

RF Exposure Evaluation Report

Applicant: Aratek Biometrics Co., Ltd.

Address of Applicant: 2F, T2-A Building, ShenZhen Software Park South Area, Hi-Tech Park

Equipment Under Test (EUT)

Product Name: Automated Election Device

Model No.: VC33, BD1300

Trade mark: Aratek

FCC ID: 2AGUJ-VC331

Applicable standards: FCC CFR Title 47 Part 2 Subpart J Section 2.1091

Date of sample receipt: 12 Jan., 2022

Date of Test: 13 Jan., to 13 Feb., 2022

Date of report issue: 22 Feb., 2022

Test Result: PASS*

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	14 Feb., 2022	Original
01	22 Feb., 2022	1. Update page 7 2. add model

Tested by: Mike OU
Test Engineer

Date: 22 Feb., 2022

Reviewed by: Winner Zhang
Project Engineer

Date: 22 Feb., 2022

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4 General Information

4.1 Client Information

Applicant:	Aratek Biometrics Co., Ltd.
Address:	2F, T2-A Building, ShenZhen Software Park South Area, Hi-Tech Park
Manufacturer:	Aratek Biometrics Co., Ltd.
Address:	2F, T2-A Building, ShenZhen Software Park South Area, Hi-Tech Park
Factory:	Aratek Biometrics Co., Ltd.
Address:	Block 4, 1st Industrial Park of Nan Gang, 1029# Song Bai Road of Bai Mang, Nan Shan District, Shenzhen 518055, China.

4.2 General Description of E.U.T.

Product Name:	Automated Election Device		
Model No.:	VC33, BD1300		
Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz		
	5.2G Wi-Fi Band 1: 5180MHz~5240MHz		
	Bluetooth/BLE: 2402MHz~2480MHz		
	2G	GSM 850: 824.20MHz~848.80MHz	PCS1900: 1850.20MHz~1909.80MHz
	3G	Band II: 1852.4 MHz~1907.6 MHz	Band V: 826.4MHz~846.6MHz
4G	Band 2: 1850MHz~1990MHz	Band 4: 1710MHz~2155MHz	
	Band 5: 824MHz~894MHz	Band 7: 2500MHz~2690MHz	
Modulation technology:	802.11b: DSSS, 802.11a/g/n/ac: OFDM Bluetooth BDR /BLE: GFSK, Bluetooth EDR: $\pi/4$ -DQPSK, 8DPSK 2G: Voice(GMSK), GPRS(GMSK) 3G: RMC(QPSK), HSUPA(QPSK) , HSDPA(QPSK,16QAM) 4G: QPSK, 16QAM, 64QAM		
Antenna Type:	Internal Antenna		
Antenna gain:	BT/BLE: 1.3 dBi; 2.4GWi-Fi: 1.3 dBi; 5.2GWi-Fi: 1.3 dBi;		
	2G: GSM 850: 0.6 dBi; PCS 1900: 1.0 dBi		
	3G: Band II: 1.0 dBi; Band V: 0.6 dBi		
	4G: Band 2: 1.0 dBi; Band 4: 1.0 dBi; Band 5: 0.5 dBi; Band 7: 1.2 dBi		
Remark:	Model No.: VC331, BD1300 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.		
Test Sample Condition:	The test samples were provided in good working order with no visible defects.		

4.3 Operating Modes

Operating mode	Detail description
BLE mode	Keep the EUT in continuously transmitting in BLE mode
BT mode	Keep the EUT in continuously transmitting in BT mode
2.4G WIFI mode	Keep the EUT in continuously transmitting in 2.4G WIFI mode
5G WIFI mode	Keep the EUT in continuously transmitting in 5G WIFI mode
2G mode	Keep the EUT in continuously transmitting in 2G mode
3G mode	Keep the EUT in continuously transmitting in 3G mode
4G mode	Keep the EUT in continuously transmitting in 4G mode

4.4 Additions to, deviations, or exclusions from the method

No

4.5 Laboratory Facility

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

● **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

4.6 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

5 Technical Requirements Specification in FCC CFR Title 47 Part 2.1091

5.1 Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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

5.2 Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

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

R = distance to the centre of radiation of the antenna

5.3 Result

Frequency (MHz)	Maximum Output power (dBm)	Maximum Output power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm ²)	Limits for General Population/ Uncontrolled Exposure (mW/cm ²)
2.4G Wi-Fi							
2437	14.94	31.189	1.3	1.35	30.00	0.0037	1.0
5.2G Wi-Fi							
5180	8.43	6.966	1.3	1.35	30.00	0.0008	1.0
BT							
2480	10.139	10.325	1.3	1.35	30.00	0.0012	1.0
BLE							
2442	-2.844	0.520	1.3	1.35	30.00	0.0001	1.0
2G							
850	34	2511.886	0.6	1.15	30.00	0.2550	0.57
1900	31.31	1352.073	1.0	1.26	30.00	0.1505	1.0
3G							
1907.60	24.27	267.301	1.0	1.26	30.00	0.0298	1.0
846.60	25	316.228	0.6	1.15	30.00	0.0321	0.56
4G							
1907.40	24.4	275.423	1.0	1.26	30.00	0.0307	1.0
1754.30	24.61	289.068	1.0	1.26	30.00	0.0322	1.0
836.50	24.94	311.889	0.5	1.12	30.00	0.0309	0.56
2502.50	22.66	184.502	1.2	1.32	30.00	0.0215	1.0

Simultaneous Transmission Evaluation:

Simultaneous Transmission Mode	Band	Result (mW/cm ²)	Result Ratio	Total Ratio	Simultaneous Transmission Ratio Limit
GSM & Wi-Fi	850MHz	0.2550	0.4473	0.71	1.0
	2.4G Wi-Fi	0.0037	0.0037		
GSM & BT	850MHz	0.2550	0.4473	0.71	1.0
	BT	0.0012	0.0012		
WCDMA & Wi-Fi	846.60 MHz	0.0321	0.0573	0.10	1.0
	2.4G Wi-Fi	0.0037	0.0037		
WCDMA & BT	846.60 MHz	0.0321	0.0573	0.09	1.0
	BT	0.0012	0.0012		
LTE & Wi-Fi	836.50 MHz	0.0309	0.0552	0.09	1.0
	2.4G Wi-Fi	0.0037	0.0037		
LTE & BT	836.50 MHz	0.0309	0.0552	0.09	1.0
	BT	0.0012	0.0012		

Note: Simultaneous Transmission Evaluation: GSM & 2.4G Wi-Fi, GSM & 5.2G Wi-Fi, GSM & BT; WCDMA & 2.4G Wi-Fi, WCDMA & 5.2G Wi-Fi, WCDMA & BT; LTE & 2.4G Wi-Fi, LTE & 5.2G Wi-Fi, LTE & BT. Just the worst case mode was shown in report.

5.4 Conclusion

The device is exempt from the SAR test and satisfies RF exposure evaluation.

-----End of report-----