

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

Test Report No. : OT-201-RWD-004
AGR No. : A19DA-017
Applicant : Bloomengine Inc.
Address : 4F #401, 26, Magokjungang 8-ro 1-gil, Gangseo-gu, Seoul, South Korea
Manufacturer : Bloomengine Inc.
Address : 4F #401, 26, Magokjungang 8-ro 1-gil, Gangseo-gu, Seoul, South Korea
Type of Equipment : Smart Indoor Planter
FCC ID. : 2AUU9-B100KHA
Model Name : B100KHA
Serial number : N/A
Total page of Report : 7 pages (including this page)
Date of Incoming : November 25, 2019
Date of issue : January 02, 2020

SUMMARY

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

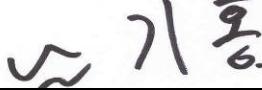
This test report only contains the result of a single test of the sample supplied for the examination.

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

Reviewed by:


Tae-Ho, Kim / Senior Manager
ONETECH Corp.

Approved by:


Ki-Hong, Nam / Chief Engineer
ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-201-RWD-004	January 02, 2020	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : Bloomengine Inc.
Address : 4F #401, 26, Magokjungang 8-ro 1-gil, Gangseo-gu, Seoul, South Korea
Manufacturer : Bloomengine Inc.
Address : 4F #401, 26, Magokjungang 8-ro 1-gil, Gangseo-gu, Seoul, South Korea
Contact Person : Seulki Park / CEO
Telephone No. : +82-70-5129-5177
FCC ID : 2AUU9-B100KHA
Model Name : B100KHA
Brand Name : -
Serial Number : N/A
Date : January 02, 2020

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Smart Indoor Planter
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 558074 D01 15.247 Meas Guidance v05r02
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	10 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 Bloomengine Inc., Model B100KHA (referred to as the EUT in this report) is a Smart Indoor Planter. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Smart Indoor Planter
Temperature Range	-10 °C ~ 50 °C
OPERATING FREQUENCY	2 402 MHz ~ 2 480 MHz
MODULATION TYPE	GFSK
RF OUTPUT POWER	-7.78 dBm
ANTENNA TYPE	PCB Antenna
ANTENNA GAIN	-7.71 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 kHz, 32 MHz
RATED SUPPLY VOLTAGE	AC 120 V

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

- None

3. EUT MODIFICATIONS

- None

4. MAXIMUM PERMISSIBLE EXPOSURE

4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are $f/1500 \text{ mW/cm}^2$ for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm^2 for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm^2 exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm^2 , Z = Impedance of free space, 377Ω

E = Electric field strength in V/m , G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm , using $P (\text{mW}) = P (\text{W}) / 1000$, $d (\text{cm}) = 0.01 * d (\text{m})$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm , P = Power in mW , G = Numeric antenna gain, and S = Power density in mW/cm^2

Kind of EUT	Smart Indoor Planter
Device Category	<input type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input checked="" type="checkbox"/> Others
Exposure	<input checked="" type="checkbox"/> MPE
Evaluation Applied	<input type="checkbox"/> SAR <input type="checkbox"/> N/A



Tested by: Hyung-Kwon, Oh / Assistant Manager

4.2 Test Result for Bluetooth LE

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
			(dBm)	(dBm)	(mW)	Log			
2 402 ~ 2 480	Bluetooth LE	-7.50 ± 0.5	-7.00	0.20	0.17	-7.71	0.05	0.000 007	1.00

According to above table, for 2 402 MHz ~ 2 480 MHz Band, safe distance,

$$D = 0.282 * \sqrt{(-0.20 * 0.17)} / 1.00 = 0.05 \text{ cm}$$

For getting power density at 20 cm separation in above table, following formula was used.

$$S = P * G / (4\pi * R^2) = 0.20 * 0.17 / (4 * 3.14 * 20^2) = 0.000 007$$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna



Tested by: Hyung-Kwon, Oh / Assistant Manager