



RF TEST REPORT

Product Name: High Precision GNSS Receiver

Model Name: T30, Tbase, T30Pro

FCC ID: 2BCUE-T30

Issued For : Guangzhou TokSurvey Information Technology Co.,Ltd
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China(office only)

Issued By : Shenzhen LGT Test Service Co., Ltd.
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TEST REPORT CERTIFICATION

Applicant: Guangzhou TokSurvey Information Technology Co.,Ltd

Address: No. 9, Caipin Road, Room 902-3, Huangpu District, Guangzhou, China(office only)

Manufacturer: Guangzhou TokSurvey Information Technology Co.,Ltd

Address: No. 9, Caipin Road, Room 902-3, Huangpu District, Guangzhou, China(office only)

Product Name: High Precision GNSS Receiver

Trademark: TOKNAV

Model Name: T30, Tbase, T30Pro

Sample Status: Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR §2.1091 KDB 447498 D01 General RF Exposure Guidance v06	PASS

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Revision History

Rev.	Issue Date	Revisions
00	Dec. 18, 2024	Initial Issue



1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF THE EUT

Product Name:	High Precision GNSS Receiver	
Trademark:	TOKNAV	
Model Name:	T30, Tbase, T30Pro	
Model Difference:	Tbase has one less laser module and AR module than T30, and T30Pro has one less laser module and one more IS module than T30, (IS module and AR module refer to two cameras for image measurement and lofting), the model name is different, and the principle diagram is the same.	
Frequency Bands:	GSM	GSM 850: 824 MHz ~ 849MHz GSM 1900: 1850 MHz ~ 1910MHz
	WCDMA	WCDMA Band V: 824 MHz ~ 849 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz
	LTE	FDD LTE Band 2:1850~1910MHz FDD LTE Band 4:1710~1755MHz FDD LTE Band 5: 824~849MHz FDD LTE Band 7:2500~2570MHz FDD LTE Band 12: 699-716MHz FDD LTE Band 13: 777-787MHz FDD LTE Band 25: 1850-1915MHz FDD LTE Band 26: 814-824MHz FDD LTE Band 38: 2570-2620MHz FDD LTE Band 41: 2496-2690MHz
	Bluetooth	2402-2480MHz
	2.4G WLAN	802.11b/g/n(20MHz): 2412~2462MHz 802.11n(40MHz):2422~2452MHz
Adapter:	Input: 100-240V 50/60Hz 0.8A Max Output: 3.3-11.0V 2.72A 29.92W or 5.0V 3.0A 15.0W or 9.0V 3.0A 27.0W or 12.0V 2.5A 30.0W or 15.0V 2.0A 30.0W	
Battery:	Capacity: 13800mAh Rated Voltage: 7.2V	
Hardware Version:	Tbase-PCBA.1.1	
Software Version:	N/A	



1.2 TEST LABORATORY

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China
Accreditation Certificate	A2LA Certificate No.: 6727.01
	FCC Registration No.: 746540
	CAB ID: CN0136



2. FCC 47CFR §2.1091 REQUIREMENT

2.1 TEST STANDARDS

The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The gain of the antennas used in the product is extracted from the Antenna data sheets provided and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis Transmission formula is far field assumption, the calculated result of that is an over-prediction for near field power density. It is taken as worst case to specify the safety range.

2.2 LIMIT

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

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)
Limits for Occupational / controlled Exposures			
0.3-3.0	614	1.63	*(100)
3.0-30	1842/f	4.89/f	*(900/f ²)
30-300	61.4	0.163	1.0
300 - 1500	--	--	F/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
0.3-1.34	614	1.63	*(100)
1.34-30	824/f	2.19/f	*(180/f ²)
30-300	27.5	0.073	0.2
300 - 1500	--	--	F/1500
1500 – 100000	--	--	1.0

F= Frequency in MHz

* = Plane-wave equivalent power density.

Friss Formula

Friss Transmission Formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = Distance between observation point and the center of radiator in cm

If we know the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value at distance 20cm.



2.3 EUT OPERATION CONDITION

EUT was enabled to transmit and receive at lowest, middle and highest channels.

2.4 CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance from the antenna should be included in the User manual. So, this device is classified as Mobile device.



2.5 TEST RESULT

Turn up Result

Mode	Turn up Power
GSM 850	33±1dBm
GSM 1900	30±1dBm
WCDMA B2	20±1dBm
WCDMA B4	21±1dBm
WCDMA B5	23±1dBm
LTE B2	20.5±1dBm
LTE B4	21±1dBm
LTE B5	23.5±1dBm
LTE B7	22.5±1dBm
LTE B12	24±1dBm
LTE B13	23±1dBm
LTE B25	21±1dBm
LTE B26	23±1dBm
LTE B38	19.5±1dBm
LTE B41	20±1dBm
BT-GFSK	1±1dBm
BT- $\pi/4$ -DQPSK	1.5±1dBm
BT-8DPSK	2±1dBm
BLE-GFSK	1±1dBm
2.4G WIFI-802.11b	15±1dBm
2.4G WIFI-802.11g	14±1dBm
2.4G WIFI-802.11n(HT20)	12±1dBm
2.4G WIFI-802.11n(HT40)	12±1dBm



The MPE result of worst mode:

RF Function	Frequency (MHz)	Max Turn up Power (dBm)	Duty cycle factor	Max Power (dBm)	Max Power (mW)	ANT Gain (dBi)	ANT Gain (gain of antenna in linear scale)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio	Result
GSM (1Slot)	848.8	34	-9.03	24.97	314.05	1	1.26	0.079	0.566	0.139	Pass
WCDMA	846.6	24	0	24	251.19	1	1.26	0.063	0.564	0.112	Pass
LTE	707.5	25	-1.99	23.01	199.99	1	1.26	0.050	1	0.050	Pass

RF Function	Frequency (MHz)	Max Turn up Power (dBm)	Max Turn up Power (mW)	ANT Gain (dBi)	ANT Gain (gain of antenna in linear scale)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio	Result
BLE	2402	2.00	1.58	1	1.26	0.0004	1	0.0004	Pass
BT	2402	3.00	2.00	1	1.26	0.0005	1	0.0005	Pass
2.4G WIFI	2437	16.00	39.81	1	1.26	0.0100	1	0.0100	Pass

The max MPE of simultaneous transmission:

$$\text{GSM}(0.139) + 2.4\text{G WIFI}(0.0100) = 0.149 < 1$$

Note:

1. The Bluetooth and WLAN can't simultaneous transmission at the same time.
2. The Maximum Power Density is less than the limit, complies with the exemption requirements.

※※※※※END OF THE REPORT※※※※※