Korea Technology Institute Co., Ltd.

Test Report

Test Report No.:	**KTI18EF02001**		
Registration No.:	**KR0023**		
Applicant:	**ATEAM VENTURES Co., Ltd.**		
Applicant Address:	**3rd floor, 60 Naruteo-ro, Seocho-gu, Seoul, Korea**		
Product:	**3D Printer Remote Controller**		
FCC ID:	**2AO9Y-WAGGLE**	**Model No.**	**Waggle**
Receipt No.:	**KTI18EK02001**	**Date of Incoming:**	**Jan 23, 2018**
Date of Issue:	**Feb 06, 2018**		
Testing location	**Korea Technology Institute Co., Ltd.** **58-10, Sagiso-gil, Docheok-myeon, Gwangju-si, Gyeonggi-do, Korea**		
Test Standards:	**FCC PART 15 SUBPART C Section 15.247**		
Method of Measurement	**KDB 447498 D01 General RF Exposure Guidance v06**		
Test Result:	**The above-mentioned product has been tested with compliance.**		

Tested by: W. J. Yun.
/ Engineer

Signature Date Feb 06, 2018

Approved by: S. H. Song
/Technical Manager

Signature Date Feb 06, 2018

Other Aspects:	
Abbreviations:	*** OK, Pass=passed * Fail=failed * N/A=not applicable**

☞ **- This test report is not permitted to copy partly without our permission.**

- This test result is dependent on only equipment to be used.

- This test result is based on a single evaluation of one sample of the above mentioned.

- We certify this test report has been based on the measurement standards that is traceable to the national or international standards.

≫≫ Contents ≪≪

1. Verification of compliance

Applicant : ATEAM VENTURES Co., Ltd.

Address : 3rd floor, 60 Naruteo-ro, Seocho-gu, Seoul, Korea

FCC ID : 2AO9Y-WAGGLE

Model Name : Waggle

Brand Name : A·TEAM VENTURES

Serial Number : N/A

Test Date : Jan 30, 2018

Equipment Class	DTS – DIGITAL TRNSMISSION SYSTEM
Kind of Equipment	WIFI(802.11)
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	10m Open area test site

- The above equipment was tested by Korea Technology Institute Co., Ltd. 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 emanation from equipment are within the compliance requirements.

2. General Information

2.1 Product Description

Waggle (referred to in this report as EUT) is used as a 3D Printer Remote Controller.

The product specification described herein was obtained from product data sheet or user's manual.

Equipment Name	Waggle
Operating Frequency	2412 MHz ~ 2462 MHz
RF Output Power	18.20 dBm
Number of Channel	802.11b/g/n(HT20) : 11 802.11n(HT40) : 7
Frequency Range	802.11b/g/n(HT20) : 2.412 GHz ~ 2.462 GHz 802.11n(HT40) : 2.422 GHz ~ 2.452 GHz
Modulation Type	802.11b: DSSS 802.11g/n(HT20/40): OFDM
Antenna Type / Gain	PCB Antenna / 2.66 dBi (Max)
List of Each OSC. Or Crystal. Freq.	12 MHz
Rated Supply Voltage	DC 5.0 V

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

- None

3. EUT MODIFICATIONS

- None

4. MAXIMUM PERMISSIBLE EXPOSURE

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 mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

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

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

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

Combing 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 (mW) = P (W) / 1 000, d (cm) = 0.01 * d (m)

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

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain,

S = Power density in mW/cm²

EUT Description

Kind of EUT	3D Printer Remote Controller
Operating Frequency Band	☐ Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz ■ WLAN: 2 412 MHz ~ 2 462 MHz ☐ WLAN: 5 180 MHz ~ 5 240 MHz ☐ WLAN: 5 745 MHz ~ 5 825 MHz ☐ Bluetooth: 2 402 MHz ~ 2 480 MHz ☐ Bluetooth BLE: 2 402 MHz ~ 2 480 MHz
MAX. RF OUTPUT	18.20 dBm
Antenna Gain	2.66 dBi
Exposure Evaluation Applied	☐ MPE ☐ SAR ■ N/A

Test Result

Operating Freq.Band (MHz)	Operating Mode	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm²)	Limit (mW/cm²)
		(dBm)	(mW)	(Log)	(Linear)			
2 412 ~ 2 462	802.11b	17.75	59.57	2.66	1.85	2.97	0.0219	1.00
	802.11g	18.20	66.07			3.12	0.0243	
	802.11n(HT20)	18.16	65.46			3.11	0.0241	
	802.11n(HT40)	14.74	29.79			2.10	0.0110	