



A Test Lab Techno Corp.

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RF Safety Evaluation Report

| | |
|------------------------------|---|
| Test Report No. | : 0905FS12 |
| Applicant | : Acer Incorporated |
| Manufacturer | : Qualcomm Incorporated |
| Model Name | : Gobi2000 PCI Express Mini Card |
| Trade Mark | : acer |
| Model Number | : Gobi2000 |
| FCC ID | : HLZGOBI2000A |
| Dates of Test | : May. 25, 2009 |
| Test Specification | : 47 CFR § 2.1091 47 CFR §1.1310 |
| Application | : Class II permissive change |
| Location of Test Lab. | : Chang-an Lab. |

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
3. The measurement report has to be written approval of A Test Lab Techno Corp. It may only be reproduced or published in full.


Kevin Wang 20090602
Approve Signer


John Cheng 20090602
Testing Engineer



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1. Description of Equipment Under Test (EUT)

Applicant :

Acer Incorporated

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Manufacturer : Qualcomm Incorporated
Manufacturer Address : 5775 Morehouse Drive San Diego, CA 92121-1714
Product Name : Gobi2000 PCI Express Mini Card
Trade Mark : acer
Model Name : Gobi2000
Frequency Range :
824.2 - 848.8 MHz (GPRS/EGPRS 850)
1850.2 - 1909.8 MHz (GPRS/EGPRS 1900)
826.4 - 846.6 MHz (UMTS Cell Band)
1852.4 - 1907.6 MHz (UMTS PCS Band)
824.7 - 848.31 MHz (CDMA 2000 Cell Band)
1851.25 - 1908.75 MHz (CDMA 2000 PCS Band)
Transmit Power (Conducted) :
32.83 dBm GPRS 2 UL (Cell Band)
24.62 dBm CDMA 2000 (Cell Band)
24.19 dBm UMTS (Cell Band)
29.42 dBm GPRS 2 UL (Cell Band)
24.64 dBm CDMA 2000 (PCS Band)
24.09 dBm UMTS (PCS Band)
Hardware Version : N/A
Software Version : N/A
Modulation Technique : GMSK / QPSK
Antenna Specification :
Cell Band -0.69 dBi
PCS Band 1.26 dBi
Antenna Designation : Internal Antenna
Temperature Range : -30 ~ +70°C

The above equipment was tested by A Test Lab Techno. Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 & 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



2. Introduction

This Maximum Permissible Exposure report demonstrates compliance with FCC CFR 47 §1.1310 and 2.1091 for any collocated transmitters used in simultaneous conditions with the Gobi2000 WWAN Mini-PCIe installed into any Acer Incorporated host platform categorized as “mobile” where the collocated transmitter has a valid FCC ID documenting equivalent or degraded RF characteristics with the collocated parameters defined in this MPE report.

The mobile classification applies when 20cm or more separation distance is maintained both WWAN and WLAN and BT transmission antennas and the end-user.

The WWAN module is model Gobi2000 authorized under **FCC ID: HLZGOBI2000A**.

The WWAN MPE calculations in the filing are based on the conducted transmit power levels listed in FCC ID HLZGOBI2000A filings and the maximum allowable antenna gains per relevant grant notes.

The Collocated MPE calculations are based on worst case conducted transmit powers and antenna gain parameters. The WLAN FCC IDs referenced in Table 1 have equal or lower conducted power and antenna gain than that used in the calculations of this report. Any other collocated transmitter must calculations of this report.

Available Collocated WLAN Transmitters

Table 1 lists available WLAN FCC IDs that may be installed in Acer Incorporated notebook computers listed in Table 2. This MPE report is also applicable to future WLAN modules with equal or less transmit power than that defined in this MPE report even though the FCC IDs are not identified in this report.

| Available Collocated FCC IDs | |
|------------------------------|--------------|
| Parts | FCC ID |
| WLAN Module | PD9533ANH |
| Bluetooth Module | QDS-BRCM1018 |

Table 1. Acer Incorporated Collocated FCC ID

Bluetooth modular transmitter can also be installed in the subjected host laptop PCs. The transmission power is **2.5mW** or less and the separation distance between the WWAN and Bluetooth antennas is 20cm or longer. Therefore the Bluetooth is not considered as a co-located transmitter and any co-location evaluation is not required pursuant to the FCC KDB 616217.



3. Host Products

Table 2 lists known mobile host devices at the time of the Class II permissive change submission.

Additional host notebooks will be added in the future as Class I permissive changes providing the hosts maintain a 20cm separation distance between all antennas and the end user thus maintaining the FCC mobile device classification.

| Available Host Models |
|-----------------------|
| MS2271 |
| AS4810TZ |
| AS4810T |
| AS4810TG |
| AS4810TZG |
| AS4410 |
| JM41 |

Table 2. Acer Incorporated Mobile Platforms

Host Different Description

Host (MS2271 / AS4810TZ / AS4810T / AS4810TG / AS4810TZG / AS4410 / JM41) are the same material design, the only difference is model name.

Host External Photos







4. Transmitter Summary

Table 3 summarizes transmitter parameters associated with this permissive change application.

The WWAN modes of operation reflect the Gobi2000 parameters associated with this **FCC ID HLZGOBI2000A**.

The WLAN transmit power and antenna gain parameters represent the highest transmit power for a given frequency band from all of the WLAN/BT FCC IDs identified in Table 3.

Integration of a WLAN/BT module that exceeds the parameters requires a new FCC authorization or permissive change application. A worst case antenna gain of **1.03dBi** has been assumed for all WLAN antennas as specified by Acer Incorporated.

| Technology | Frequency (MHz) | Maximum Conducted Power (dBm) | Conducted Power (W) | Maximum Antenna Gain (dBi) | Duty Cycle |
|------------|-----------------|-------------------------------|---------------------|----------------------------|------------|
| GPRS 2 UL | 824 | 32.83 | 1.919 | -0.69 | 0.25 |
| CDMA2000 | 824 | 24.62 | 0.290 | -0.69 | 1.00 |
| UMTS | 824 | 24.19 | 0.262 | -0.69 | 1.00 |
| GPRS 2 UL | 1850 | 29.42 | 0.874 | 1.26 | 0.25 |
| CDMA2000 | 1850 | 24.64 | 0.291 | 1.26 | 1.00 |
| UMTS | 1850 | 24.09 | 0.256 | 1.26 | 1.00 |
| WLAN | 2400 | 0.438 | 26.41 | 0.96 | 1.00 |
| WLAN | 5000 | 0.441 | 26.44 | 1.03 | 1.00 |
| BT | 2400 | 0.002 | 3.97 | 0.96 | 1.00 |

Table 3. WWAN and WLAN /BT Declared Transmitter Parameters



5. RF Exposure Limits and Equations

According to FCC CFR 47 §1.1310, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power density (mW/cm ²) | Average Time (Minutes) |
|--|-------------------------------|-------------------------------|-------------------------------------|------------------------|
| (A) Limits for Occupational / Control Exposures (f=frequency) | | | | |
| 30 - 300 | 61.4 | 0.163 | 1.0 | 6 |
| 300 – 1500 | --- | --- | f/300 | 6 |
| 1500 – 100,000 | --- | --- | 5.0 | 6 |
| (B) Limits for General Population / Uncontrolled Exposure (f=frequency) | | | | |
| 30 - 300 | 27.5 | 0.073 | 0.2 | 30 |
| 300 – 1500 | --- | --- | f/1500 | 30 |
| 1500 – 100,000 | --- | --- | 1.0 | 30 |

Table 4. Limits for Maximum Permissible Exposure (MPE)

Friis transmission formula:

$$P_d = (P_{out} * G) / (4\pi R^2)$$

Where,

P_d = power density (mW/cm²)

P_{out} = output power to antenna (mW)

G = gain of antenna in linear scale

R = distance between observation point and center of the radiator (cm)



6. MPE Calculations

Stand Alone Transmitter Calculations

The MPE calculations for standalone transmitters at a separation distance of 20 cm are shown in Table 5 per the transmit power and antenna gain values declared in Table 3.

For frequency dependent limits, the lowest transmitter frequency was used to represent the lowest MPE limit (e.g. 824MHz = 0.549 mW/cm²).

The WLAN power levels listed represent the worst-case values for the corresponding frequency ranges associated with the grants listed in table 5.

| Technology | Frequency (MHz) | Maximum Conducted Power (dBm) | Conducted Power (W) | Maximum Antenna Gain (dBi) | Duty Cycle | Average EIRP (dBm) | Average EIRP (W) | Power Density @ 20cm (mW/cm ²) | MPE Limit (mW/cm ²) |
|------------|-----------------|-------------------------------|---------------------|----------------------------|------------|--------------------|------------------|--|---------------------------------|
| GPRS 2 UL | 824 | 32.83 | 1.919 | -0.69 | 0.25 | 26.119 | 0.409 | 0.081 | 0.549 |
| CDMA2000 | 824 | 24.62 | 0.290 | -0.69 | 1.00 | 23.930 | 0.247 | 0.049 | 0.549 |
| UMTS | 824 | 24.19 | 0.262 | -0.69 | 1.00 | 23.500 | 0.224 | 0.045 | 0.549 |
| GPRS 2 UL | 1850 | 29.42 | 0.874 | 1.26 | 0.25 | 24.654 | 0.292 | 0.058 | 1.000 |
| CDMA2000 | 1850 | 24.64 | 0.291 | 1.26 | 1.00 | 25.900 | 0.389 | 0.077 | 1.000 |
| UMTS | 1850 | 24.09 | 0.256 | 1.26 | 1.00 | 25.350 | 0.343 | 0.068 | 1.000 |
| WLAN | 2400 | 0.438 | 26.41 | 0.96 | 1.00 | 27.370 | 0.546 | 0.109 | 1.000 |
| WLAN | 5000 | 0.441 | 26.44 | 1.03 | 1.00 | 27.470 | 0.558 | 0.111 | 1.000 |
| BT | 2400 | 0.002 | 3.97 | 0.96 | 1.00 | 4.930 | 0.003 | 0.001 | 1.000 |

Table 5. WWAN and WLAN Standalone MPE Calculations



Collocated MPE Calculations

Per OET 65, when RF sources have difference frequencies, the fraction of the FCC power density limited should be determined and the sum of all fractional components should be less than 1.

| WLAN Band | WLAN Pd (mW/cm ²) | MPE Limit (mW/cm ²) | (WLAN Pd) / (MPE Limit) | 850 MHz WWAN Pd (mW/cm ²) | FCC MPE Limit (mW/cm ²) | (WWAN 850 MHz) / MPE Limit | (850 MHz WWAN fraction) + (WLAN fraction) | Limit | Pass/Fail |
|-----------|-------------------------------|---------------------------------|-------------------------|---------------------------------------|-------------------------------------|----------------------------|---|-------|-----------|
| 5 GHz | 0.109 | 1.000 | 0.109 | 0.081 | 0.549 | 0.147 | 0.153 | 1 | Pass |

Table 6. WWAN 850 MHz Collocations

| Band | WLAN Pd (mW/cm ²) | MPE Limit (mW/cm ²) | (WLAN Pd) / (MPE Limit) | 1900 MHz Pd (mW/cm ²) | FCC MPE Limit (mW/cm ²) | (WWAN 1900 MHz) / MPE Limit | (1900 MHz WWAN fraction) + (WLAN fraction) | Limit | Pass/Fail |
|-------|-------------------------------|---------------------------------|-------------------------|-----------------------------------|-------------------------------------|-----------------------------|--|-------|-----------|
| 5 GHz | 0.111 | 1.000 | 0.111 | 0.077 | 1.000 | 0.077 | 0.080 | 1 | Pass |

Table 7. WWAN 1900 MHz Collocation Power Density

7. Antenna Location for MS2271 / AS4810TZ / AS4810T / AS4810TG / AS4810TZG / AS4410 / JM41

