



Guangdong Changhong Electronics Co., Ltd.

Application
For
Certification
FCC ID: 2ABNOLED22YB1600UA
Computer Peripheral

Report No.: 140512037SZN-001

Prepared and Checked by:

Approved by:

Sign on file

Hardy Suo
Assistant Engineer

Andy Yan
Project Engineer
Date: June 10, 2014

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF No.: FCC 15C_PC_b
FCC ID: 2ABNOLED22YB1600UA

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INTERTEK TESTING SERVICES

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MEASUREMENT / TECHNICAL REPORT

Guangdong Changhong Electronics Co., Ltd.

MODEL: LED22YB1600UA

FCC ID: 2ABNOLED22YB1600UA

June 10, 2014

This report concerns (check one:) Original Grant ☒ Class II Change ☐

Equipment Type: JBP-Class B Computing Device Peripheral

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes ☐ No ☒

If no, assumed Part 15, Subpart B for unintentional radiator – the new 47 CFR [10-01-13 Edition] provision.

Report prepared by:

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List of attached file

Exhibit Type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated photos	radiated photos.pdf
Test Setup Photo	Conducted photos	conducted photos.pdf
External Photo	External Photos	external photos.pdf
Internal Photo	Internal Photos	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
ID Label / Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidential Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 **General Description**

1.1 Product Description

The Equipment Under Test (EUT) is a LED TV. The device can be used to connect PC by HDMI and VGA port. The EUT is powered by AC 120V/60Hz.

1.2 Related Submittal(s) Grants

This is an application for certification of a computer peripheral. Other digital functions were reported in the verification report: 140512036SZN-001.

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1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). Radiated emission measurement was performed in Semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The Semi-anechoic chamber and shielding room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

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EXHIBIT 2

SYSTEM TEST CONFIGURATION

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2.0 **System Test Configuration**

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The device was powered by AC 120V/60Hz during the test. The worst case data was reported in this report.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. The step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

The frequency range from 30MHz to 1GHz (highest frequency is below 108MHz used in the device, the frequency range of radiated measurements is up to 1GHz in accordance with § 15.33) was searched for spurious emissions from the device. Only those emissions reported were detected. All other emissions were at least 20 dB below the applicable limits.

2.2 EUT Exercising Software

N/A

2.3 Special Accessories

N/A

2.4 Equipment Modification

Any modifications installed previous to testing by Guangdong Changhong Electronics Co., Ltd. will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch.

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2.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
Laptop	Lenovo	T420
Laptop	Lenovo	X1
Hard Disk	Smart.drive	HD-003
USB Memory	TOSHIBA	UHYBS-004G-BL
1394 Cable	Smart.drive	Unshielded, Length 180cm
USB Cable	Smart.drive	Unshielded, Length 155cm
Dummy Load	N/A	N/A
VGA Cable	HP	Unshielded, Length 180cm
HDMI Cable	N/A	Unshielded, Length 110cm
Component In Cable	N/A	Unshielded, Length 120cm
Earphone	N/A	Unshielded, Length 100cm
PC Audio Cable	N/A	Unshielded, Length 150cm
Digital Audio Cable	N/A	Unshielded, Length 120cm
Audio In Cable (RL)	N/A	Unshielded, Length 120cm
Tuner Resister	N/A	75ohm
Remote controller	CHANGHONG	N/A

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EXHIBIT 3

EMISSION RESULTS

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3.0 **Emission Results**

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB/m

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

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3.1 Field Strength Calculation (cont'd)

Example

Assume a receiver reading of 62.0dB μ V is obtained. The antenna factor of 7.4dB/m and cable factor of 1.6dB is added. The amplifier gain of 29dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0dB, and the resultant average factor was -10dB. The net field strength for comparison to the appropriate emission limit is 32dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0\text{dB}\mu\text{V}$$

$$AF = 7.4\text{dB/m}$$

$$CF = 1.6\text{dB}$$

$$AG = 29.0\text{dB}$$

$$PD = 0\text{dB}$$

$$AV = -10\text{dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32\text{dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8\mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
At
170.763MHz (VGA Mode)

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos.pdf.

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3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 6.1dB margin (VGA Mode)

TEST PERSONNEL:

Sign on file

Hardy Suo, Assistant Engineer
Typed/Printed Name

May 25, 2014
Date

INTERTEK TESTING SERVICES

Company: Guangdong Changhong Electronics Co., Ltd.
Model: LED22YB1600UA
Operating Mode: HDMI In

Date of Test: May 25, 2014

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	191.020	50.2	20.0	6.9	37.1	43.5	-6.4
Horizontal	296.750	43.8	20.0	14.8	38.6	46.0	-7.4
Horizontal	361.740	35.3	20.0	21.9	37.2	46.0	-8.8
Vertical	79.955	33.9	20.0	16.8	30.7	40.0	-9.3
Vertical	143.975	45.3	20.0	11.3	36.6	43.5	-6.9
Vertical	360.770	49.7	20.0	7.1	36.8	46.0	-9.2

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3 meter distances were measured at 0.3- meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.

Test Engineer: Hardy Suo

INTERTEK TESTING SERVICES

Company: Guangdong Changhong Electronics Co., Ltd.
Model: LED22YB1600UA
Operating Mode: VGA

Date of Test: May 25, 2014

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	170.763	42.8	20.0	14.6	37.4	43.5	-6.1
Horizontal	274.725	38.3	20.0	19.7	38.0	46.0	-8.0
Horizontal	637.833	36.8	20.0	22.1	38.9	46.0	-7.1
Vertical	56.675	34.8	20.0	16.6	31.4	40.0	-8.6
Vertical	73.219	46.2	20.0	7.3	33.5	40.0	-6.5
Vertical	363.242	43.4	20.0	15.3	38.7	46.0	-7.3

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3 meter distances were measured at 0.3- meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.

Test Engineer: Hardy Suo

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3.4 Conducted Emission Configuration Photograph

Worst Case Conducted Configuration
at
0.406 MHz (VGA Mode)

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

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3.5 Conducted Emission Data

Judgement: Passed by 10.2 dB margin(VGA Mode)

TEST PERSONNEL:

Sign on file

Hardy Suo, Assistant Engineer
Typed/Printed Name

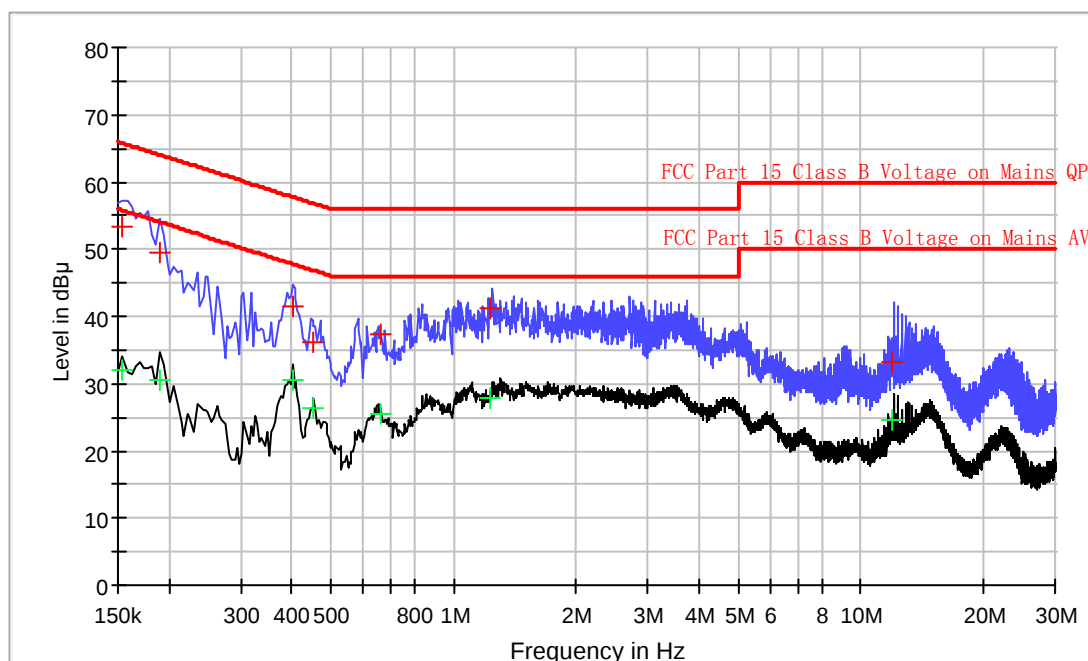
May 25, 2014
Date

INTERTEK TESTING SERVICES

Company: Guangdong Changhong Electronics Co., Ltd.
Model: LED22YB1600UA
Operating Mode: HDMI In
Phase: Live

Date of Test: May 25, 2014

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.154	53.4	L1	9.9	12.4	65.8
0.190	49.6	L1	9.8	14.4	64.0
0.402	41.6	L1	9.7	16.2	57.8
0.662	37.4	L1	9.5	18.6	56.0
1.226	41.1	L1	9.8	14.9	56.0
11.900	33.1	L1	10.1	26.9	60.0

Result Table AV

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.154	32.0	L1	9.9	23.8	55.8
0.190	30.4	L1	9.8	23.6	54.0
0.402	30.4	L1	9.7	17.4	47.8
0.662	25.6	L1	9.5	20.4	46.0
1.226	27.9	L1	9.8	18.1	46.0
11.900	24.6	L1	10.1	25.4	50.0

Test Engineer: Hardy Suo

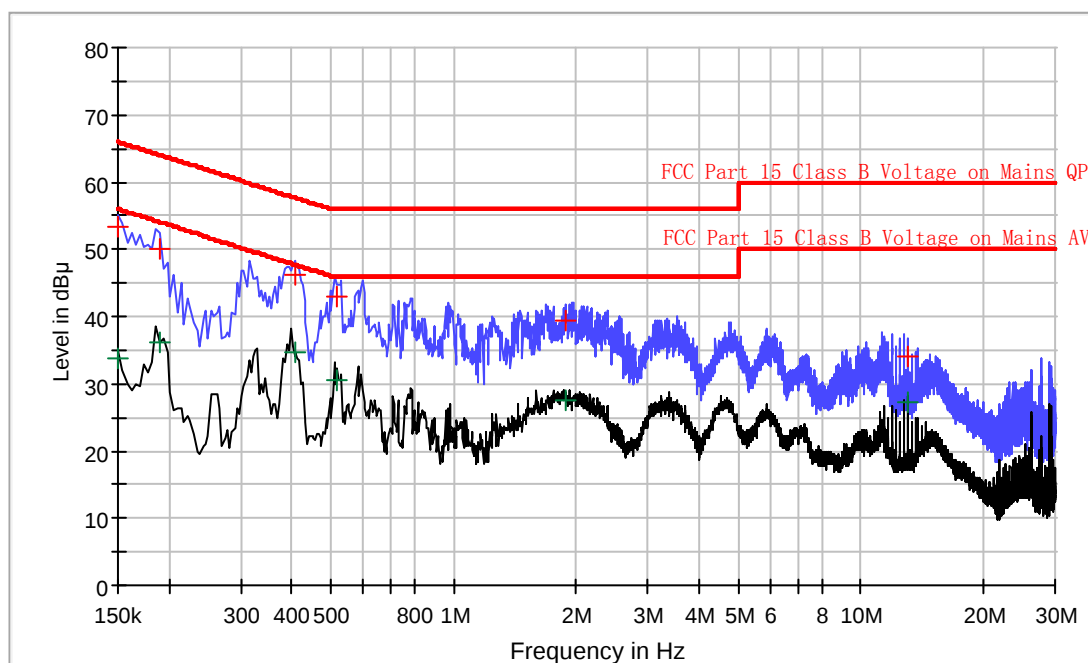
TRF No.: FCC 15C_PC_b
FCC ID: 2ABNOLED22YB1600UA

INTERTEK TESTING SERVICES

Company: Guangdong Changhong Electronics Co., Ltd.
Model: LED22YB1600UA
Operating Mode: HDMI In
Phase: Neutral

Date of Test: May 25, 2014

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150	53.4	N	10.0	12.6	66.0
0.190	50.1	N	9.8	13.9	64.0
0.406	46.2	N	9.6	11.5	57.7
0.518	43.0	N	9.5	13.0	56.0
1.878	39.4	N	9.8	16.6	56.0
13.046	34.0	N	9.9	26.0	60.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150	33.9	N	10.0	22.1	56.0
0.190	36.1	N	9.8	17.9	54.0
0.406	34.6	N	9.6	13.1	47.7
0.518	30.5	N	9.5	15.5	46.0
1.878	27.4	N	9.8	18.6	46.0
13.046	27.3	N	9.9	22.7	50.0

Test Engineer: Hardy Suo

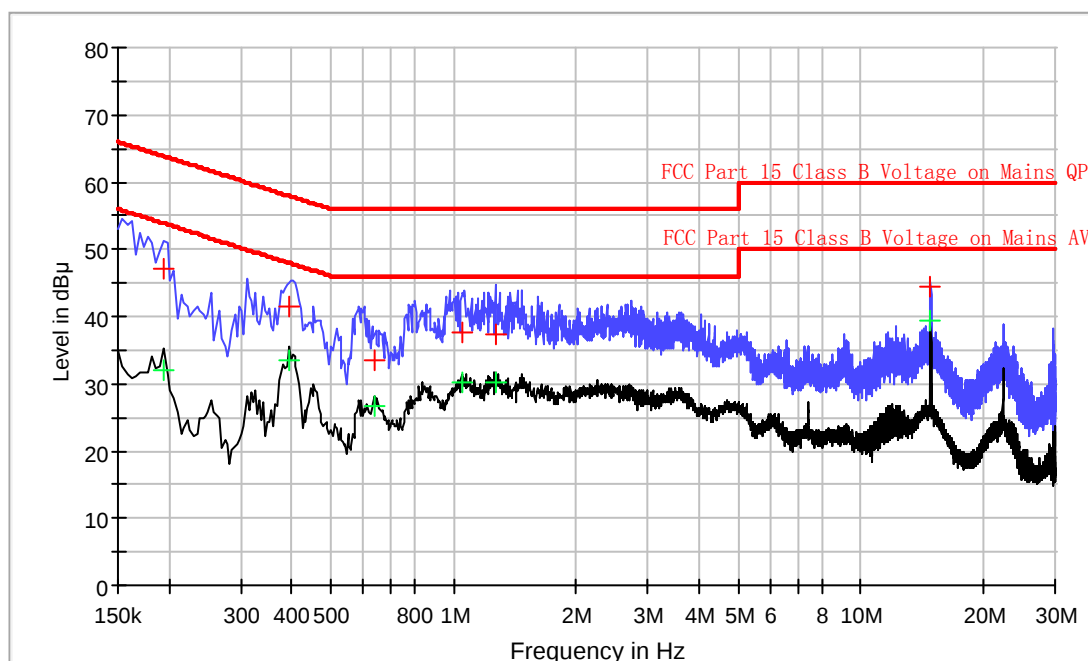
TRF No.: FCC 15C_PC_b
FCC ID: 2ABNOLED22YB1600UA

INTERTEK TESTING SERVICES

Company: Guangdong Changhong Electronics Co., Ltd.
Model: LED22YB1600UA
Operating Mode: VGA
Phase: Live

Date of Test: May 25, 2014

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.194	47.1	L1	9.8	16.8	63.9
0.394	41.4	L1	9.7	16.6	58.0
0.638	33.5	L1	9.5	22.5	56.0
1.054	37.5	L1	9.7	18.5	56.0
1.266	37.3	L1	9.8	18.7	56.0
14.850	44.6	L1	10.3	15.4	60.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.194	32.0	L1	9.8	21.9	53.9
0.394	33.4	L1	9.7	14.6	48.0
0.638	26.7	L1	9.5	19.3	46.0
1.054	30.2	L1	9.7	15.8	46.0
1.266	30.3	L1	9.8	15.7	46.0
14.850	39.5	L1	10.3	10.5	50.0

Test Engineer: Hardy Suo

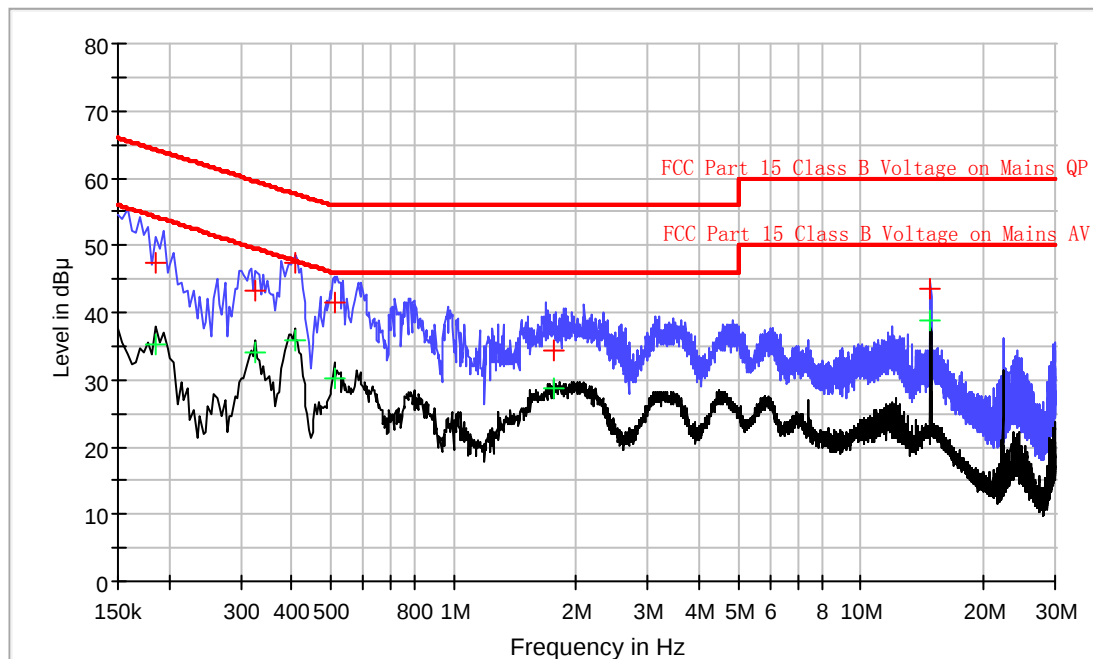
TRF No.: FCC 15C_PC_b
FCC ID: 2ABNOLED22YB1600UA

INTERTEK TESTING SERVICES

Company: Guangdong Changhong Electronics Co., Ltd.
Model: LED22YB1600UA
Operating Mode: VGA
Phase: Neutral

Date of Test: May 25, 2014

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.186	47.4	N	9.9	16.8	64.2
0.326	43.3	N	9.7	16.3	59.6
0.406	47.5	N	9.6	10.2	57.7
0.510	41.4	N	9.5	14.6	56.0
1.762	34.4	N	9.9	21.6	56.0
14.850	43.7	N	10.3	16.3	60.0

Result Table AV

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.186	35.3	N	9.9	18.9	54.2
0.326	34.1	N	9.7	15.5	49.6
0.406	35.9	N	9.6	11.8	47.7
0.510	30.1	N	9.5	15.9	46.0
1.762	28.7	N	9.9	17.3	46.0
14.850	38.7	N	10.3	11.3	50.0

Test Engineer: Hardy Suo

TRF No.: FCC 15C_PC_b
FCC ID: 2ABNOLED22YB1600UA

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EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

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4.0 **Equipment Photographs**

For electronic filing, photographs of the tested EUT are saved with filename: external photos.pdf and internal photos.pdf.

EXHIBIT 5
PRODUCT LABELLING

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5.0 **Product Labelling**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

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EXHIBIT 6

TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

For electronic filing, the block diagram of the tested EUT is saved with filename: block.pdf.

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EXHIBIT 7

INSTRUCTION MANUAL

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7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold / leased in the United States.

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EXHIBIT 8

MISCELLANEOUS INFORMATION

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8.0 **Miscellaneous Information**

This miscellaneous information includes emission measuring procedure.

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8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of computer peripheral operating under Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 – 2009.

The computer peripheral equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The antenna height and polarization are varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions are in QP mode from the frequency band 30MHz to 1GHz with RBW setting 120kHz. Detector function for conducted emissions are in QP & AV mode and IFBW setting is 9kHz from the frequency band 150kHz to 30MHz.

For radiated emission, the frequency range scanned is 30MHz to 1GHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

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8.1 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

Conducted measurements are made as described in ANSI C63.4 – 2009.

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EXHIBIT 9

TEST EQUIPMENT LIST

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9.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	Biconilog Antenna	ETS	3142C	00078828	29-Jun-2013	29-Jun-2014
SZ185-01	EMI Receiver	R & S	ESCI	100547	10-Mar-2014	10-Mar-2015
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	19-Apr-2014	19-Apr-2015
SZ062-04	RF Cable	RADIAL	RG 213U	--	08-Jan-2014	08-Jul-2014
SZ062-06	RF Cable	RADIAL	0.04-26.5GHz	083388	09-Nov-2013	09-Nov-2014
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	09-Nov-2013	09-Nov-2014
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	09-Nov-2013	09-Nov-2014
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	23-Aug-2013	23-Aug-2014
SZ188-03	Shielding Room	ETS	RFD-100	4100	29-Jun-2013	29-Jun-2014