

# **FCC TEST REPORT**

**for**

**47 CFR Part 24E**

Equipment : **GSM phone**

Model No. : **EB-A102**

FCC ID : **HFS-A100**

Filing Type : **Certification**

Applicant : **Quanta Computer Inc.**  
No. 188, Wen Hwa 2<sup>nd</sup> 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.

---

***SPORTON International Inc.***

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

FCC ID

HFS-A100

Page No.

1 of 50

Issued Date

July 5,2004

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**

<b>Rule</b>	<b>Description</b>	<b>Page</b>
	Test Report	4
2.1033(c)	General Information Required	5
2.1033(c)(14)	Rule Summary	9
	General Information	10
	Standard Test Conditions and Engineering Practices	11
2.1046(a)	EIRP Carrier Power (Radiated)	12
2.1051, 2.1049(c), 24, 24.238(b)	Transmitter Conducted Measurements	17
	Conducted Spurious Emission	23
2.1053(a)	Field Strength of Spurious Radiation	28
2.1055(a)(1)	Frequency Stability (Temperature Variation)	44
2.1055(b)(1)	Frequency Stability (Voltage Variation)	47
	Antenna Factor & Cable Loss	48
	List of Measuring Equipments	49
	Uncertainty of Test Site	50
<b>Appendix A</b>	<b>External Product Photograph</b>	
<b>Appendix B</b>	<b>Internal Photograph</b>	
<b>Appendix C</b>	<b>Set up Photograph</b>	

## **FCC TEST REPORT**

Report No. : F462913

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

**a) Test Report**

- b) Laboratory: Sporton International Inc.  
No.52, Hwa-Ya 1<sup>st</sup> RD., Hwa Ya Technology Park, Kwei-Shan  
Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
- c) Report Number: F462913
- d) Client: Quanta Computer Inc.  
No. 188, Wen Hwa 2<sup>nd</sup> Road, Kuei Shan Hsinag, Tao Yuan Shien, Taiwan

- e) Identification: Model Name: EB-A102  
FCC ID : HFS-A100  
Description: GSM 1900 Radio

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

- g) Report Date: July 5, 2004  
EUT Received: June 29, 2004

- 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:

  
Hendry 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-A102
Earpiece	N/A

**List of General Information Required for Certification**

In Accordance with FCC Rules and Regulations,  
Volume II, Part 2 and  
24E, Confidentiality

**Sub-Part 2.1033****(c)(1): Name and Address of Applicant:**

Quanta Computer Inc.  
No. 188, Wen Hwa 2<sup>nd</sup> Road, Kuei Shan  
Hsinag, Tao Yuan Shien, Taiwan

**Manufacturer**

Quanta Computer Inc.  
No. 188, Wen Hwa 2<sup>nd</sup> Road, Kuei Shan  
Hsinag, Tao Yuan Shien, Taiwan

**(c)(2): FCC ID:** HFS-A100

**Model Number:** EB-A102

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

Please See Attached Exhibits

**(c)(4): Type of Emission:** 300 KGXW

**(c)(5): FREQUENCY RANGE, MHz:** 1850.2 to 1909.8

**(c)(6): Power Rating, Watts:** 0.933 (conducted)  
0.672 (EIRP)  
x Switchable Variable N/A

**(c)(7): Maximum Power Rating, Watts:** 1

**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 = 0.5  
Collector Voltage, Vdc = 3.6  
Supply Voltage, Vdc = 3.6

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

Please See Attached Exhibits

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

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

**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:

 7/7/2004

Daniel Lee  
Manager

Certificate of NVLAP Accreditation

<p>United States Department of Commerce National Institute of Standards and Technology</p> <p><b>NVLAP</b><sup>®</sup></p>	
<p>ISO/IEC 17025:1999 ISO 9002:1994</p>	<p><b>Certificate of Accreditation</b></p>
	
<p><b>SPORTON INTERNATIONAL, INC.</b> TAIPEI HSIEN 221 TAIWAN</p> <p><i>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:</i></p> <p><b>ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS</b></p>	
<p>December 31, 2004</p> <hr/> <p>Effective through</p>	 <hr/> <p>For the National Institute of Standards and Technology NVLAP Lab Code: 200079-0</p>

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:

- 22 – Public Mobile Services
- 22 Subpart H - Cellular Radiotelephone Service
- x 24 – Personal Communications Services

**General Information**

Product Feature & Specification	
1. Type of Modulation	GMSK
2. Number of Channels	GSM 1900 : 512 to 810
3. Frequency Band , MHz	Tx:: 1850-1910 Rx: 1805-1880
4. Channel Spacing	200 KHz
5. Maximum Output Power to Antenna	29.7 dBm
6. HW Version	G3C
7. SW Version	040423n-08.00 BN1. PAC-0.15BTC
8. Antenna Type	Fixed Internal Antenna

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

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

In accordance with TIA603, 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.

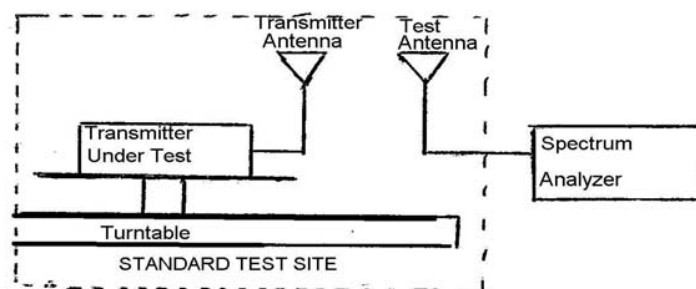
**Name of Test:** EIRP Carrier Power (Radiated)

**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 as  $R_t$ . Calculate electric field strength in receive antenna as  $E_t$ .

$$E_t = R_t + AF$$

AF (dB/m): Receive Antenna Factor

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  $P_s$ . Raise and lower the test antenna like in step b) and record the highest received signal showed in spectrum analyzer as  $R_s$ . Calculate electric field strength in receive antenna as  $E_s$ .

$$E_s = R_s + AF$$

AF (dB/m): Receive Antenna Factor

d) Calculate radiated power as following:

$$EIRP = P_s + E_t - E_s + G_s$$

$P_s$  (dBm): Input Power to Substitution Antenna

$G_s$  (dBi) : Substitution Antenna Gain

Results Attached

Tim Kao

Tested By:

Tim Kao

**SPORTON International Inc.**

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

FCC ID HFS-A100

Page No. 12 of 50

Issued Date July 5, 2004

**Test Results For:** EIRP Carrier Power (Radiated)**Conducted Power**

Bands	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
GSM 1900	512	1850.2 (Low)	29.7	0.933
	661	1880.0 (Mid)	29.45	0.881
	810	1909.8 (High)	29.46	0.883

**EIRP**

Freq MHz	Pol	Substitution Antenna Input Power (dBm)	Substitution Antenna Gain (dBi)	Et (dBuV/m)	Es (dBuV/m)	Et - Es (dB)	Radiated Power (dBm)	Radiated Power (Watts)
1850.27	H	-3.76	6.64	120.07	101.70	18.37	21.26	0.134
1880.07	H	-3.78	6.65	121.82	101.64	20.18	23.05	0.202
1909.87	H	-3.81	6.66	121.87	101.58	20.29	23.14	0.206
1850.15	V	-3.76	6.64	126.64	101.70	24.94	27.83	0.606
1879.90	V	-3.78	6.65	126.33	101.64	24.69	27.56	0.570
1909.83	V	-3.81	6.66	127.00	101.58	25.42	28.27	0.672

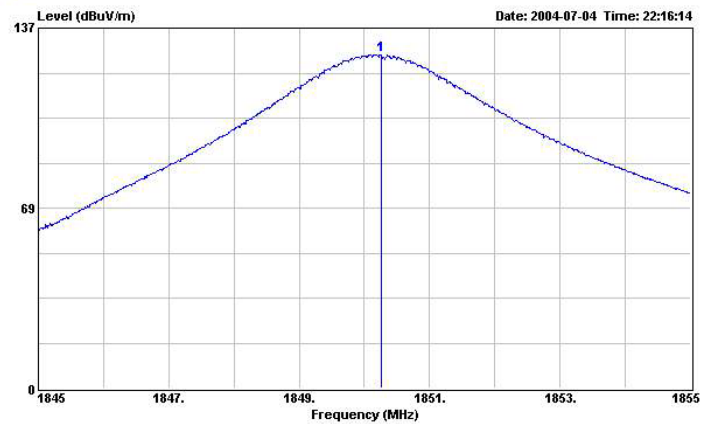
## GSM 1900 CH512 Horizontal Polarization



Site : 03CH03-HY  
Condition : 3m HORN-ANT-6821 HORIZONTAL  
EUT : GSM/GPRS handset 900/1800/1900 MHz  
Power : 120Vac/60Hz  
Model : A102  
Memo : PCS Link Mode; CH 512

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		Pos	Pos
1	1850.110	120.07	-----	92.05	26.53	1.49	0.00	Peak	---	---

## GSM 1900 CH512 Vertical Polarization



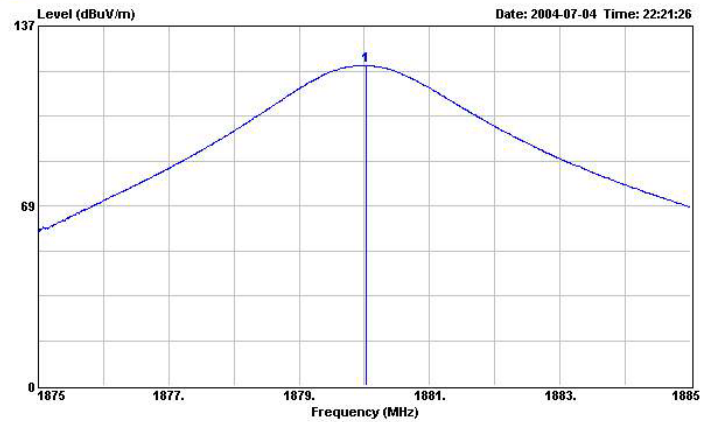
Site : 03CH03-HY  
Condition : 3m HORN-ANT-6821 VERTICAL  
EUT : GSM/GPRS handset 900/1800/1900 MHz  
Power : 120Vac/60Hz  
Model : A102  
Memo : PCS Link Mode; CH 512

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		Pos	Pos
1	1850.260	126.64	-----	98.62	26.53	1.49	0.00	Peak	---	---

## FCC TEST REPORT

Report No. : F461002

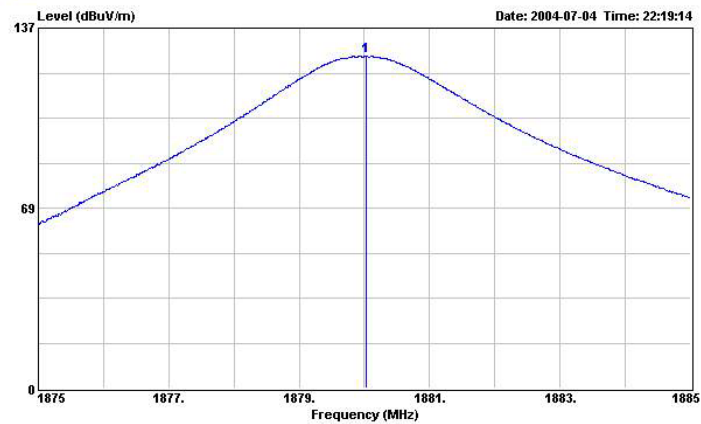
### GSM 1900 CH661 Horizontal Polarization



Site : 03CH03-HY  
Condition : 3m HORN-ANT-6821 HORIZONTAL  
EUT : GSM/GPRS handset 900/1800/1900 MHz  
Power : 120Vac/60Hz  
Model : A102  
Memo : PCS Link Mode; CH 661

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
		Limit	Line							
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1 1880.020	121.82	-----	-----	93.66	26.66	1.50	0.00	Peak	---	---

### GSM 1900 CH661 Vertical Polarization



Site : 03CH03-HY  
Condition : 3m HORN-ANT-6821 VERTICAL  
EUT : GSM/GPRS handset 900/1800/1900 MHz  
Power : 120Vac/60Hz  
Model : A102  
Memo : PCS Link Mode; CH 661

Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
		Limit	Line							
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1 1880.020	126.33	-----	-----	98.17	26.66	1.50	0.00	Peak	---	---

**SPORTON International Inc.**

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

FCC ID

HFS-A100

Page No.

15 of 50

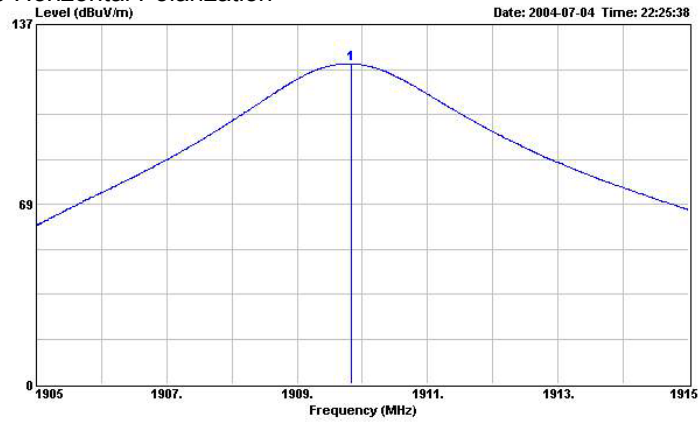
Issued Date

July 5, 2004

# FCC TEST REPORT

Report No. : F461002

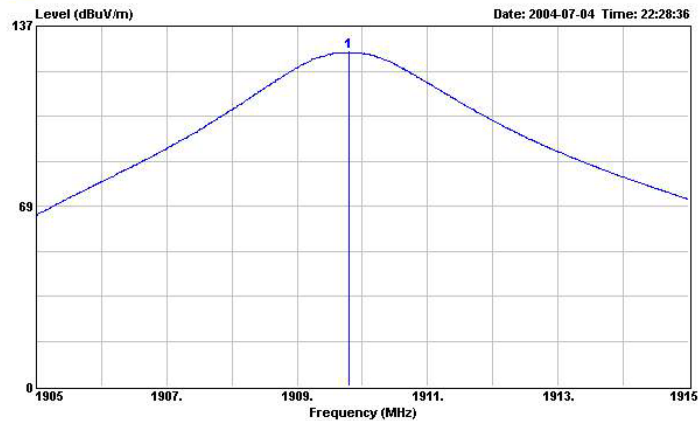
## GSM 1900 CH810 Horizontal Polarization



Site : 03CH03-HY  
 Condition : 3m HORN-ANT-6821 HORIZONTAL  
 EUT : GSM/GPRS handset 900/1800/1900 MHz  
 Power : 120Vac/60Hz  
 Model : A102  
 Memo : PCS Link Mode; CH 810

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1909.830	121.87	-----	-----	93.59	26.78	1.50	0.00	Peak	---	---

## GSM 1900 CH810 Vertical Polarization



Site : 03CH03-HY  
 Condition : 3m HORN-ANT-6821 VERTICAL  
 EUT : GSM/GPRS handset 900/1800/1900 MHz  
 Power : 120Vac/60Hz  
 Model : A102  
 Memo : PCS Link Mode; CH 810

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1909.790	127.00	-----	-----	98.72	26.78	1.50	0.00	Peak	---	---

**SPORTON International Inc.**

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

FCC ID

HFS-A100

Page No.

16 of 50

Issued Date

July 5, 2004



**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



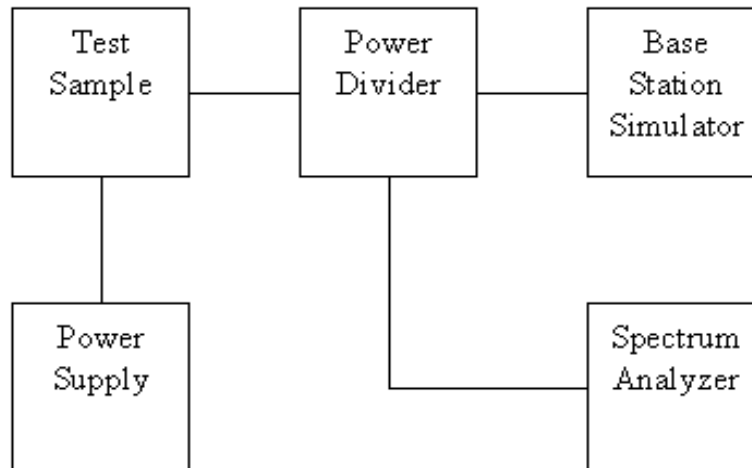
Tested By:

Tim Kao

**Transmitter Spurious Emission**

Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious

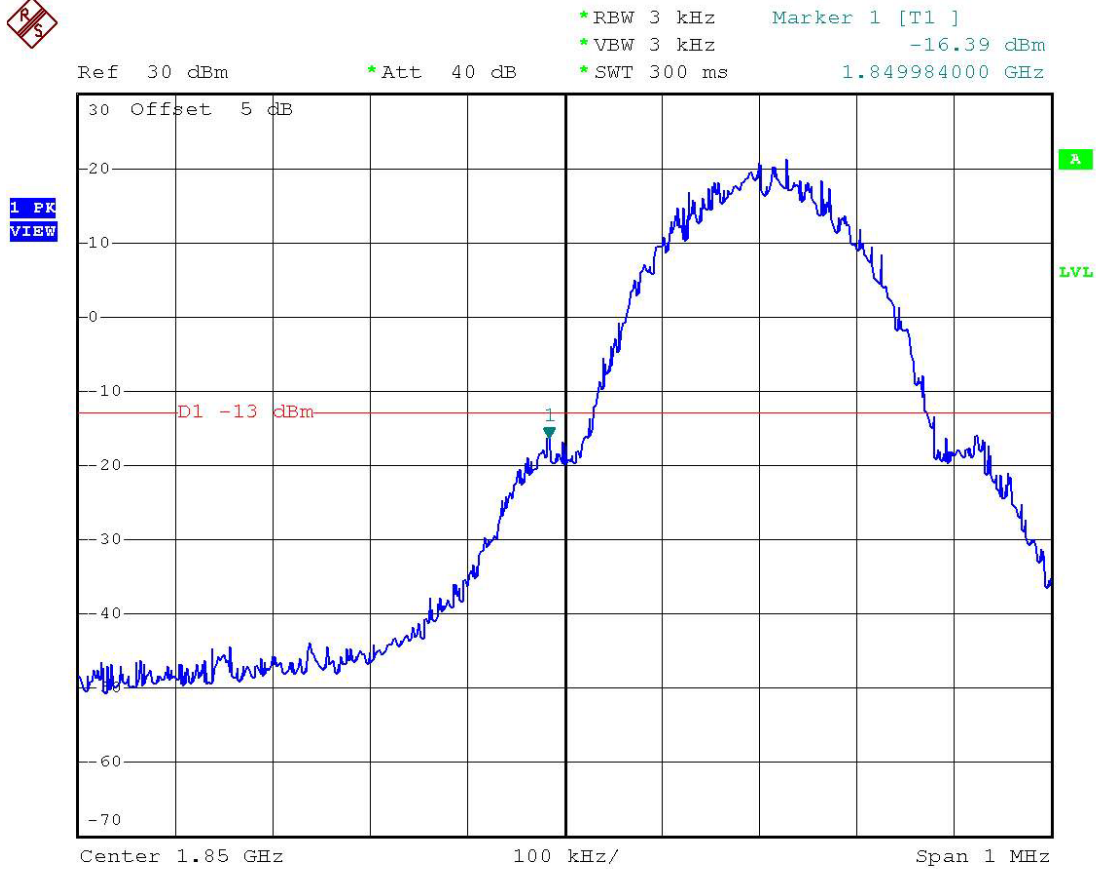


Asset	Model Name	S/N
Base Station Simulator	CMU200	102278
Base Station Simulator	E5515C	GB43460754
Spectrum Analyzer	FSP30	838858/014
AC/DC Power Source	HPA-500W	HPA0100024

## FCC TEST REPORT

Report No. : F461002

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



Power: HIGH  
Modulation: GSM 1900  
LOWER BAND EDGE

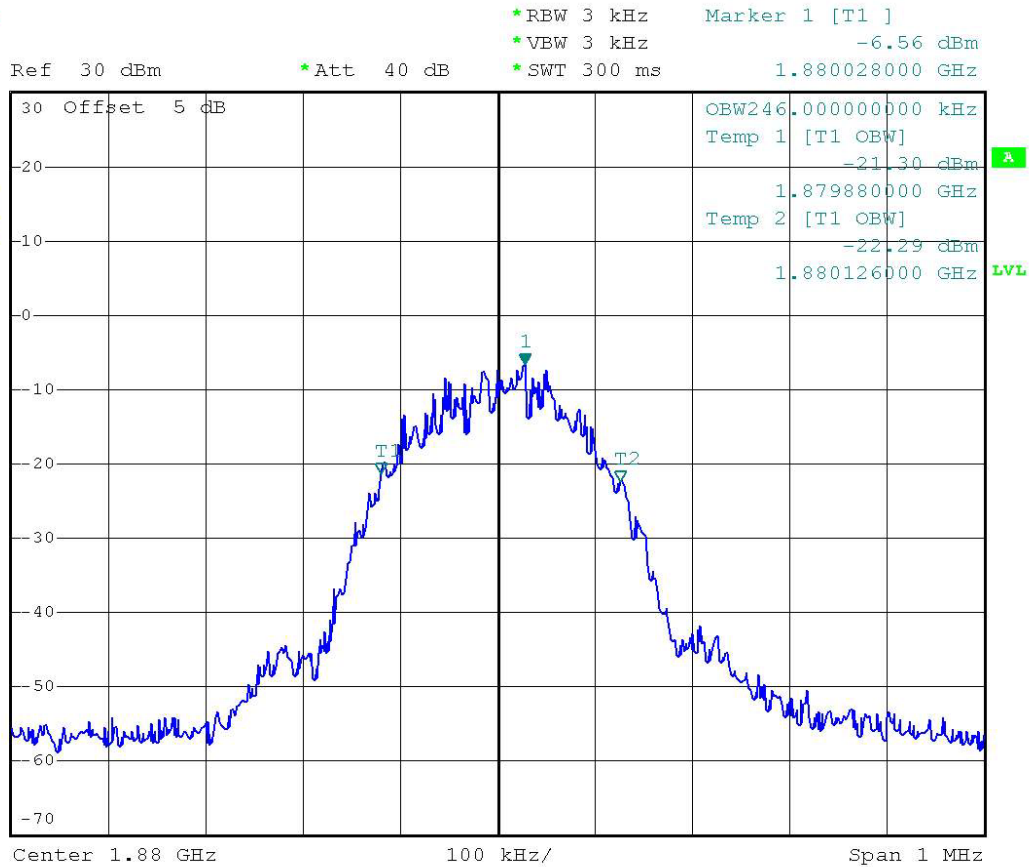
# FCC TEST REPORT

Report No. : F461002

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



1 PK  
VIEW



Power: LOW  
Modulation: GSM 1900  
99% BANDWIDTH

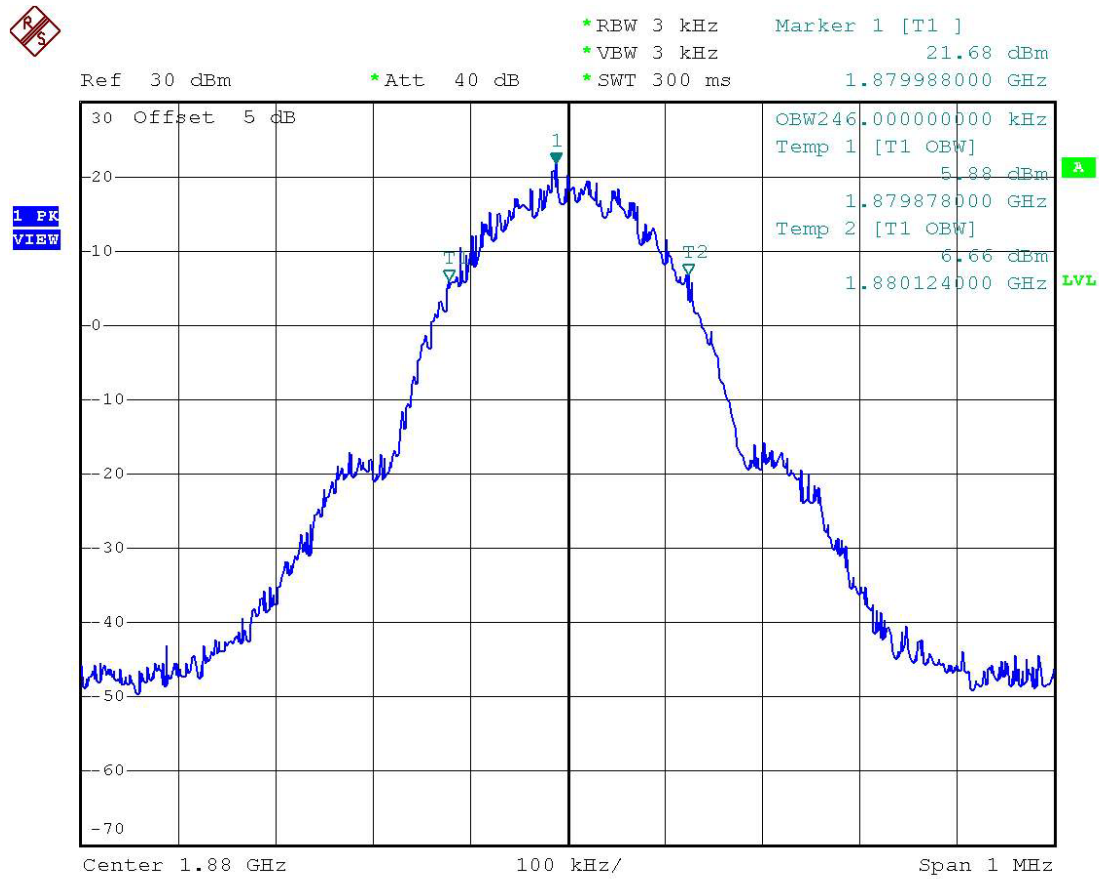
**SPORTON International Inc.**  
TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

FCC ID HFS-A100  
Page No. 20 of 50  
Issued Date July 5, 2004

## FCC TEST REPORT

Report No. : F461002

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



Power: HIGH  
Modulation: GSM 1900  
99% BANDWIDTH

**SPORTON International Inc.**

TEL : 886-2-2696-2468

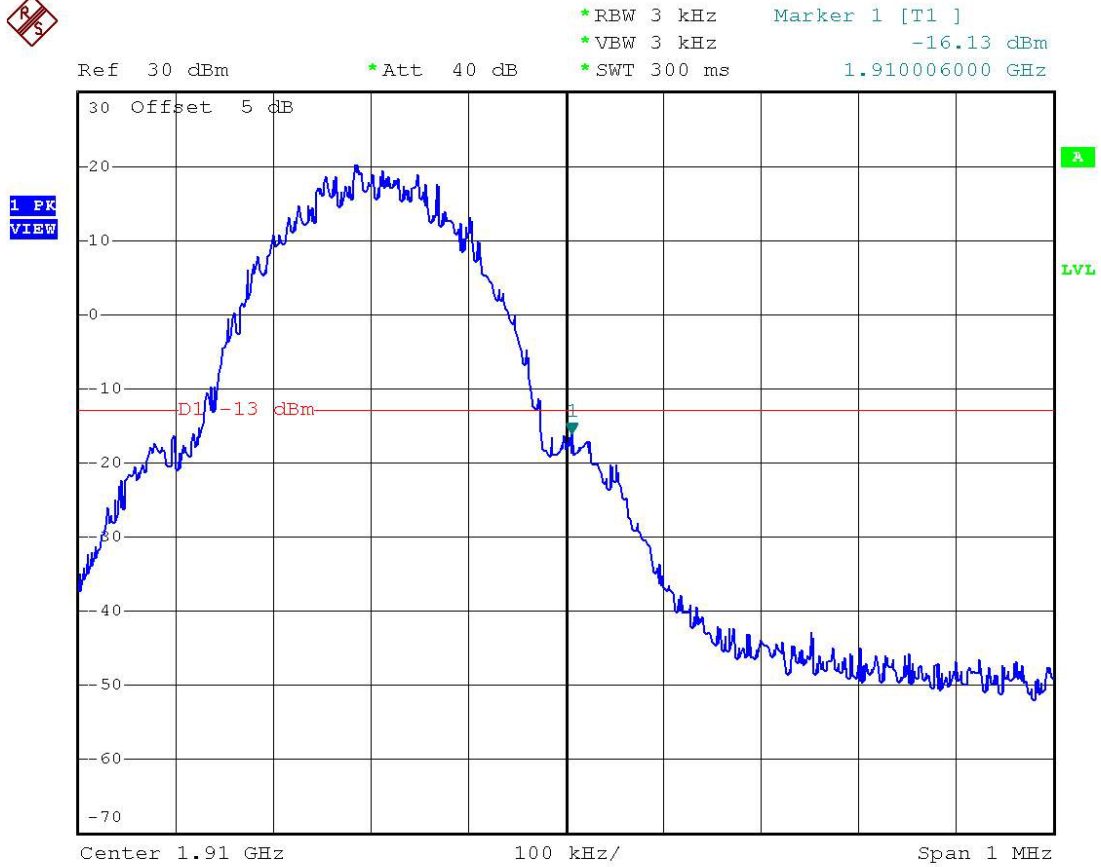
FAX : 886-2-2696-2255

FCC ID      HFS-A100

Page No.      21 of 50

Issued Date      July 5, 2004

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

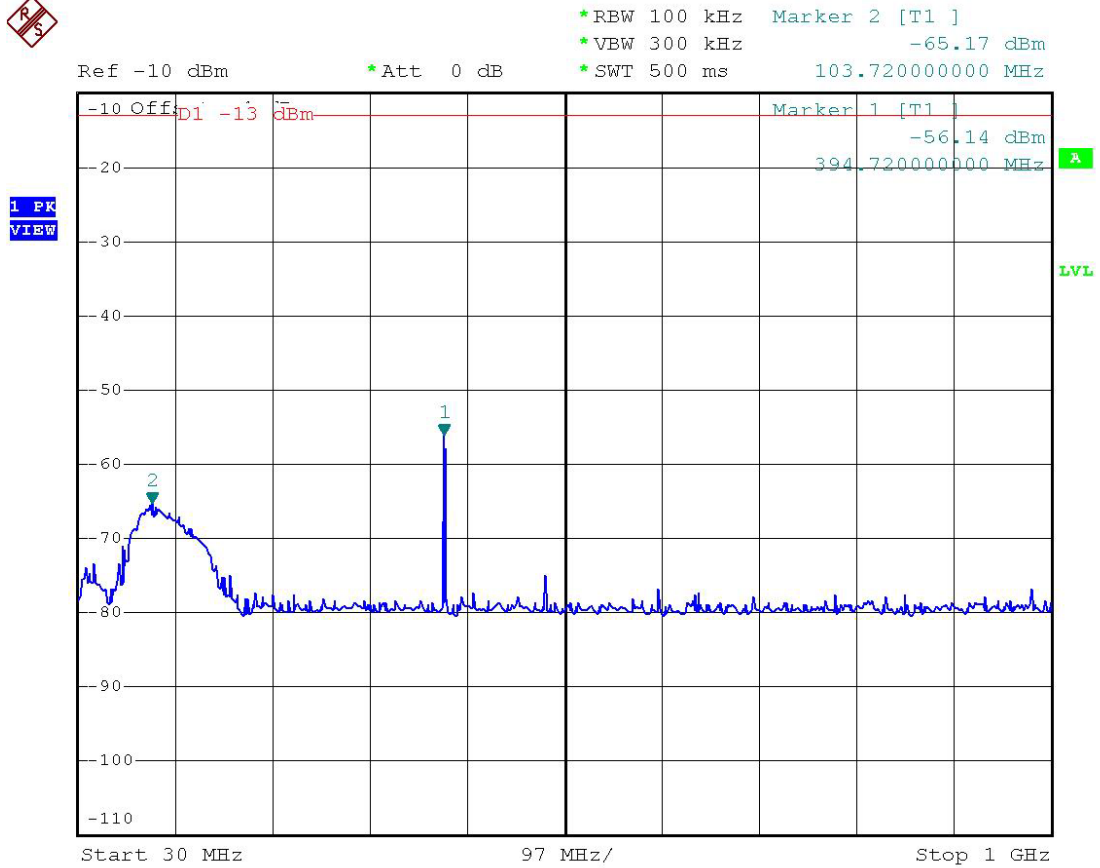


Power: HIGH  
Modulation: GSM 1900  
UPPER BAND EDGE

# FCC TEST REPORT

Report No. : F461002

**Name of Test:** Conducted Spurious Emission  
30M-1G



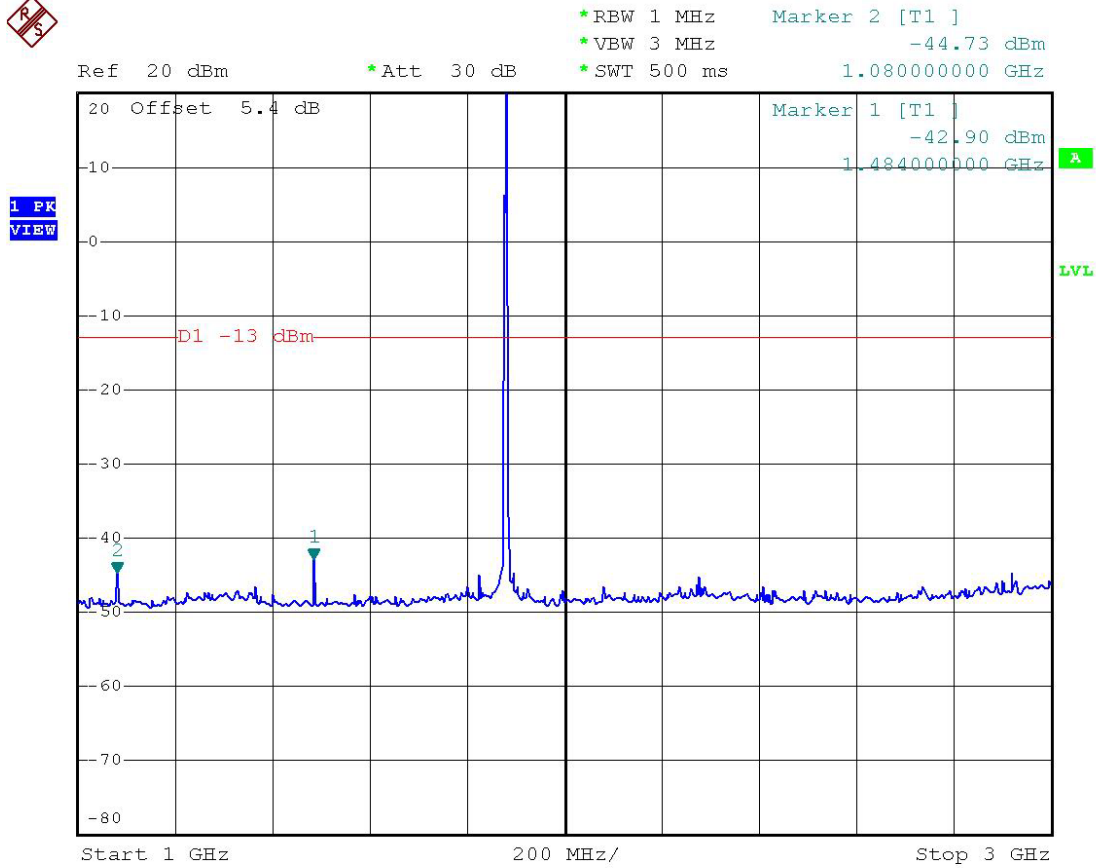
**SPORTON International Inc.**  
TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

FCC ID HFS-A100  
Page No. 23 of 50  
Issued Date July 5, 2004

## FCC TEST REPORT

Report No. : F461002

**Name of Test:** Conducted Spurious Emission  
1G-3G



**SPORTON International Inc.**  
TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

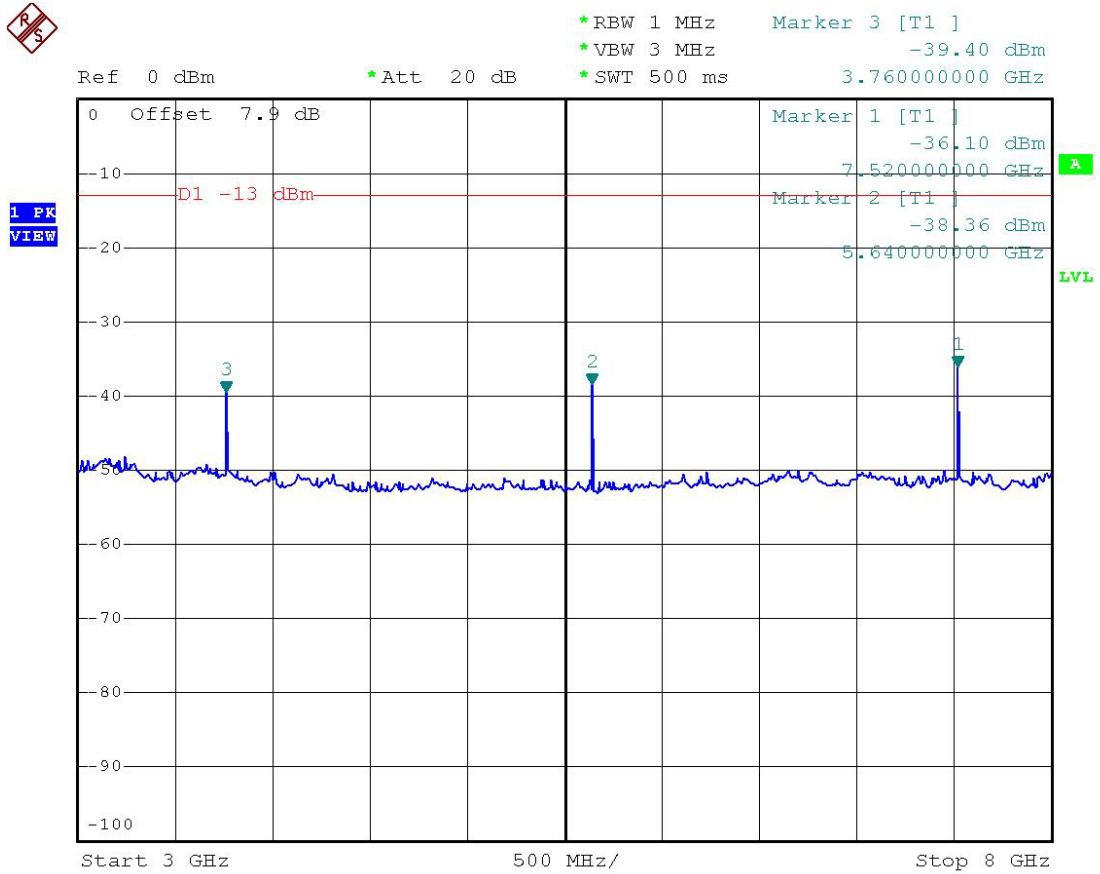
FCC ID      HFS-A100  
Page No.      24 of 50  
Issued Date      July 5, 2004



# FCC TEST REPORT

Report No. : F461002

Name of Test: Conducted Spurious Emission  
3G-8G



**SPORTON International Inc.**  
TEL : 886-2-2696-2468  
FAX : 886-2-2696-2255

FCC ID      HFS-A100  
Page No.      25 of 50  
Issued Date      July 5, 2004