



**CENTRE OF TESTING SERVICE
INTERNATIONAL**

OPERATE ACCORDING TO ISO/IEC 17025

FCC TEST REPORT

TEST REPORT NUMBER : CGZ3150202-00097-E



CENTRE OF TESTING SERVICE CO., LTD.

A101, No.65, Zhuji Highway, Tianhe District, Guangzhou, Guangdong, China

TEST REPORT FOR FCC 47 CFR PART 15 OCT, 2014 Radio frequency devices	
Report Reference No.	CGZ3150202-00097-E
Date of issue	04 February 2015
Testing Laboratory Name	CENTRE OF TESTING SERVICE CO., LTD.
Address	A101, No.65, Zhuji Highway, Tianhe District, Guangzhou, Guangdong, China
Testing location/ procedure	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
Applicant's name	Adafruit Industries
Address	150 Varick St. #3 New York, NY 10013
Test specification:	
Standard	47 CFR PART 15 OCT, 2014
Test Report Form No.	CTSEMC-1.0
TRF Originator	CENTRE OF TESTING SERVICE CO., LTD.
Master TRF	Dated 2009-01
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Test item description	Pro Trinket 5V
Trade Mark	Adafruit
Manufacturer	Adafruit Industries
Model/Type reference	Pro Trinket 5V
Ratings	Battery 5V
Result	PASSED

Compiled by:


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Supervised by:


Duke yang / Technique principal

Approved by:


Vincent yao / Manager

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FCC -- TEST REPORT

Test Report No. : CGZ3150202-00097-E	04 February 2015 Date of issue
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Type / Model.....	Pro Trinket 5V
EUT.....	Pro Trinket 5V
Applicant	Adafruit Industries
Address.....	150 Varick St. #3 New York, NY 10013
Telephone.....	+1-760-884-7727
Fax.....	+1-760-887-8574
Contact.....	Mary Jungman
Manufacturer	Adafruit Industries
Address.....	150 Varick St. #3 New York, NY 10013
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Fax.....	+1-760-887-8574
Contact.....	Mary Jungman
Factory	Adafruit Industries
Address.....	150 Varick St. #3 New York, NY 10013
Telephone.....	+1-760-884-7727
Fax.....	+1-760-887-8574
Contact.....	Mary Jungman

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

- 47 CFR PART 15 OCT, 2014
- ANSI C63.4-2009

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	02 February 2015
Testing commenced on	02~03 February 2015
Testing concluded on	04 February 2015

2.2 FINAL ASSESSMENT

The FCC requirements pertaining to the technical standards and tested operation modes are

- - Fulfilled.
- **Not** fulfilled.

The equipment under test

- - Fulfils the FCC requirements cited on page 1.
- **Does not** fulfil the FCC requirements cited on page 1.



3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage: Battery 5V
 Others

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1
Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

Normal

Operating Mode: Normal

The equipment under test was operated during the measurement under the following conditions:
Test program (customer specific)

Emissions tests.....: According to **47 CFR PART 15**, searching for the highest disturbance.

3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Name:	/
M/N:	/
S/N:	/
Manufacturer:	/
Power Cord:	/
Certificate:	/

- unscreened power cables

- customer specific cables

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China
 Tel: +86-20-85543113 (32 lines) Fax: +86-20-38780406

4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of **CENTRE OF TESTING SERVICE CO., LTD.** has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

FCC-Registration No.: 971995

CENTRE OF TESTING SERVICE CO., LTD., EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 13, 2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.7 Test Description

4.7.1 Description of Standards and Results

EMISSION		
Description of Test Item	Standard	Results
Conducted Emission Test	47 CFR PART 15 OCT, 2014 ANSI C63.4-2009	N/A
Radiated Emission Test	47 CFR PART 15 OCT, 2014 ANSI C63.4-2009	PASS Class B

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5.1.3 Limits of disturbance (FCC Part 15 B Class B)

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

5.1.4 Test result

The requirements are	Fulfilled
Band width	9kHz
Frequency range	0.15kHz - 30 MHz
Min. limit margin	N/A

Remarks: The EUT power supply by battery, Not applicable.

5.2 Radiated disturbance (Electric field)

For test instruments and accessories used see section 6 part 6.1.

5.2.1 Description of the test location

Test location : Semi-Anechoic chamber

Test disturbance: 3 Meter

5.2.2 Description of the test set-up

5.2.2.1 Test procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to FCC Part 15 on radiated emission Test.

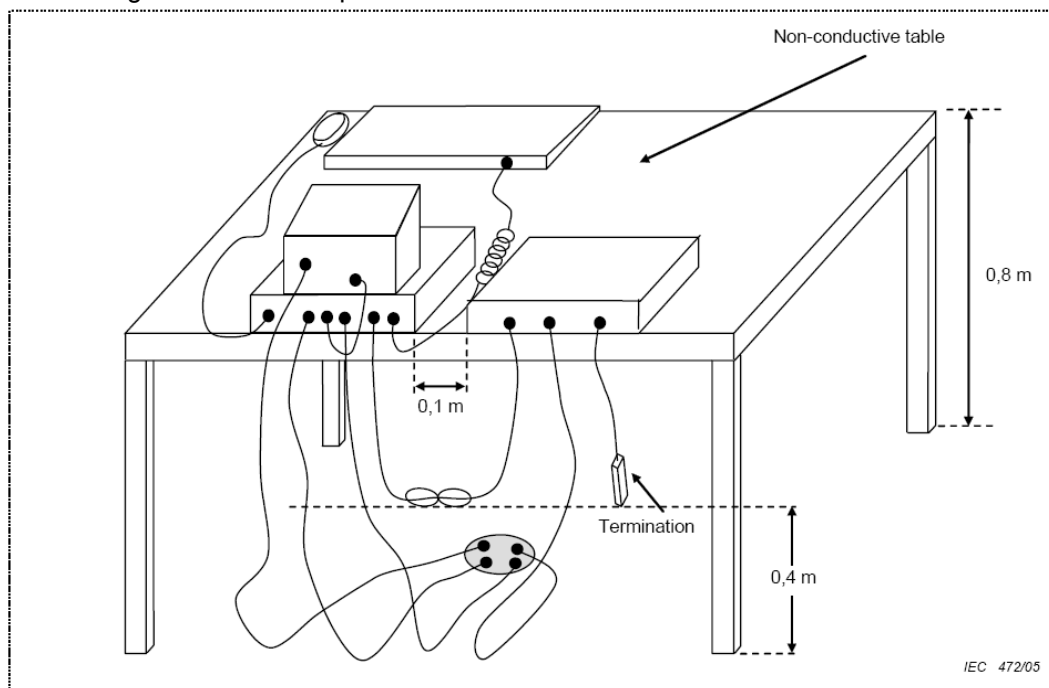
The frequency range from 30MHz to 1000MHz and above 1GHz. is investigated. Please see the following pages.

All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 120kHz RBW below 1GHz .

All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 300kHz VBW below 1GHz.

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.2.2.2 Block Diagram of Test Setup



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5.2.3 Limits of disturbance (FCC Part 15 B Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	40
88 ~ 216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

5.2.4 Test result

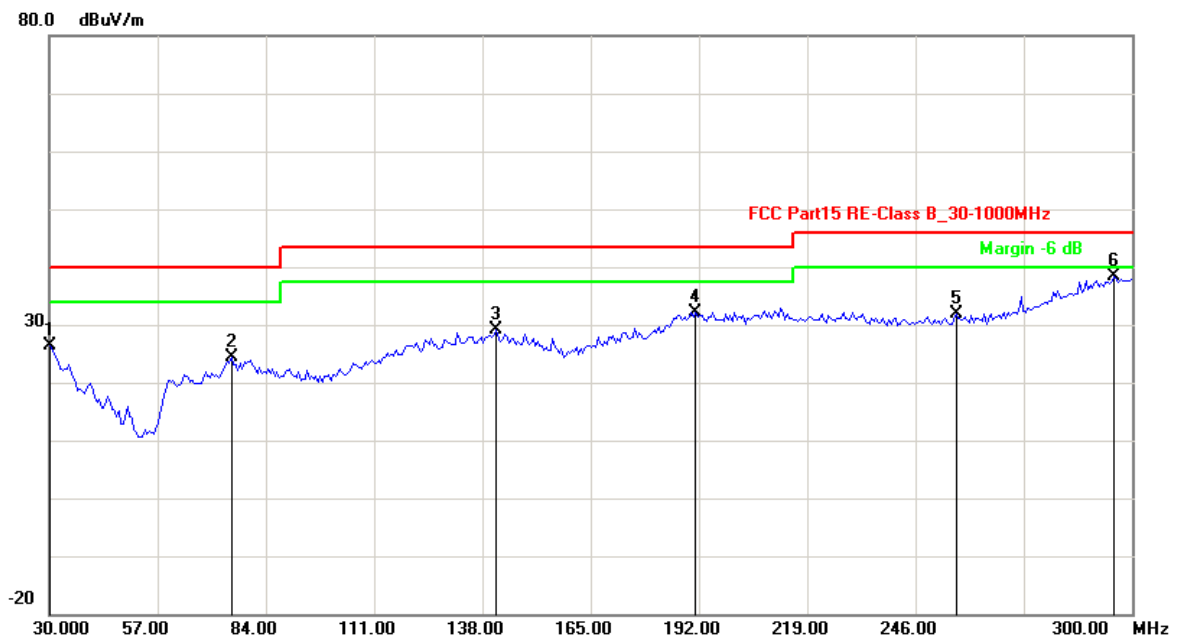
The requirements are	Fulfilled
Band width	120kHz
Frequency range	30 MHz - 1000 MHz
Min. limit margin	>7.69 dB at 30MHz - 1000 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.2.5 Test protocol

Test point Operation mode Remarks:	Horizontal Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
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EUT	Pro Trinket 5V
Operating Condition	Battery 5V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	Pro Trinket 5V



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBµV)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.
1	30.0000	-24.45	50.92	26.47	40.00	-13.53	QP
2	75.4509	-27.45	51.90	24.45	40.00	-15.55	QP
3	141.4629	-22.52	51.53	29.01	43.50	-14.49	QP
4	191.2425	-18.09	50.28	32.19	43.50	-11.31	QP
5	256.1723	-18.68	50.53	31.85	46.00	-14.15	QP
6	295.6713	-12.21	50.52	38.31	46.00	-7.69	QP

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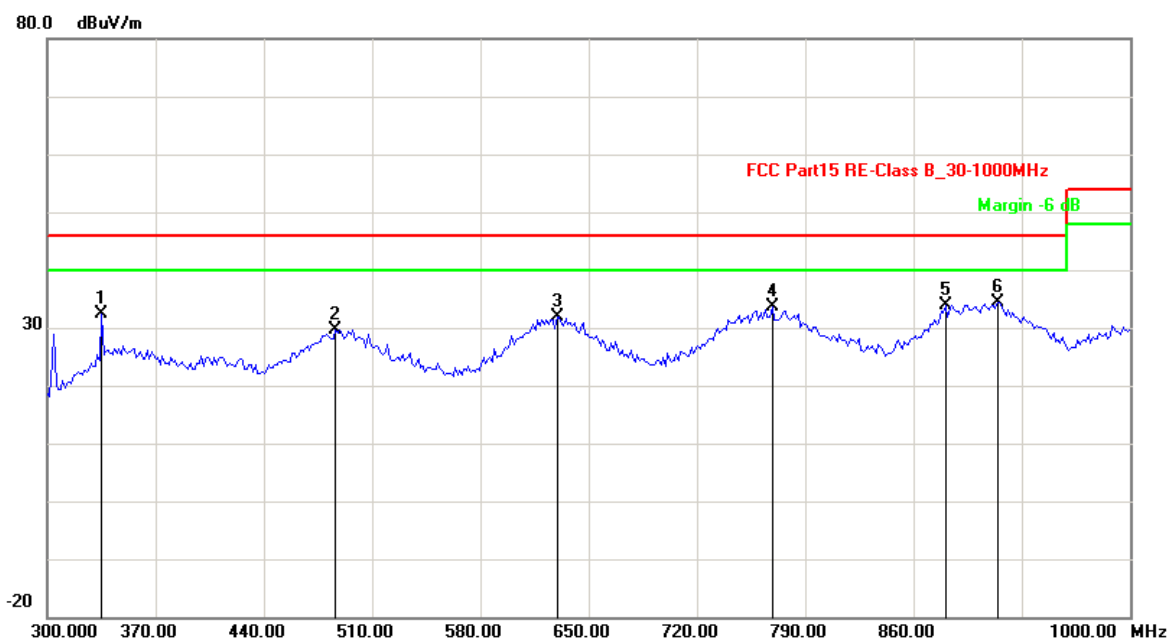
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	335.0701	-24.24	56.57	32.33	46.00	-13.67	QP
2	486.5731	-18.82	48.49	29.67	46.00	-16.33	QP
3	629.6593	-15.83	47.75	31.92	46.00	-14.08	QP
4	768.5371	-14.11	47.63	33.52	46.00	-12.48	QP
5	880.7615	-12.15	46.09	33.94	46.00	-12.06	QP
6	914.4289	-12.08	46.42	34.34	46.00	-11.66	QP

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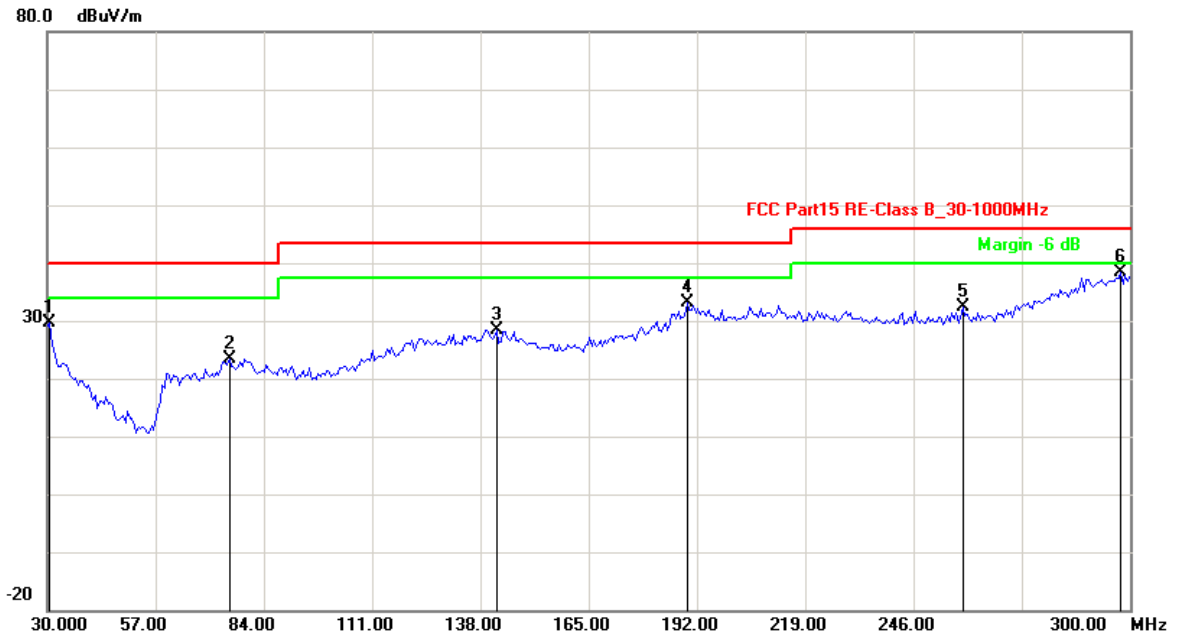
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Test point	Vertical	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			

EUT	Pro Trinket 5V
Operating Condition	Battery 5V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	Pro Trinket 5V



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	30.5411	-24.94	54.57	29.63	40.00	-10.37	QP
2	75.4509	-27.45	50.95	23.50	40.00	-16.50	QP
3	142.0040	-22.57	51.05	28.48	43.50	-15.02	QP
4	189.6192	-18.14	51.16	33.02	43.50	-10.48	QP
5	258.3367	-18.64	51.01	32.37	46.00	-13.63	QP
6	297.8357	-11.89	50.19	38.30	46.00	-7.70	QP

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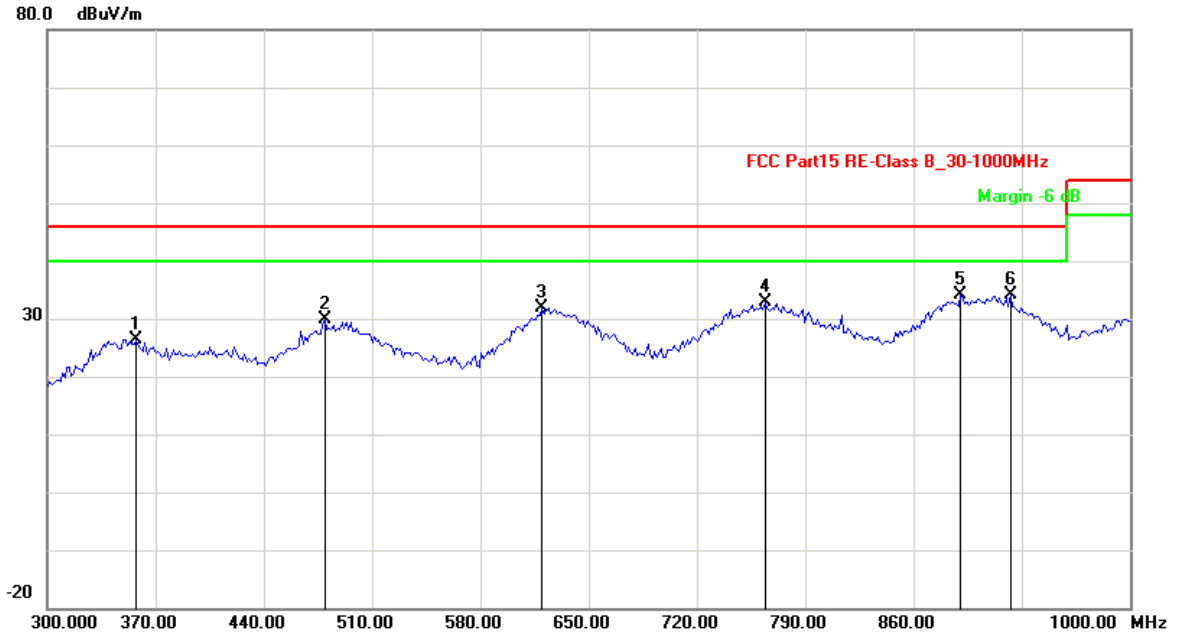
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	357.5150	-23.43	49.82	26.39	46.00	-19.61	QP
2	479.5591	-18.79	48.72	29.93	46.00	-16.07	QP
3	619.8397	-15.63	47.59	31.96	46.00	-14.04	QP
4	764.3287	-14.00	46.94	32.94	46.00	-13.06	QP
5	890.5812	-11.75	45.92	34.17	46.00	-11.83	QP
6	922.8457	-12.75	46.94	34.19	46.00	-11.81	QP

Note: Level=Reading+Factor. Margin= Level-Limit.

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6 USED TEST EQUIPMENT

6.1					
Radiated disturbance (Electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2014/03/25
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2014/11/04
3	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2014/03/30
4	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2014/03/30
5	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2014/03/30
6	Pre-Amplifier	EMC	EMC330	980113	2014/03/25
7	Pre-Amplifier	EMC	EMC012645	980114	2014/03/25
8	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.2					
Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2014/11/04
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2014/11/04
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	100140	2014/11/04
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2014/11/04
5	EMI Test Software	Farad	EZ-EMC	N/A	N/A

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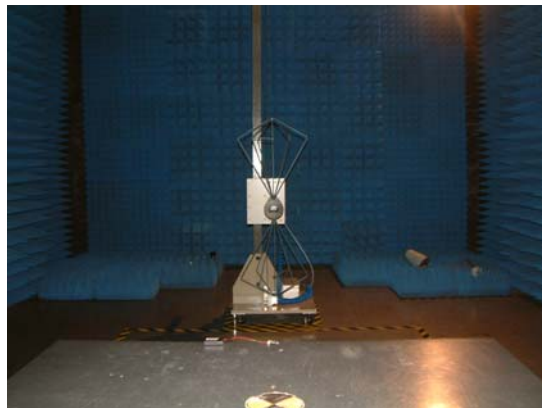
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7 TEST PHOTOGRAPHS

7.1. Photo of radiated emission measurement (R.E.)



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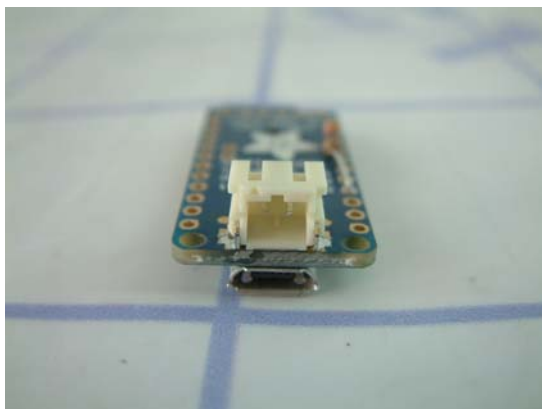
8 External and Internal Photos of the EUT



External view 1



External view 2



External view 3

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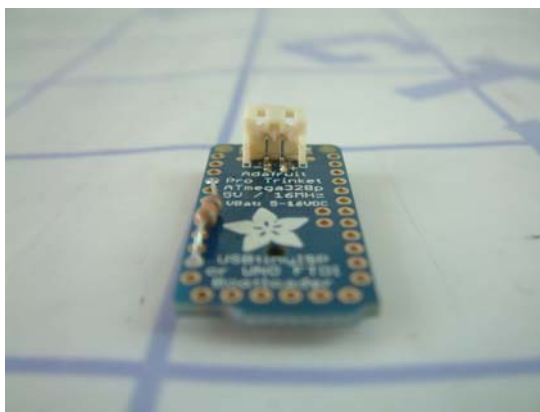
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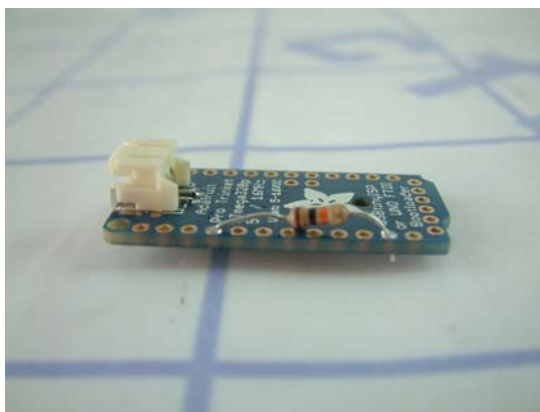
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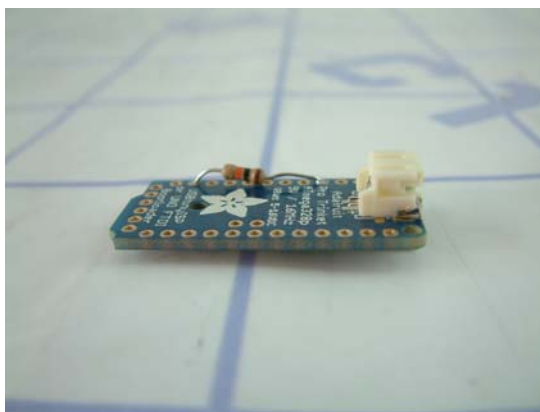
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External view 4



External view 5



External view 6

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9 Normative references

1. **47 CFR PART 15 OCT, 2014**
Radio Frequency Devices
2. **ANSI C 63.4 : 2009**
American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

10 Manufacturer/ Approval holder Declaration

The following identical model(s):

N/A

Belong to the tested device:

Product description: **Pro Trinket 5V**
Model name: **Pro Trinket 5V**