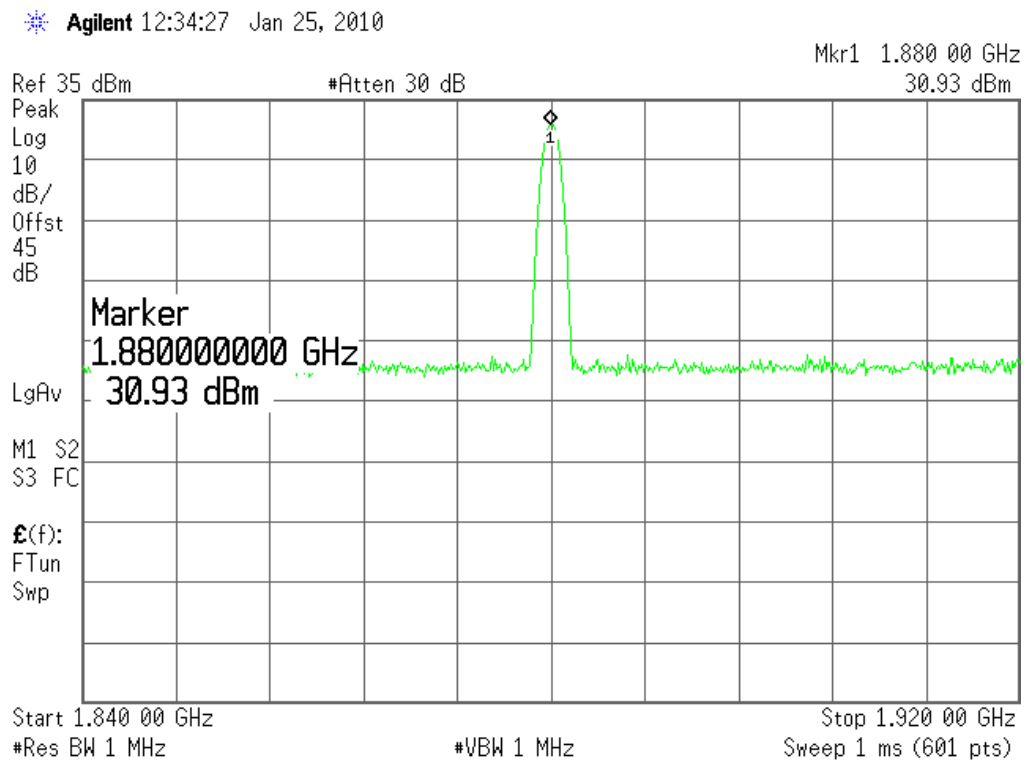
(Plot B6:GSM 850MHz Channel = 190)



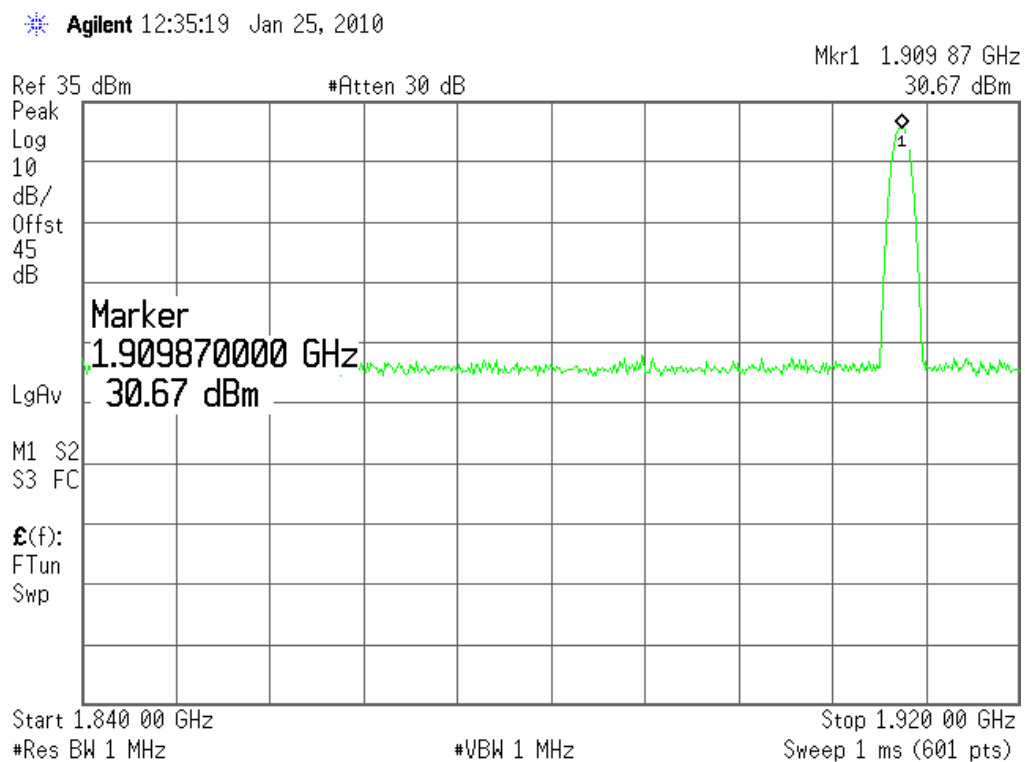
(Plot C6:GSM 850MHz Channel = 251)



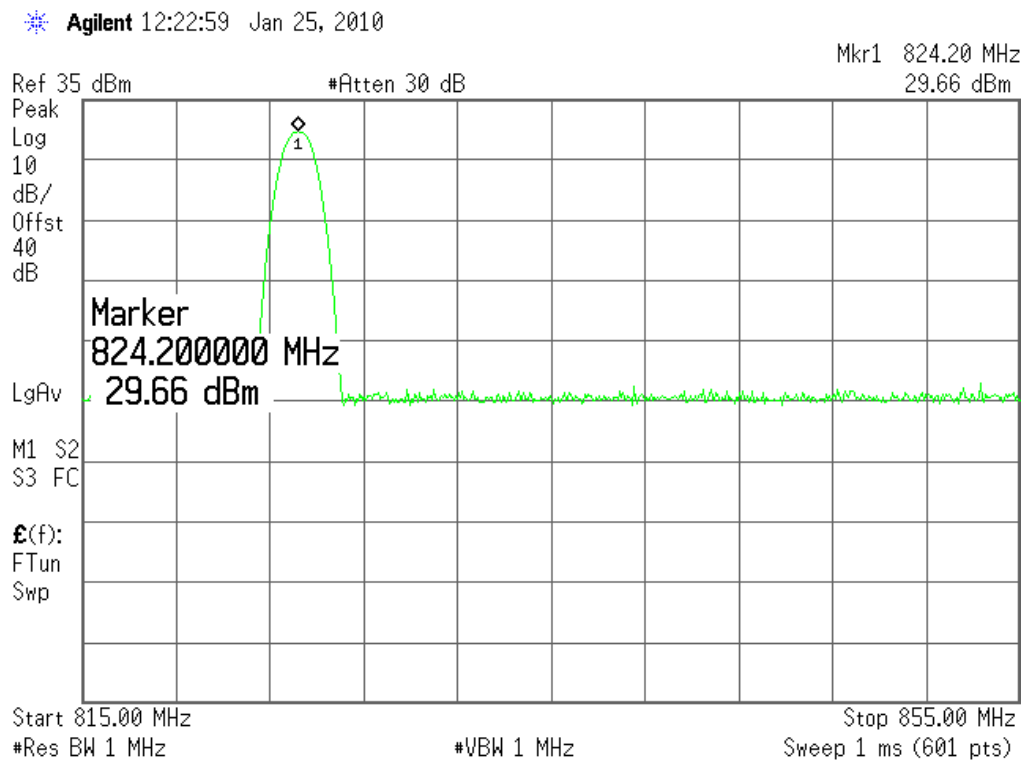
(Plot D6:GSM 1900MHz Channel = 512)



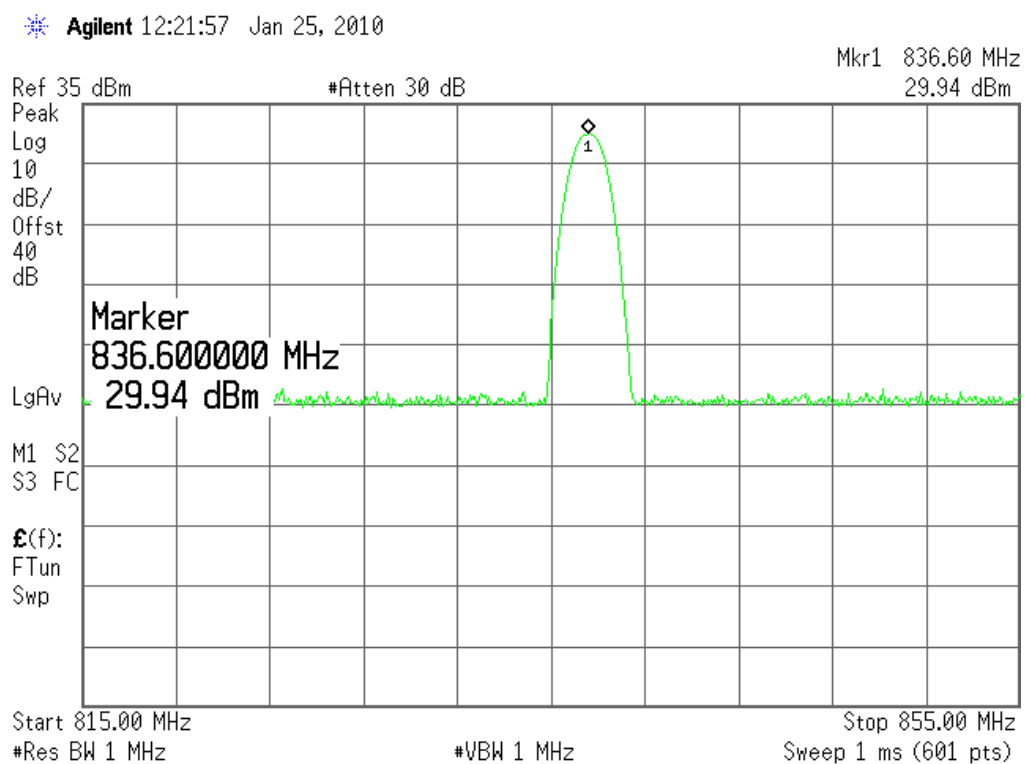
(Plot E6:GSM 1900MHz Channel = 661)



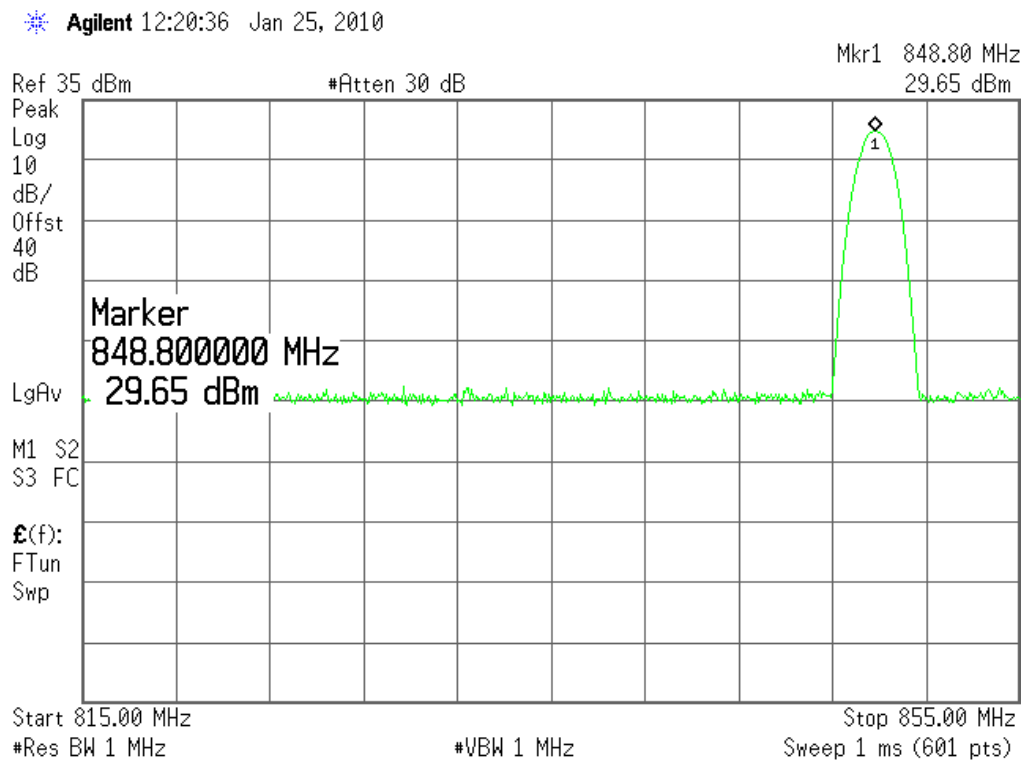
(Plot F6:GSM 1900MHz Channel = 810)



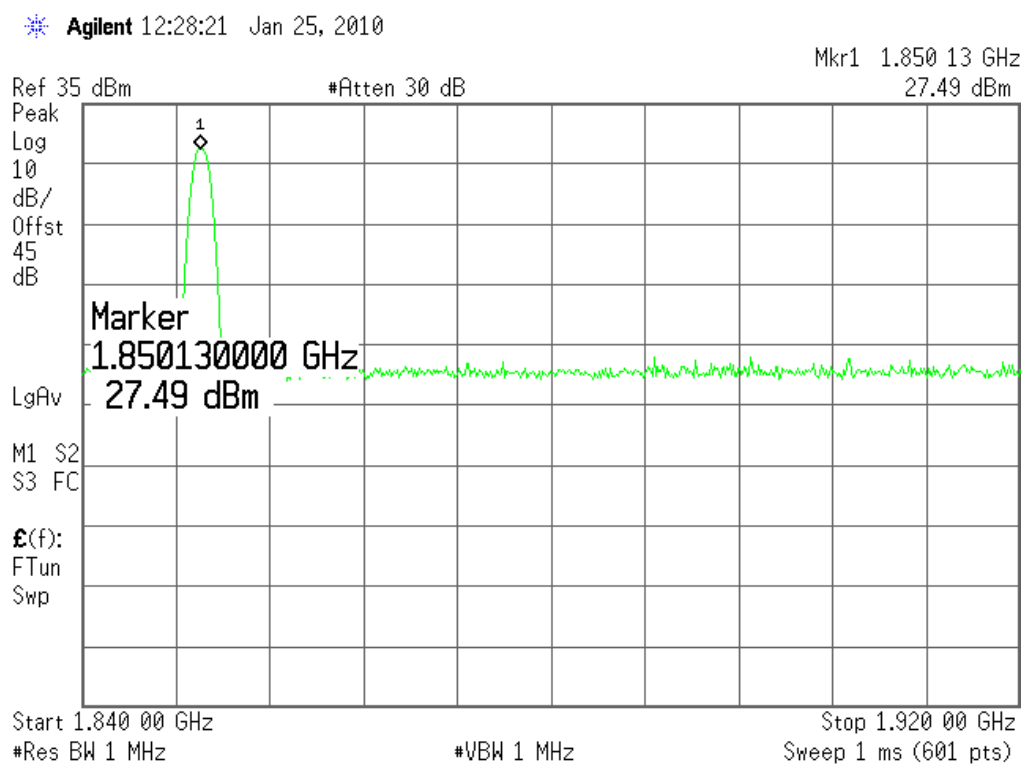
(Plot G6:GPRS 850MHz Channel = 128)



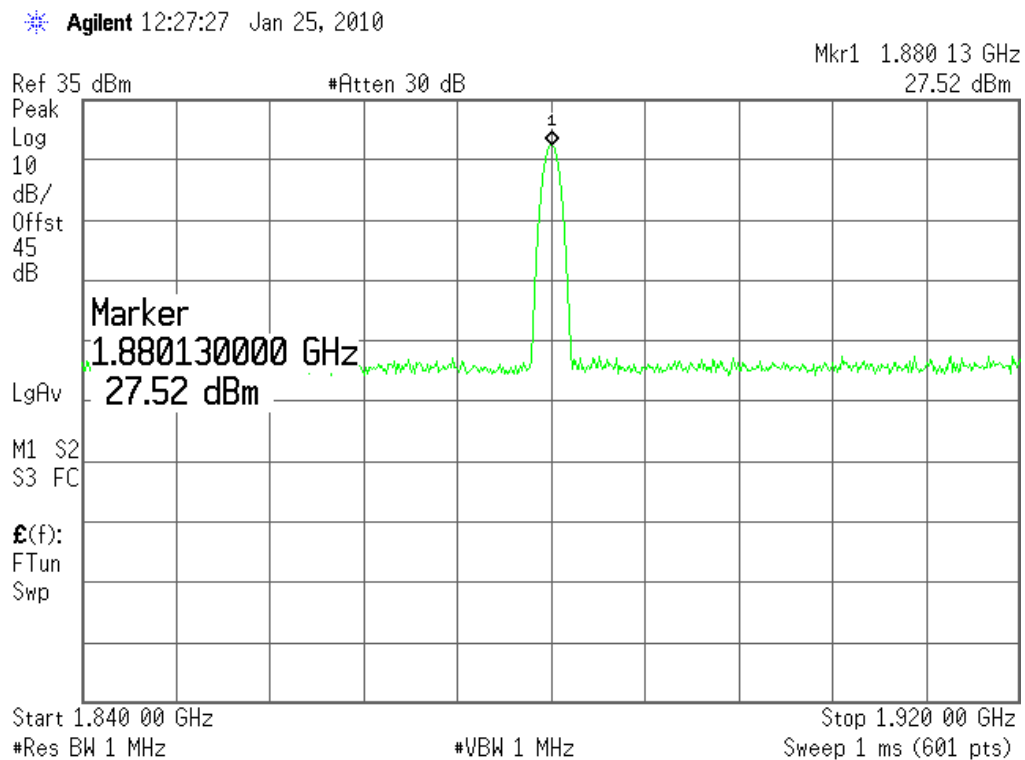
(Plot H6: GPRS 850MHz Channel = 190)



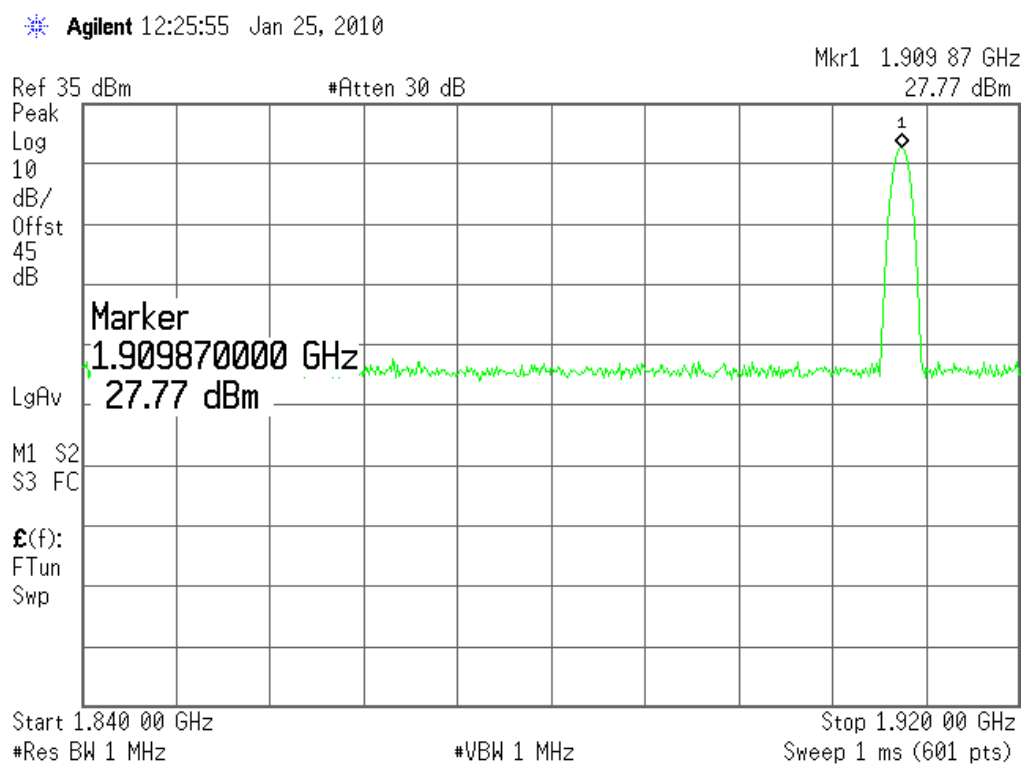
(Plot I6: GPRS 850MHz Channel = 251)



(Plot J6: GPRS 1900MHz Channel = 512)



(Plot K6: GPRS 1900MHz Channel = 661)



(Plot L6:GPRS 1900MHz Channel = 810)

3.8 Radiated Out of Band Emissions

3.8.1 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.

3.8.2 Test Description

See section 3.7.2 of this report.

3.8.3 Test Procedure

1. Perform test system setup as section 2.4.2
2. Make a limit line whose value is -13dBm on the Spectrum Analyzer, and set the RBW of the Spectrum Analyzer to 1MHz.
3. The lowest and the highest channel were selected to perform tests respectively.
4. Employ the bi-log Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 30MHz to 3GHz.
5. The measurement is performed with the Test Antenna at both horizontal and vertical polarization respectively. Set the polarization of the Test Antenna to be horizontal.
6. Actuate the Turn Table to turn from 0 degrees to 360 degrees to find the maximum reading via the Spectrum Analyzer, mark the fundamental frequency and the harmonics thereof, after then record the harmonics and the plot.
7. Set the polarization of the Test Antenna to be vertical, then repeat step 6.
8. Employ the horn Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 3GHz to 10th harmonic of the fundamental frequency (here used 10GHz), then repeat step 5 to 7.
9. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.

3.8.4 Test Result

3.8.4.1 Table for the Harmonics

NOTE: “---” in the table following means that the emission power was too small to be measured and was at least 12dB below the limit.

I GSM 850MHz

| No. | Frequency (MHz) | Emission Power (dBm) | | Limit (dBm) |
|----------------------------------|-----------------|-----------------------|-------------------------|-------------|
| | | Test Antenna Vertical | Test Antenna Horizontal | |
| TCH number set to 128 (824.2MHz) | | | | |
| 1 | 1652.51 | -40.95 | -44.21 | -13 |
| 2 | 2438.22 | --- | --- | -13 |
| 3 | 3356.20 | --- | --- | -13 |
| 4 | 4561.58 | --- | --- | -13 |
| 5 | 4489.14 | --- | --- | -13 |
| 6 | 5927.24 | --- | --- | -13 |
| 7 | 6748.45 | --- | --- | -13 |
| 8 | 7951.45 | --- | --- | -13 |
| 9 | 8598.74 | --- | --- | -13 |
| TCH number set to 190 (836.6MHz) | | | | |
| 10 | 1688.25 | -40.12 | -40.74 | -13 |
| 11 | 2481.14 | --- | --- | -13 |
| 12 | 2944.51 | --- | --- | -13 |
| 13 | 3915.14 | --- | --- | -13 |
| 14 | 4842.44 | --- | --- | -13 |
| 15 | 5954.56 | --- | --- | -13 |
| 16 | 6942.48 | --- | --- | -13 |
| 17 | 7456.48 | --- | --- | -13 |
| 18 | 8054.48 | --- | --- | -13 |
| TCH number set to 251 (848.8MHz) | | | | |
| 19 | 1743.58 | -39.51 | -41.37 | -13 |
| 20 | 2545.22 | --- | --- | -13 |
| 21 | 3395.96 | --- | --- | -13 |
| 22 | 4256.70 | --- | --- | -13 |
| 23 | 5088.44 | --- | --- | -13 |
| 24 | 5561.18 | --- | --- | -13 |
| 25 | 6786.92 | --- | --- | -13 |
| 26 | 7622.66 | --- | --- | -13 |
| 27 | 8158.40 | --- | --- | -13 |

II GSM 1900MHz

| No. | Frequency (MHz) | Emission Power (dBm) | | Limit (dBm) |
|-----------------------------------|-----------------|-----------------------|-------------------------|-------------|
| | | Test Antenna Vertical | Test Antenna Horizontal | |
| TCH number set to 512 (1850.2MHz) | | | | |
| 1 | 3758.26 | -43.55 | -42.05 | -13 |
| 2 | 5545.75 | --- | --- | -13 |
| 3 | 7406.00 | --- | --- | -13 |
| 4 | 9056.25 | --- | --- | -13 |
| 5 | 11108.50 | --- | --- | -13 |
| 6 | 12561.75 | --- | --- | -13 |
| 7 | 14810.00 | --- | --- | -13 |
| 8 | 16661.25 | --- | --- | -13 |
| 9 | 18515.50 | --- | --- | -13 |
| TCH number set to 661 (1880.2MHz) | | | | |
| 10 | 3804.23 | -39.15 | -37.56 | -13 |
| 11 | 5635.00 | --- | --- | -13 |
| 12 | 7524.00 | --- | --- | -13 |
| 13 | 9423.00 | --- | --- | -13 |
| 14 | 11286.00 | --- | --- | -13 |
| 15 | 13168.00 | --- | --- | -13 |
| 16 | 15048.00 | --- | --- | -13 |
| 17 | 16926.00 | --- | --- | -13 |
| 18 | 18800.00 | --- | --- | -13 |
| TCH number set to 810 (1909.8MHz) | | | | |
| 19 | 3952.10 | -41.51 | -41.28 | -13 |
| 20 | 5729.25 | --- | --- | -13 |
| 21 | 7633.00 | --- | --- | -13 |
| 22 | 9545.75 | --- | --- | -13 |
| 23 | 11452.50 | --- | --- | -13 |
| 24 | 13362.25 | --- | --- | -13 |
| 25 | 15272.00 | --- | --- | -13 |
| 26 | 17175.75 | --- | --- | -13 |
| 27 | 19088.50 | --- | --- | -13 |

III GPRS 850MHz

| No. | Frequency (MHz) | Emission Power (dBm) | | Limit (dBm) |
|----------------------------------|-----------------|-----------------------|-------------------------|-------------|
| | | Test Antenna Vertical | Test Antenna Horizontal | |
| TCH number set to 128 (824.2MHz) | | | | |
| 1 | 1518.61 | -41.52 | -42.05 | -13 |
| 2 | 2540.15 | --- | --- | -13 |
| 3 | 3594.84 | --- | --- | -13 |
| 4 | 4156.47 | --- | --- | -13 |
| 5 | 4625.94 | --- | --- | -13 |
| 6 | 5126.48 | --- | --- | -13 |
| 7 | 6545.75 | --- | --- | -13 |
| 8 | 7406.00 | --- | --- | -13 |
| 9 | 9258.25 | --- | --- | -13 |
| TCH number set to 190 (836.6MHz) | | | | |
| 10 | 1784.93 | -40.25 | -41.33 | -13 |
| 11 | 2635.00 | --- | --- | -13 |
| 12 | 3524.00 | --- | --- | -13 |
| 13 | 4423.00 | --- | --- | -13 |
| 14 | 5286.00 | --- | --- | -13 |
| 15 | 6168.00 | --- | --- | -13 |
| 16 | 7048.00 | --- | --- | -13 |
| 17 | 8926.00 | --- | --- | -13 |
| 18 | 9800.00 | --- | --- | -13 |
| TCH number set to 251 (848.8MHz) | | | | |
| 19 | 1180.64 | -44.32 | -45.21 | -13 |
| 20 | 2729.25 | --- | --- | -13 |
| 21 | 3633.00 | --- | --- | -13 |
| 22 | 4545.75 | --- | --- | -13 |
| 23 | 5452.50 | --- | --- | -13 |
| 24 | 6165.18 | --- | --- | -13 |
| 25 | 7156.00 | --- | --- | -13 |
| 26 | 8548.75 | --- | --- | -13 |
| 27 | 9518.50 | --- | --- | -13 |

IV GPRS 1900MHz

| No. | Frequency (MHz) | Emission Power (dBm) | | Limit (dBm) |
|-----------------------------------|-----------------|-----------------------|-------------------------|-------------|
| | | Test Antenna Vertical | Test Antenna Horizontal | |
| TCH number set to 512 (1850.2MHz) | | | | |
| 1 | 3848.50 | -40.32 | -43.14 | -13 |
| 2 | 5545.75 | --- | --- | -13 |
| 3 | 7406.00 | --- | --- | -13 |
| 4 | 9258.25 | --- | --- | -13 |
| 5 | 11108.50 | --- | --- | -13 |
| 6 | 12956.75 | --- | --- | -13 |
| 7 | 14810.00 | --- | --- | -13 |
| 8 | 16661.25 | --- | --- | -13 |
| 9 | 18515.50 | --- | --- | -13 |
| TCH number set to 661 (1880.2MHz) | | | | |
| 10 | 3936.60 | -39.74 | -38.56 | -13 |
| 11 | 5635.00 | --- | --- | -13 |
| 12 | 7524.00 | --- | --- | -13 |
| 13 | 9423.00 | --- | --- | -13 |
| 14 | 11286.00 | --- | --- | -13 |
| 15 | 13168.00 | --- | --- | -13 |
| 16 | 15048.00 | --- | --- | -13 |
| 17 | 16926.00 | --- | --- | -13 |
| 18 | 18800.00 | --- | --- | -13 |
| TCH number set to 810 (1909.8MHz) | | | | |
| 19 | 3485.85 | -42.49 | -45.26 | -13 |
| 20 | 5729.25 | --- | --- | -13 |
| 21 | 7633.00 | --- | --- | -13 |
| 22 | 9545.75 | --- | --- | -13 |
| 23 | 11452.50 | --- | --- | -13 |
| 24 | 13362.25 | --- | --- | -13 |
| 25 | 15272.00 | --- | --- | -13 |
| 26 | 17175.75 | --- | --- | -13 |
| 27 | 19088.50 | --- | --- | -13 |

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

** END OF REPORT **