



# M. Flom Associates, Inc.

## International Compliance Testing Laboratory

3356 N. San Marcos Place, Suite 107  
Chandler, AZ 85225

toll-free: (866) 311-3268  
fax: (480) 926-3598

<http://www.mflom.com>  
[info@mflom.com](mailto:info@mflom.com)

Date of Report: November 30, 2004  
Date of Submission: January 21, 2005

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Vertu Ltd.  
Equipment: Model: Ascent, Type RHV-3  
FCC ID: P7QRHV-3  
FCC Rules: 24E and Confidentiality

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

David E. Lee,  
Compliance Test Manager

enclosure(s)  
cc: Applicant  
DEL/ca

M. Flom Associates, Inc.  
3356 N. San Marcos Place, Suite 107  
Chandler, Arizona 85225-7176  
(480) 926-3100 phone, fax (480) 926-3598

FCC ID: P7QRHV-3  
MFA p04b0002, d04b00633



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### Transmitter Certification

of

FCC ID: P7QRHV-3  
Model: Ascent, Type RHV-3

to

### Federal Communications Commission

Rule Parts 24E and Confidentiality

**Date Of Report:** November 30, 2004

#### On the Behalf of the Applicant:

Vertu Ltd.

#### At the Request of:

P.O. J93-4971588

Vertu Ltd.  
Beacon Hill Road  
Church Crookham, Hampshire GU52 8DY UK

#### Attention of:

Mark Pope, Certification and Compliance Manager  
+44 1252 611135; FAX: -611302  
Mobile: +44 7774 8158594  
[mark.pope@vertu.com](mailto:mark.pope@vertu.com)

#### Supervised By:

David E. Lee,  
Compliance Test Manager

**List of Exhibits**  
(FCC **Certification** (PCS Transmitters) - Revised 9/28/98)

Applicant: Vertu Ltd.

FCC ID: P7QRHV-3

**By Applicant:**

1. Letter of Authorization
2. Identification Drawings, 2.1033(c)(11)
  - Id Label
  - Location of Label
  - Compliance Statement
  - Location of Compliance Statement
3. Photographs, 2.1033(c)(12)
4. Confidentiality Request: 0.457 And 0.459
5. Documentation: 2.1033(c)
  - (3) User Manual
  - (9) Tune Up Info
  - (10) Schematic Diagram
  - (10) Circuit Description
  - Block Diagram
  - Parts List
  - Active Devices
6. SAR Report

**By M.F.A. Inc.**

- A. Testimonial & Statement of Certification

**The Applicant has been cautioned as to the following:**

15.21 Information to User.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

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*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

a) **Test Report**

b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d04c0051

d) Client: Vertu Ltd.  
Beacon Hill Road  
Church Crookham, Hampshire GU52 8DY UK

e) Identification: Model: Ascent, Type RHV-3  
FCC ID: P7QRHV-3  
S/N: 004400/31/171367/9  
Description: Cellular/PCS Phone

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: December 20, 2004  
EUT Received: November 8, 2004

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:



David E. Lee,  
Compliance Test Manager

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

## List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,  
Volume II, Part 2 and to

24E and Confidentiality

### Sub-Part 2.1033

(c)(1): **Name and Address of Applicant:**

Vertu Ltd.  
Beacon Hill Road  
Church Crookham, Hampshire GU52 8DY UK

**Manufacturer:**

Applicant

(c)(2): **FCC ID:**

P7QRHV-3

**Model Number:**

Ascent, Type RHV-3

The P7QRHV-3 Mobile phone combines PCS technology and performance with design and craftsmanship to produce a product available in a number of cosmetic finishes. As this is restricted to cosmetics all will have the same Model, Type and FCCID.

The Electrical design is particularly robust and incorporates a self-contained, multiplayer, double-sided screened board with screening of the digital, base band and RF circuitry.

Cosmetic finishing of the phone allows some variation of the Ceramic and Leather components, as well as levels of polishing and finishing and color, using these materials. Test results demonstrate the equivalence of products tested and the independence of these finishing components from electrical performance in any mix/match combination.

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type of Emission:**

256KGXW

(c)(5): **Frequency Range, MHz:**

1850 - 1910

(c)(6): **Power Rating, Watts:**

\_\_\_\_ Switchable

X  Variable

1.096

\_\_\_\_ N/A

(c)(7): **Maximum Power Rating, Watts:**

2.0

**Subpart 2.1033** (continued)

(c)(8): Voltages & Currents in All Elements in Final RF Stage, Including Final Transistor or Solid State Device:

|                        |   |            |
|------------------------|---|------------|
| Collector Current, A   | = | per manual |
| Collector Voltage, Vdc | = | per manual |
| Supply Voltage, Vdc    | = | 4.0        |

(c)(9): **Tune-Up Procedure:**

Please See Attached Exhibits

(c)(10): **Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please See Attached Exhibits

(c)(11): **Label Information:**

Please See Attached Exhibits

(c)(12): **Photographs:**

Please See Attached Exhibits

(c)(13): **Digital Modulation Description:**

☐ Attached Exhibits  
☒ N/A

(c)(14): **Test and Measurement Data:**

Follows



## A2LA

"A2LA has accredited M. Flom Associates, Inc. Chandler, AZ for technical competence in the field of Electrical Testing. The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Certificate Number: **2152-01**



UNITED STATES DEPARTMENT OF COMMERCE  
National Institute of Standards and Technology  
Gaithersburg, Maryland 20899

September 15, 1999

Mr. Morton Flom  
M. Flom Associates Inc.  
3356 N. San Marcos Place, Suite 107  
Chandler, AZ 85224

Dear Mr. Flom:

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology, and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Arrangement (APEC MRA). Your laboratory is now formally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at <http://ts.nist.gov/mra> under the "Asia" category.

As of August 1, 1999, you may submit test data to BSMI to verify that the equipment to be imported into Chinese Taipei satisfies the applicable EMC requirements. **Your assigned BSMI number is SL2-IN-E-041R; you must use this number when sending test reports to BSMI.** Your designation will remain in force as long as your NVLAP and/or A2LA and/or BSMI accreditation remains valid for the CMC 13418.

Please note that BSMI requires that the entity making application for the approval of regulated equipment must make such application in person at their Taipei office. **BSMI also requires the names of the authorized signatories who are authorized to sign the test reports.** You can send this information via fax to C-Taipei CAB Response Manager at 301-975-5414. I am also enclosing a copy of the cover sheet that, according to BSMI requirements, must accompany every test report.

**NIST**

If you have any questions, please contact Robert Gladhill at 301-975-4273 or Joe Phillips at 301-975-5521. We appreciate your continued interest in our international conformity assessment activities.

Sincerely,

  
Melinda L. Collins, Ph.D.  
Director, Office of Standards Services

Enclosure

## NIST

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Your laboratory is now formally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at <http://ts.nist.gov/mra> under the 'Asia' category."

BSMI Number: **SL2-IN-E-041R**

Sub-part

**2.1033(c)(14):**

**Test and Measurement Data**

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts:

- ☐ 21 - Domestic Public Fixed Radio Services
- ☐ 22 - Public Mobile Services
- ☐ 22 Subpart H - Cellular Radiotelephone Service
- ☐ 22.901(d) - Alternative technologies and auxiliary services
- ☐ 23 - International Fixed Public Radiocommunication services
- ☒ 24 - Personal Communications Services
- ☐ 74 Subpart H - Low Power Auxiliary Stations
- ☐ 80 - Stations in the Maritime Services
- ☐ 80 Subpart E - General Technical Standards
- ☐ 80 Subpart F - Equipment Authorization for Compulsory Ships
- ☐ 80 Subpart K - Private Coast Stations and Marine Utility Stations
- ☐ 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- ☐ 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- ☐ 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- ☐ 80 Subpart V - Emergency Position Indicating Radiobeacons (EPIRB'S)
- ☐ 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- ☐ 80 Subpart X - Voluntary Radio Installations
- ☐ 87 - Aviation Services
- ☐ 90 - Private Land Mobile Radio Services
- ☐ 94 - Private Operational-Fixed Microwave Service
- ☐ 95 Subpart A - General Mobile Radio Service (GMRS)
- ☐ 95 Subpart C - Radio Control (R/C) Radio Service
- ☐ 95 Subpart D - Citizens Band (CB) Radio Service
- ☐ 95 Subpart E - Family Radio Service
- ☐ 95 Subpart F - Interactive Video and Data Service (IVDS)
- ☐ 97 - Amateur Radio Service
- ☐ 101 - Fixed Microwave Services

## **Standard Test Conditions and Engineering Practices**

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

In accordance with ANSI C63.4-1992/2001, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

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

**Name of Test:** R. F. Power Output (Radiated)

**Specification:** 47 CFR 2.1046(a)

### Measurement Procedure (Radiated)

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation  $P_t = ((E \times R)^2 / 49.2)$  watts, where  $R = 3m$ .
2. Measurement accuracy is  $\pm 1.5$  dB.

### Test Equipment

| Asset                    | Description              | s/n        | Cycle  | Last Cal |
|--------------------------|--------------------------|------------|--------|----------|
| <b>Transducer</b>        |                          |            |        |          |
| i00088                   | EMCO 3109-B 25MHz-300MHz | 2336       | 24 mo. | Sep-03   |
| X i00089                 | Apriel 2001 200MHz-1GHz  | 001500     | 24 mo. | Sep-03   |
| X i00103                 | EMCO 3115 1GHz-18GHz     | 9208-3925  | 24 mo. | Jan-04   |
| <b>Amplifier</b>         |                          |            |        |          |
| X i00028                 | HP 8449A                 | 2749A00121 | 12 mo. | May-04   |
| <b>Spectrum Analyzer</b> |                          |            |        |          |
| X i00029                 | HP 8563E                 | 3213A00104 | 12 mo. | May-04   |
| X i00033                 | HP 85462A                | 3625A00357 | 12 mo. | Sep-04   |

### Measurement Results

#### GSM / GPRS 1900 g04b0002: 2004-Nov-08 Mon 11:39:00

| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV/m | CF, dB | EIRP, dBm | EIRP, Watts |
|----------------------|-------------------------|---------------|--------|-----------|-------------|
| 1850.200000          | 1850.113000             | 81.50         | 44.15  | 30.4      | 1.096       |
| 1880.000000          | 1879.913000             | 81.15         | 44.31  | 30.2      | 1.047       |
| 1909.800000          | 1909.713000             | 81.02         | 44.47  | 30.3      | 1.072       |

#### EGPRS 1900 g04b0003: 2004-Nov-08 Mon 16:48:00

| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV/m | CF, dB | EIRP, dBm | EIRP, Watts |
|----------------------|-------------------------|---------------|--------|-----------|-------------|
| 1850.200000          | 1850.113000             | 78.11         | 44.15  | 27.0      | 0.501       |
| 1880.000000          | 1879.913000             | 77.08         | 44.31  | 26.2      | 0.417       |
| 1909.800000          | 1909.713000             | 77.86         | 44.47  | 27.1      | 0.513       |

#### Bluetooth g04b0008: 2004-Nov-08 Mon 11:39:00

| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV/m | CF, dB | EIRP, dBm | EIRP, Watts |
|----------------------|-------------------------|---------------|--------|-----------|-------------|
| 2.402000             | 2401.950000             | 48.42         | 48.01  | 1.2       | 0.00132     |
| 2.441000             | 2440.950000             | 49.40         | 48.33  | 2.5       | 0.00178     |
| 2.480000             | 2479.950000             | 47.73         | 48.64  | 1.1       | 0.00129     |



Supervised By:

David E. Lee,  
Compliance Test Manager

**Name of Test:** Emission Masks (Occupied Bandwidth)

**Specification:** 47 CFR 2.1049(c)(1), 22

### Measurement Procedure

- A) The EUT and test equipment were set up as shown below
- B) For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- C) The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

### Transmitter Equipment

The relevant equipment used during the test is listed below.

Directional Coupler      Serial no. C-1530-10-U (0204)

RLC Electronics      Calibration N/A

Directional Coupler      Serial no. C-0510-10-U (0204)

RLC Electronics      Calibration N/A

Base Station Emulator      Serial no. 1100.0008.02

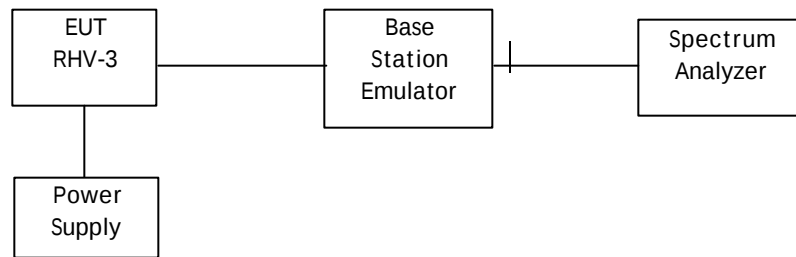
Rohde & Schwarz CMU200      Calibrated 9 Dec, 2003      Due 09 Dec, 2004

Spectrum Analyser      Serial no. 3943A11206

Agilent 8563E      Calibrated 29 Jun, 2003      Due 29 Jun, 2006

## Test Set-Up

The measurement equipment is set up as shown below.



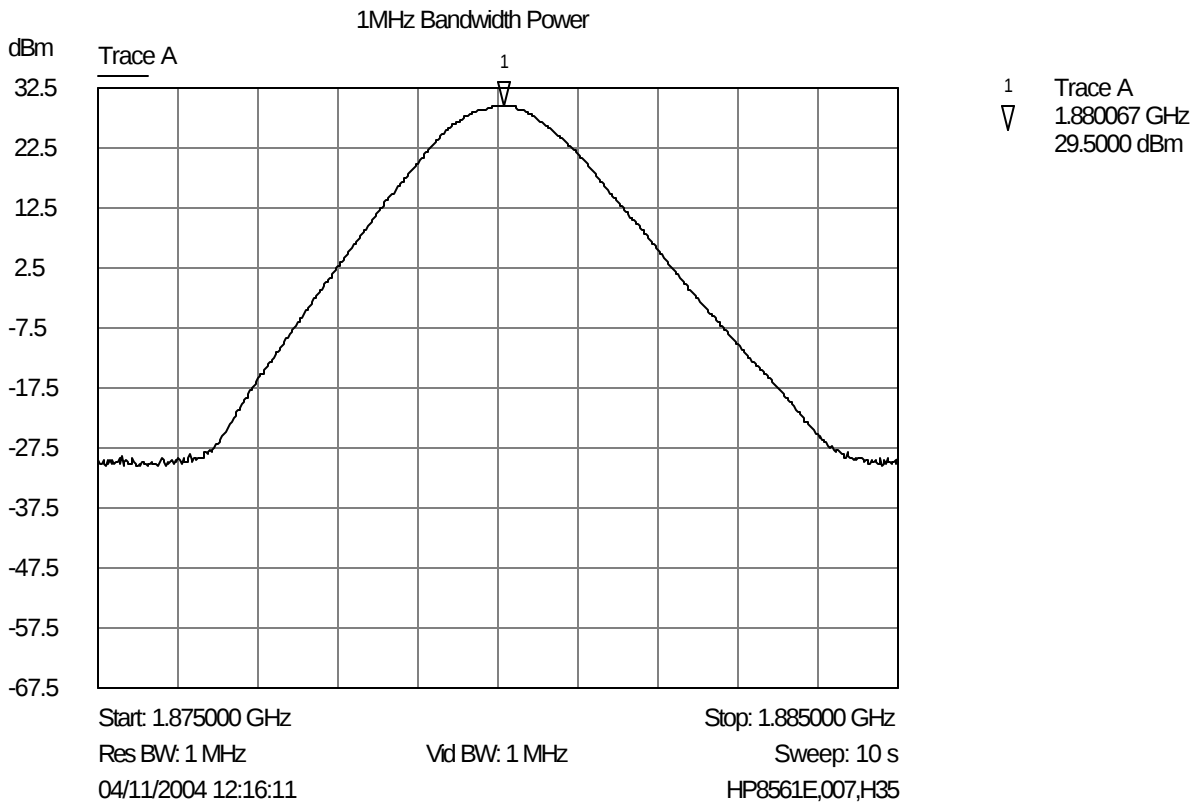
## Measurement Procedure

- 1) The EUT is connected via a conducted connection and placed in a call with random (worst case) modulation against the base station emulator.
  - a) For PCS mid channel 661, Tx Power Control level 0 (max power).
- 2) The spectrum analyser is connected via the coupled RF port on the base station emulator.
- 3) The maximum power in 1 MHz RBW is measured.
- 4) The Occupied Bandwidth is measured via the 99% Power BW function on the spectrum analyser.
- 5) The channel is changed to low channel PCS - CH512.
- 6) The band edge emissions limit is checked in 1% RBW for compliance.
- 7) The channel is changed to the next band edge channel.
- 8) The band edge emissions limit is checked in 1% RBW for compliance.
- 9) Repeat 7) & 8) up to the last band edge channel 810
- 10) The results are attached in the following pages.

**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

Applicant Supplied Data



Power:  
Modulation:

HIGH POWER, REFERENCE IN 1MHz  
GSM 1900  
MID CHANNEL

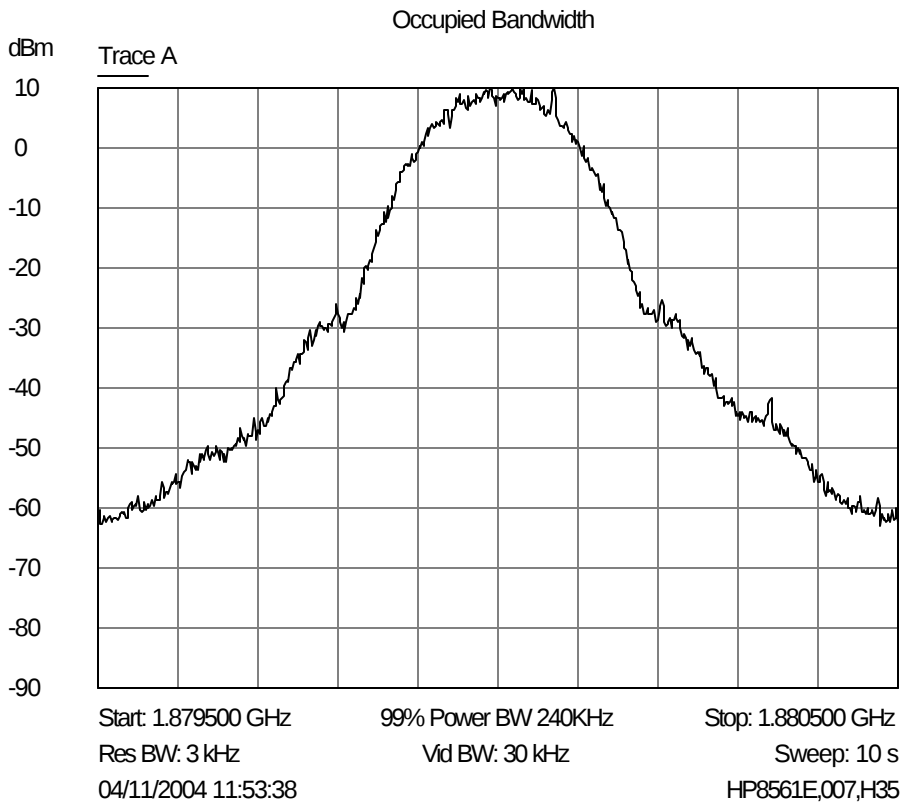
Verified by:

David E. Lee,  
Compliance Test Manager

**Name of Test:** Emission Masks (Occupied Bandwidth)

### Measurement Results

Applicant Supplied Data



Power:  
Modulation:

HIGH POWER  
GSM 1900  
MID CHANNEL, 99% POWER BANDWIDTH



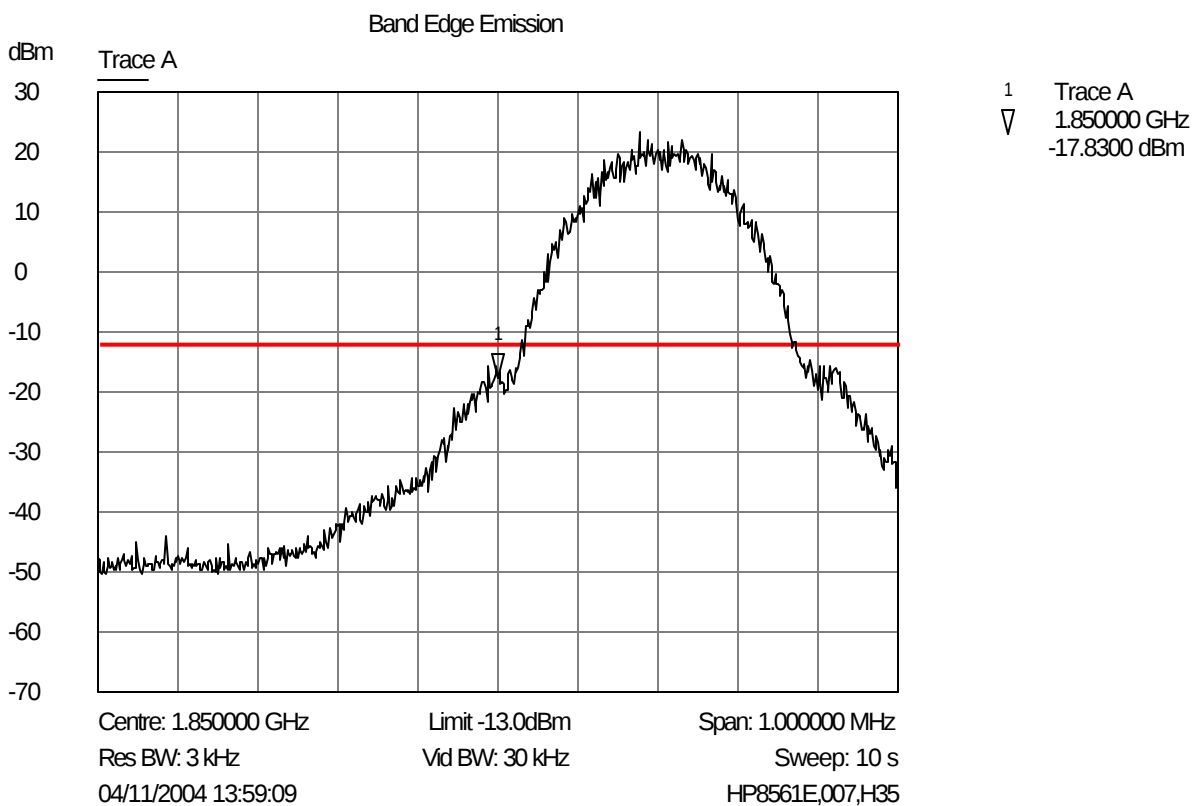
Verified by:

David E. Lee,  
Compliance Test Manager

**Name of Test:** Emission Masks (Occupied Bandwidth)

### Measurement Results

Applicant Supplied Data



Power:  
Modulation:

HIGH POWER  
GSM 1900  
LOW CHANNEL, LOWER BAND EDGE

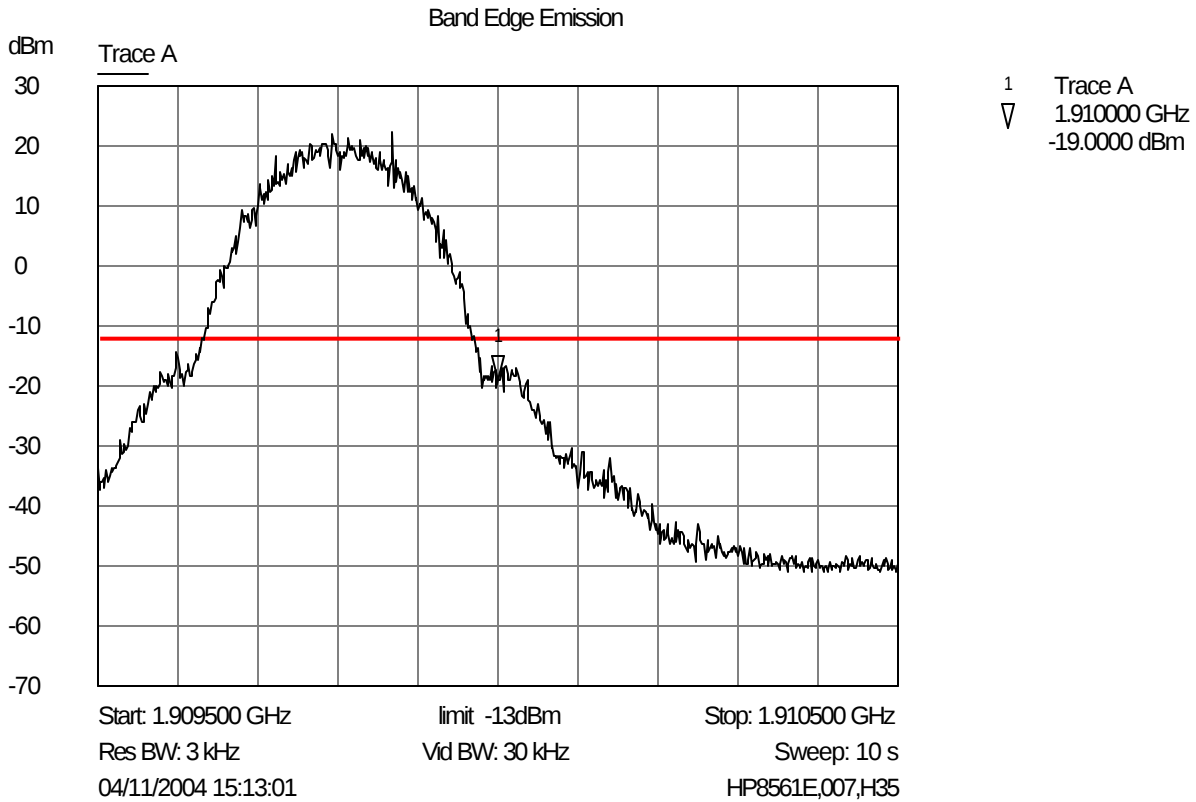
Verified by:

David E. Lee,  
Compliance Test Manager

**Name of Test:** Emission Masks (Occupied Bandwidth)

### Measurement Results

Applicant Supplied Data



Power:  
Modulation:

HIGH POWER  
GSM 1900  
HIGH CHANNEL, UPPER BAND EDGE

Verified by:

David E. Lee,  
Compliance Test Manager

**Name of Test:** Emission Masks (Occupied Bandwidth)

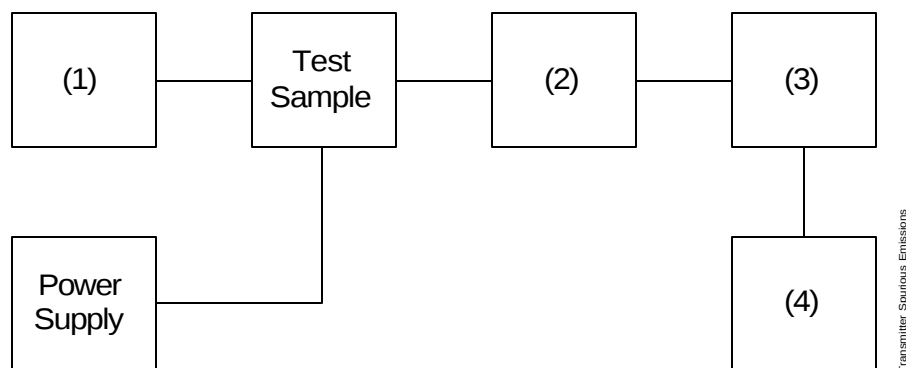
**Specification:** 47 CFR 2.1049(c)(1), 22

**Test Equipment:** As per previous page

### Measurement Procedure

- A) The EUT and test equipment were set up as shown below
- B) For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for  $\pm 2.5/\pm 1.25$  kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
- C) For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- D) The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

### Transmitter Test Set-Up: Occupied Bandwidth



| Asset                                 | Description                    | s/n        | Cycle  | Last Cal |
|---------------------------------------|--------------------------------|------------|--------|----------|
| <b>(1) Audio Oscillator/Generator</b> |                                |            |        |          |
| i00017                                | HP 8903A Modulation Meter      | 2216A01753 | 12 mo. | Apr-04   |
| <b>(2) Coaxial Attenuator</b>         |                                |            |        |          |
| X i00231/2                            | PASTERNAK PE7021-30 (30 dB)    | 231 or 232 | NCR    |          |
| i00123                                | NARDA 766 (10 dB)              | 7802A      | NCR    |          |
| <b>(3) Interface</b>                  |                                |            |        |          |
| X i00021                              | HP 8954A Transceiver Interface | 2146A00159 | NCR    |          |
| <b>(4) Spectrum Analyzer</b>          |                                |            |        |          |
| X i00048                              | HP 8566B Spectrum Analyzer     | 2511A01467 | 12 mo. | Oct-04   |
| i00029                                | HP 8563E Spectrum Analyzer     | 3213A00104 | 12 mo. | May-04   |

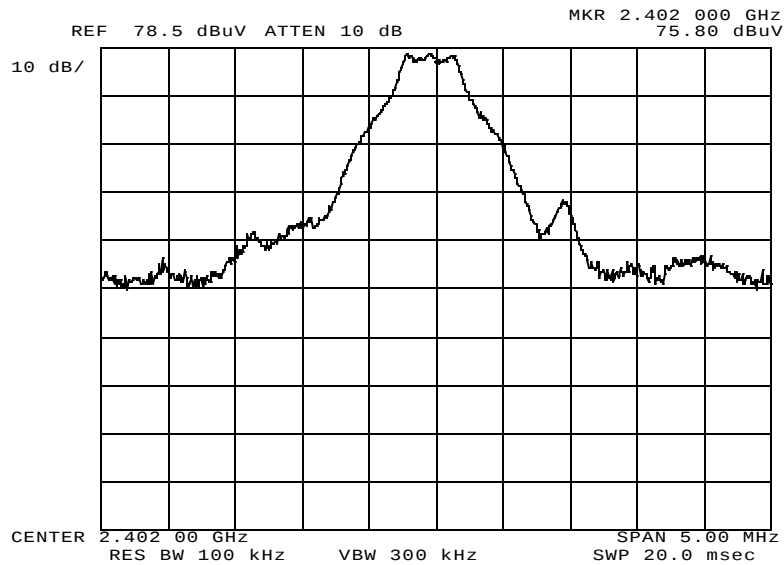
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

g04b0019: 2004-Nov-10 Wed 09:26:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
BLUETOOTH  
LOW CHANNEL

Performed by:



Samir Mahmoud, Test Technician

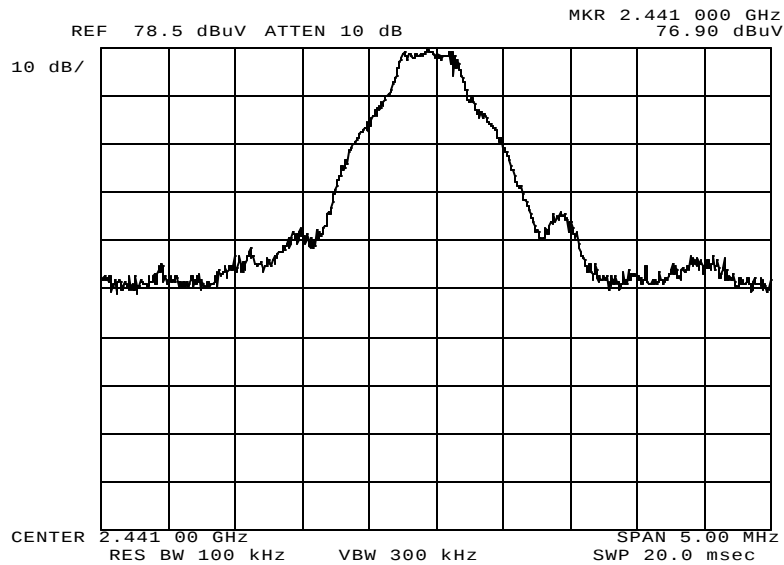
**Name of Test:** Emission Masks (Occupied Bandwidth)

**Measurement Results**

g04b0020: 2004-Nov-10 Wed 09:31:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
BLUETOOTH  
MID CHANNEL

Performed by:

Samir Mahmoud, Test Technician

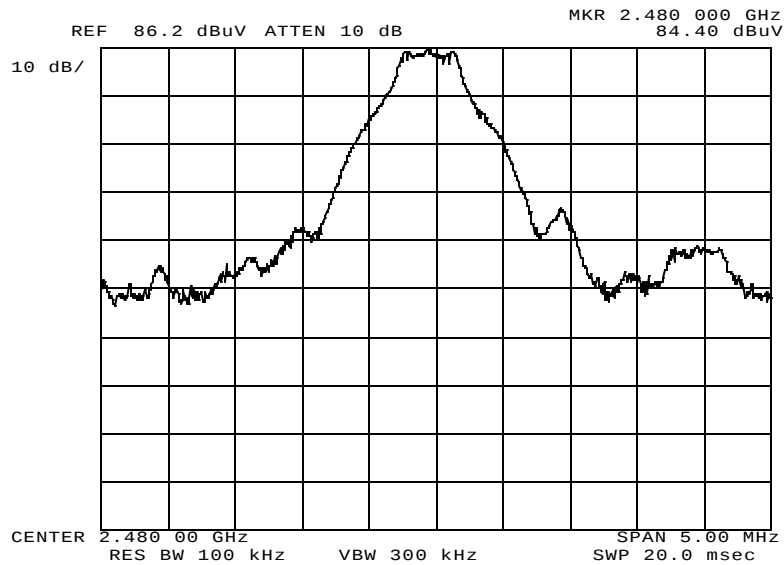
**Name of Test:** Emission Masks (Occupied Bandwidth)

### Measurement Results

g04b0021: 2004-Nov-10 Wed 09:47:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
BLUETOOTH  
HIGH CHANNEL

Performed by:



Samir Mahmoud, Test Technician

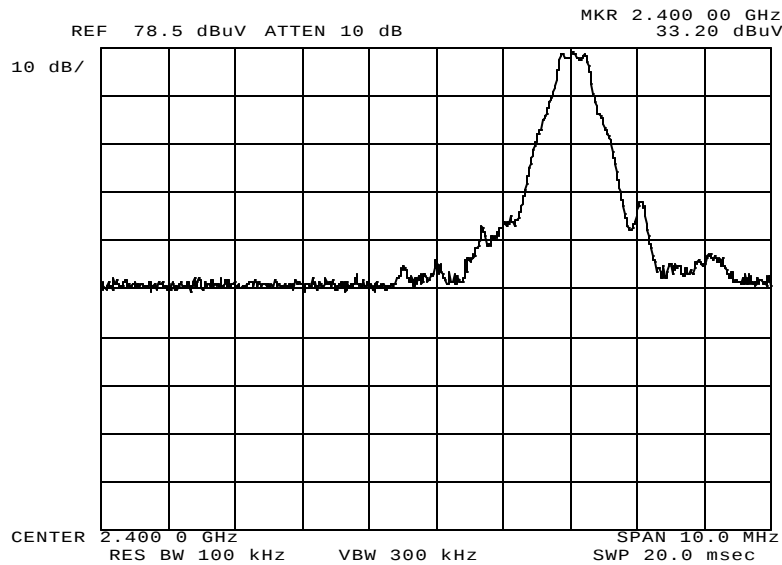
**Name of Test:** Emission Masks (Occupied Bandwidth)

### Measurement Results

g04b0018: 2004-Nov-10 Wed 09:25:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
BLUETOOTH  
LOW BAND EDGE

Performed by:



Samir Mahmoud, Test Technician

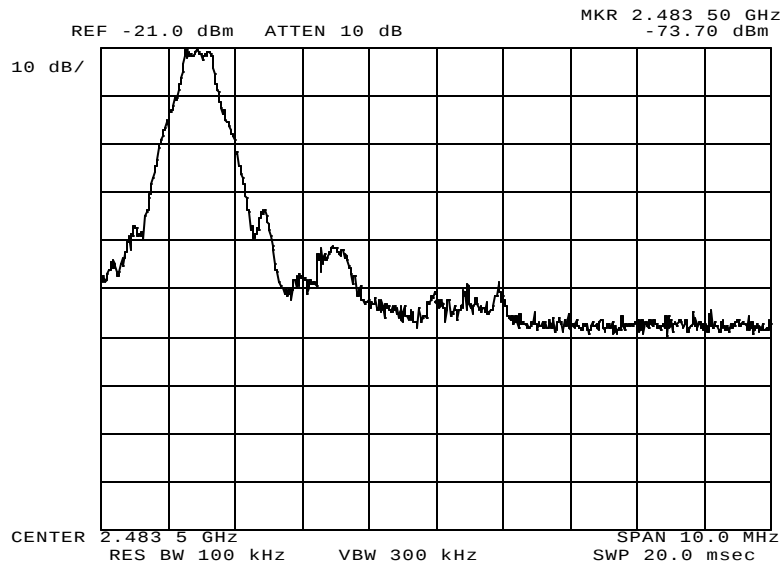
**Name of Test:** Emission Masks (Occupied Bandwidth)

### Measurement Results

g04b0022: 2004-Nov-10 Wed 09:54:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
BLUETOOTH  
UPPER BAND EDGE

Performed by:



Samir Mahmoud, Test Technician

**Name of Test:** Field Strength of Spurious Radiation

**Specification:** 47 CFR 2.1053(a)

**Guide:** ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

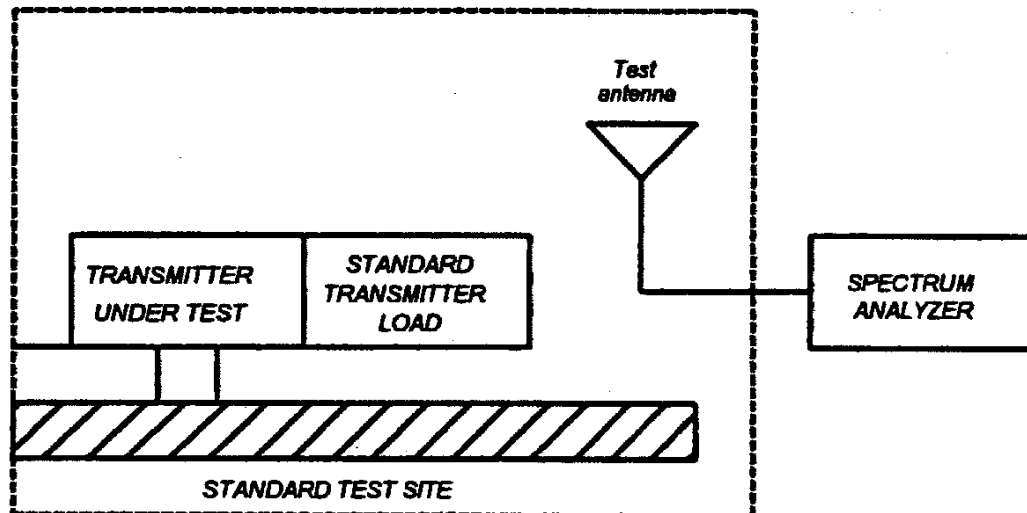
### Measurement Procedure

#### Definition:

Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

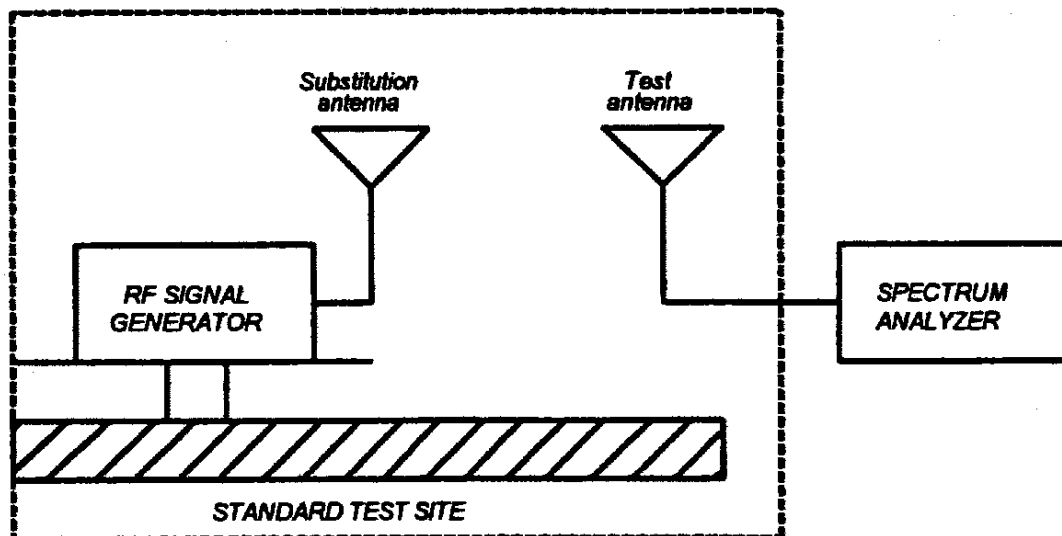
#### Method of Measurement:

- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
  - 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
  - 2) Video Bandwidth = 3 times Resolution Bandwidth, or 30 kHz (22.917)
  - 3) Sweep Speed  $\leq 2000$  Hz/second
  - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.



**Name of Test:** Field Strength of Spurious Radiation (Cont.)

- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to  $\pm$  the test bandwidth (see section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

**Name of Test:** Field Strength of Spurious Radiation (Cont.)

- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =

$$10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$$

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

**Test Equipment**

| Asset                         | Description               | s/n        | Cycle  | Last Cal |
|-------------------------------|---------------------------|------------|--------|----------|
| <b>Transducer</b>             |                           |            |        |          |
| i00088                        | EMCO 3109-B 25MHz-300MHz  | 2336       | 24 mo. | Sep-03   |
| X i00089                      | Apriel 2001 200MHz-1GHz   | 001500     | 24 mo. | Sep-03   |
| X i00103                      | EMCO 3115 1GHz-18GHz      | 9208-3925  | 24 mo. | Jan-04   |
| <b>Amplifier</b>              |                           |            |        |          |
| X i00028                      | HP 8449A                  | 2749A00121 | 12 mo. | May-04   |
| <b>Spectrum Analyzer</b>      |                           |            |        |          |
| X i00029                      | HP 8563E                  | 3213A00104 | 12 mo. | May-04   |
| X i00033                      | HP 85462A                 | 3625A00357 | 12 mo. | Sep-04   |
| <b>Substitution Generator</b> |                           |            |        |          |
| X i00067                      | HP 8920A Communication TS | 3345U01242 | 12 mo. | Jun-04   |
| i00207                        | HP 8753D Network Analyzer | 3410A08514 | 12 mo. | Jul-04   |

**Name of Test:** Field Strength of Spurious Radiation

**GSM / GPRS 1900**

g04b0010: 2004-Nov-09 Tue 10:21:00

STATE: 2:High Power

| Frequency Tuned,<br>MHz | Frequency Emission,<br>MHz | Meter, dBuV | CF, dB | EIRP, dBm | Margin, dB |
|-------------------------|----------------------------|-------------|--------|-----------|------------|
| 1850.200000             | 3701.306667                | 37.17       | 10.00  | -48.1     | -37.2      |
| 1880.000000             | 3760.483333                | 36.33       | 10.53  | -48.4     | -37.5      |
| 1909.800000             | 3819.536667                | 36.50       | 11.04  | -47.7     | -36.9      |
| 1850.200000             | 5549.980000                | 35.00       | 12.47  | -47.8     | -36.9      |
| 1880.000000             | 5639.666667                | 35.50       | 12.84  | -46.9     | -36.1      |
| 1909.800000             | 5728.450000                | 35.17       | 13.20  | -46.9     | -36.0      |
| 1850.200000             | 7400.313333                | 35.67       | 15.17  | -44.4     | -33.6      |
| 1880.000000             | 7519.453333                | 35.50       | 15.69  | -44.0     | -33.2      |
| 1909.800000             | 7638.350000                | 35.50       | 16.20  | -43.5     | -32.7      |
| 1850.200000             | 9250.073333                | 36.17       | 16.73  | -42.3     | -31.5      |
| 1880.000000             | 9399.626667                | 35.83       | 18.74  | -40.7     | -29.8      |
| 1909.800000             | 9548.716667                | 36.33       | 20.05  | -38.8     | -28.0      |
| 1850.200000             | 11101.956667               | 36.67       | 25.59  | -33.0     | -22.1      |
| 1880.000000             | 11279.850000               | 36.50       | 27.75  | -31.0     | -20.2      |
| 1909.800000             | 11459.796667               | 36.67       | 29.89  | -28.7     | -17.8      |
| 1850.200000             | 12951.556667               | 35.67       | 12.77  | -46.8     | -36.0      |
| 1880.000000             | 13159.346667               | 36.67       | 13.63  | -44.9     | -34.1      |
| 1909.800000             | 13368.480000               | 38.17       | 14.66  | -42.4     | -31.6      |
| 1850.200000             | 14801.093333               | 38.17       | 14.82  | -42.2     | -31.4      |
| 1880.000000             | 15040.100000               | 37.83       | 16.77  | -40.6     | -29.8      |
| 1909.800000             | 15279.060000               | 38.83       | 14.66  | -41.7     | -30.9      |
| 1850.200000             | 16651.780000               | 37.50       | 10.76  | -47.0     | -36.1      |
| 1880.000000             | 16920.316667               | 37.83       | 7.49   | -49.9     | -39.1      |
| 1909.800000             | 17187.896667               | 36.67       | 8.46   | -50.1     | -39.3      |

Performed By:



Samir Mahmoud, Test Technician

**Name of Test:** Field Strength of Spurious Radiation

**EGPRS 1900**

g04b0011: 2004-Nov-09 Tue 11:27:00

STATE: 2:High Power

| Frequency Tuned,<br>MHz | Frequency Emission,<br>MHz | Meter, dBuV | CF, dB | EIRP, dBm | Margin, dB |
|-------------------------|----------------------------|-------------|--------|-----------|------------|
| 1850.200000             | 3699.493333                | 36.83       | 9.99   | -48.4     | -37.6      |
| 1880.000000             | 3760.070000                | 37.17       | 10.53  | -47.5     | -36.7      |
| 1909.800000             | 3820.140000                | 37.00       | 11.05  | -47.2     | -36.4      |
| 1850.200000             | 5550.223333                | 35.17       | 12.48  | -47.6     | -36.8      |
| 1880.000000             | 5639.546667                | 36.00       | 12.84  | -46.4     | -35.6      |
| 1909.800000             | 5730.010000                | 36.00       | 13.20  | -46.0     | -35.2      |
| 1850.200000             | 7400.490000                | 36.67       | 15.17  | -43.4     | -32.6      |
| 1880.000000             | 7520.740000                | 35.83       | 15.70  | -43.7     | -32.9      |
| 1909.800000             | 7640.033333                | 35.83       | 16.21  | -43.2     | -32.4      |
| 1850.200000             | 9251.543333                | 36.67       | 16.75  | -41.8     | -31.0      |
| 1880.000000             | 9400.233333                | 37.00       | 18.75  | -39.5     | -28.7      |
| 1909.800000             | 9549.483333                | 37.50       | 20.05  | -37.7     | -26.9      |
| 1850.200000             | 11100.790000               | 36.50       | 25.57  | -33.2     | -22.3      |
| 1880.000000             | 11280.280000               | 36.00       | 27.75  | -31.5     | -20.7      |
| 1909.800000             | 11457.913333               | 36.67       | 29.87  | -28.7     | -17.9      |
| 1850.200000             | 12951.286667               | 35.67       | 12.77  | -46.8     | -36.0      |
| 1880.000000             | 13159.566667               | 36.83       | 13.63  | -44.8     | -33.9      |
| 1909.800000             | 13367.780000               | 38.17       | 14.66  | -42.4     | -31.6      |
| 1850.200000             | 14800.786667               | 38.33       | 14.82  | -42.1     | -31.3      |
| 1880.000000             | 15040.076667               | 38.00       | 16.77  | -40.5     | -29.6      |
| 1909.800000             | 15277.683333               | 38.00       | 14.67  | -42.6     | -31.7      |
| 1850.200000             | 16652.640000               | 38.00       | 10.75  | -46.5     | -35.7      |
| 1880.000000             | 16919.130000               | 37.83       | 7.50   | -49.9     | -39.1      |
| 1909.800000             | 17188.363333               | 37.17       | 8.47   | -49.6     | -38.8      |

Performed By:



Samir Mahmoud, Test Technician

**Name of Test:** Frequency Stability (Temperature Variation)

**Specification:** 47 CFR 2.1055(a)(1)

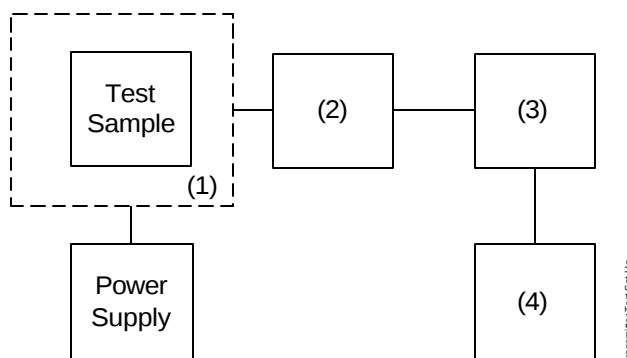
### Measurement Procedure

- A) The EUT and test equipment were set up as shown on the following page.
- B) With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
- C) With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

FCC Requirements: +/- 1ppm

GSM Requirements: +/- 0.1 ppm

### Transmitter Test Set-Up



### Test Equipment

The relevant equipment used during the test is listed below.

|                                                 |                                                            |                                       |
|-------------------------------------------------|------------------------------------------------------------|---------------------------------------|
| Environmental Chamber<br>Thermotron S1.2        | Serial no. 30913NMP Asset reg. 7672<br>Calibrated 7 Aug 04 | Due 7 Aug 05                          |
| Base Station Emulator<br>Rohde & Schwarz CMU200 | Serial no. 100715<br>Calibrated 9 April 04                 | NMP Asset reg. 7937<br>Due 9 April 05 |
| Power Supply<br>Agilent 6632A                   | Serial no. 2924A-02342<br>Calibrated 20 Aug 04             | NMP Asset reg. 458<br>Due 20 Aug 05   |

**Name of Test:** Frequency Stability (Temperature Variation)

**Measurement Results**

Applicant Supplied Data

| Temperature<br>(°C) | GSM1900<br>Frequency Error (Hz)<br>Limit = +/- 185 Hz |        |        |
|---------------------|-------------------------------------------------------|--------|--------|
|                     | ch 512                                                | ch 661 | ch 810 |
| -30                 | -24.54                                                | -35.93 | -47.92 |
| -20                 | -25.08                                                | 32.00  | -31.73 |
| -10                 | -26.17                                                | 32.81  | 29.36  |
| 0                   | -33.90                                                | -31.59 | 26.17  |
| 10                  | 30.17                                                 | -34.44 | 28.75  |
| 20                  | 31.32                                                 | 31.46  | -27.33 |
| 30                  | 33.02                                                 | -35.05 | 23.39  |
| 40                  | 34.10                                                 | -31.79 | -37.56 |
| 50                  | -33.97                                                | 31.53  | -35.26 |

Verified by:



David E. Lee,  
Compliance Test Manager

**Name of Test:** Frequency Stability (Voltage Variation)

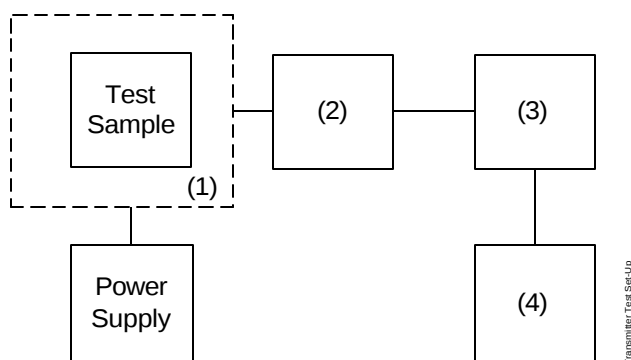
**Specification:** 47 CFR 2.1055(d)(1)

**Guide:** ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

### Measurement Procedure

- A) The EUT was placed in a temperature chamber (if required) at  $25 \pm 5^\circ\text{C}$  and connected as shown below.
- B) The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
- C) The variation in frequency was measured for the worst case.

### Transmitter Test Set-Up: Voltage Variation



| Asset                                       | Description                 | s/n           | Cycle  | Last Cal |
|---------------------------------------------|-----------------------------|---------------|--------|----------|
| <b>(1) Temperature, Humidity, Vibration</b> |                             |               |        |          |
| i00027                                      | Tenney Temp. Chamber        | 9083-765-234  | NCR    |          |
| <b>(2) Coaxial Attenuator</b>               |                             |               |        |          |
| X i00231/2                                  | PASTERNAK PE7021-30 (30 dB) | 231 or 232    | NCR    |          |
| i00122/3                                    | NARDA 766 (10 dB)           | 7802 or 7802A | NCR    |          |
| <b>(3) RF Power</b>                         |                             |               |        |          |
| X i00020                                    | HP 8901A Power Mode         | 2105A01087    | 12 mo. | Apr-04   |
| <b>(4) Frequency Counter</b>                |                             |               |        |          |
| X i00020                                    | HP 8901A Frequency Mode     | 2105A01087    | 12 mo. | Apr-04   |

**Results:** Frequency Stability (Voltage Variation)

Applicant Supplied Data

FCC Requirements: +/- 1ppm

GSM Requirements: +/- 0.1 ppm

| Voltage (%)     | Voltage (V) | GSM1900<br>Frequency Error (Hz)<br>Limit = +/- 185 Hz |        |        |
|-----------------|-------------|-------------------------------------------------------|--------|--------|
|                 |             | ch 512                                                | ch 661 | ch 810 |
| End Point       | <3.4        | Tx off                                                | Tx off | Tx off |
| Nominal         | 4.0         | 27.81                                                 | 23.80  | 22.58  |
| 115%<br>Nominal | 4.6         | 25.66                                                 | 22.51  | 21.86  |
| 85% Nominal     | 3.4         | -47.02                                                | 21.72  | 23.65  |

The transmit power amplifier supply is disabled below 3.3 V and phone powers off at 3.2 V.



Verified by:

David E. Lee,  
Compliance Test Manager

**Name of Test:** Necessary Bandwidth and Emission Bandwidth

**Specification:** 47 CFR 2.202(g)

Modulation =

**Necessary Bandwidth:**

Necessary Bandwidth ( $B_N$ ), = 256kHz

(measured at the 99% power bandwidth) 240kHz



Supervised By:

David E. Lee,  
Compliance Test Manager

END OF TEST REPORT

**Testimonial  
and  
Statement of Certification**

**This is to certify that:**

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

Certifying Engineer:



David E. Lee,  
Compliance Test Manager