

# **FCC TEST REPORT**

Report No.: 210520024EMC-1

Computer

**Trade Mark:** 

**BLUEBIRD** 

Model No.: EK430

Add. Model No.: N/A

Report Number: 210520024EMC-1

Test Standards: FCC 47 CFR Part 15 Subpart B

FCC ID: SS4EK430

Test Result: PASS

Date of Issue: September 30, 2021

Prepared for:

#### Bluebird Inc.

3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

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**Version** 

Version No.	Date	Description
V1.0	September 30, 2021	Original





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# 1. GENERAL INFORMATION 1.1 CLIENT INFORMATION

Applicant:	Bluebird Inc.
Address of Applicant: 3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea	
Manufacturer:	Bluebird Inc.
Address of Manufacturer:	3F 115 Irwon-ro Gangnam-gu Seoul Republic of Korea

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# 1.2 EUT INFORMATION

1.2.1 General Description of EUT

2.1 Conclusive Scoription of 201			
Product Name:	Enterprise Key-Based Touch Mobile Computer		
Model No.:	EK430		
Add. Model No.:	N/A		
Trade Mark:	BLUEBIRD		
DUT Stage:	Identical Prototype		
Rated Voltage:	<ul><li>☑ Powered by USB port (5Vdc)</li><li>☑ 110-240V~50/60Hz, 1.0A and/or 3.9Vdc (1x3.9V Li-ion Rechargeable battery)</li></ul>		
Classification of digital devices:	Class B		
Highest Internal Frequency:	5.825 GHz		
Software Version:	EK430-VX500-AND10-EN-20210510_R1.00-user		
Hardware Version: 0.2			
Sample Received Date: May 28, 2021			
Sample Tested Date:	June 18, 2021 to June 21, 2021		

1.2.2 Description of Accessories

Adapter					
Model No.:	XSD-0503000DEXU				
Input:	100-240 V~50/60 Hz 0.5 A Max				
Output:	5.0 V == 3.0A				
AC Cable:	N/A				
DC Cable:	N/A				

Battery (Main)			
Model No.:	BAT-680001		
Battery Type: Lithium-ion Rechargeable Battery			
Rated Voltage:	3.6 Vdc		
Limited Charge Voltage:	4.2 Vdc		
Rated Capacity:	6700 mAh		

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Battery (Sub)		
Model No.:	VK401324PH-Q5	
Battery Type: Lithium-ion Rechargeable Battery		
Rated Voltage: 3.7 Vdc		
Limited Charge Voltage: 4.2 Vdc		
Rated Capacity:	65 mAh	

Cable			
Model No.:	N/A		
Description:	USB Type-C Plug Cable		
Cable Type:	Shielded without ferrite		
Length:	1 Meter		

#### 1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

) Support Equipment				
Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	TP00067A	N/A	UnionTrust
Earphone	OPPO	S16	N/A	UnionTrust
Mouse	DELL	MS111	N/A	UnionTrust
USB Disk	aigo	U268	N/A	UnionTrust
TF Card	SanDisk	N/A	N/A	UnionTrust
USB2.0 Micro-B to USB3.0 Type-C Adaptor	HUAWEI	N/A	N/A	UnionTrust

#### 2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	OTG Cable	USB2.0 Type-A to USB2.0 Micro-B	15cm Shielded without ferrite	UnionTrust

# 1.4 TEST LOCATION

#### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district,

Shenzhen, China, China 518109 Telephone: +86 (0) 755 2823 0888 Fax: +86 (0) 755 2823 0886

#### 1.5 TEST FACILITY

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

CNAS-Lab Code: L9069

#### Shenzhen UnionTrust Quality and Technology Co., Ltd.



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The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

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#### A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **ISED Wireless Device Testing Laboratories**

CAB identifier: CN0032

#### FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

#### 1.6 DEVIATION FROM STANDARDS

None.

#### 1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

### 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

#### 1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	ltem	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	±4.7 dB
4	Radiated emission 30MHz-1GHz	±4.6 dB
5	Radiated emission 1GHz-18GHz	±4.4 dB
6	Radiated emission 18GHz-26GHz	±4.6 dB
7	Radiated emission 26GHz-40GHz	±4.6 dB



# 2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart B Test Cases				
Test Item Test Requirement Test Method Result				
Conducted Emission	FCC 47 CFR Part 15.107	ANSI C63.4-2014	PASS	
Radiated Emission	FCC 47 CFR Part 15.109	ANSI C63.4-2014	PASS	

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# 3. EQUIPMENT LIST

	Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)	
$\boxtimes$	3m SAC	ETS-LINDGREN	3m	N/A	Jan. 22, 2021	Jan. 21, 2024	
$\boxtimes$	Receiver	R&S	ESIB26	100114	Nov. 18, 2020	Nov. 17, 2021	
$\boxtimes$	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 14, 2020	Nov. 13, 2022	
$\boxtimes$	6dB Attenuator	Talent	RA6A5-N- 18	18103001	Nov. 14, 2020	Nov. 13, 2022	
$\boxtimes$	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2020	Nov. 9, 2021	
$\boxtimes$	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	Apr. 30, 2021	Apr. 29, 2023	
$\boxtimes$	Pre-amplifier	ETS-LINDGREN	00118385	00201541	Nov. 10, 2020	Nov. 9, 2021	
$\boxtimes$	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 17, 2020	Nov. 16, 2022	
$\boxtimes$	Pre-amplifier	ETS-LINDGREN	00118384	00202652	Nov. 17, 2020	Nov. 16, 2022	
	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A	
	Test Software Audix e3 Software Version: 9.160323			0323			

	Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)	
$\boxtimes$	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Nov. 18, 2020	Nov. 17, 2021	
$\boxtimes$	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 18, 2020	Nov. 17, 2021	
$\boxtimes$	LISN	R&S	ESH2-Z5	860014/024	Nov. 18, 2020	Nov. 17, 2021	
	Test Software	Audix	e3	Software Version: 9.160323		0323	



#### 4. TEST CONFIGURATION

# 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

# 4.1.1 Normal or Extreme Test Conditions

<b>Environment Parameter</b>	Selected Values During Tests			
Test Condition	Ambient			
rest Condition	Temperature (°C)	Voltage	Relative Humidity (%)	
NT/NV	+15 to +35	1. 120V~60Hz and/or Battery 2. 240V~50Hz and/or Battery	20 to 75	
Remark:  1) NV: Normal Voltage; NT: Normal Temperature				

#### 4.1.2 Record of Normal Environment

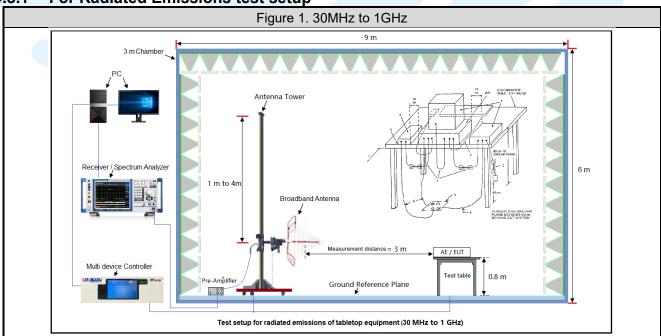
Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Conducted Emission				
Radiated Emission				

#### **4.2TEST MODES**

Test Item	EMI Test Modes
	Test Mode 1: Charging from 120 Vac (with adapter) + Battery + MP4 playing + With TF Card + Earphone Test Mode 2: Charging from 120 Vac (with adapter) + Battery + Camera (Front) + With TF Card
Radiated	Test Mode 3: Charging from 120 Vac (with adapter) + Battery + Camera (Rear) + With TF Card
Emission	Test Mode 4: Charging from 240 Vac (with adapter) + Battery + Worse from mode 1~3
	Test Mode 5: Battery + OTG (with USB Disk) + Worse from mode 1~3
	Test Mode 6: Battery + USB Cable (data transfer with notebook) + With TF Card
	Test Mode 1: Charging from 120 Vac (with adapter) + Battery + MP4 playing + With TF Card + Earphone
Conducted	Test Mode 2: Charging from 120 Vac (with adapter) + Battery + Camera (Front) + With TF Card
	Test Mode 3: Charging from 120 Vac (with adapter) + Battery + Camera (Rear) + With TF Card
Emission	Test Mode 4: Charging from 240 Vac (with adapter) + Battery + Worse from mode 1~3
	Test Mode 5: Battery + USB Cable (data transfer with notebook) + With TF Card

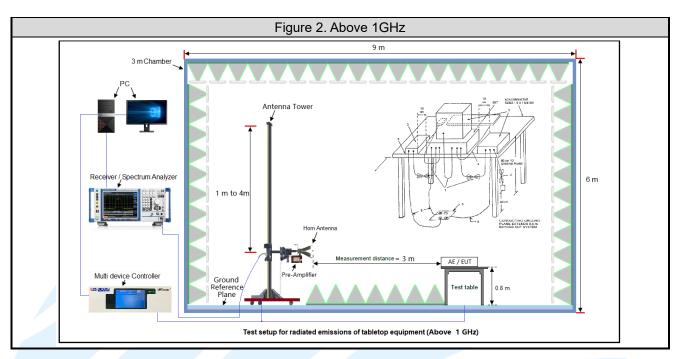
#### 4.3 TEST SETUP

# 4.3.1 For Radiated Emissions test setup

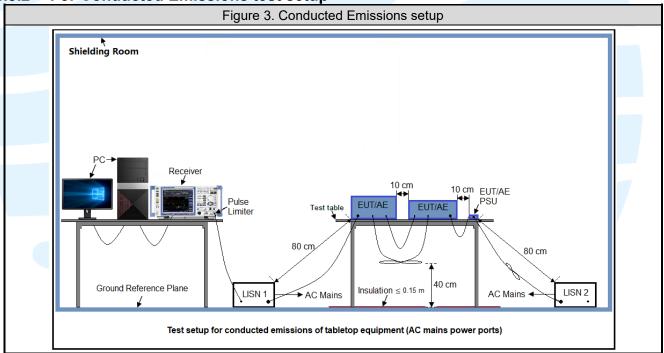


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4.3.2 For Conducted Emissions test setup



#### 4.4 SYSTEM TEST CONFIGURATION

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic (according to KDB 896810 D02 SDoC FAQ v01r01) of the highest fundamental frequency or to 40 GHz, whichever is lower.



#### 5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title			
1	FCC 47 CFR Part15 Subpart B	Unintentional Radiators			
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz			
3	KDB 174176 D01 Line Conducted FAQ v01r01	AC power-line conducted emission frequency asked questions			
4	KDB 896810 D02 SDoC FAQ v01r02	Supplier's Declaration of Conformity frequency asked questions			

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# 6. EMC REQUIREMENTS SPECIFICATION 6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 15.109

Test Method: ANSI C63.4-2014

**Receiver Setup:** 

I	Frequency: (f)	quency: (f)  Retector type  Measurement receiver bandwidth		
	(MHz)	Detector type	RBW	VBW
	$30 \le f \le 1000$	Quasi Peak	120 kHz	300 kHz
	f≥1000	Peak	1 MHz	3 MHz
	1 ≥ 1000	Average	1 MHz	3 MHz

#### Measured frequency range

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705-108	1000.
108-500	2000.
500-1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

#### Limits:

Limits for Class B devices

Fraguerov (MUT)	limits at 3m (dBμV/m)			
Frequency (MHz)	QP Detector	PK Detector	AV Detector	
30-88	40.0			
88-216	43.5	-		
216-960	46.0			
960 to 1000	54.0			
Above 1000		74.0	54.0	

#### Remark:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m).
- 3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

**Test Setup:** Refer to section 4.3.1 for details.

#### **Test Procedures:**

1. From 30 MHz to 1GHz test procedure as below:

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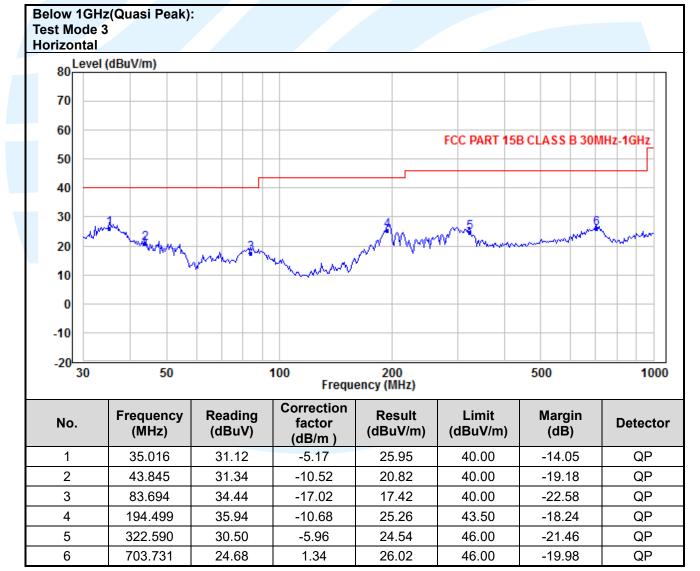
- The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

- 3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
- 2. Above 1GHz test procedure as below:
- 1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

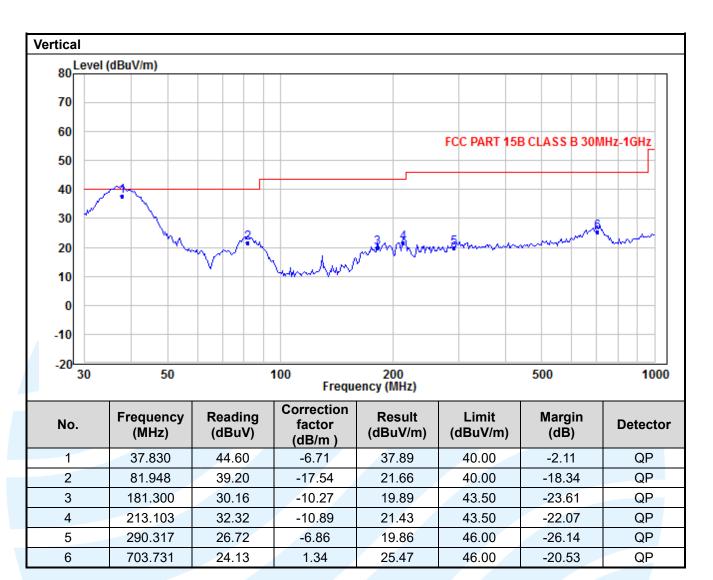
**Equipment Used:** Refer to section 3 for details.

Test Result: Pass

The worst measurement data as follows:



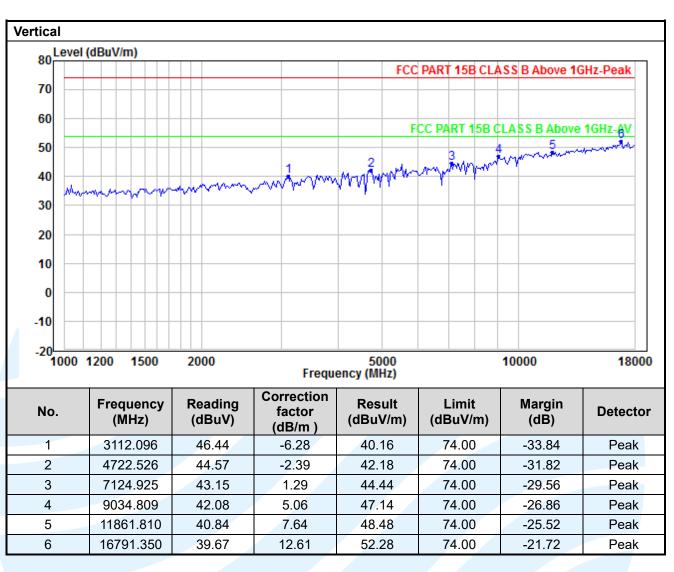






Above 1GHz(Peak & Average) **Test Mode 4** Horizontal 80 Level (dBuV/m) FCC PART 15B CLASS B Above 1GHz-Peak 70 60 50 40 30 20 10 0 -10 -20 1000 1200 1500 2000 5000 10000 18000 Frequency (MHz) Correction **Frequency** Reading Result Limit Margin No. factor **Detector** (dB) (MHz) (dBuV) (dBuV/m) (dBuV/m) (dB/m) 1 2015.509 47.07 -9.53 37.54 74.00 -36.46 Peak 2 3414.304 45.56 -5.31 40.25 74.00 -33.75Peak 3 5521.982 43.22 0.09 43.31 74.00 -30.69 Peak 4 10442.590 41.67 6.31 47.98 74.00 -26.02 Peak 5 11.73 74.00 -23.88 14194.950 38.39 50.12 Peak 6 16312.020 39.42 12.15 51.57 74.00 -22.43 Peak





#### Remark:

- 1. Correct Factor = Antenna Factor + Cable Loss Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
- 2. Result = Reading + Correct Factor.
- 3. Margin = Result Limit
- 4. All possible modes of operation were investigated, and testing at two nominal voltages of 240V~50Hz and 120V~60Hz, only the worst case emissions reported.
- 5. For Radiated Emission above 18GHz, there was not any unwanted emission detected.
- 6. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.



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#### **6.2 CONDUCTED EMISSION**

Test Requirement: FCC 47 CFR Part 15.107

Test Method: ANSI C63.4-2014

Limits:

Limits for Class B devices

Frequency range	Limits (dB(μV)		
(MHz)	Quasi-peak	Average	
0,15 to 0,50	66 to 56	56 to 46	
0,50 to 5	56	46	
5 to 30	60	50	

#### Remark:

1. The lower limit shall apply at the transition frequencies.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

**Test Setup:** Refer to section 4.3.2 for details.

#### **Test Procedures:**

- 1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- 2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

**Equipment Used:** Refer to section 3 for details.

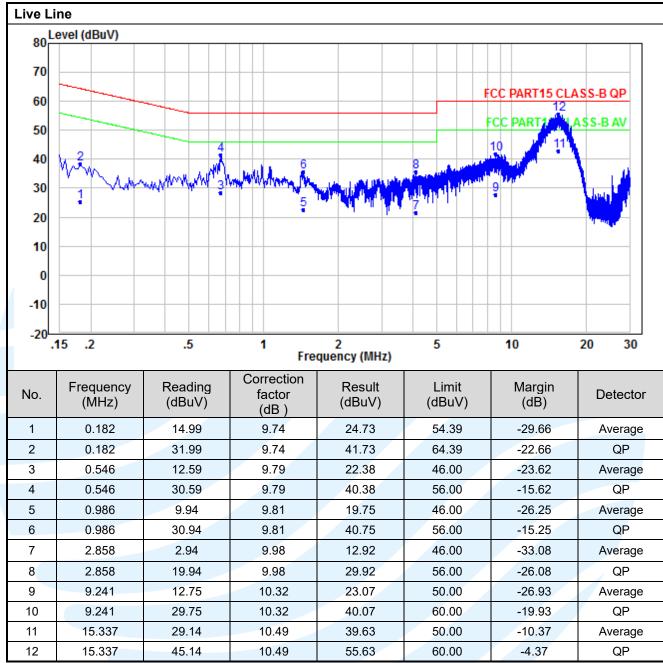
Test Result: Pass



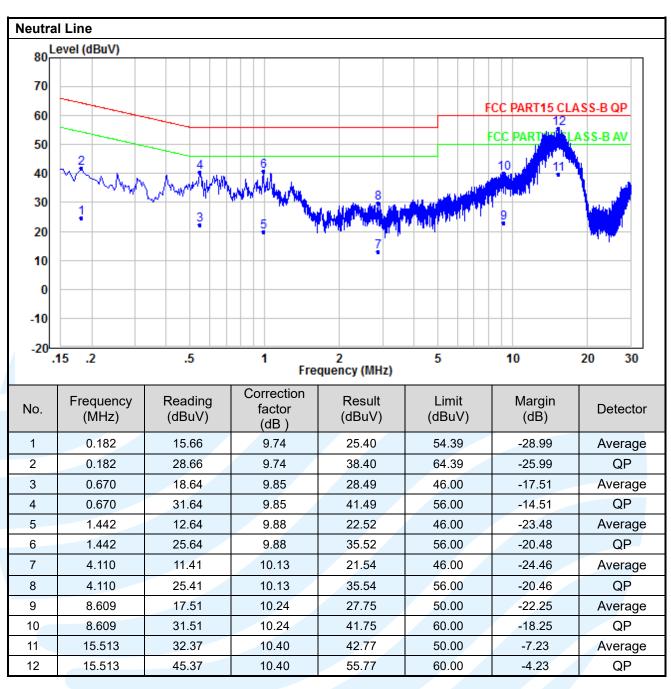
The worst measurement data as follows:

Quasi Peak and Average:

**Test Mode 4** 







#### Remark:

- 1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
- Result = Reading + Correct Factor.
- 3. Margin = Result Limit
- 4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.
- 5. All possible modes of operation were investigated, and testing at two nominal voltages of 240V~50Hz and 120V~60Hz, only the worst case emissions reported.



#### APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

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# **APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS**

