



RF Exposure Evaluation Report

APPLICANT : Montage
EQUIPMENT : GSM/GPRS+WCDMA Module
MODEL NAME : GT3GM-M
FCC ID : N69-715100
FILING TYPE : Certification
STANDARD : OET Bulletin 65 Supplement C (Edition 01-01)

We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the device has been evaluated in accordance with FCC OET Bulletin 65 Supplement C (Edition 01-01), and pass the limit. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai / Manager

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA280201	Rev. 01	Initial issue of report	Sep. 29, 2012

**1. Administration Data****1.1. Testing Laboratory**

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958

1.2. Applicant

Company Name	Montage
Address	Flat J, 13/F, Tower C, NEO Enterprise Avenue, 6009 Shennan Mid Road, Futian, Shenzhen, CHINA 518048

1.3. Manufacturer

Company Name	Montage
Address	Flat J, 13/F, Tower C, NEO Enterprise Avenue, 6009 Shennan Mid Road, Futian, Shenzhen, CHINA 518048

2. Description of Device Under Test (DUT)

Product Feature & Specification	
DUT Type	GSM/GPRS+WCDMA Module
Model Name	GT3GM-M
FCC ID	N69-715100
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz
Antenna Type	Dipole Antenna
HW Version	M7600_V10
SW Version	MAUI.11A.W11.12.MP.V7.F40
Type of Modulation	GSM / GPRS : GMSK WCDMA : QPSK (Uplink) HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink)
DUT Stage	Identical Prototype

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

3. RF Exposure Limit Introduction

The FCC categorizes the RF exposure limit based on the intended usage of the device and the user's awareness and ability to exercise control over his or her exposure. This is a consumer product to be used in the home, hence this device was evaluated by mobile device with general population/uncontrolled exposure condition. The definition of these category are shown as follows:

▪ Mobile Devices:

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to be generally used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitters' radiating structures and the body of the user or nearby persons. Transmitters designed to be used by consumers or workers that can be easily re-located are considered mobile devices if they meet the 20 centimeter separation requirement. The FCC rules for evaluating mobile devices for RF compliance are found in 47 CFR 2.1091.

▪ General Population/Uncontrolled Exposure:

The general population / uncontrolled exposure limits are applicable to situations in which the general public may



be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category and the general population/uncontrolled exposure limits apply to these devices.

Per OET Bulletin 65, the power density limit for General Population/Uncontrolled Exposure summary here:

Table: Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Power Density (S) (mW/cm ²)
0.3–1.34	*(100)
1.34–30	*(180/f ²)
30–300	0.2
300–1500	f/1500
1500–100,000	1.0

f = frequency in MHz

* = Plane-wave equivalent power density

4. Conducted RF Output Power (Unit: dBm)

Burst Average Power						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM (GMSK, 1 Tx slot)	31.56	31.53	31.53	28.67	28.67	29.02
GPRS (GMSK, 1 Tx slot) – CS1	31.53	31.53	31.52	28.64	28.64	29.00
GPRS (GMSK, 2 Tx slots) – CS1	31.13	31.13	31.13	28.30	28.31	28.66
GPRS (GMSK, 3 Tx slots) – CS1	29.99	29.96	29.96	27.23	27.20	27.60
GPRS (GMSK, 4 Tx slots) – CS1	29.18	29.17	29.18	26.43	26.41	26.79
Source-Based Time-Averaged Power						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM (GMSK, 1 Tx slot)	22.56	22.53	22.53	19.67	19.67	20.02
GPRS (GMSK, 1 Tx slot) – CS1	22.53	22.53	22.52	19.64	19.64	20.00
GPRS (GMSK, 2 Tx slots) – CS1	25.13	25.13	25.13	22.30	22.31	22.66
GPRS (GMSK, 3 Tx slots) – CS1	25.73	25.70	25.70	22.97	22.94	23.34
GPRS (GMSK, 4 Tx slots) – CS1	26.18	26.17	26.18	23.43	23.41	23.79
Remark: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below: Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB						

Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency (MHz)	826.4	836.4	846.6	1852.4	1880.0	1907.6
RMC 12.2K	23.25	23.03	23.00	22.99	23.22	23.13
HSDPA Subtest-1	23.16	23.00	23.00	22.90	23.21	23.12
HSDPA Subtest-2	22.07	22.08	21.89	22.09	22.41	22.41
HSDPA Subtest-3	21.61	21.59	20.86	21.63	21.90	21.94
HSDPA Subtest-4	21.64	21.57	21.41	21.58	21.81	21.95
HSUPA Subtest-1	21.22	21.03	21.01	20.96	21.25	21.35
HSUPA Subtest-2	20.20	20.02	19.89	19.95	20.26	20.33
HSUPA Subtest-3	20.69	20.54	20.44	20.50	20.82	20.77
HSUPA Subtest-4	21.23	20.54	20.44	21.06	21.27	21.42
HSUPA Subtest-5	22.74	22.67	22.56	22.59	22.83	22.95

5. Radio Frequency Radiation Exposure Evaluation

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna (i.e., 20 cm for this product)

For this device, the calculation is as follows:

WWAN Operating frequency ≤ 1.5GHz

Function	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Source-Based Time-Average Power (dBm)	Source-Based Time-Average Power (mW)	Source-Based Time-Average EIRP (mW)	Source-Based Time-Average ERP (mW)	Calculated RF Exposure (mW/cm ²)	Limit (mW/cm ²)
GSM 850 (1 Tx slot)	824.20	-1.00	0.79	22.56	180.30	143.22	87.30	0.03	0.55
GPRS 850 (1 Tx slot)	824.20	-1.00	0.79	22.53	179.06	142.23	86.70	0.03	0.55
GPRS 850 (2 Tx slots)	824.20	-1.00	0.79	25.13	325.84	258.82	157.76	0.05	0.55
GPRS 850 (3 Tx slots)	824.20	-1.00	0.79	25.73	374.11	297.17	181.13	0.06	0.55
GPRS 850 (4 Tx slots)	824.20	-1.00	0.79	26.18	414.95	329.61	200.91	0.07	0.55
WCDMA Band 5	826.40	-1.00	0.79	23.25	211.35	167.88	102.33	0.03	0.55

WWAN Operating frequency > 1.5GHz

Function	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Source-Based Time-Average Power (dBm)	Source-Based Time-Average Power (mW)	Source-Based Time-Average EIRP (mW)	Calculated RF Exposure (mW/cm ²)	Limit (mW/cm ²)
GSM 1900 (1 Tx slot)	1850.20	1.00	1.26	20.02	100.46	126.47	0.03	1.00
GPRS 1900 (1 Tx slot)	1850.20	1.00	1.26	20.00	100.00	125.89	0.03	1.00
GPRS 1900 (2 Tx slots)	1850.20	1.00	1.26	22.66	184.50	232.27	0.05	1.00
GPRS 1900 (3 Tx slots)	1909.80	1.00	1.26	23.34	215.77	271.64	0.05	1.00
GPRS 1900 (4 Tx slots)	1909.80	1.00	1.26	23.79	239.33	301.30	0.06	1.00
WCDMA Band 2	1907.60	1.00	1.26	23.22	209.89	264.24	0.05	1.00

**Conclusion:**

Per part 2.1091(c), EUT source-based time-averaged ERP < 1.5W for RF operating frequency <= 1.5GHz, EUT source-based time-averaged EIRP < 3W for RF operating frequency > 1.5GHz, routine evaluation of MPE is not required; MPE calculation is sufficient to show compliance. The MPE calculation results indicate that the DUT complies with the RF exposure limit of FCC OET Bulletin 65 Supplement C (Edition 01-01).