RF Exposure Report

Report No.: AGC15705230930FH01

FCC ID	:	2BCO8-TF15EX-RID
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	GPS OBSTACLE AVOIDANCE DRONE
BRAND NAME	:	TRIPLEFINE
MODEL NAME	:	TF15-EX, TF770
APPLICANT	:	Guangzhou Xingde Industrial Development Co., LTD
DATE OF ISSUE	:	Oct. 19, 2023
STANDARD(S)	:	FCC Part 2 Subpart J §2.1091
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 19, 2023	Valid	Initial Release

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Table of Contents

1. General Information **4**
2. Product Information **5**
2.1 Product Technical Description 5
3. Test Environment **6**
3.1 Address Of The Test Laboratory 6
3.2 Test Facility 6
3.3 Environmental Conditions 7
4. Portable Device Evaluation Method and Limit **8**
5. Mobile Device Evaluation Method and Limit **9**
6. Measurement Results **10**
7. Measurement Evaluation **10**

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1. General Information

Applicant	Guangzhou Xingde Industrial Development Co., LTD
Address	Room 301, No. 2, Yingcai Street, Tianhe District, Guangzhou City, Guangdong province, China
Manufacturer	HK TECH SCIENCE&TECHNOLOGY CO., LTD
Address	Chenghai District Laimeilu South Union Industrial Park B District 4 South Building, Shantou City, Guangdong Province, China
Factory	Guangzhou Xingde Industrial Development Co., LTD
Address	Room 301, No. 2, Yingcai Street, Tianhe District, Guangzhou City, Guangdong province, China
Product Designation	GPS OBSTACLE AVOIDANCE DRONE
Brand Name	TRIPLEFINE
Test Model	TF15-EX
Series Model(s)	TF770
Difference Description	All the series models are the same as the test model except for the model names, the color of appearance and the packing.
Date of receipt of test item	Sep. 12, 2023
Date of Test	Sep. 12, 2023 - Oct.19, 2023
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-RF Exposure-V1

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By	Bibo Zhang (Project Engineer)	Oct. 19, 2023
Reviewed By	Calvin Liu (Reviewer)	Oct. 19, 2023
Approved By	Max Zhang Authorized Officer	Oct. 19, 2023

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2. Product Information

2.1 Product Technical Description

Frequency Band (Operating)	☐WLAN: 2.412GHz ~ 2.462GHz ☒WLAN: 5.18GHz ~ 5.24GHz ☐WLAN: 5.26GHz ~ 5.32GHz/ 5.5GHz~5.7GHz/ 5.745GHz ~ 5825GHz ☒Bluetooth: 2.402GHz ~ 2.480GHz ☐Other:
Hardware Version	V1.0
Software Version	V1.0
Modulation Type	5G WLAN: 802.11a/n:(64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11ac :(256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDM BT_BLE: GFSK
Device Category	☐Portable (<20cm separation) ☒Mobile (≥ 20cm separation) ☐Others:
Antenna Diversity	☐Single antenna ☒Multiple antennas ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Antenna Designation	5G WLAN: Copper tube Antenna BT_BLE: PCB Antenna
Antenna Gain	BT_BLE: 1.74dBi 5G WLAN: 2.4dBi
Minimum Assessment Distance	20cm
Evaluation Applied	☒MPE Evaluation ☐SAR Evaluation

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3. Test Environment

3.1 Address Of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

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

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow 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.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory 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 with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 Environmental Conditions

	NORMAL CONDITIONS
Temperature range (℃)	15 - 35
Relative humidity range	20 % - 75 %
Pressure range (kPa)	86 - 106
Power supply	DC 11.4V
Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.	

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4. Portable Device Evaluation Method and Limit

Following FCC KDB 447498 D01 “General SAR test exclusion guidance” The corresponding SAR Exclusion Threshold condition, listed below:

- The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤50 mm are determined by:
  - [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] [√ f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where
  - f(GHz) is the RF channel transmit frequency in GHz.
  - Power and distance are rounded to the nearest mW and mm before calculation.
  - The result is rounded to one decimal place for comparison The test exclusions are applicable only when the minimum test separation distance is ≤50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

- At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:

  - [Threshold at 50 mm in step 1) + (test separation distance - 50mm) (f(MHz)/150)] mW, at 100MHz to 1500 MHz;
  - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)-10] mW at > 1500 MHz and ≤6 GHz;

- At frequencies below 100 MHz, the following may be considered for SAR test exclusion.

  - The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by [1 + log(100/f(MHz))] for test separation distances > 50 mm and < 200 mm.
  - The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by 1/2 for test separation distances ≤ 50 mm.
  - SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

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5. Mobile Device Evaluation Method and Limit

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

Limits For General Population / Uncontrolled Exposure

Frequency Range (MHz)	E-field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (Minutes)
0.3 -- 1.34	614	1.63	(100)*	30
1.34 -- 30	824/f	2.19/f	($180/f^2$)*	30
30 -- 300	27.5	0.073	0.2	30
300 -- 1500	--	--	f/1500	30
1500 -- 100,000	--	--	1.0	30

*Note:

1. f= Frequency in MHz * Plane-wave Equivalent Power Density
2. The averaging time for General Population/Uncontrolled exposure to fixed transmitters is not applicable for mobile and portable transmitters. See 47 CFR §§2.1091 and 2.1093 on source-based time-averaging requirement for mobile and portable transmitters.

The calculation formula of MPE measurement is as follows:

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

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6. Measurement Results

A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be at least 20 cm and fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated.

Test Mode	Test Frequency (MHz)	Antenna Gain (linear)	Max.Output Power (dBm)	Max.Output Power (mW)	Power Density (mW/cm^2)	Measurement Limit (mW/cm^2)
BT	2440	1.49	4.581	2.871	0.0009	1
5G WLAN ANT 1	5180	1.74	10.97	12.503	0.0043	1
5G WLAN ANT 2	5180	1.74	12.74	18.793	0.0065	1
5G WLAN MIMO	5180	1.74	14.39	27.479	0.0095	1

Simultaneous transmission of:

Test Mode	**Test Frequency (MHz)**	**Antenna Gain (linear)**	**Max.Output Power (dBm)**	**Max.Output Power (mW)**	**Power Density (mW/cm^2)**	**Measurement Limit (mW/cm^2)**
BT	2440	1.49	4.581	2.871	0.0009	1
5G WLAN MIMO	5180	1.74	14.39	27.479	0.0095	1

1. Only the worst case recorded.
2. The BT and 5G WIFI can transmit simultaneously：0.0009/1 +0.0095/1=0.0104<1
3. According to the user manual, the minimum separate distance which used for MPE calculate is 20cm

8. Measurement Evaluation

The equipment meets MPE measurement evaluation requirements.

-----End of Report-----

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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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