

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

Test Report No. : OT-19O-RWD-053

AGR No. : A195A-256

Applicant : Bloomengine Inc.

Address : Seoul Startup Didimteo #302, Dongil-ro 174-gil 27, Nowon-gu, 01849, Seoul, Korea

Manufacturer : Bloomengine Inc.

Address : Seoul Startup Didimteo #302, Dongil-ro 174-gil 27, Nowon-gu, 01849, Seoul, Korea

Type of Equipment : Smart Indoor Planter

FCC ID. : 2AUU9-B100KHB

Model Name : B100KHB

Multiple Model Name : B100KHC

Serial number : N/A

Total page of Report : 7 pages (including this page)

Date of Incoming : October 01, 2019

Date of issue : October 22, 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:


Tae-Ho, Kim / Senior Manager
ONETECH Corp.

Approved by:


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ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-19O-RWD-053	October 22, 2019	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : Bloomengine Inc.

Address : Seoul Startup Didimteo #302, Dongil-ro 174-gil 27, Nowon-gu, 01849, Seoul, Korea

Contact Person : Seulki, Park / CEO

Telephone No. : +82-70-5129-5177

FCC ID : 2AUU9-B100KHB

Model Name : B100KHB

Brand Name : -

Serial Number : N/A

Date : October 22, 2019

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	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 Bloomengine Inc., Model B100KHB (referred to as the EUT in this report) is an 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	0 °C ~ 70 °C
Operating Frequency	2 412 MHz ~ 2 462 MHz (802.11b/g)
Modulation Type	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g: OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
RF Output Power	15.66 dBm(802.11b) 12.06 dBm(802.11g)
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	1.50 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 kHz, 24 MHz
RATED SUPPLY VOLTAGE	AC 120 V

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
B100KHB	Basic model.	<input checked="" type="checkbox"/>
B100KHC	The model does not have a camera module.	<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 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 $P (\text{mW}) = P (\text{W}) / 1 000$, $d (\text{cm}) = 0.01 * d (\text{m})$

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

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 Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A

Tested by: Hyung-Kwon, Oh / Assistant Manager

4.2 Test Result for WLAN 2.4 GHz

According to above equation, the following result was obtained.

Operating Mode	Operating Channel	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	Linear			
802.11b	Low	14.5 ± 0.5	15.00	31.62	1.50	1.41	1.88	0.008 9	1.00
	Mid	15.0 ± 0.5	15.50	35.48			2.00	0.010 0	1.00
	High	15.5 ± 0.5	16.00	39.81			2.11	0.011 2	1.00
802.11g	Low	8.50 ± 0.5	9.00	7.94			0.94	0.002 2	1.00
	Mid	12.0 ± 0.5	12.50	17.78			1.41	0.005 0	1.00
	High	12.0 ± 0.5	12.50	17.78			1.41	0.005 0	1.00

According to above table, for 2 400 ~ 2 483.5 MHz Band(802.11b_High Channel), safe distance,

$$D = 0.282 * \sqrt{(39.81 * 1.41)/1.00} = 2.11 \text{ cm}$$

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

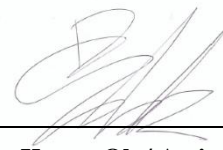
$$S = P * G / (4\pi * R^2) = 39.81 * 1.41 / (4 * 3.14 * 20^2) = 0.011 2$$

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