

RF Exposure evaluation

Product Name : GPS Tracker
Brand Name : Trackimo, Tracki
Model : TK12
Series Model : N/A
FCC ID : 2AAI6-TK12
Applicant : **Trackimo INC.**
Address : 680 Central Ave, suite 108, Cedarhurst, New York 11516,USA
Manufacturer : **Trackimo INC.**
Address : 680 Central Ave, suite 108, Cedarhurst, New York 11516,USA
Standard(s) : 47CFR §1.1310, 47CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt : Oct. 21, 2024
Date of Test : Oct. 21, 2024~ May 21, 2025
Issued Date : May 22, 2025

Issued By: **Guangdong Asia Hongke Test Technology Limited**

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Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.

Guangdong Asia Hongke Test Technology Limited

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Report Revise Record

Report Version	Issued Date	Notes
M1	May 22, 2025	Initial Release

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1 GENERAL INFORMATION

1.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

1.2 General Description of EUT

Product Name:	GPS Tracker
Model/Type reference:	TK12
Serial Model:	N/A
Power Supply:	DC 3.70V from battery
Hardware Version:	TK12_V0.1
Software Version:	N/A
Sample(s) Status:	AiTSZ-241021022-1(Normal sample) AiTSZ-241021022-2(Engineer sample)
LTE:	
Operation Band:	FDD-LTE: Band 2/4/5/7/12/17/25/26a/26b TDD-LTE: Band 41
Support Bandwidth:	Band 2: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz, <input checked="" type="checkbox"/> 15MHz, <input type="checkbox"/> 20MHz Band 4: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz, <input checked="" type="checkbox"/> 15MHz, <input type="checkbox"/> 20MHz Band 5: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz Band 7: <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz, <input checked="" type="checkbox"/> 15MHz, <input checked="" type="checkbox"/> 20MHz Band 12: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz Band 17: <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz Band 25: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz, <input checked="" type="checkbox"/> 15MHz, <input type="checkbox"/> 20MHz Band 26a: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz Band 26b: <input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz, <input checked="" type="checkbox"/> 15MHz Band 41: <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz, <input checked="" type="checkbox"/> 15MHz, <input checked="" type="checkbox"/> 20MHz
Frequency Range:	Band 2:uplink 1850MHz to 1910MHz; downlink 1930MHz to 1990MHz Band 4:uplink 1710MHz to 1755MHz; downlink 2110MHz to 2155MHz Band 5:uplink 824MHz to 849MHz; downlink 869MHz to 894MHz Band 7:uplink 2500MHz to 2570MHz; downlink 2620MHz to 2690MHz Band 12:uplink 699MHz to 716MHz; downlink 729MHz to 746MHz Band 17:uplink 704MHz to 716MHz;downlink 734MHz to 746MHz Band 25:uplink 1850MHz to 1915MHz;downlink 1930MHz to 1995MHz Band 26a:uplink 814MHz to 824MHz; downlink 859MHz to 869MHz Band 26b:uplink 824MHz to 849MHz; downlink 869MHz to 894MHz Band 41:uplink 2555MHz to 2655MHz;downlink 2555MHz to 2655MHz
Power Class:	Power Class 3
Modulation Type:	QPSK, 16QAM
Antenna type:	PIFA Antenna

Antenna gain:	LTE Band 2: 2.12 dBi; LTE Band 4: 3.24dBi; LTE Band 5: -13.91dBi; LTE Band 7: 0.36 dBi, LTE Band 12: -17.81dBm; LTE Band 17: -17.81dBi; LTE Band 25: 2.12dBi; LTE Band 26: -13.91dBi;LTE Band 41: 0.36dBi
2.4G WIFI:	
Supported type:	802.11b/802.11g /802.11n(HT20)/802.11n(HT40)
Modulation:	802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11n(H40): 2422MHz~2452MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11n(H40): 7
Channel separation:	5MHz
Antenna type:	PIFA Antenna
Antenna gain:	5.23dBi
Bluetooth LE:	
Supported type:	Bluetooth LE 1M
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PIFA Antenna
Antenna gain:	2.72dBi
Remark: The above DUT's information was declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual..	

1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited

B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified or accredited by the following organizations:

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Guangdong Asia Hongke Test Technology Limited's quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	150KHz~30MHz ± 1.20 dB	(1)
Radiated Emission	9KHz~30Hz ± 3.10 dB	(1)
Radiated Emission	9KHz~1GHz ± 3.75 dB	(1)
Radiated Emission	1GHz~18GHz ± 3.88 dB	(1)
Radiated Emission	18GHz-40GHz ± 3.88 dB	(1)
RF power, conducted	30MHz~6GHz ± 0.16 dB	(1)
RF power density, conducted	± 0.24 dB	(1)
Spurious emissions, conducted	± 0.21 dB	(1)
Temperature	$\pm 1^\circ\text{C}$	(1)
Humidity	$\pm 3\%$	(1)
DC and low frequency voltages	$\pm 1.5\%$	(1)
Time	$\pm 2\%$	(1)
Duty cycle	$\pm 2\%$	(1)
Bandwidth	$\pm 1.5 \times 10^{-6}$	(1)

The report uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

2 Method of measurement

2.1 Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

FCC KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures

2.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

2.3 MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

2.4 Manufacturing Tolerance

WWAN

Band	Target Power (dBm)	Tolerance (dBm)
LTE BAND 2	23.0	+1/-2dBm
LTE BAND 4	23.5	+1/-2dBm
LTE BAND 5	23.0	+1/-2dBm
LTE BAND 7	22.0	+1/-2dBm
LTE BAND 12	23.0	+1/-2dBm
LTE BAND 17	23.0	+1/-2dBm
LTE BAND 25	25.0	+1/-2dBm
LTE BAND 26	23.0	+1/-2dBm
LTE BAND 41	23.0	+1/-2dBm

WIFI 2.4G

Mode	Channel	Target Power PK (dBm)	Tolerance (dBm)
802.11b	1	14	±1
	6	14	±1
	11	14	±1
802.11g	1	16	±1
	6	16	±1
	11	16	±1
802.11n-HT20	1	15	±1
	6	15	±1
	11	15	±1
802.11n-HT40	3	18	±1
	6	18	±1
	9	18	±1

BLE

Mode	Channel	Target Power
BLE 1M	0	2±1 dBm
	19	2±1 dBm
	39	2±1 dBm

2.5 MPE Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r = 20\text{cm}$, as well as the gain of the used antenna is refer to section 2.2, the RF power density can be obtained.

Standalone Evaluation

WWAN

Modulation Type	Output power with tune_up		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)	radio
	dBm	mW					
LTE BAND 2	24	251.1886	2.12	1.6293	0.08142	1.0000	0.0814
LTE BAND 4	24.5	281.8383	3.24	2.1086	0.11823	1.0000	0.1182
LTE BAND 5	24	251.1886	-13.91	0.0406	0.00203	0.5577	0.0036
LTE BAND 7	23	199.5262	0.36	1.0864	0.0431	1.0000	0.0431
LTE BAND 12	24	251.1886	-17.81	0.0166	0.0008	0.4717	0.0017
LTE BAND 17	24	251.1886	-17.81	0.0166	0.0008	0.4733	0.0017
LTE BAND 25	26	398.1072	2.12	1.6293	0.12904	1.0000	0.1290
LTE BAND 26	24	251.1886	-13.91	0.0406	0.00203	0.5577	0.0036
LTE BAND 41	24	251.1886	0.36	1.0864	0.05429	1.0000	0.0543

2.4GHz WLAN

Modulation Type	Output power with tune_up		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)	radio
	dBm	mW					
2.4G WIFI	19	79.4328	5.23	3.3343	0.0527	1.0000	0.0527
BLE	3	1.9953	2.72	1.8707	0.0007	1.0000	0.0007

Remark:

1. Output power (Peak) including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

simultaneous transmission Evaluation

The EUT have three type RF transmitters, WWAN(4G), WLAN(Wi-Fi), BLE, and they can transmit simultaneously, if the sum of the ratios of all individual transmitters is less than 1, the simultaneously transmit can be exempt.

$$\text{SUM}_{\text{ratios}} = \text{Max. radio of LTE} + \text{Max. radio of WIFI} + \text{Max. radio of BLE} = 0.1290 + 0.0527 + 0.0007 = 0.1824 < 1.$$

2.6 Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

***** End of Report *****