

FCC Test Report

Client Name : Seeed Technology Co, Ltd.
Address : 9F, G3 Building, TCL International E City,
Zhongshanyuan Road, Nanshan District, Shenzhen,
Guangdong Province, P.R.C
Product Name : Arduino Sensor Kit - Base
Date : Dec. 14, 2020



Shenzhen Anbotech Compliance Laboratory Limited



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TEST REPORT

Applicant : Seeed Technology Co, Ltd.
Manufacturer : Seeed Technology Co, Ltd.
Product Name : Arduino Sensor Kit - Base
Model No. : Arduino Sensor Kit - Base(for Arduino)
Trade Mark : Seeed Studio
Rating(s) : USB Input: DC5V/500mA
DC Input: DC 9V-12V
Test Standard(s) : FCC Rules and Regulations Part 15 Subpart B: 2019
Test Method(s) : ANSI C63.4-2014

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited To determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits both radiated and conducted emissions. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited Is assumed full responsibility for the accuracy and completeness of these measurements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited

Date of Receipt: Nov. 23, 2020

Date of Test: Nov. 23~Dec. 11, 2020

Prepared By:

Winnie Huang
(Engineer / Winnie Huang)

Reviewer:

Well Wang
(Supervisor / Well Wang)

Approved & Authorized Signer:

KingKong Jin
(Manager / KingKong Jin)

1. General Information

1.1. Client Information

Applicant	:	Seed Technology Co, Ltd.
Address	:	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C
Manufacturer	:	Seed Technology Co, Ltd.
Address	:	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C
Factory	:	Seed Technology Co, Ltd.
Address	:	9F, G3 Building, TCL International E City, Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province, P.R.C

1.2. Description of Device (EUT)

Product Name	:	Arduino Sensor Kit - Base	
Model No.	:	Arduino Sensor Kit - Base(for Arduino)	
Trade Mark	:	Seed Studio	
Test Power Supply	:	DC 5V via adapter / DC 12V	
Test Sample No.	:	1-1-1	
Product Description	:	Adapter:	N/A
Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

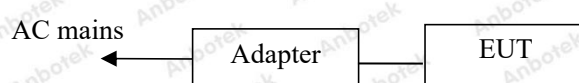
1.3. Auxiliary Equipment Used During Test

N/A	
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1.4. Description of Test Modes

Pretest Modes	Descriptions
Mode	USB On
Mode 2	DC On

For Mode 1 Block Diagram of Test Setup



For Mode 2 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Modes	Status
Power Line Conducted Emission Test (150KHz To 30MHz)	/	N
Radiated Emission Test (30MHz To 1000MHz)	All Mode	P
P) Indicates "PASS". N) Indicates "Not applicable".		

1.6. Test Equipment List

Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 26, 2020	1 Year
2.	Pre-amplifier	Schwarzbeck	BBV-9745	9745-075	Oct. 26, 2020	1 Year
3.	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	Nov. 02, 2020	2 Year
4.	Software Name EZ-EMC	Ferrari Technology	EMEC-3A1	N/A	N/A	N/A

1.7. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.7 dB (Horizontal)
		Ur = 4.3 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB
Disturbance Uncertainty	:	Ud = 3.4 dB

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, 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. 184111, September 30, 2020.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128



2. Radiated Emission Test

2.1. Test Standard and Limit

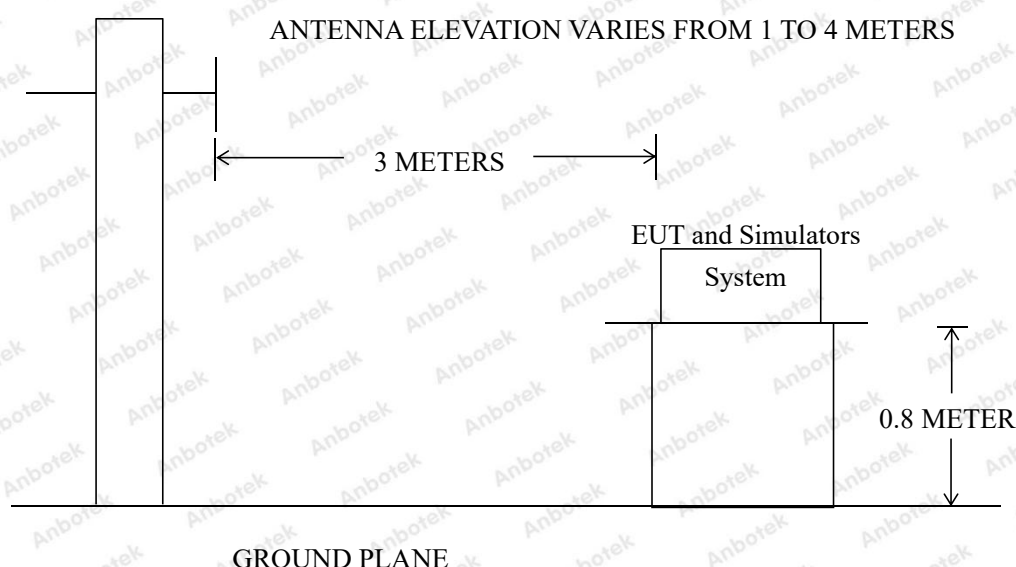
Test Standard	FCC Part 15 Subpart B
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Radiated Emission Test Limit (Subpart B Class B)

Test Limit	Frequency (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT	
			$\mu\text{V/m}$	$(\text{dB}\mu\text{V/m})$
	30 ~ 88	3	100	40
	88 ~ 216	3	150	43.5
	216 ~ 960	3	200	46
	960 ~ 1000	3	500	54

Remark: (1) Emission level $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
 (2) The smaller limit shall apply at the cross point between two frequency bands.
 (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

2.2. Test Setup



2.3. EUT Configuration on Measurement

The following equipments are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

2.4. Operating Condition of EUT

2.4.1. Setup the EUT as shown in Section 2.2.

2.4.2. Turn on the power of all equipments.

2.4.3. Let the EUT work in test mode and measure it.

2.5. Test Procedure

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. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (Trilog Broadband Antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

The bandwidth of the EMI test receiver (ESCI) is set at 120kHz.

The frequency range from 30MHz to 1000MHz is checked.

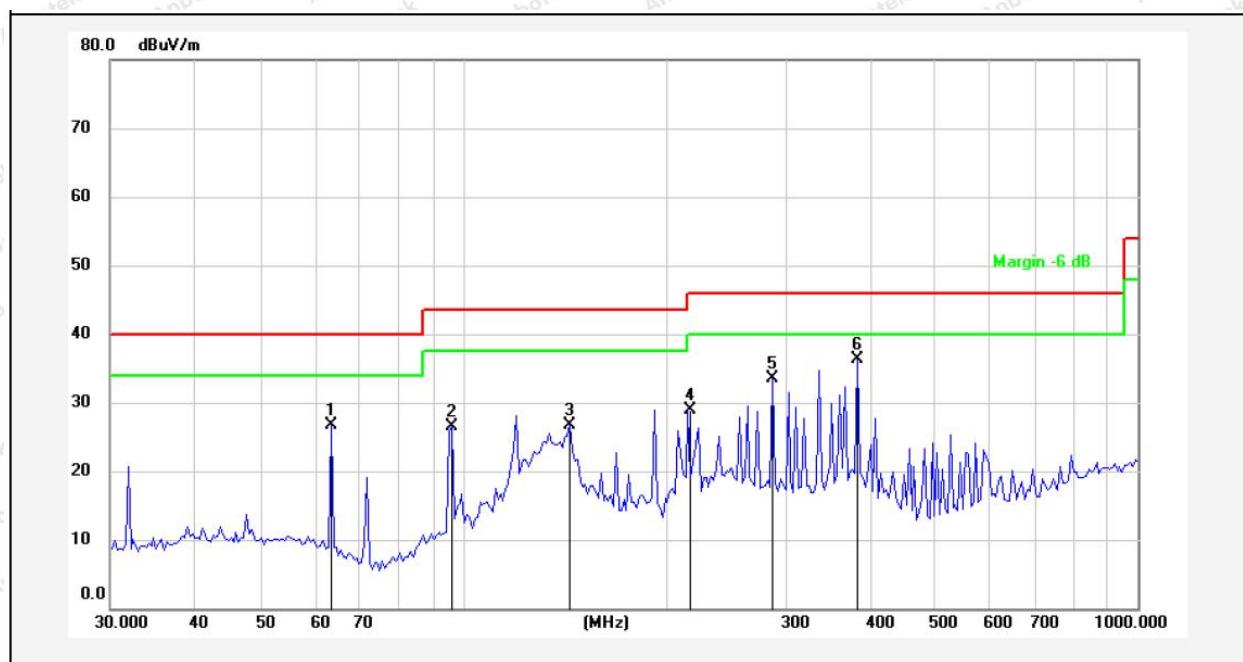
The test results are listed in Section 2.6.

2.6. Test Results

PASS

The test curves are shown in the following pages.

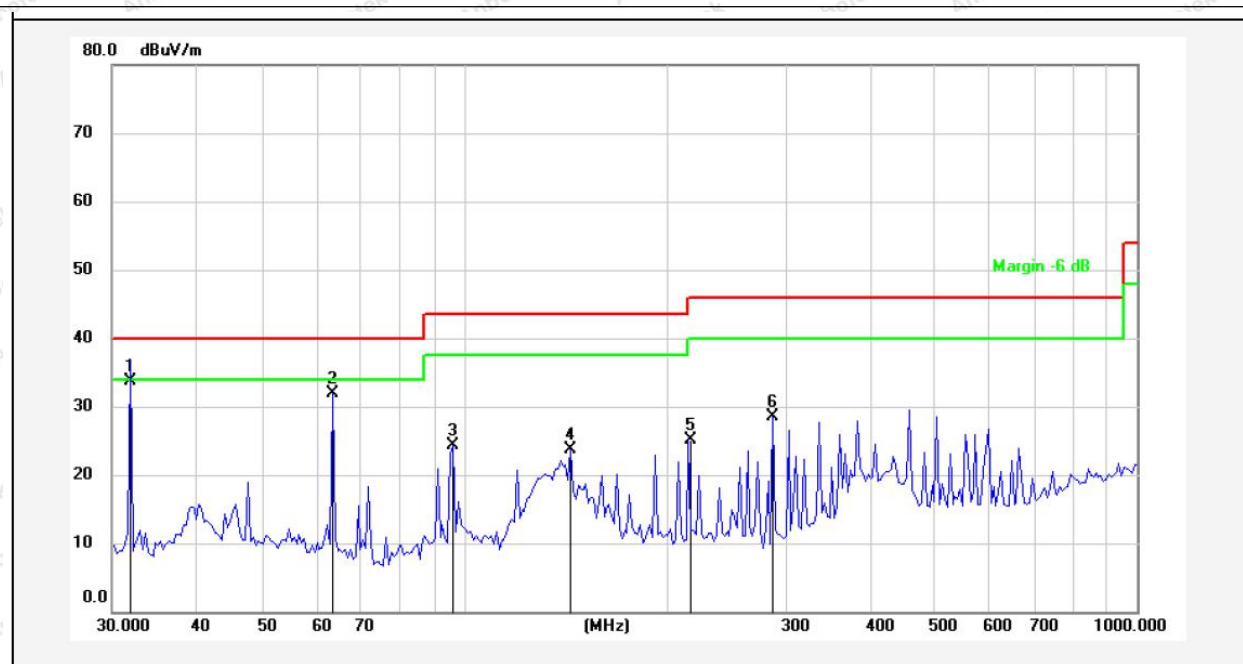
Test item:	Radiation Test	Polarization:	Horizontal
Standard:	(RE)FCC Part 15 Subpart B	Power Source:	DC 5V via adapter
Distance:	3m	Temp.(°C)/Hum.(%RH):	20.2(°C)/50%RH
Test Mode:	USB Mode		



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	63.7588	44.68	-17.88	26.80	40.00	-13.20	peak			
2	96.2672	42.50	-15.96	26.54	43.50	-16.96	peak			
3	144.0819	47.08	-20.42	26.66	43.50	-16.84	peak			
4	215.6456	46.28	-17.29	28.99	43.50	-14.51	peak			
5	287.9904	50.82	-17.35	33.47	46.00	-12.53	peak			
6	384.6055	51.50	-15.16	36.34	46.00	-9.66	peak			

Note: **Result=Reading+Factor** **Over Limit=Result-Limit**

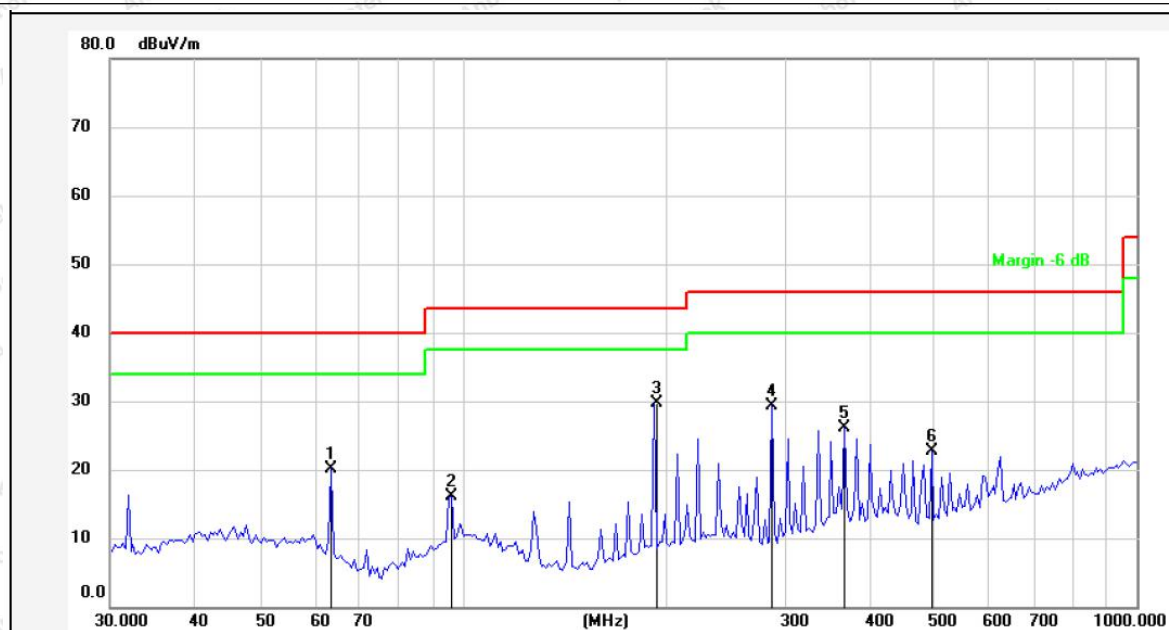
Test item: Radiation Test **Polarization:** Vertical
Standard: (RE)FCC Part 15 Subpart B **Power Source:** DC 5V via adapter
Distance: 3m **Temp.(°C)/Hum.(%RH):** 20.2(°C)/50%RH
Test Mode: USB Mode



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.8986	50.45	-16.82	33.63	40.00	-6.37	QP	100	360	
2	63.7588	49.73	-17.88	31.85	40.00	-8.15	peak			
3	96.2672	40.33	-15.96	24.37	43.50	-19.13	peak			
4	144.0819	44.05	-20.42	23.63	43.50	-19.87	peak			
5	215.6456	42.48	-17.29	25.19	43.50	-18.31	peak			
6	287.9904	45.79	-17.35	28.44	46.00	-17.56	peak			

Note: **Result=Reading+Factor** **Over Limit=Result-Limit**

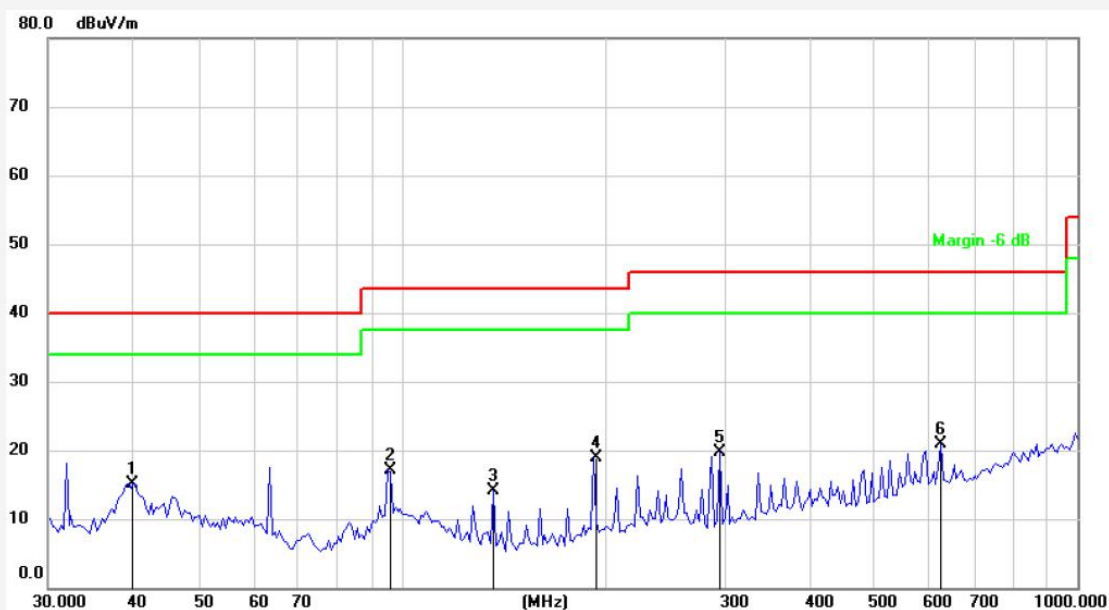
Test item: Radiation Test **Polarization:** Horizontal
Standard: (RE)FCC Part 15 Subpart B **Power Source:** DC 12V
Distance: 3m **Temp.(°C)/Hum.(%RH):** 20.2(°C)/50%RH
Test Mode: DC Mode



No.	Freq. (MHz)	Reading (dBuV)	Factor (°)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	63.7588	37.89	-17.88	20.01	40.00	-19.99	peak			
2	96.2672	32.10	-15.96	16.14	43.50	-27.36	peak			
3	192.4186	47.47	-17.86	29.61	43.50	-13.89	peak			
4	287.9904	46.57	-17.35	29.22	46.00	-16.78	peak			
5	368.1116	41.50	-15.37	26.13	46.00	-19.87	peak			
6	495.9344	37.14	-14.38	22.76	46.00	-23.24	peak			

Note: Result=Reading+Factor Over Limit=Result-Limit

Test item: Radiation Test **Polarization:** Vertical
Standard: (RE)FCC Part 15 Subpart B **Power Source:** DC 12V
Distance: 3m **Temp.(°C)/Hum.(%RH):** 20.2(°C)/50%RH
Test Mode: DC Mode



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	40.0644	30.65	-15.57	15.08	40.00	-24.92	peak			
2	95.4270	33.16	-16.01	17.15	43.50	-26.35	peak			
3	136.6993	34.44	-20.25	14.19	43.50	-29.31	peak			
4	192.4186	36.72	-17.86	18.86	43.50	-24.64	peak			
5	295.6648	36.81	-17.18	19.63	46.00	-26.37	peak			
6	628.3745	32.71	-11.90	20.81	46.00	-25.19	peak			

Note: **Result=Reading+Factor** **Over Limit=Result-Limit**

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Radiated Emission Test



APPENDIX II -- EXTERNAL PHOTOGRAPH

----- End of Report -----