

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : OT-196-RWD-011
AGR No. : A192A-017
Applicant : BIOLOG DEVICE
Address : 3F, 64-10, Dongtangiheung-ro, Dongtan-myeon, Hwaseong-si, Gyeonggi-do, Korea
Manufacturer : BIOLOG DEVICE
Address : 3F, 64-10, Dongtangiheung-ro, Dongtan-myeon, Hwaseong-si, Gyeonggi-do, Korea
Type of Equipment : Face Recognition Terminal
FCC ID. : 2ATMI-FL1000-A
Model Name : FL1000-A
Multiple Model Name : FL1000-B, FL1000-C, FL1000-D, FL1000-E, FL1000-F, FL1000-G, FL1000-H, FL1000-I, FL1000-J, FL1000-K, FL1000-L, FL1000-M, FL1000-N, FL1000-O, FL1000-P, FL1000-Q, FL1000-R, FL1000-S, FL1000-T, FL1000-U, FL1000-V
Serial number : N/A
Total page of Report : 9 pages (including this page)
Date of Incoming : April 15, 2019
Date of issue : June 07, 2019

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.247**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:


Ha-Ram Lee / Assistant Manager
ONETECH Corp.

Approved by:


Jae-Ho Lee / Chief Engineer
ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-196-RWD-011	June 07, 2019	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

Applicant : BIOLOG DEVICE

Address : 3F, 64-10, Dongtangiheung-ro, Dongtan-myeon, Hwaseong-si, Gyeonggi-do, Korea

Contact Person : PARK YUN HO / Deputy department head

Telephone No. : +82-70-5015-4176

FCC ID : 2ATMI-FL1000-A

Model Name : FL1000-A

Brand Name : -

Serial Number : N/A

Date : June 07, 2019

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER
E.U.T. DESCRIPTION	Face Recognition Terminal
KIND OD EQUIPMENT	Modular Transmitter
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT	
AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The BIOLOG DEVICE, Model FL1000-A (referred to as the EUT in this report) is a Face Recognition Terminal. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Face Recognition Terminal				
Operating Frequency	Bluetooth	2 402 MHz ~ 2 480 MHz			
	WLAN 2.4 GHz Hand	2 412 MHz ~ 2 462 MHz			
	NFC	13.56 MHz			
RF Output Power	Bluetooth	1 Mbps	6.33 dBm		
		2 Mbps	5.33 dBm		
		3 Mbps	5.51 dBm		
	WLAN 2.4 GHz Hand	Wi-Fi 802.11b (8.99 dBm) Wi-Fi 802.11g (8.37 dBm) Wi-Fi 802.11n(HT20) (8.23 dBm)			
Number of Channel	Bluetooth	79 Channels			
	WLAN 2.4 GHz Hand	11 Channels			
	NFC	1 Channel			
Modulation Type	Bluetooth	GFSK for 1 Mbps, $\pi/4$ -DQPSK for 2 Mbps, 8-DPSK for 3 Mbps			
	WLAN 2.4 GHz Hand	DSSS Modulation(DBPSK/DQPSK/CCK) OFDM Modulation(BPSK/QPSK/16QAM/64QAM)			
	NFC	ASK			
	Bluetooth	FPCB Antenna			
Antenna Type	WLAN 2.4 GHz Hand				
	NFC	PCB Antenna			
	Bluetooth	2.0 dBi			
Antenna Gain	WLAN 2.4 GHz Hand				
List of each Osc. or crystal Freq.(Freq. \geq 1 MHz)	12 MHz, 25 MHz, 26 MHz				
Rated Supply Voltage	DC 12.0 V				

Note: Bluetooth and WLAN do not operate simultaneously.

2.2 Alternative type(s)/model(s); also covered by this test report.

- The following lists consist of the added model and their differences.

Model Name	Differences	Tested
FL1000-A	Basic Model	<input checked="" type="checkbox"/>
FL1000-B		<input type="checkbox"/>
FL1000-C		<input type="checkbox"/>
FL1000-D		<input type="checkbox"/>
FL1000-E		<input type="checkbox"/>
FL1000-F		<input type="checkbox"/>
FL1000-G		<input type="checkbox"/>
FL1000-H		<input type="checkbox"/>
FL1000-I		<input type="checkbox"/>
FL1000-J		<input type="checkbox"/>
FL1000-K		<input type="checkbox"/>
FL1000-L	This model is identical to the basic model except for model name. Multiple Model name is added for the marketing purpose.	<input type="checkbox"/>
FL1000-M		<input type="checkbox"/>
FL1000-N		<input type="checkbox"/>
FL1000-O		<input type="checkbox"/>
FL1000-P		<input type="checkbox"/>
FL1000-Q		<input type="checkbox"/>
FL1000-R		<input type="checkbox"/>
FL1000-S		<input type="checkbox"/>
FL1000-T		<input type="checkbox"/>
FL1000-U		<input type="checkbox"/>
FL1000-V		<input type="checkbox"/>

Note: 1. Applicant consigns only basic model to test. Therefore, this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

3. EUT MODIFICATIONS

- None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

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

7.5 - the limit for extremity is being used. Extremity limit is being used since the device has a touch pad and not a handheld device.

4.2 EUT Description

Kind of EUT	Face Recognition Terminal	
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 240 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz <input type="checkbox"/> Bluetooth BLE: 2 402 MHz ~ 2 480 MHz <input checked="" type="checkbox"/> NFC : 13.56 MHz	
MAX. RF OUTPUT POWER	1 Mbps	6.33 dBm
	2 Mbps	5.33 dBm
	3 Mbps	5.51 dBm
Antenna Gain	2.0 dBi	
Exposure	<input type="checkbox"/> MPE	
Evaluation Applied	<input type="checkbox"/> SAR <input checked="" type="checkbox"/> SAR Test Exclusion Evaluation	

4.3 Test Result of SAR Exclusion for Devices

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

$$[(\text{Max. Power of channel, including tune-up tolerance, mW}) / (\text{Min. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 7.5$$

$$= (4.82/5) \times \sqrt{2.441} = 1.51$$

Conclusion: The SAR test exclusion threshold is less than 7.5, so the device meets the RF Exposure Requirement and excluded SAR Test.

Mode	Frequency (MHz)	Target Power W/tolerance (dBm)	Max tune up power (dBm)	Max tune up power (mW)	Separation distance (mm)	RF exposure
BDR (1 Mbps)	2 441	6.33 ± 0.5	6.83	4.82	5	1.51
EDR (2 Mbps)	2 441	5.33 ± 0.5	5.83	3.83	5	1.20
EDR (3 Mbps)	2 402	5.51 ± 0.5	6.01	3.99	5	1.24



Tested by: Yu-Seog, Sim / Assistant Manager

4.4 Calculation Result of Simultaneous RF Power

Bluetooth transmit simultaneously with NFC.

Simultaneous RF Power = Power of BT(Worst Case) + EIRP of NFC

$$4.82 + 0.000\ 055\ 847 = 4.820\ 055\ 847 \text{ mW}$$

$$[(\text{Simultaneous RF Power, mW})/(\text{Mim. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] < 7.5$$

$$= (4.820\ 055\ 847/5) \times \sqrt{2.441} = 1.51$$

- Therefore the maximum calculations of above situations are less than the "7.5" limit.

Note 1. Power of WLAN(Worst Case) = 4.82 mW

Note 2. EIRP of NFC = $E (\text{dB}\mu\text{V/m}) + 20 \log D - 104.8$; where D is the measurement distance in meters.

$$= 53.23 \text{ dB}\mu\text{V/m} + 20\log(3) - 104.8$$

$$= -42.03 \text{ dBm}$$

$$= 0.000\ 055\ 847 \text{ mW}$$