FCC TEST REPORT

for

47 CFR, Part 22E, 24H

Equipment : GSM / GPRS Mobile Phone

Model No. : EB-G51U

FCC ID : HFS-G51

Filing Type : Certification

Applicant :

Quanta Computer Inc.
No.188, Wen Hwa 2nd Road , Kuei Shan Hsiang
Tao Yuan Shien, Taiwan

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced
  except in full.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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.

Table of Contents

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

a) **Test Report**

b) Laboratory: Sporton International Inc.
No.52, Hwa-Ya 1st RD., Hwa Ya Technology Park, Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.

c) Report Number: F3N0709

d) Client: **Quanta Computer Inc.**
No.188, Wen Hwa 2nd Road , Kuei Shan Hsiang
Tao Yuan Shien, Taiwan

e) Identification: EB-G51U
FCC ID: HFS-G51
Description: GSM850/1900 Radio

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

g) Report Date: November 28, 2003
EUT Received: November 17 , 2003

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

i) Sampling method: No sampling procedure used.

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

m) Supervised by:

Joe Yang

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.

Accessories Used During Testing:

Type	**Model**
EUT	EB-G51U
Adaptor	KWS05C 18
Battery	N/A

List of General Information Required for Certification

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

22E, 24H, Confidentiality

Sub-Part 2.1033

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

Quanta Computer Inc.
No.188, Wen Hwa 2nd Road , Kuei Shan Hsiang
Tao Yuan Shien, Taiwan

Manufacturer

As above

(c)(2): **FCC ID**: **HFS-G51**

Model Number: EB-G51U

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

Please See Attached Exhibits

(c)(4): **Type of Emission**: Continuous Bursted Transmitting Mode

(c)(5): **FREQUENCY RANGE, MHz**: 824.2 to 848.8 GSM850
1850.2 to 1909.8 GSM1900

(c)(6): **Power Rating, Watts**: 0.745 ERP (850)
0.854 EIRP (1900)

Switchable x Variable N/A

(c)(7): **Maximum Power Rating, Watts**: 2 GSM 850
1 GSM 1900

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 =	4.1

(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
_x_ N/A

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

Follows

Certificate of NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

SPORTON INTERNATIONAL, INC.
TAIPEI HSIEN 221
TAIWAN

is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

December 31, 2003
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 200079-0

NVLAP-01C (06-01)

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
- x 22 – Public Mobile Services
- 22 Subpart H - Cellular Radiotelephone Service
- 22.901(d) - Alternative technologies and auxiliary services
- 23 – International Fixed Public Radiocommunication services
- x 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

General Information

Product Feature & Specification	
1. Host/Radio Interface	GSM/GPRS
2. Type of Modulation	GMSK
3. Number of Channels	GSM850 : 128 to 251
	GSM1900 : 512 to 810
4. Tx Frequency Band	GSM850 : 824 to 849
	GSM1900 : 512 to 810
5. Bandwidth of each channel	200 kHz
6. Maximum Output Power to Antenna	GSM850 : 33 dBm
	GSM1900 : 30 dBm
7. Power Rating (DC/AC , Voltage)	DC 4.1V
8. Duty Cycle	12%
9. Basic function of product	GSM/GPRS Mobile Phone
10. Temperature Range (Operating)	0~60C
11. Humidity	0~95%
12. Other Special	N/A
13. Remark	N/A

Standard Test Conditions

and

Engineering Practices

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

In accordance with ANSI C63.4-1992/2000, 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.

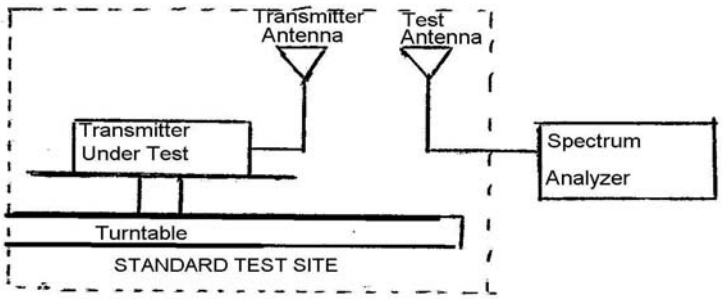
Measurement results, unless otherwise noted, are worst-case measurements.

Name of Test: ERP/EIRP Carrier Power (Radiated)

Specification: TIA/EIA 603A (Substitution Method)

Definition: The average radiated power of device is the equivalent power required, when delivered to a substitution antenna, to produce at a distant point the same average received power as produced by the licensed device.

Method Of Measurement:
a) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.



b) Raise and lower the test antenna from 1m to 4m and rotate turntable from 0° to 360°. Record the highest received signal showed in spectrum analyzer in dBuV as Rt . Calculate electric field strength in receive antenna in dBuV/m as Et.
Et = Rt + AF

c) Replace the transmitter under test with a substitution antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power level Ps. Raise and lower the test antenna like in step b) and record the highest received signal showed in spectrum analyzer in dBuV as R_S. Calculate electric field strength in receive antenna in dBuV/m as Es.
Es = Rs + AF

d) Calculate radiated power as following:
Fc = Es-Ps-Gs
E(I)RP = Et - Fc

Ps (dBm): Input Power to Substitution Antenna
Gs (dBd or dBi): Substitution Antenna Gain
E(I)RP(dBm) : Transmit Antenna Effect Dipole (Isotropic) Radiated Power
AF (dB/m): Receive Antenna Factor
Es (dBuV/m): Electric Field measured in Receive Antenna
Ps (dBuV) : Measured Power in Spectrum Analyzer
Fc : Convertion factor from E(I)RP to Et

Results Attached

Test Results For: ERP/EIRP Carrier Power (Radiated)

GSM850 **ERP**

Frequency (MHz)	Reading (dBuV/m) H	Reading (dBuV/m) V	Convertion Factor (dBuV/m) H	Convertion Factor (dBuV/m) V	ERP (dBm)	ERP (Watts)
824.200	123.5	---	98.8	93.4	24.7	0.292
836.400	123.3	---	98.2	94.3	25.1	0.323
848.800	122.7	---	97.5	95.3	25.2	0.333
824.200	---	122.1	98.8	93.4	28.7	0.745
836.400	---	121.7	98.2	94.3	27.4	0.549
848.800	---	121.4	97.5	95.3	26.1	0.405

GSM1900 **EIRP**

Frequency (MHz)	Reading (dBuV/m) H	Reading (dBuV/m) V	Convertion Factor (dBuV/m) H	Convertion Factor (dBuV/m) V	EIRP (dBm)	EIRP (Watts)
1850.200	122.9	---	99.5	99.2	23.4	0.218
1880.000	123.8	---	99.6	99.2	24.2	0.262
1909.800	123.7	---	99.7	99.2	24.0	0.253
1850.200	---	128.4	99.5	99.2	29.2	0.832
1880.000	---	128.2	99.6	99.2	29.0	0.796
1909.800	---	128.5	99.7	99.2	29.3	0.854

Name of Test: Emission Masks (Occupied Bandwidth)

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

Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.

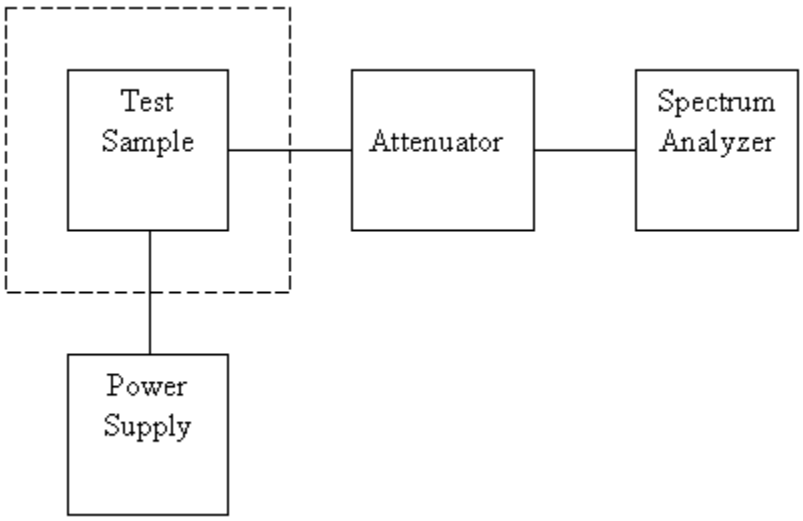
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.

4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

5. Measurement Results: Attached

Transmitter Spurious Emission

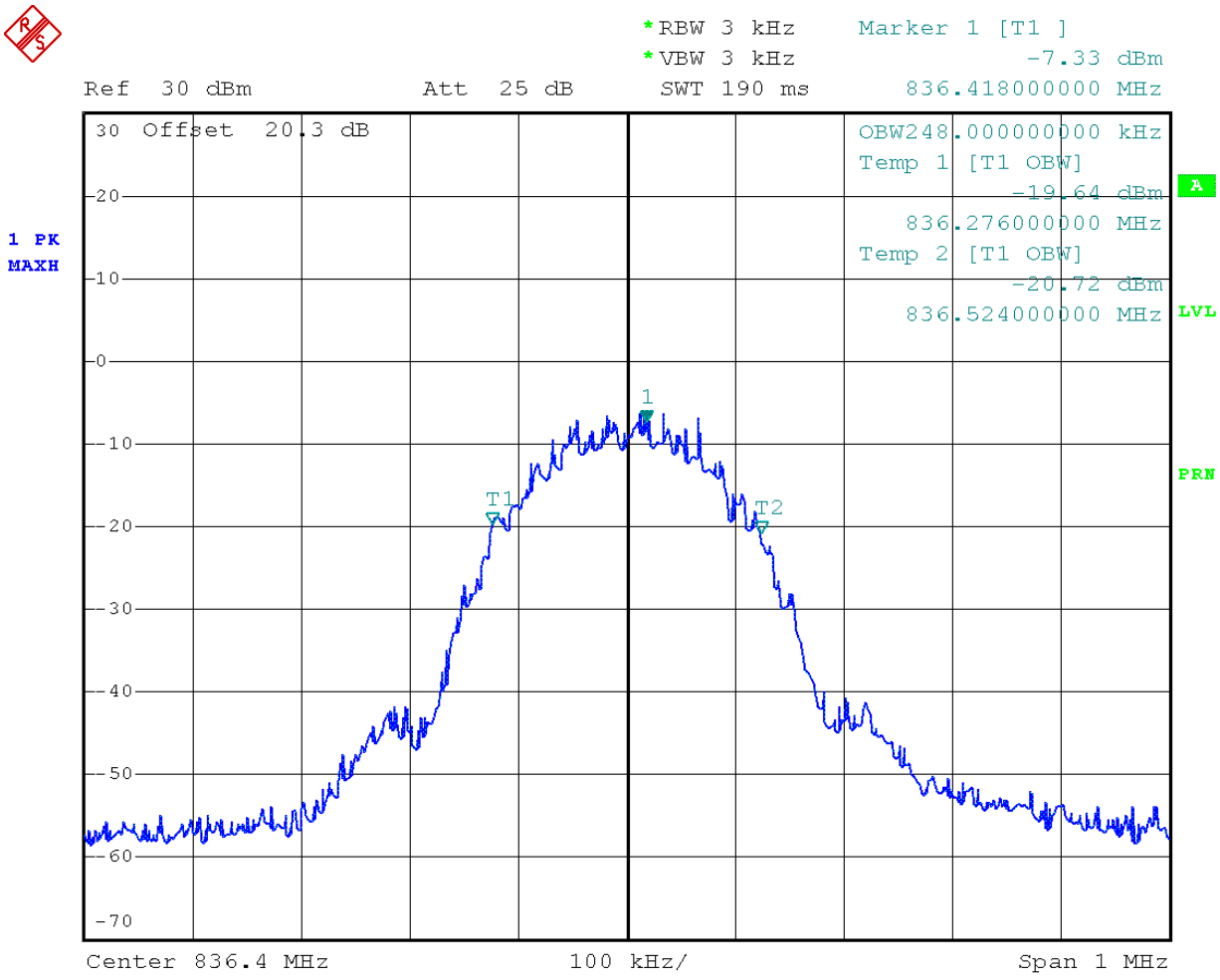
Test A. Occupied Bandwidth (In-Band Spurious)
Test B. Out-of-Band Spurious



PS : Attenuator + Cable Loss =20.3 dB

Asset	Model Name	S/N
Base Station Simulator	CMU200	102278
Spectrum Analyzer	FSP30	838858/014
AC/DC Power Source	HPA-500W	HPA0100024

Name of Test: Emission Masks (Occupied Bandwidth)
State: 1:Low Power

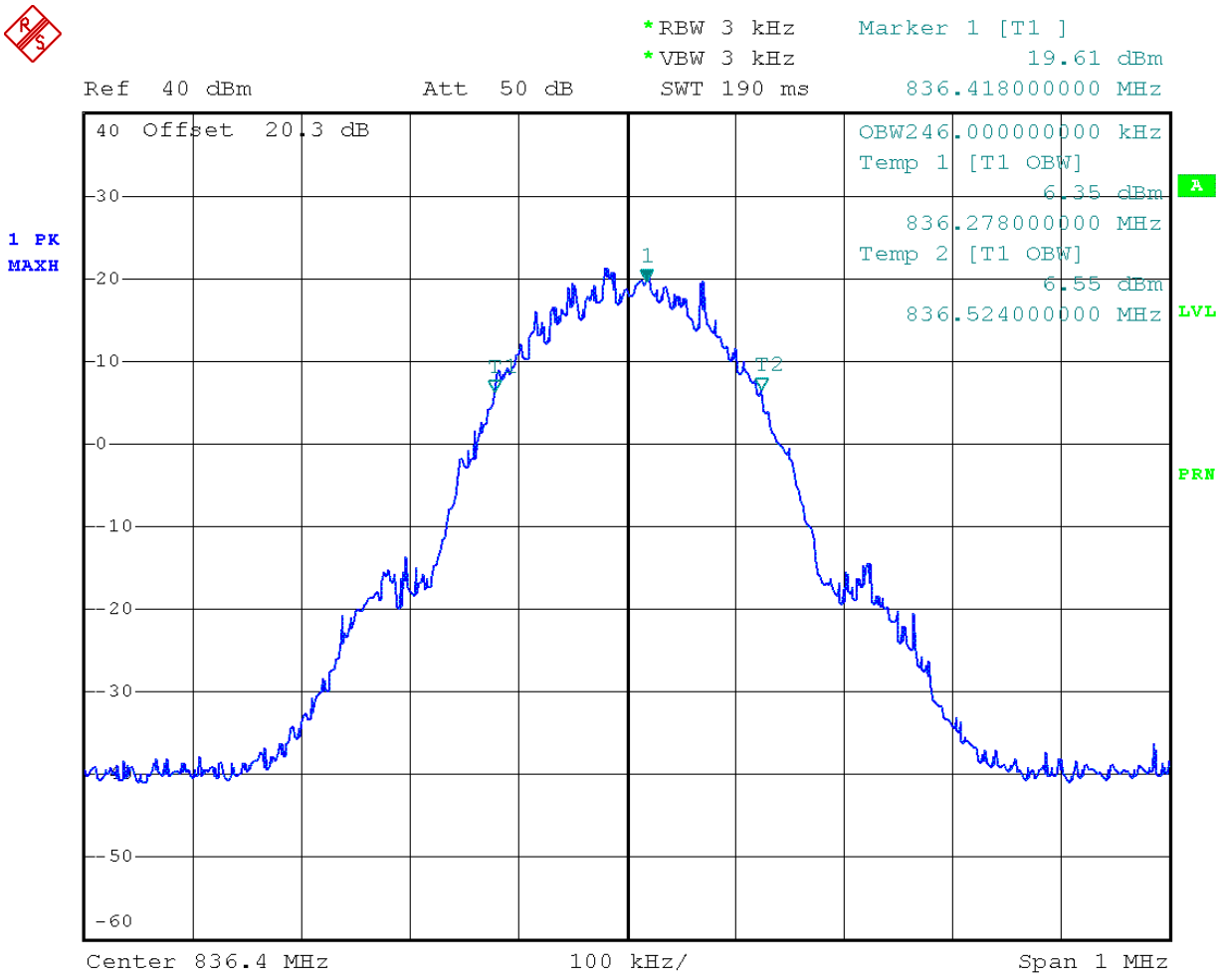


Date: 22.NOV.2003 22:46:28

Power: LOW
Modulation: GSM/GPRS850
99% BANDWIDTH

Performed By: Hendry Yang

Name of Test: Emission Masks (Occupied Bandwidth)
State: 2:High Power

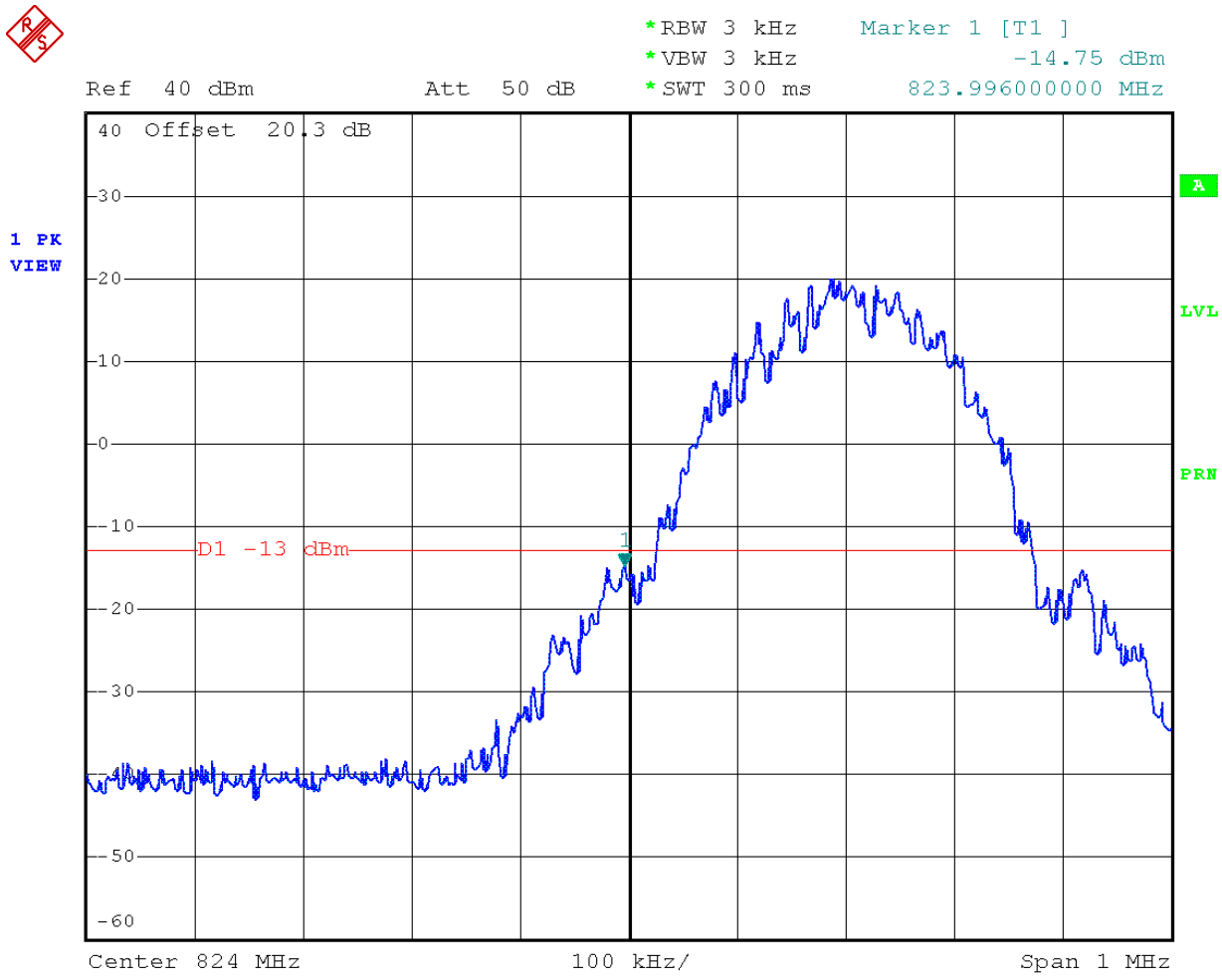


Date: 22.NOV.2003 22:43:17

Power: HIGH
Modulation: GSM/GPRS850
99% BANDWIDTH

Performed By: Hendry Yang

Name of Test: Emission Masks (Occupied Bandwidth)
State: 2:High Power

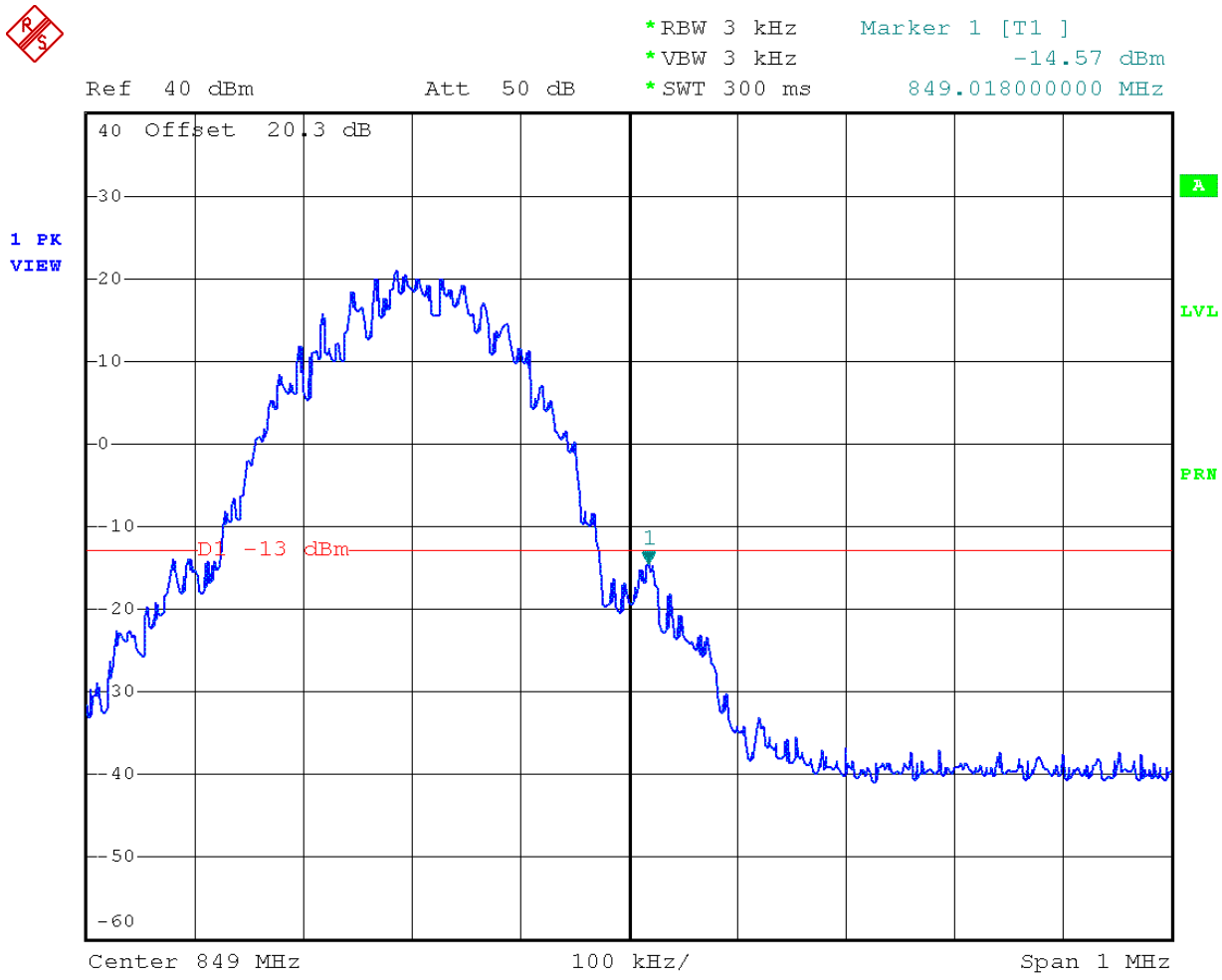


Date: 19.NOV.2003 13:49:40

Power: HIGH
Modulation: GSM/GPRS850
A LOWER BAND EDGE

Performed By: Hendry Yang

Name of Test: Emission Masks (Occupied Bandwidth)
State: 2:High Power



Date: 19.NOV.2003 13:28:57

Power: HIGH
Modulation: GSM/GPRS850
UPPER BAND EDGE

Performed By: Hendry Yang

Name of Test: Transmitter Conducted Measurements

Specification: 47 CFR 2.1051: Unwanted (spurious) Emissions
2.1049(c), 24.238(b): Occupied Bandwidth
24: Emissions at Band Edges

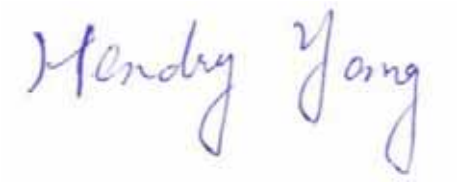
Test Equipment: As per attached page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page with the Spectrum Analyzer connected.

2. The low and high channels for all RF powers within the Transmitting frequency band were measured.

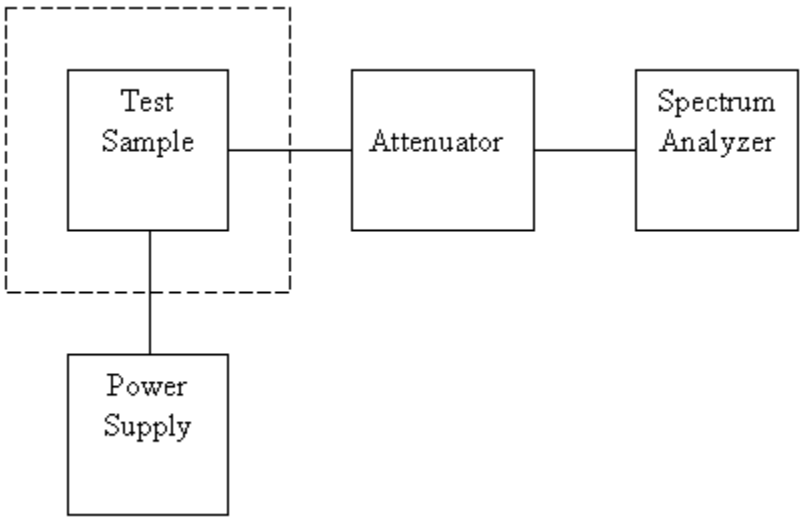
3. Measurement Results: Attached



Performed By: Hendry Yang

Transmitter Spurious Emission

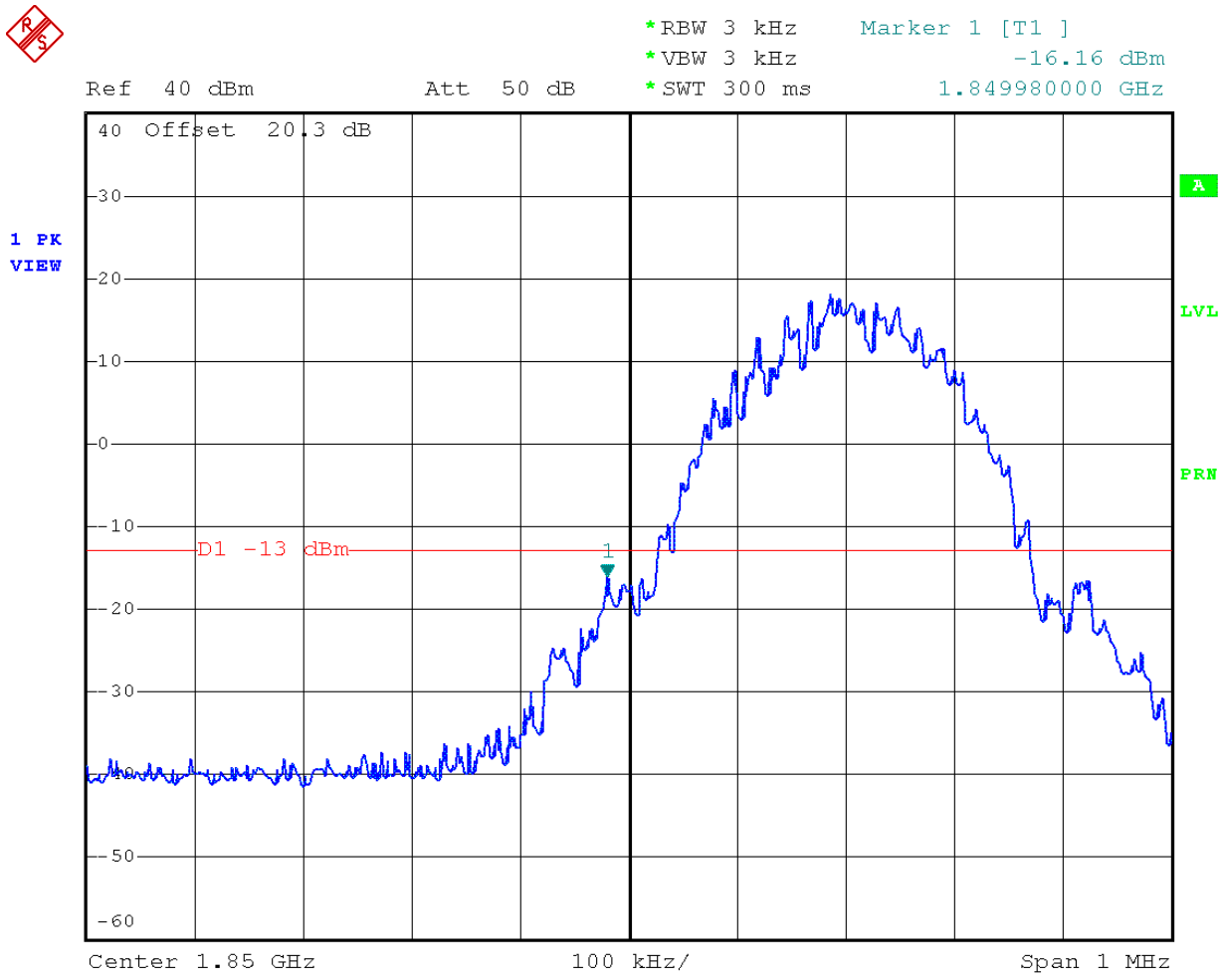
Test A. Occupied Bandwidth (In-Band Spurious)
Test B. Out-of-Band Spurious



PS : Attenuator + Calbe Loss =20.3 dB

Asset	Model Name	S/N
Base Station Simulator	CMU200	102278
Spectrum Analyzer	FSP30	838858/014
AC/DC Power Source	HPA-500W	HPA0100024

Name of Test: Emission Masks (Occupied Bandwidth)
State: 2:High Power

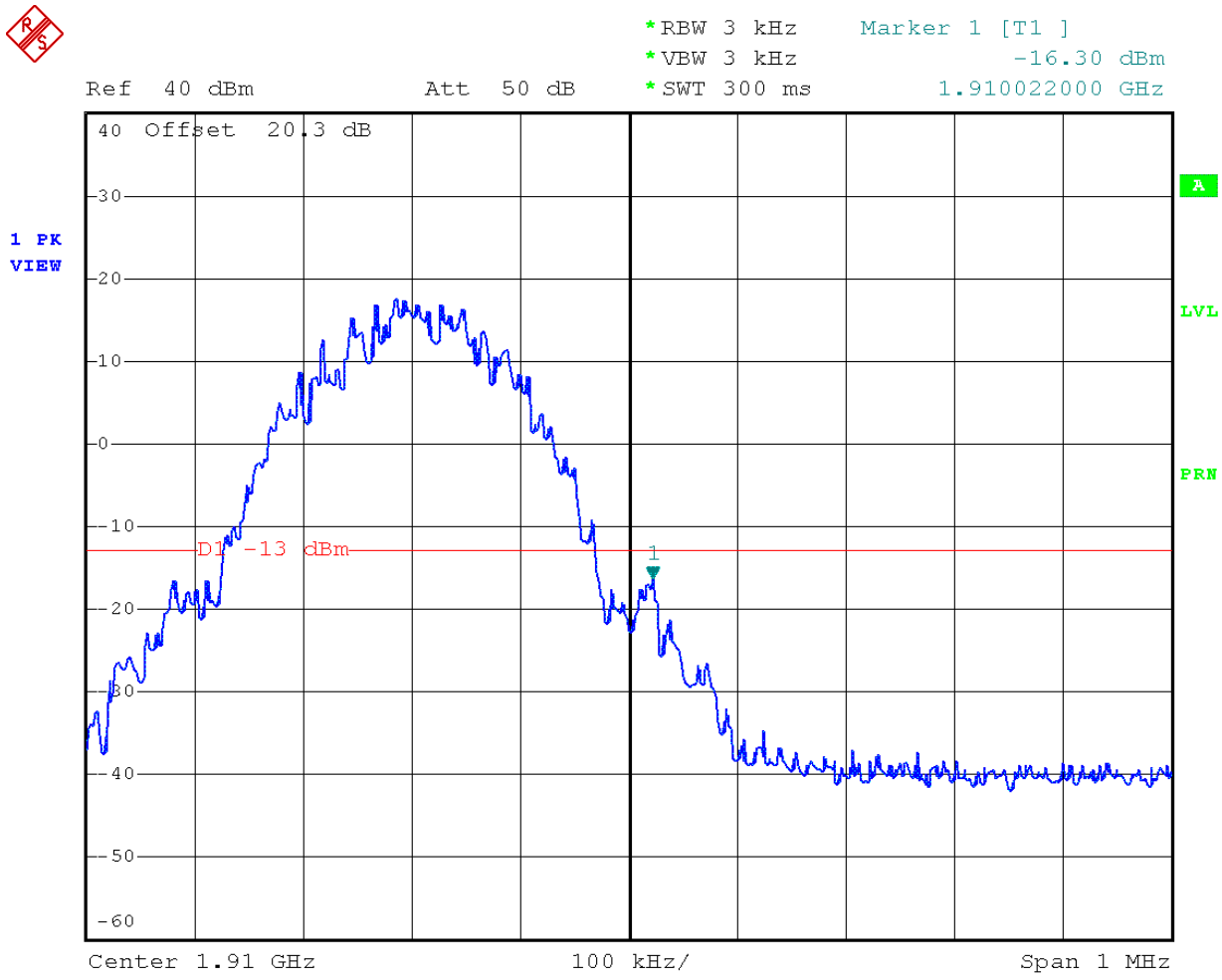


Date: 19.NOV.2003 13:42:57

Power: HIGH
Modulation: GSM/GPRS1900
LOWER BAND EDGE

Performed By: Hendry Yang

Name of Test: Emission Masks (Occupied Bandwidth)
State: 2:High Power

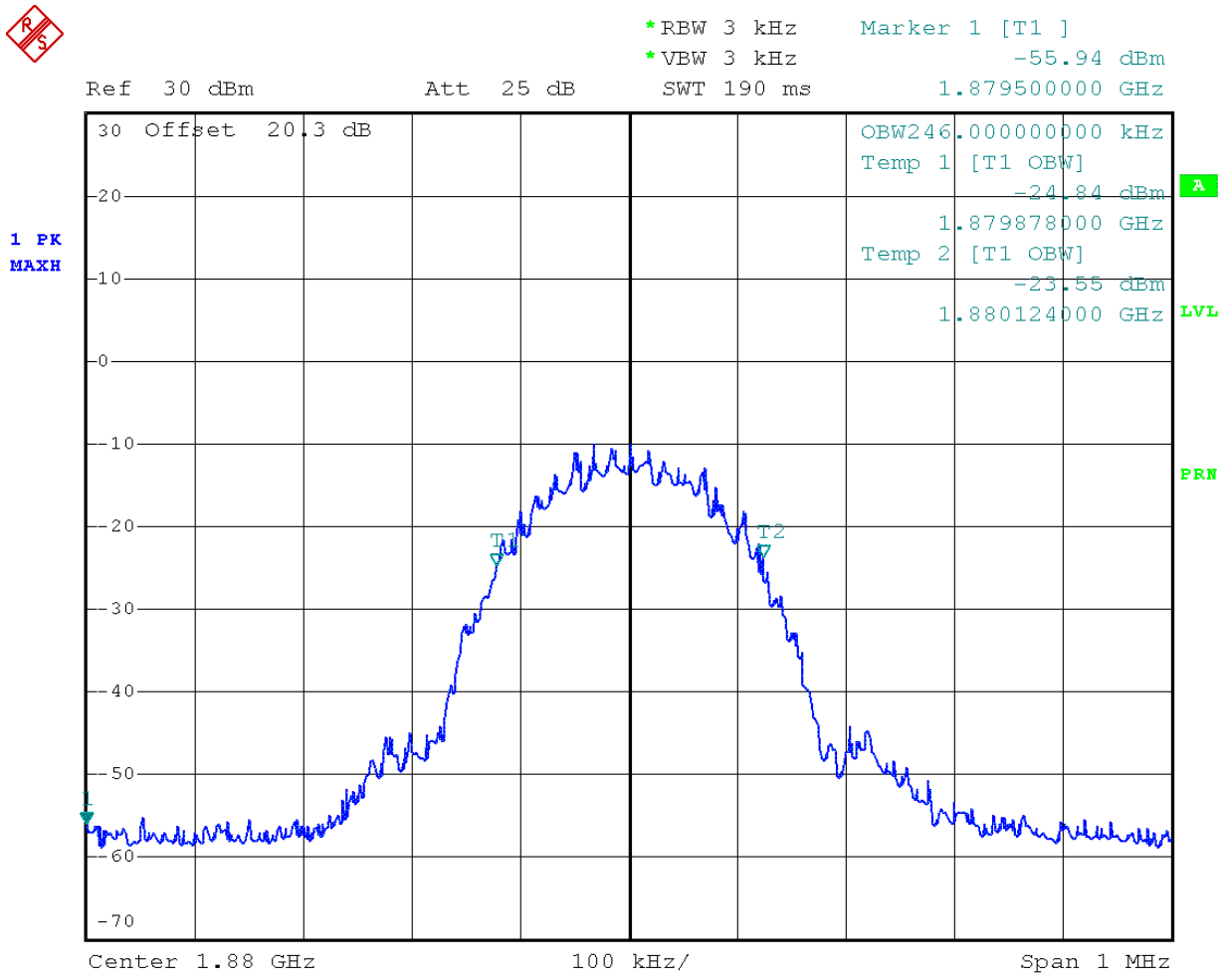


Date: 19.NOV.2003 13:45:38

Power: HIGH
Modulation: GSM/GPRS1900
UPPER BAND EDGE

Performed By: Hendry Yang

Name of Test: Emission Masks (Occupied Bandwidth)
State: 1:Low Power

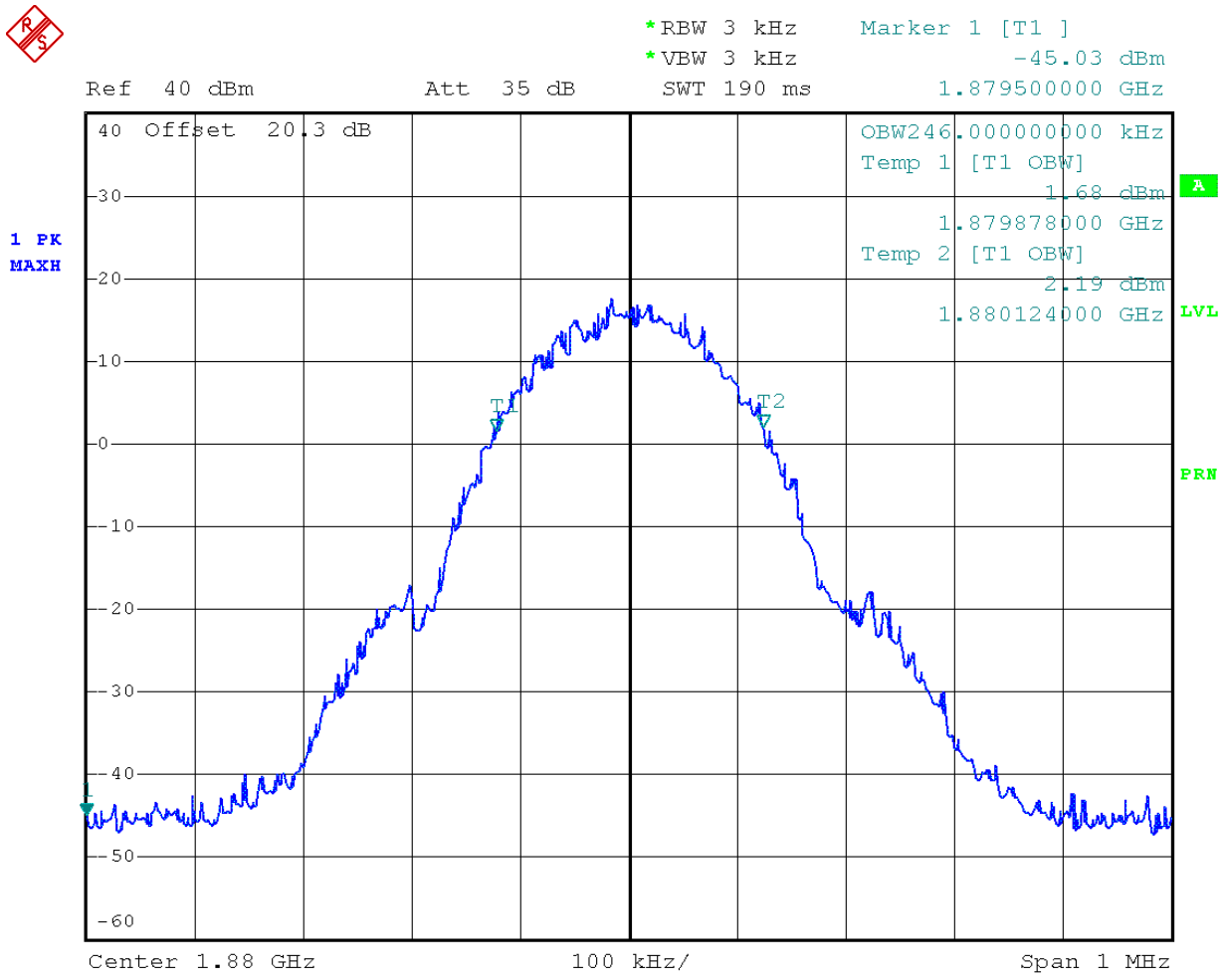


Date: 22.NOV.2003 22:50:51

Power: LOW
Modulation: GSM/GPRS1900
99% BANDWIDTH

Performed By: Hendry Yang

Name of Test: Emission Masks (Occupied Bandwidth)
State: 2:High Power



Date: 22.NOV.2003 22:49:11

Power: HIGH
Modulation: GSM/GPRS1900
99% BANDWIDTH

Performed By: Hendry Yang

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

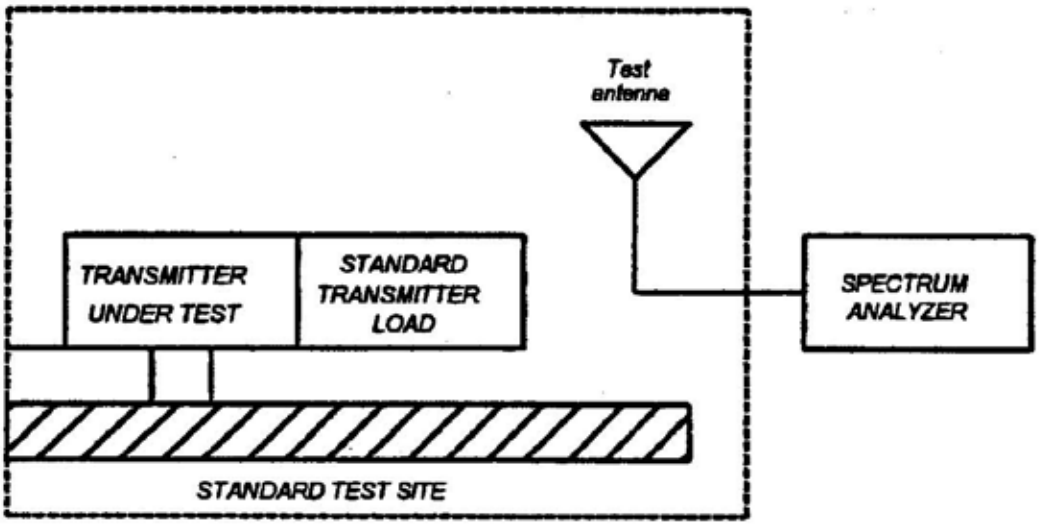
1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

1.2.12.2 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
3) Sweep Speed ≤2000 Hz/second
4) Detector Mode = Mean or Average Power

C) Place the transmitter to be tested on the turntable in the standard test site. If the antenna is detatchable, The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.

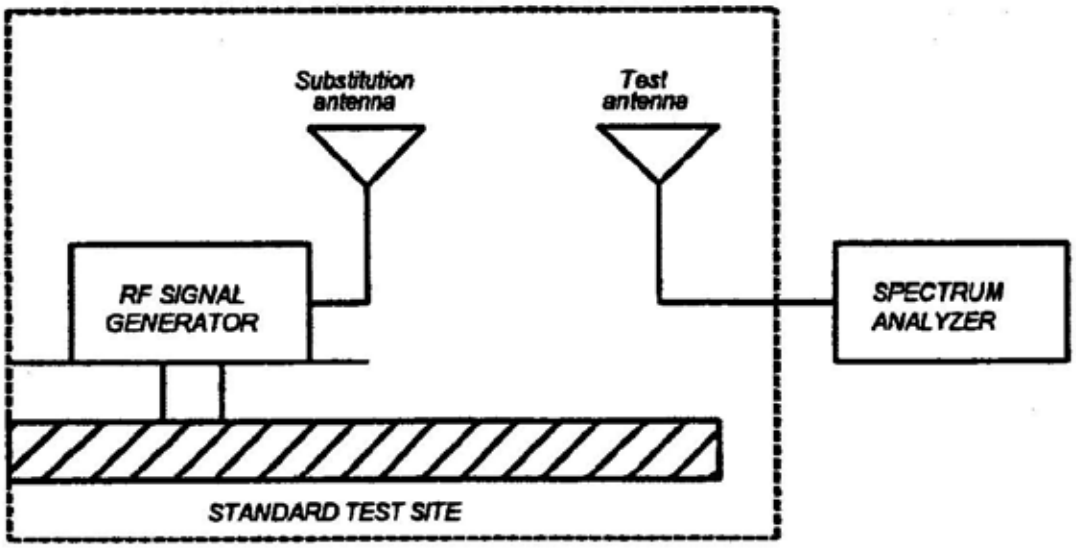


Name of Test: Field Strength of Spurious Radiation (Cont.)

D) For each spurious measurement the test antenna should cover the measured frequency. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).

E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



G) Reconnect the equipment as illustrated.

H) Keep the spectrum analyzer adjusted as in step B).

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

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.

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. The calculation method for spurious ERP/EIRP is the same as described in ERP/EIRP Carrier Power Measurement.

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

Name of Test: Field Strength of Spurious Radiation

Frequency Tuned : 836.4 MHz

GSM850
CH189

ERP

Frequency (MHz)	Reading (dBuV/m) H	Reading (dBuV/m) V	Convertion Factor (dBuV/m) H	Convertion Factor (dBuV/m) V	ERP (dBm)	Limit (dBm)	Margin (dB)
1670.000	56.9	---	101.2	101.4	-44.3	-13.0	-31.3
2510.000	46.0	---	101.8	101.1	-55.8	-13.0	-42.8
3489.000	43.1	---	101.8	102.7	-58.7	-13.0	-45.7
4182.000	52.4	---	103.1	103.6	-50.7	-13.0	-37.7
5022.000	56.4	---	102.8	102.6	-46.4	-13.0	-33.4
5850.000	46.5	---	103.3	103.2	-56.8	-13.0	-43.8
6690.000	48.7	---	103.9	103.4	-55.2	-13.0	-42.2
7527.000	46.9	---	105.1	105.4	-58.2	-13.0	-45.2
8361.000	48.7	---	103.1	103.3	-54.3	-13.0	-41.3
1670.000	---	56.8	101.2	101.4	-44.6	-13.0	-31.6
2510.000	---	45.5	101.8	101.1	-55.6	-13.0	-42.6
3450.000	---	43.1	101.8	102.7	-59.6	-13.0	-46.6
4182.000	---	49.4	103.1	103.6	-54.2	-13.0	-41.2
5022.000	---	50.6	102.8	102.6	-52.0	-13.0	-39.0
5853.000	---	46.2	103.3	103.2	-57.0	-13.0	-44.0
6690.000	---	52.5	103.9	103.4	-50.9	-13.0	-37.9
7533.000	---	46.1	105.1	105.4	-59.3	-13.0	-46.3
8367.000	---	48.5	103.1	103.3	-54.8	-13.0	-41.8

Name of Test: Field Strength of Spurious Radiation

Frequency Tuned : 1880 MHz

GSM1900
CH661

EIRP

Frequency (MHz)	Reading (dBuV/m) H	Reading (dBuV/m) V	Convertion Factor (dBuV/m) H	Convertion Factor (dBuV/m) V	EIRP (dBm)	Limit (dBm)	Margin (dB)
32.910	23.9	---	70.3	79.3	-46.4	-13.0	-33.4
56.190	20.3	---	88.5	87.8	-68.2	-13.0	-55.2
858.380	28.9	---	126.6	124.4	-97.7	-13.0	-84.7
3753.000	59.9	---	100.5	101.4	-40.5	-13.0	-27.5
5637.000	54.9	---	101.7	101.6	-46.8	-13.0	-33.8
7516.000	58.0	---	103.0	103.3	-45.1	-13.0	-32.1
9400.000	62.4	---	100.3	102.2	-37.8	-13.0	-24.8
11276.000	49.8	---	105.0	104.8	-55.2	-13.0	-42.2
13160.000	61.6	---	116.9	119.9	-55.2	-13.0	-42.2
15040.000	51.9	---	126.2	123.9	-74.4	-13.0	-61.4
16924.000	51.9	---	123.4	120.4	-71.6	-13.0	-58.6
36.790	---	32.5	71.7	79.2	-46.8	-13.0	-33.8
56.190	---	32.6	88.5	87.8	-55.2	-13.0	-42.2
858.380	---	32.4	126.6	124.4	-92.0	-13.0	-79.0
3753.000	---	62.1	100.5	101.4	-39.3	-13.0	-26.3
5637.000	---	55.7	101.7	101.6	-46.0	-13.0	-33.0
7516.000	---	55.8	103.0	103.3	-47.5	-13.0	-34.5
9400.000	---	59.9	100.3	102.2	-42.3	-13.0	-29.3
11280.000	---	49.9	105.0	104.8	-55.0	-13.0	-42.0
13160.000	---	54.3	116.9	119.9	-65.6	-13.0	-52.6
15040.000	---	51.8	126.2	123.9	-72.1	-13.0	-59.1
16920.000	---	50.2	123.4	120.5	-70.3	-13.0	-57.3

Name of Test: Frequency Stability (Temperature Variation)

Specification: 47 CFR 2.1055(a)(1)

Test Conditions: As Indicated

Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page.

2. 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.

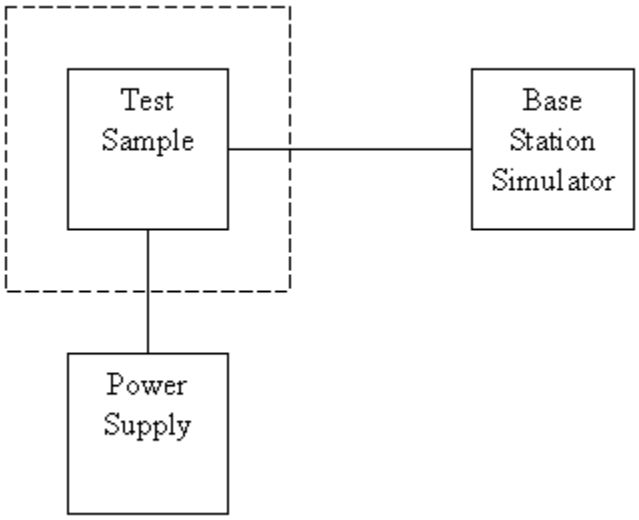
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

4. The temperature tests were performed for the worst case.

5. Measurement Results: Attached

Transmitter Test Set-Up

Frequency Stability: Temperature Variation
Frequency Stability: Voltage Variation



Asset	Model Name	S/N
Temperature & Humidity Controller	P-9000	612
AC/DC Power Source	HPA-500W	HPA0100024
Base Station Simulator	CMU200	102278

Name of Test: Frequency Stability (Temperature Variation)

GSM/GPRS CELLULAR BAND
Frequency Tuned : 836.4 MHz

Temperature(°C)	Change, Hz	Change, ppm
-30	770	0.91
-20	-312	-0.37
-10	-75	-0.09
0	-34	-0.04
10	-31	-0.04
20	-28	-0.03
30	-30	-0.04
40	-28	-0.03
50	-27	-0.03

GSM/GPRS PCS BAND
Frequency Tuned : 1880 MHz

Temperature(°C)	Change, Hz	Change, ppm
-30	1080	0.57
-20	526	0.28
-10	-128	-0.07
0	-78	-0.04
10	-63	-0.03
20	-67	-0.04
30	-65	-0.03
40	-71	-0.04
50	-67	-0.04

Name of Test: Frequency Stability (Voltage Variation)

Specification: 47 CFR 2.1055 (b)(1)

Test Equipment: As per previous page

Measurement Procedure

1. The EUT was placed in a temperature chamber at 25±5°C and connected as for "Frequency Stability - Temperature Variation" test.

2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.

3. The variation in frequency was measured for the worst case.

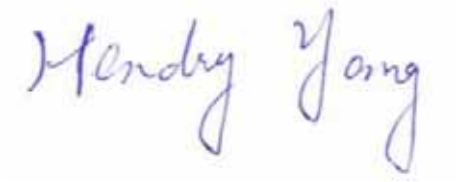
Results: Frequency Stability (Voltage Variation)
BATTERY END POINT (Voltage) = 4.1 (Both GSM850/GSM1900 Band)
GSM/GPRS CELLULAR BAND
Frequency Tuned : 836.4 MHz

Voltage(Volt)	Change, Hz	Change, ppm
4.10	-25	-0.03
3.485	-22	-0.03
4.715	-38	-0.04

GSM/GPRS PCS BAND
Frequency Tuned : 1880 MHz

Voltage(Volt)	Change, Hz	Change, ppm
4.10	-65	-0.03
3.485	-58	-0.03
4.715	-51	-0.03

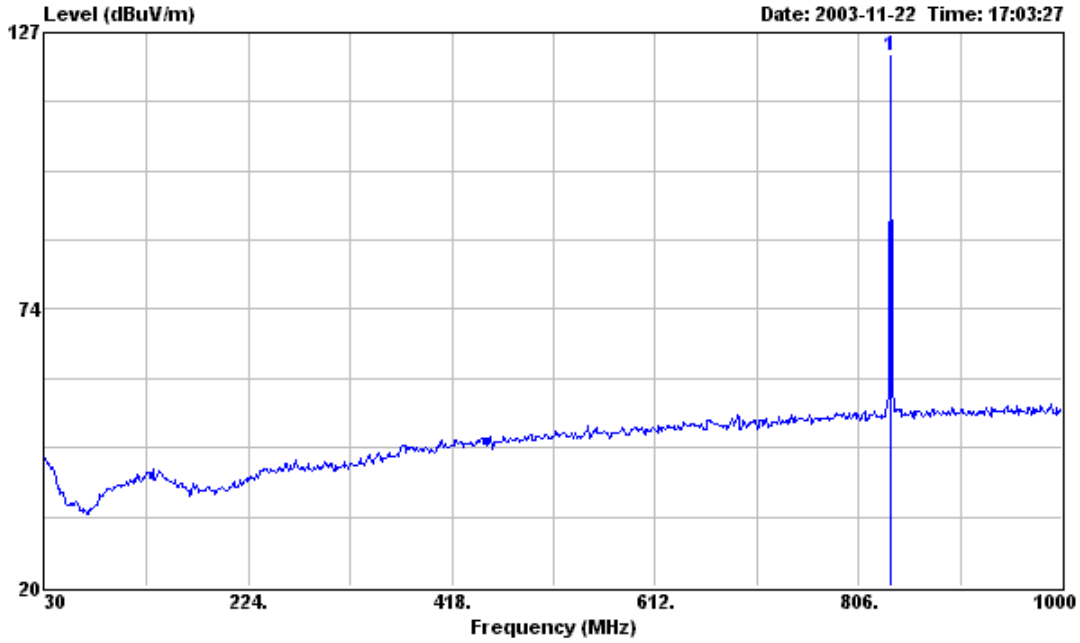
Limit: Must remain within authorized frequency block.



Performed By: Hendry Yang

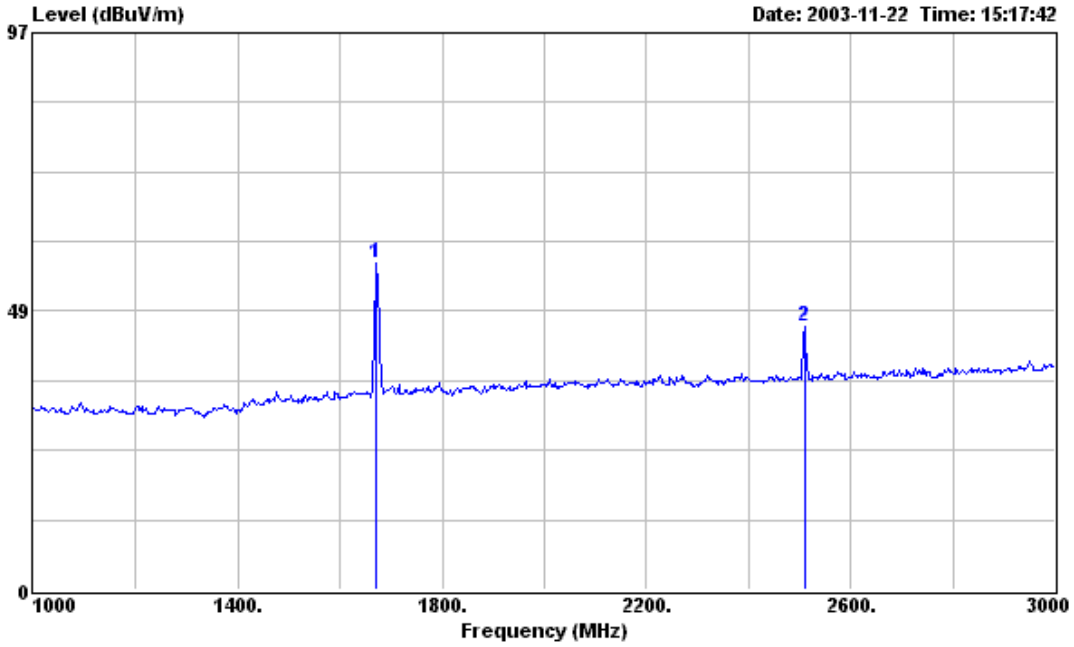
Radiated Scanned Data

GSM850, Horizontal Polarization



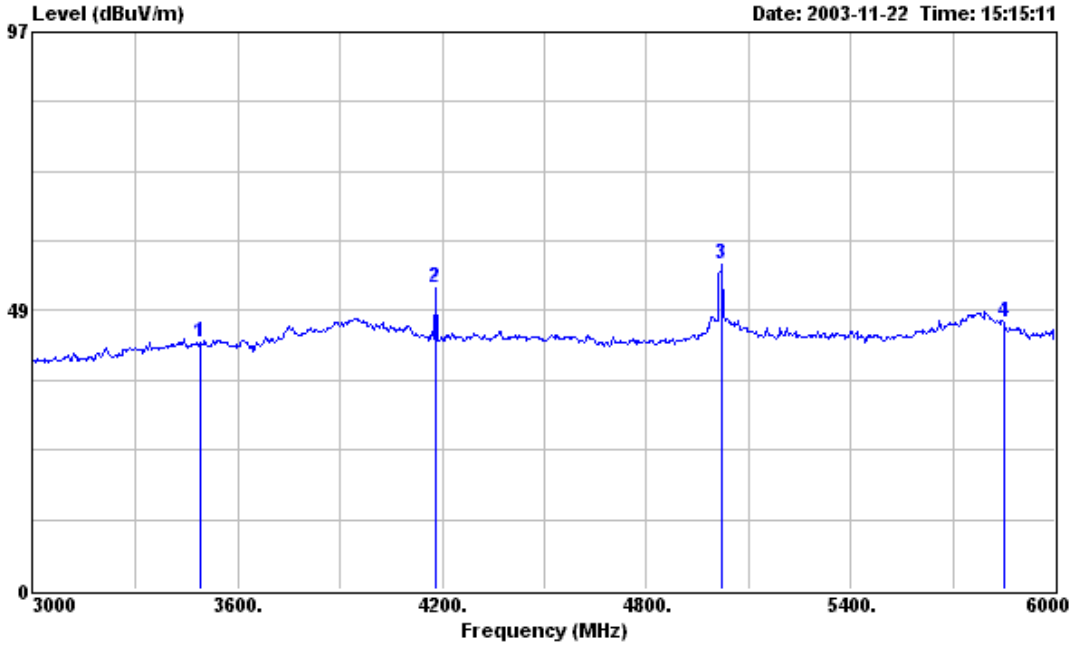
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	836.070	122.36	------	------	97.93	19.02	5.41	0.00	Peak	---	---



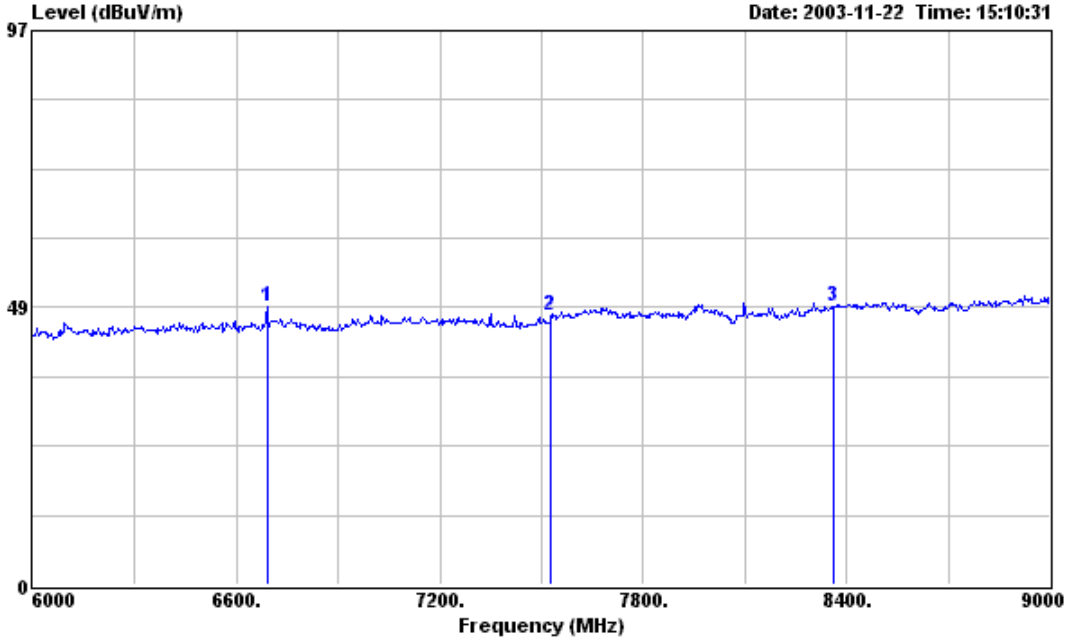
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1670.000	56.91	------	------	69.06	26.06	2.50	40.71	Peak	---	---
2	2510.000	45.96	------	------	55.66	28.47	3.03	41.20	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

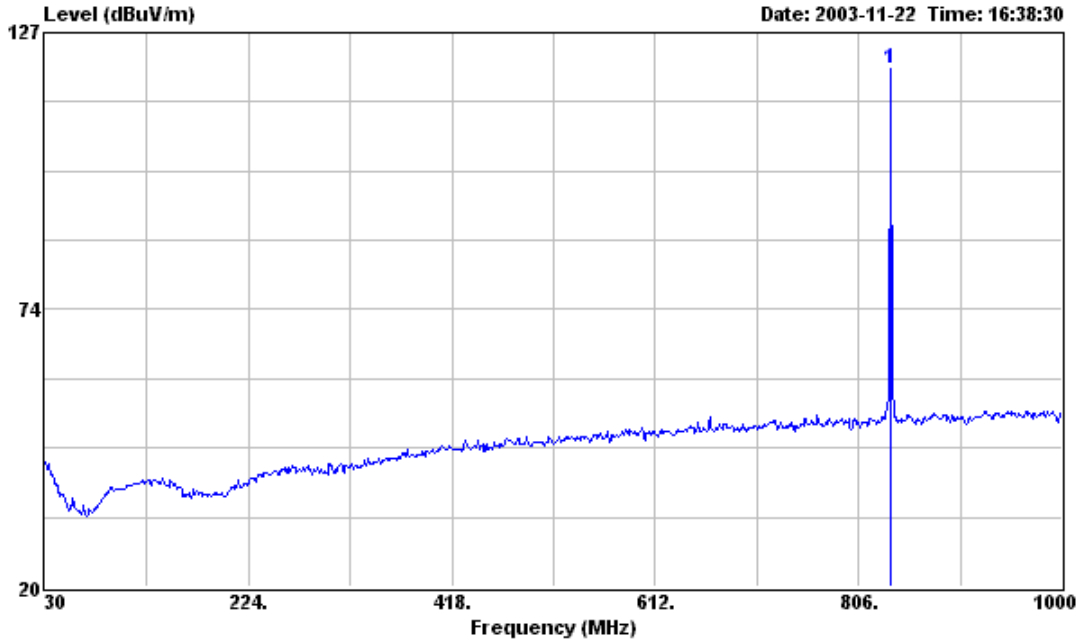
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	3489.000	43.09	------	------	47.81	31.19	5.39	41.30	Peak	---	---
2	4182.000	52.37	------	------	55.40	32.52	6.10	41.65	Peak	---	---
3	5022.000	56.41	------	------	58.60	33.44	7.00	42.63	Peak	---	---
4	5850.000	46.52	------	------	49.63	34.14	5.99	43.24	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

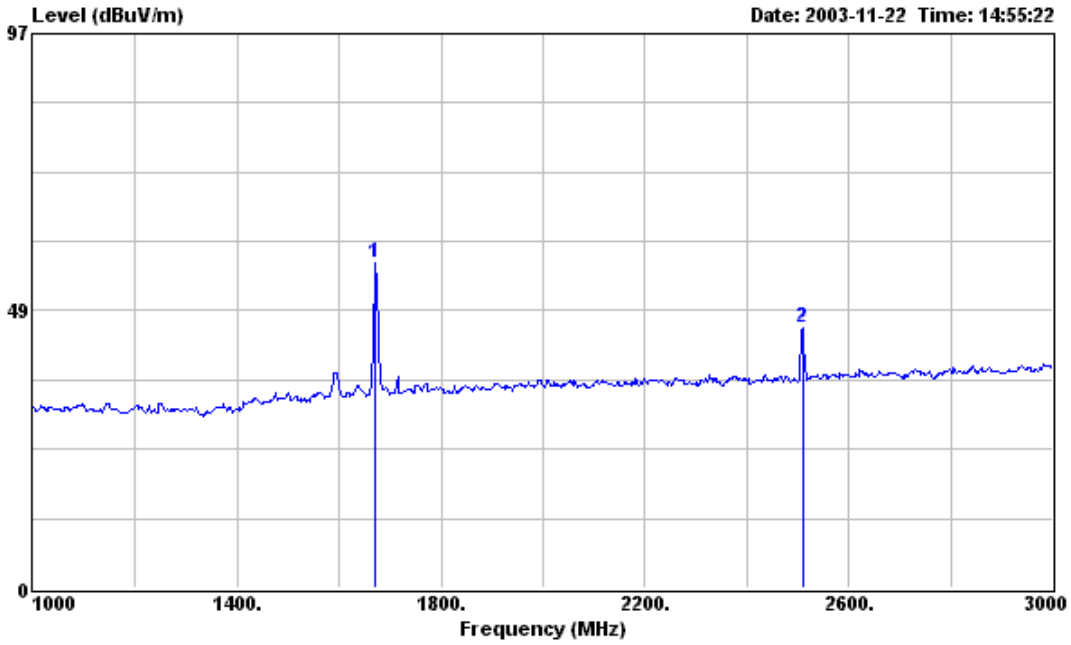
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	6690.000	48.66	------	------	51.81	34.69	5.34	43.18	Peak	---	---
2	7527.000	46.93	------	------	47.64	36.53	5.13	42.37	Peak	---	---
3	8361.000	48.73	------	------	46.77	37.64	6.02	41.70	Peak	---	---

GSM850, Vertical Polarization



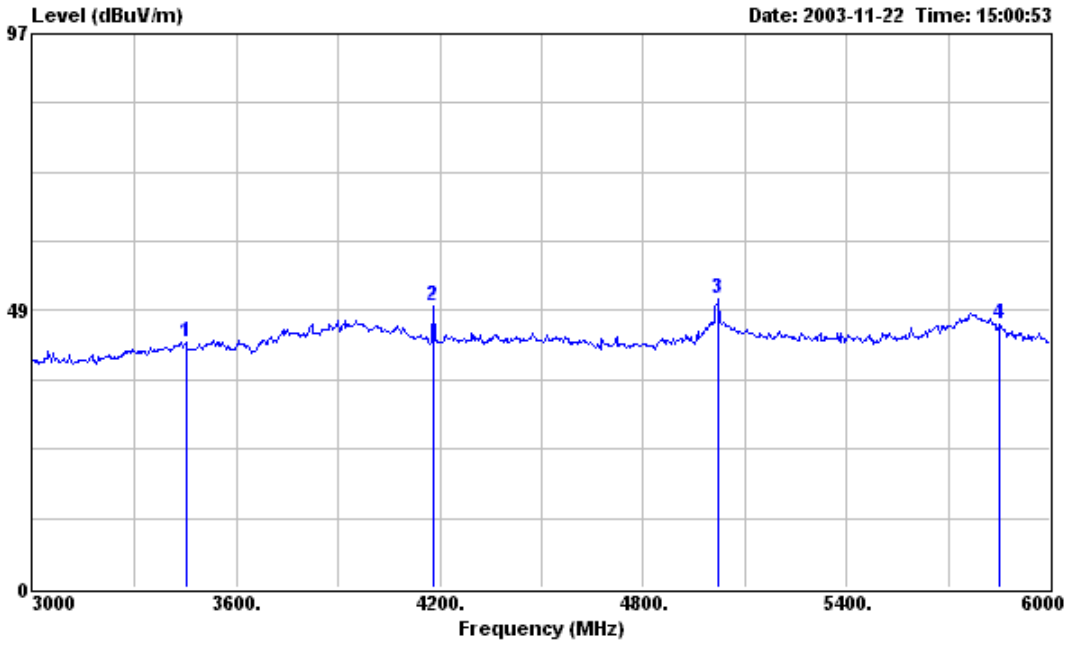
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	836.070	120.12	------	------	95.69	19.02	5.41	0.00	Peak	---	---



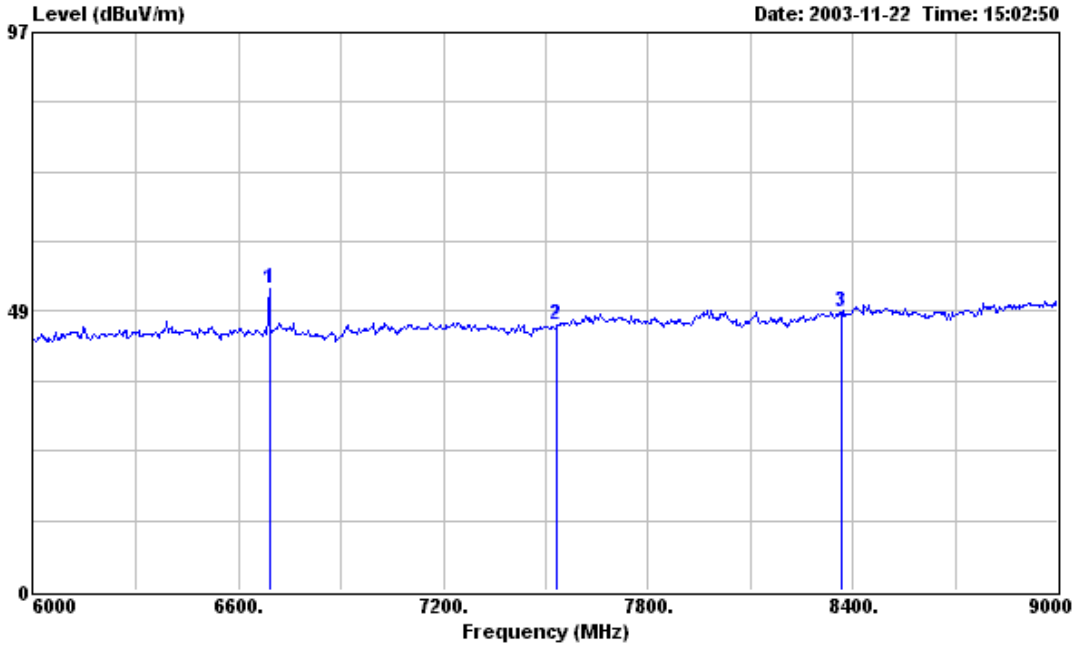
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1670.000	56.84	------	------	68.99	26.06	2.50	40.71	Peak	---	---
2	2510.000	45.52	------	------	55.22	28.47	3.03	41.20	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

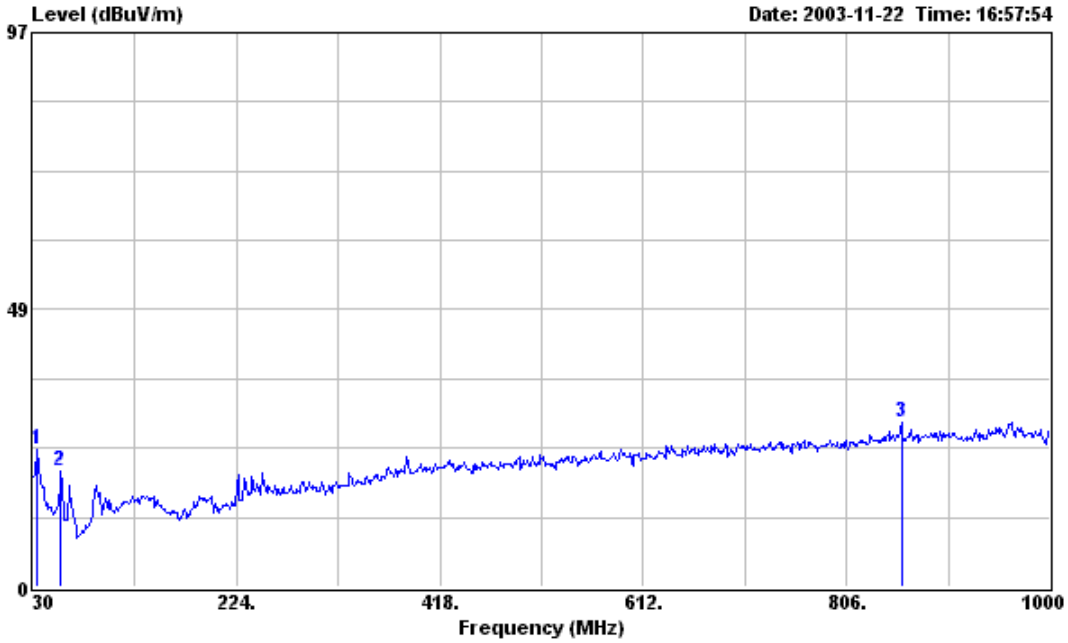
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	3450.000	43.12	------	------	48.06	31.10	5.25	41.29	Peak	---	---
2	4182.000	49.43	------	------	52.46	32.52	6.10	41.65	Peak	---	---
3	5022.000	50.58	------	------	52.77	33.44	7.00	42.63	Peak	---	---
4	5853.000	46.22	------	------	49.42	34.14	5.91	43.25	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM850 CH189

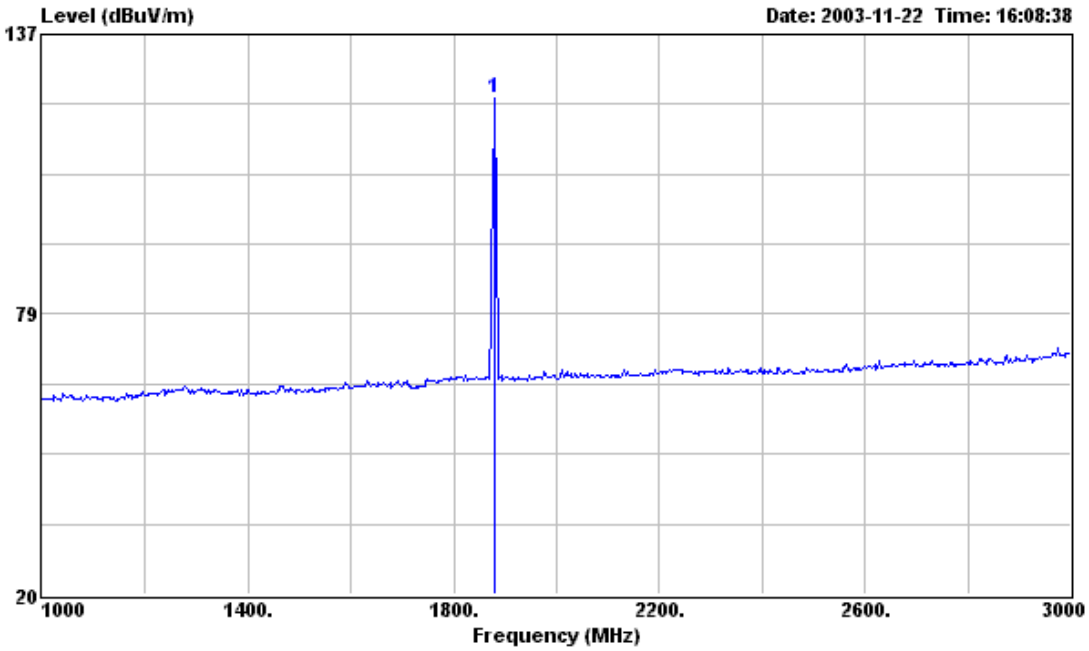
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	6690.000	52.53	------	------	55.68	34.69	5.34	43.18	Peak	---	---
2	7533.000	46.13	------	------	46.81	36.54	5.15	42.37	Peak	---	---
3	8367.000	48.49	------	------	46.50	37.65	6.04	41.70	Peak	---	---

GSM1900, Horizontal Polarization



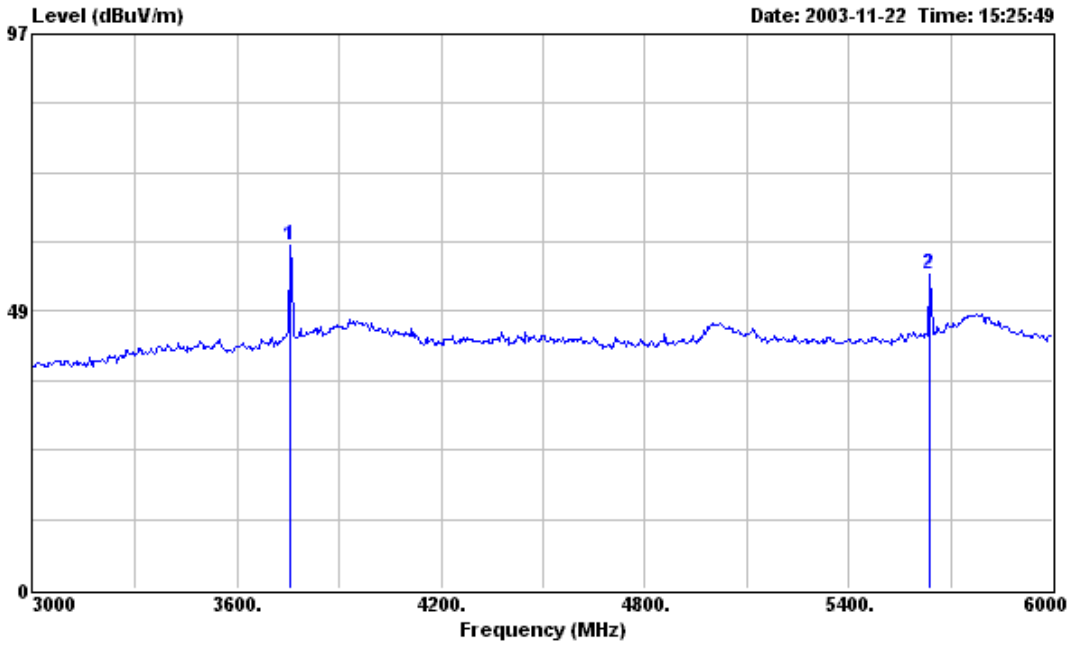
Site : 03CH03-HY
Condition : 3m 03CH03-MAT HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	32.910	23.88	------	------	36.66	14.08	1.18	28.04	Peak	---	---
2	56.190	20.29	------	------	41.13	5.70	1.45	27.99	Peak	---	---
3	858.380	28.90	------	------	33.41	19.16	4.83	28.50	Peak	---	---



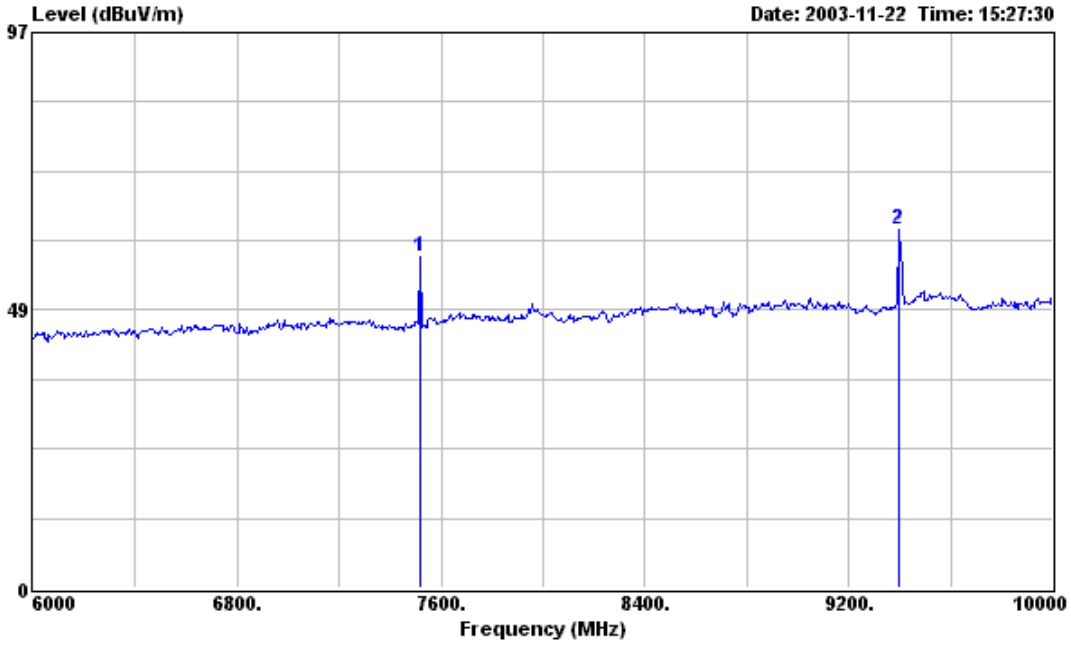
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1878.000	123.78	------	------	94.37	26.92	2.49	0.00	Peak	---	---



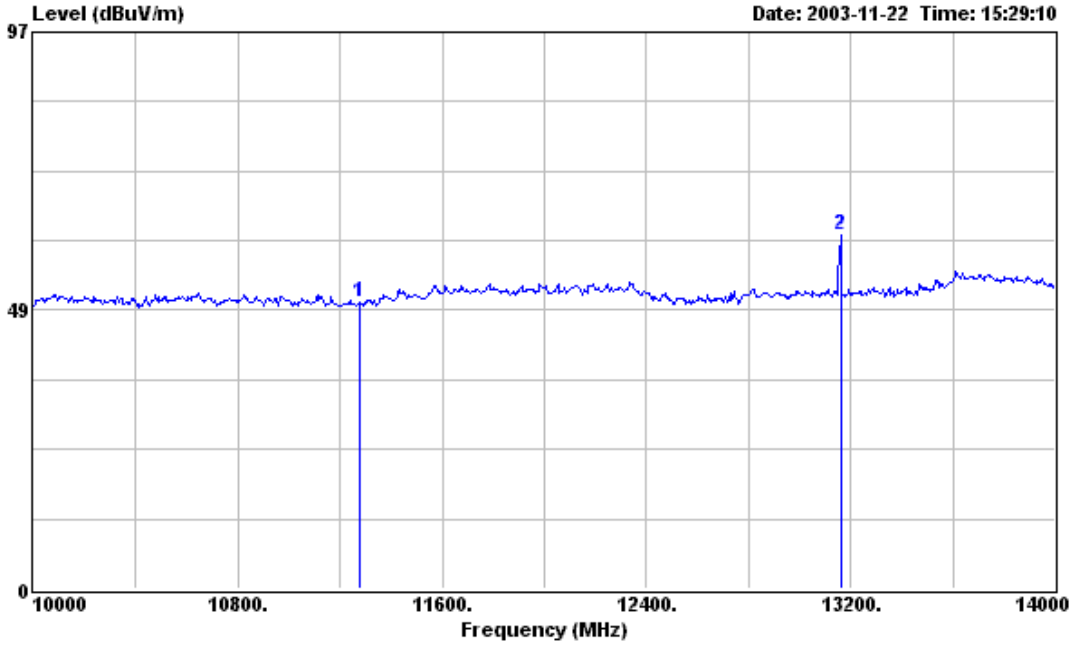
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	3753.000	59.94	------	------	62.80	31.94	6.61	41.41	Peak	---	---
2	5637.000	54.85	------	------	58.55	34.06	5.40	43.16	Peak	---	---



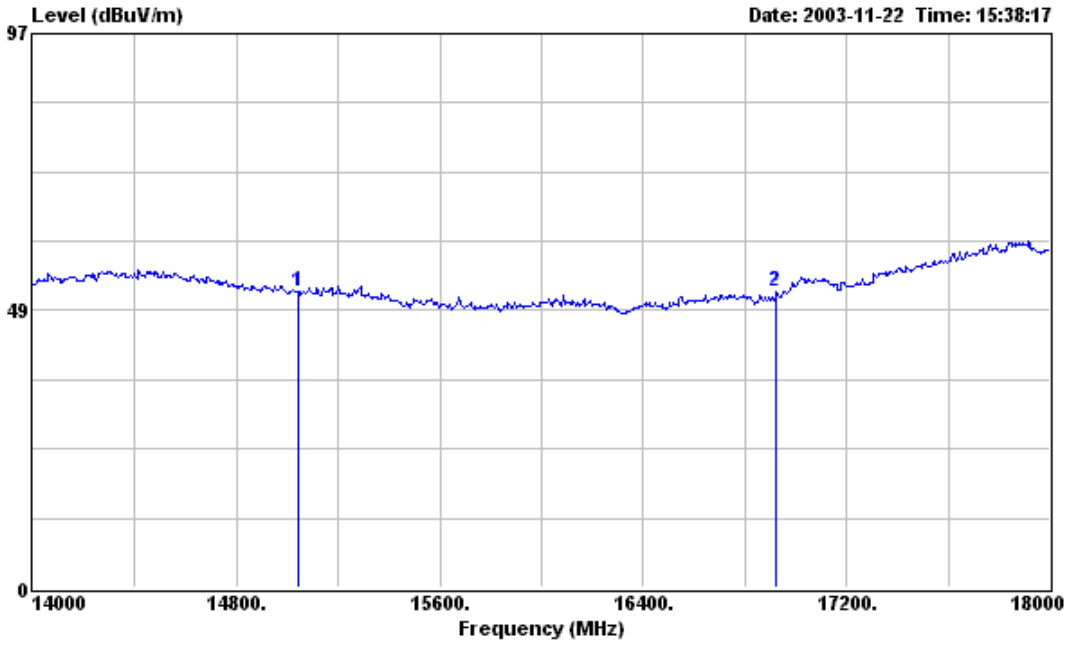
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	7516.000	57.95	------	------	58.73	36.52	5.08	42.38	Peak	---	---
2	9400.000	62.42	------	------	57.42	37.94	7.22	40.16	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

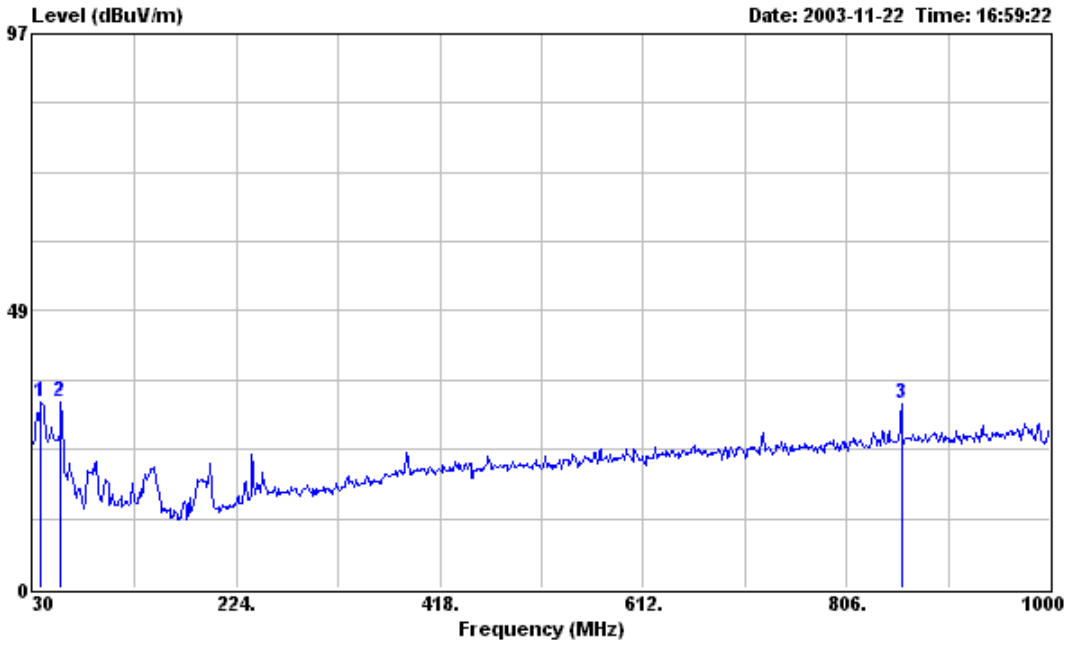
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	11276.000	49.82	------	------	43.62	38.94	7.19	39.93	Peak	---	---
2	13160.000	61.64	------	------	56.25	39.64	7.45	41.70	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 HORIZONTAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

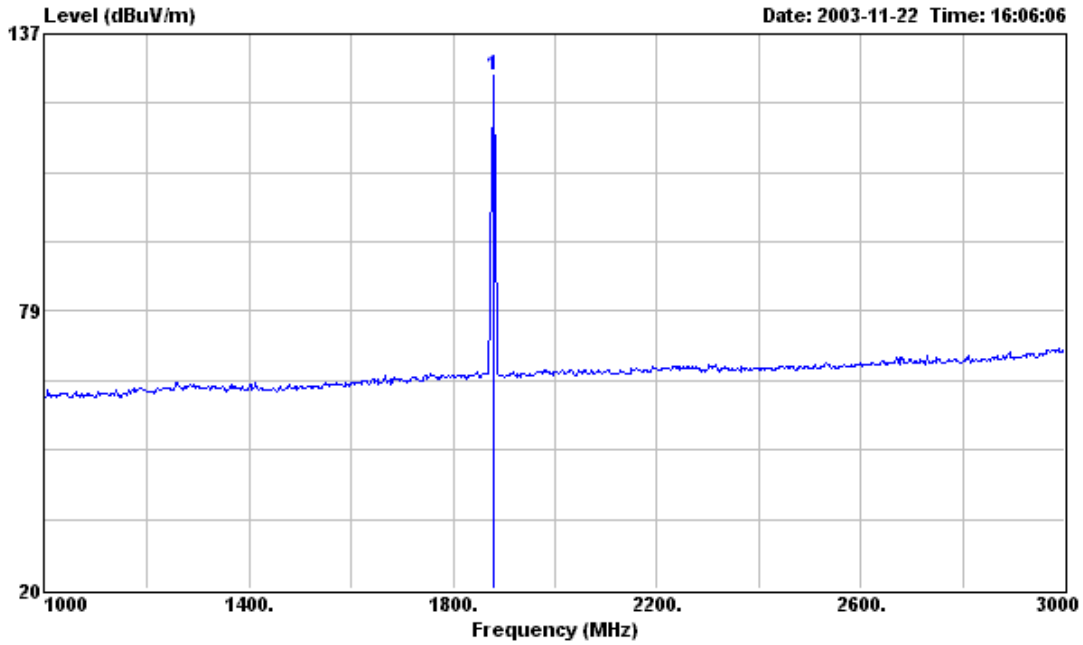
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	15040.000	51.85	------	------	46.85	40.40	8.26	43.66	Peak	---	---
2	16924.000	51.86	------	------	47.81	39.87	7.03	42.85	Peak	---	---

GSM1900, Vertical Polarization



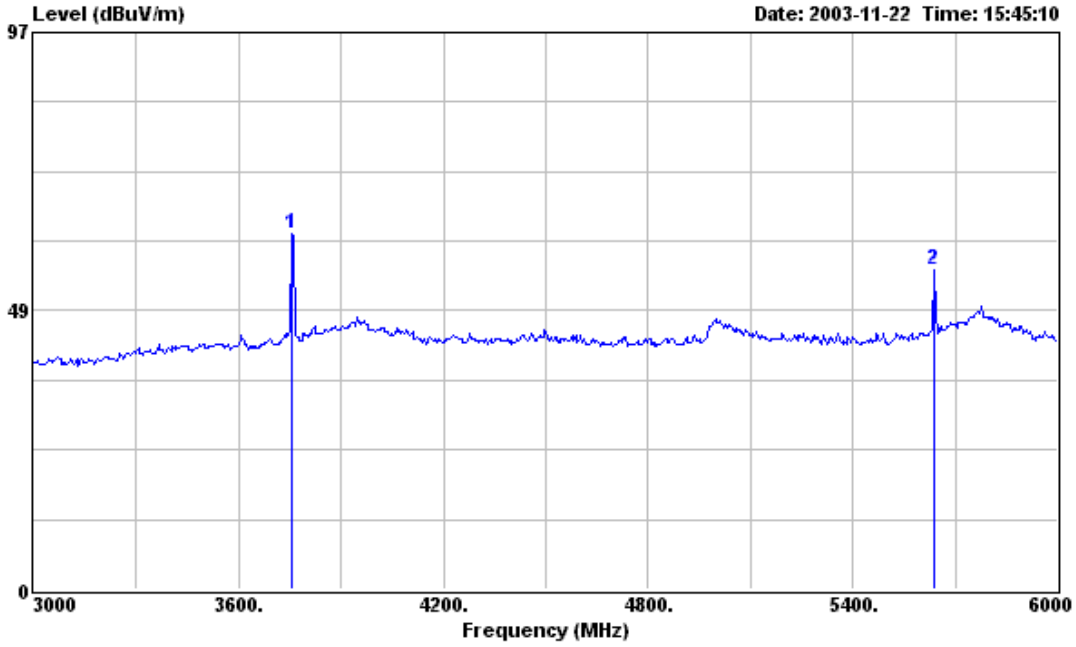
Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	36.790	32.45	------	------	47.05	12.38	1.05	28.03	Peak	---	---
2	56.190	32.63	------	------	53.47	5.70	1.45	27.99	Peak	---	---
3	858.380	32.35	------	------	36.86	19.16	4.83	28.50	Peak	---	---



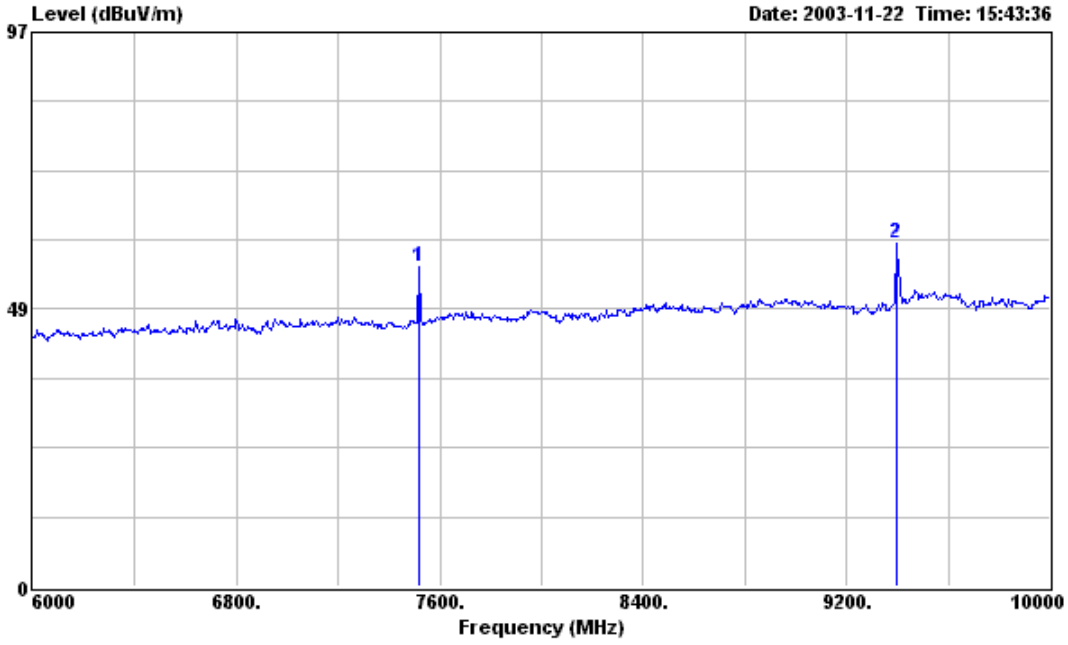
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1878.000	128.20	------	------	98.79	26.92	2.49	0.00	Peak	---	---



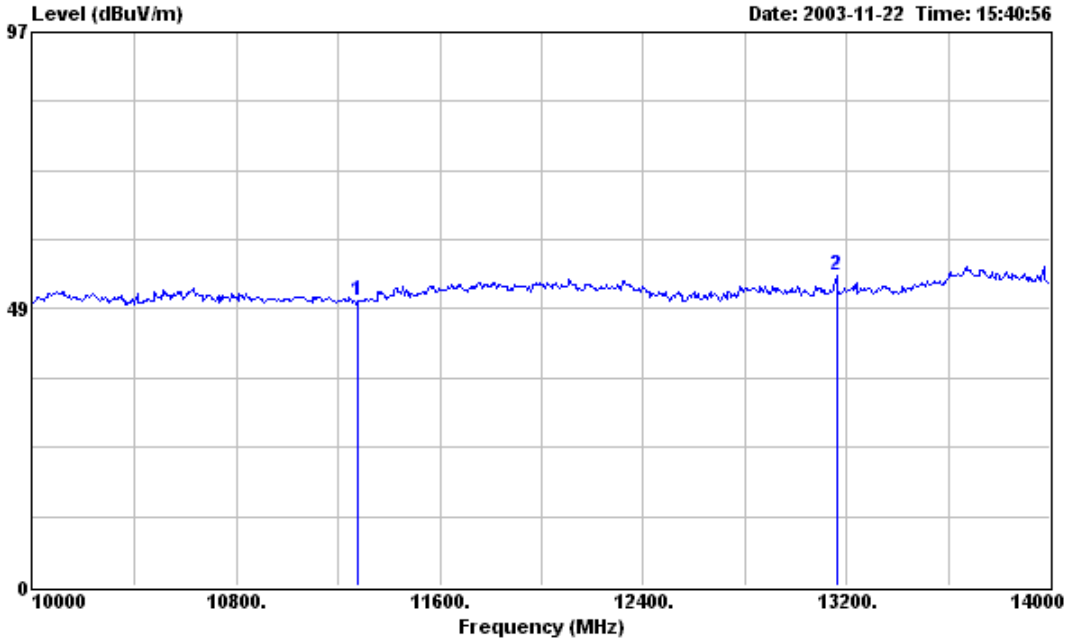
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	3753.000	62.07	------	------	64.93	31.94	6.61	41.41	Peak	---	---
2	5637.000	55.66	------	------	59.36	34.06	5.40	43.16	Peak	---	---



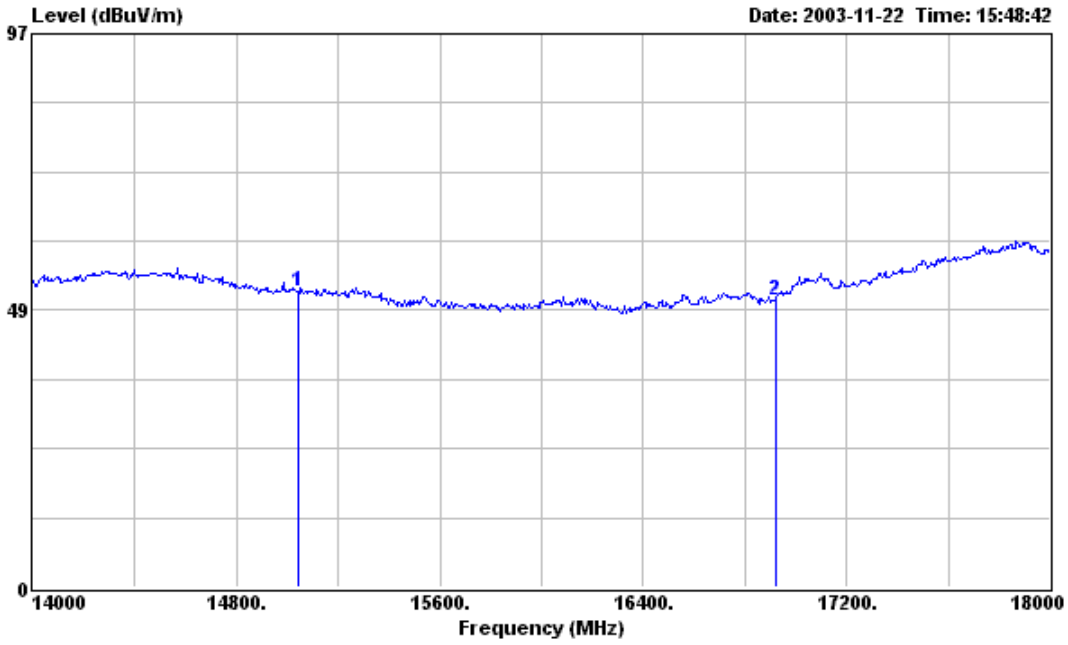
Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	7516.000	55.81	------	------	56.59	36.52	5.08	42.38	Peak	---	---
2	9400.000	59.91	------	------	54.91	37.94	7.22	40.16	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
Power : 110Vac/60Hz
MODEL : V5U
MEMO : GSM1900 CH661

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	11280.000	49.88	------	------	43.68	38.94	7.20	39.94	Peak	---	---
2	13160.000	54.25	------	------	48.86	39.64	7.45	41.70	Peak	---	---



Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GSM/GPRS
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	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	15040.000	51.79	------	------	46.79	40.40	8.26	43.66	Peak	---	---
2	16920.000	50.16	------	------	46.15	39.85	7.02	42.86	Peak	---	---

Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	0.92	1000	24.10	1.81
35	13.63	1.05	2000	27.40	2.65
40	11.11	1.08	3000	30.00	3.80
45	10.59	1.15	4000	32.60	6.71
50	6.47	1.29	5000	33.40	7.59
55	5.83	1.63	6000	34.20	4.71
60	5.18	1.30	7000	35.30	6.09
65	4.81	1.36	8000	36.90	6.82
70	4.43	1.43	9000	38.10	6.23
75	5.10	1.48	10000	39.00	6.51
80	5.91	1.53	11000	38.60	6.83
85	7.33	1.61	12000	39.50	8.00
90	8.74	1.69	13000	39.30	7.47
95	9.05	1.67	14000	41.60	7.73
100	9.36	1.76	15000	40.60	8.25
110	9.65	1.80	16000	37.20	8.14
120	9.97	1.90	17000	40.20	7.13
130	10.51	1.61	18000	48.90	6.57
140	10.32	2.14	19000	37.60	8.26
150	9.42	2.16	20000	37.30	8.56
160	8.09	2.16	21000	37.00	9.49
170	7.43	1.99	22000	38.00	8.57
180	7.60	2.39	23000	38.70	8.92
190	7.43	2.38	24000	38.60	9.41
200	7.26	2.46	25000	24.10	8.33
220	9.11	2.59			
240	10.88	2.68			
260	11.75	2.91			
280	11.55	2.92			
300	11.36	2.99			
320	12.03	3.03			
340	12.69	3.22			
360	13.33	3.28			
380	14.00	3.80			
400	14.63	3.80			
450	15.33	3.69			
500	16.03	3.93			
550	16.65	3.56			
600	17.29	4.15			
650	17.64	4.58			
700	18.00	4.73			
750	18.39	4.71			
800	18.79	4.99			
850	19.10	5.24			
900	19.42	5.38			
950	19.58	5.57			
1000	19.75	5.62			

List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 07, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation (03CH03-HY)
Temperature & Humidity Controller	LABTEK	P-9000	612	-40°C~+70°C	Oct. 01,2003	Conductive (TMH)
AC/DC Power Source	HPA	HPA-500W	HPA-9100024	0V~240V	Mar 05, 2003	Conductie (TMH)
Spectrum analyzer	R&S	FSP30	100004	9KHZ~30GHz	Sep. 03, 2003	Conductive (TMH)
Base Station Simulator	R&S	CMU200	102278	9KHz~2.7GHz	Mar. 26, 2003	Both Radiation and Conductive

※ Calibration Interval of instruments listed above is one year, except for Horn Antenna, BBHA9170.

Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54
combined standard uncertainty Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.4

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

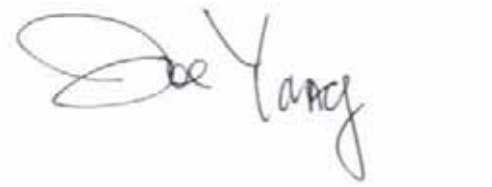
$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.7$ for 3m test distance

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.



Certified by: Joe Yang