



RF Exposure Evaluation Report

APPLICANT : ATrack Technology Inc.
EQUIPMENT : UMTS GPS Vehicle Tracker
BRAND NAME : ATrack
MODEL NAME : AK7
FCC ID : YA7-ATVT1304
FILING TYPE : Certification
STANDARD : OET Bulletin 65 Supplement C (Edition 01-01)

We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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1. Administration Data

1.1. Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
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1.2. Applicant

Company Name	ATrack Technology Inc.
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1.3. Manufacturer

Company Name	ATrack Technology Inc.
Address	3F., No. 88, Sec. 1, Neihu Rd., Neihu Dist., Taipei City 11493 Taiwan (R. O. C.)



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	UMTS GPS Vehicle Tracker
Brand Name	ATrack
Model Name	AK7
FCC ID	YA7-ATVT1304
IMEI Code	358901045493910
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
Antenna Type	Monopole Antenna
Uplink Modulation	GPRS: GMSK EDGE: GMSK / 8PSK WCDMA (Rel 99): QPSK HSDPA (Rel 6): QPSK HSUPA (Rel 6): QPSK
EUT Stage	Identical Prototype

Remark: The above EUT'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. Maximum RF average output power among production units

Average Power (dBm)		
Mode	GSM 850	GSM 1900
GPRS/EDGE (GMSK, 1 Tx slot)	32.5	29.5
GPRS/EDGE (GMSK, 2 Tx slots)	32.5	29.5
GPRS/EDGE (GMSK, 3 Tx slots)	31.5	28.5
GPRS/EDGE (GMSK, 4 Tx slots)	30.5	27.5
EDGE (8PSK, 1 Tx slot)	27	26
EDGE (8PSK, 2 Tx slots)	27	26
EDGE (8PSK, 3 Tx slots)	26	25
EDGE (8PSK, 4 Tx slots)	25	24

Average Power (dBm)		
Mode	WCDMA Band V	WCDMA Band II
RMC 12.2K	23	23
HSDPA Subtest-1	23	23
HSUPA Subtest-5	23	23



5. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

Band: GSM850 Channel	Burst Average Power (dBm)			Frame-Average Power (dBm)		
	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
GPRS (GMSK, 1 Tx slot) – CS1	31.83	31.85	31.79	22.83	22.85	22.79
GPRS (GMSK, 2 Tx slots) – CS1	31.42	31.44	31.43	25.42	25.44	25.43
GPRS (GMSK, 3 Tx slots) – CS1	30.89	30.91	30.91	26.63	26.65	26.65
GPRS (GMSK, 4 Tx slots) – CS1	30.17	30.24	30.21	27.17	27.24	27.21
EDGE (GMSK, 1 Tx slot) – MCS1	31.83	31.83	31.81	22.83	22.83	22.81
EDGE (GMSK, 2 Tx slots) – MCS1	31.43	31.44	31.37	25.43	25.44	25.37
EDGE (GMSK, 3 Tx slots) – MCS1	30.90	30.95	30.91	26.64	26.69	26.65
EDGE (GMSK, 4 Tx slots) – MCS1	30.18	30.22	30.21	27.18	27.22	27.21
EDGE (8PSK, 1 Tx slot) – MCS5	26.25	26.33	26.32	17.25	17.33	17.32
EDGE (8PSK, 2 Tx slots) – MCS5	26.24	26.32	26.31	20.24	20.32	20.31
EDGE (8PSK, 3 Tx slots) – MCS5	25.39	25.49	25.45	21.13	21.23	21.19
EDGE (8PSK, 4 Tx slots) – MCS5	24.19	24.27	24.26	21.19	21.27	21.26

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

Band: GSM1900 Channel	Burst Average Power (dBm)			Frame-Average Power (dBm)		
	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
GPRS (GMSK, 1 Tx slot) – CS1	28.93	29.06	28.70	19.93	20.06	19.70
GPRS (GMSK, 2 Tx slots) – CS1	28.92	29.03	28.70	22.92	23.03	22.70
GPRS (GMSK, 3 Tx slots) – CS1	28.11	28.19	27.87	23.85	23.93	23.61
GPRS (GMSK, 4 Tx slots) – CS1	26.93	27.03	26.72	23.93	24.03	23.72
EDGE (GMSK, 1 Tx slot) – MCS1	28.96	29.04	28.71	19.96	20.04	19.71
EDGE (GMSK, 2 Tx slots) – MCS1	28.92	29.03	28.71	22.92	23.03	22.71
EDGE (GMSK, 3 Tx slots) – MCS1	28.11	28.20	27.88	23.85	23.94	23.62
EDGE (GMSK, 4 Tx slots) – MCS1	26.94	27.01	26.73	23.94	24.01	23.73
EDGE (8PSK, 1 Tx slot) – MCS5	25.16	25.25	24.97	16.16	16.25	15.97
EDGE (8PSK, 2 Tx slots) – MCS5	25.32	25.43	25.13	19.32	19.43	19.13
EDGE (8PSK, 3 Tx slots) – MCS5	24.56	24.69	24.40	20.30	20.43	20.14
EDGE (8PSK, 4 Tx slots) – MCS5	23.40	23.54	23.24	20.40	20.54	20.24

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB



<WCDMA Conducted Power>

Band		WCDMA V			WCDMA II		
TX Channel		4132	4182	4233	9262	9400	9538
Rx Channel		4357	4407	4458	9662	9800	9938
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880	1907.6
3GPP Rel 99	RMC 12.2Kbps	22.78	22.56	22.60	22.45	22.98	22.47
3GPP Rel 6	HSDPA Subtest-1	22.76	22.56	22.60	22.40	22.97	22.44
3GPP Rel 6	HSDPA Subtest-2	22.30	22.11	22.13	21.88	22.38	21.91
3GPP Rel 6	HSDPA Subtest-3	21.84	21.66	21.69	21.69	22.16	21.72
3GPP Rel 6	HSDPA Subtest-4	21.78	21.62	21.64	21.45	21.98	21.44
3GPP Rel 6	HSUPA Subtest-1	21.98	21.78	21.81	21.70	22.12	21.65
3GPP Rel 6	HSUPA Subtest-2	20.05	19.83	19.83	19.82	19.85	19.40
3GPP Rel 6	HSUPA Subtest-3	20.75	20.55	20.58	20.53	20.97	20.45
3GPP Rel 6	HSUPA Subtest-4	20.36	20.05	20.06	19.95	20.45	19.95
3GPP Rel 6	HSUPA Subtest-5	22.13	21.91	21.93	21.78	22.23	21.70
3GPP MPR specification		WCDMA V			WCDMA II		
0	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00
0	HSDPA Subtest-2	0.46	0.45	0.47	0.52	0.59	0.53
≤ 0.5	HSDPA Subtest-3	0.92	0.90	0.91	0.71	0.81	0.72
≤ 0.5	HSDPA Subtest-4	0.98	0.94	0.96	0.95	0.99	1.00
≤ 0	HSUPA Subtest-1	0.15	0.13	0.12	0.08	0.11	0.05
≤ 2	HSUPA Subtest-2	2.08	2.08	2.10	1.96	2.38	2.30
≤ 1	HSUPA Subtest-3	1.38	1.36	1.35	1.25	1.26	1.25
≤ 2	HSUPA Subtest-4	1.77	1.86	1.87	1.83	1.78	1.75
≤ 0	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00



6. 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 = 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

For this device, the calculation is as follows:

WWAN Operating frequency <= 1.5GHz

Table with 9 columns: Mode, Frequency (MHz), Antenna Gain (dBi), Antenna Gain (numeric), Average Power (dBm), Average Power (mW), Average ERP (mW), Calculated RF Exposure (mW/cm2), Limit (mW/cm2). Rows include GPRS 850 (1-4 Tx slots) and WCDMA Band 5.

WWAN Operating frequency > 1.5GHz

Table with 9 columns: Mode, Frequency (MHz), Antenna Gain (dBi), Antenna Gain (numeric), Average Power (dBm), Average Power (mW), Average EIRP (mW), Calculated RF Exposure (mW/cm2), Limit (mW/cm2). Rows include GPRS 1900 (1-4 Tx slots) and WCDMA Band 2.

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 EUT complies with the RF exposure limit of FCC OET Bulletin 65 Supplement C (Edition 01-01).