RF Exposure Evaluation Report

Report No.:	RWAQ202400248B
Applicant:	VarioTek GmbH
Address:	Wiesenstrasse 21A 40549 Duesseldorf,Germany
Product Name:	Asset GPS Tracker
Product Model:	EverFind
Multiple Models:	TL-60
Trade Mark:	trackilive
FCC ID:	2BFC3-TL-60
Standards:	47 CFR §1.1307 KDB 447498 D04 Interim General RF Exposure Guidance v01
Test Date:	2024-03-21
Test Result:	Complied
Report Date:	2024-03-26

Reviewed by:	Frank Yin	**Approved by:**	Jacob Kong
	Frank Yin Project Engineer		Jacob Kong Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

NVLAP TESTING NVLAP LAB CODE 600335-0

ilac-MRA

This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★"

Announcement

1. This test report shall not be reproduced in full or partial, without the written approval of World Alliance Testing & Certification (Shenzhen) Co., Ltd

2. The results in this report apply only to the sample tested.

3. This sample tested is in compliance with the limits of the above regulation.

4. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

5. The information marked "#" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

Revision History

Version No.	Issued Date	Description
00	*2024-03-26*	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	VarioTek GmbH
Address:	Wiesenstrasse 21A 40549 Duesseldorf,Germany
Manufacturer:	VarioTek GmbH
Address:	Wiesenstrasse 21A 40549 Duesseldorf,Germany

1.2 Product Description of EUT

The EUT is Asset GPS Tracker contains a certified Wi-Fi module(FCC ID: 2AQ5K-M169) and a certified WWAN module(FCC ID: XMR201707BG96).

Sample Serial Number	6U-1 (assigned by WATC)
Sample Received Date	2024-03-18
Sample Status	Good Condition
Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Cat M1 / NB-IoT: Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) Band 4: 1710-1755MHz(TX); 2110-2155MHz(RX) Band 5: 824-849MHz(TX); 869-894MHz(RX) Band 12: 699-716MHz(TX); 729-746MHz(RX) Band 13: 777-787MHz(TX); 746-756MHz(RX) Band 26: 814-849MHz(TX); 859-894MHz(RX) 2.4G Wi-Fi: 2412-2462/2422-2452MHz (TX/RX)
Modulation Technology	GSM: GMSK, 8PSK LTE Cat M1 / NB-IoT: BPSK, QPSK, 16QAM 2.4G Wi-Fi: DSSS, OFDM
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain#	GSM 850/LTE Band 5/26: 3.27dBi; PCS 1900/LTE Band 2: 2.71dBi Band 4: 0.32dBi; Band 12: 3.13dBi; Band 13: 3.52dBi; 2.4G Wi-Fi: 0dBi
Power Supply	DC 4.5V from Battery
Operating temperature#	-20 deg.C to +60 deg.C
Adapter Information	N/A
Modification	Sample No Modification by the test lab

1.3 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

2 RF Exposure Evaluation

2.1 Standard

According to §1.1307(b)(3)(i), For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right)$$ and f is in GHz;

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C)—Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3–1.34	1,920 R^2.
1.34–30	3,450 R^2/f^2.
30–300	3.83 R^2.
300–1,500	0.0128 R^2f.
1,500–100,000	19.2R^2.

According to §1.1307(b)(3)(ii), For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

2.2 Result

Single RF source:

Option B:

Radio	Frequency (MHz)	Distance (mm)	P_{th} (mW)	Maximum Conducted Power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	The Greater of Conducted Power or ERP		Result Option B
						dBm	mW	
2.4G Wi-Fi	2412-2462	200	3060	18	0	15.85	38.46	exempt
GSM 850	824-849	200	1680	23.97	3.27	25.09	322.85	exempt
GSM 1900	1850-1910	200	3060	20.97	2.71	21.53	142.23	exempt
LTE Cat M1 B2	1850-1910	200	3060	24	2.71	24.56	285.76	exempt
LTE Cat M1 B4	1710-1755	200	3060	23	0.32	21.17	130.92	exempt
LTE Cat M1 B5	824-849	200	1680	24	3.27	25.12	325.09	exempt
LTE Cat M1 B12	699-716	200	1425	24	3.13	24.98	314.77	exempt
LTE Cat M1 B13	777-787	200	1585	24	3.52	25.37	344.35	exempt
LTE Cat M1 B26	814-824	200	1660	24	3.27	25.12	325.09	exempt
LTE NB-IoT B2	1850-1910	200	3060	25	2.71	25.56	359.75	exempt
LTE NB-IoT B4	1710-1755	200	3060	25	0.32	23.17	207.49	exempt
LTE NB-IoT B5	824-849	200	1680	25	3.27	26.12	409.26	exempt
LTE NB-IoT B12	699-716	200	1425	25	3.13	25.98	396.28	exempt
LTE NB-IoT B13	777-787	200	1585	25	3.52	26.37	433.51	exempt
LTE NB-IoT B26	814-824	200	1660	25	3.27	26.12	409.26	exempt

Note:

1. The EUT contains a certified Wi-Fi module(FCC ID: 2AQ5K-M169), the turn up power and antenna gain was refer the module report.

2. The EUT contains a certified WWAN module(FCC ID: XMR201707BG96) , the turn up power was refer the module report, and the antenna gain was provided by manufacturer.

Multiple RF sources transmission simultaneously consider:

According to applicant, the 2.4G Wi-Fi and WWAN can transmission simultaneously.

The Worst case is 2.4G Wi-Fi + LTE NB IoT Band 12

The ratio=38.46/3060+396.28/1425=0.291<1.0

Result: Complied

---End of Report---