FCC MPE TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

CODI Smart Toy

ISSUED TO
Pillar Learning, LLC

92 SW 3rd Street, Suite 2605, Miami, Florida, USA, 33130

Tested by: Zong Liyao
(Engineer)
Date Dec. 13, 2018

Approved by: Wei Yanguan
(Chief Engineer)
Date Dec. 13, 2018

Report No.:	BL-HK18B0124-701
EUT Name:	CODI Smart Toy
Model Name:	CD0001
Brand Name:	Codi by Pillar (Pillar Learning, LLC)
Test Standard:	FCC 47 CFR 2.1091
FCC ID:	2ARR5-CD0001
Test Conclusion:	Pass
Test Date:	Nov. 13, 2018 ~ Nov. 28, 2018
Date of Issue:	Dec. 13, 2018

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Revision History

Version	Issue Date	Revisions Content
Rev. 01	Dec. 06, 2018	Initial Issue
Rev. 02	Dec. 12, 2018	Added Simultaneous Transmission for MPE Exclusion on page 11.
Rev. 03	Dec. 13, 2018	Updated Simultaneous Transmission for MPE Exclusion on page 11.

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Phone Number	+86 755 6685 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation (A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	20℃ to 23℃
Ambient Relative Humidity	30% to 60 %
Ambient Pressure	100 KPa to 102 KPa

1.4 Announce

(1) The test report reference to the report template version V1.0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Pillar Learning, LLC
Address	92 SW 3rd Street, Suite 2605, Miami, Florida, USA, 33130

2.2 Manufacturer Information

Manufacturer	Pillar Learning, LLC
Address	92 SW 3rd Street, Suite 2605, Miami, Florida, USA, 33130

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	CODI Smart Toy
Model Name Under Test	CD0001
Series Model Name	N/A
Description of Model Name Differentiation	N/A
Hardware Version	Version 1
Software Version	Version 1
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	Zhen Yang
	Model No.	903048
	Serial No.	N/A
	Capacity	1000 mAh
	Rated Voltage	3.7 V
	Limit Charge Voltage	4.2 V
Ancillary Equipment 2	Adapter	
	Brand Name	FLYPOWER
	Model No.	PS10J050K2000UU
	Serial No.	N/A
	Rated Input	100-240 V~, 0.35 A, 50/60 Hz
	Rated Output	5 V⎓ 2 A
Ancillary Equipment 3	USB Cable	
	Length (Approx.)	1 m

2.6 Technical Information

Network and Wireless connectivity	Bluetooth 4.2 (BR+EDR) WIFI 802.11b, 802.11g, 802.11n(HT20)

The requirement for the following technical information of the EUT was tested in this report:

Exposure Category	General Population/Uncontrolled Exposure
EUT Stage	Mobile Device

For BT_EDR	
Modulation Technology	FHSS
Modulation Type	GFSK, ∏/4-DQPSK
Transfer Rate	DH5: 1 Mbps 2DH5: 2 Mbps
Frequency Range	The frequency range used is 2400 MHz to 2483.5 MHz.
Number of channel	79 (at intervals of 1 MHz)
Antenna Type	PCB Antenna
Antenna Gain	-0.58 dBi
Antenna System(MIMO Smart Antenna)	N/A

For 2.4 GHz ISM Band of Wi-Fi	
Frequency Range	802.11b/g/n(20 MHz): 2.412 GHz - 2.462 GHz
Modulation Type	DSSS, OFDM
Antenna System (eg., MIMO, Smart Antenna)	N/A
Categorization as	N/A

Correlated or Completely Uncorrelated	
Antenna Type	PCB Antenna
Antenna Gain	-0.58 dBi

3 STANDARD INFORMATION

3.1 Test Standard

No.	Identity	Document Title
1	CFR Title 47 §1.1310	Radiofrequency radiation exposure limits
2	CFR Title 47 §2.1091	Radiofrequency radiation exposure evaluation: mobile devices
3	FCC KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

4 DEVICE CATEGORY AND LEVELS LIMITS

The field calculation does not take into account the antenna size, which is assumed to be a point source. An ideal isotropic antenna is used as a reference to compare the performance of practical antennas: ***P*** watts is radiated, from a point, uniformly over the surface of sphere of radius ***r***. The POINTING VECTOR gives the power density:

Assumed use distance from EUT to Human, **20 cm** separation distance warning is required. In this section, the power density at 20 cm location is calculated to examine if it is lower than the limit.

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density

P = output power (W)

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

R = Separation distance between radiator and human body (m)

According to FCC Part 1.1307, systems operating under the provisions of this section shall be operated in a manner the ensures that the public is not exposed to radio frequency energy level in excess of the commission's guidelines.

Limits for General Population/ Uncontrolled Exposure			
Frequency Range (MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength (H)(A/m)	Power Density (S)(mW/cm^2)
0.3-1.34	614	1.63	(100)*
1.34-30	824/f	2.19/f	(180/f2)*
30-300	27.5	0.073	0.2
300-1500			f/1500
1500-100,000			1.0

5 MPE ASSESSMENT

5.1 Output Power

BLUETOOTH		
Mode	BR/EDR	
	GFSK	∏/4-DQPSK
Peak Power (dBm)	0.34	**1.69**
Note: This report listed the worst case peak power value, please refer to RF test report BL-HK18B0124-601 for more details.		

WIFI 2.4G			
Mode	802.11b	802.11g	802.11n-20
Peak Power (dBm)	15.73	**15.87**	15.86
Note: This report listed the worst case peak power value, please refer to RF test report BL-HK18B0124-602 for more details.			

5.2 Declared maximum conducted output power

Band (GHz)	Mode	Peak Power Range (dBm)
Bluetooth (2.4~2.4835)	GFSK	(-1.00)-1.00
	∏/4-DQPSK	0.00-2.00
WIFI 2.4G (2.412~2.462)	802.11b	13.50-16.00
	802.11g	14.00-16.00
	802.11n(HT20)	14.00-16.00

5.3 Assessment Result

Evolution mode	Maximum peak output power（dBm）	Antenna Gain (typical) (dBi)	Total Power (mw)	Distance (cm)	Limit of Power Density (mW/cm²)	Power Density (mW/cm²)	Verdict
Bluetooth	2.00	-0.58	1.39	20	1	$2.76x10^{-4}$	Pass
WIFI 2.4G	16.00	-0.58	34.83	20	1	0.007	Pass

5.4 Simultaneous Transmission for MPE Exclusion

List of Configurations for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	WLAN 2.4G + BT	Support

Results for transmit simultaneously

No.	Configurations	Maximum MPE Value (mw/cm^2)		Transmit simultaneously MPE	Limits
		WLAN	BT		
1	WLAN 2.4G + BT	0.007	$2.76x10^{-4}$	0.007	1
Note : According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows: Transmit simultaneously MPE = Σ of MPE ratios MPE ratios = Field strengths or power density / MPE limit at the test frequency					

5.5 Conclusion

This EUT is deemed to comply with the FCC General Population/ Uncontrolled Exposure limits.

--END OF REPORT--