S&O ELECTRONICS (MALAYSIA) SDN. BHD.

Application
For
Certification

FCC ID: 2AB3N-XLHF203BTX

Hi Fi COMPONENT SYSTEM

Model: XL-HF203B

Additional Models: XL-HF203B* whereas the suffix * represents character(s) A through Z, with or without bracket to denotes color or cosmetics.

Computer Peripheral

Report No.: 170224003GZU-002

Prepared and Checked by:	Approved by:
Sign on file	Digitally signed by Kidd Yang Location: Intertek Testing Services
Robert Li Senior Project Engineer	Kidd Yang Senior Project Engineer Date: 07 March 2017

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LIST OF EXHIBITS

MEASUREMENT / TECHNICAL REPORT

S&O ELECTRONICS (MALAYSIA) SDN. BHD.

MODEL: XL-HF203B
Additional Models: XL-HF203B* whereas the suffix * represents character(s) A through Z, with or without bracket to denotes color or cosmetics.

FCC ID: 2AB3N-XLHF203BTX

This report concerns (check one:) Original Grant ___X___ Class II Change _____

Equipment Type: JBP-Class B Computing Device Peripheral

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No ___X

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 ___X

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

EXHIBIT 1

GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description

The equipment under test (EUT) is a Hi Fi COMPONENT SYSTEM with BT 2.1 with EDR function operating in 2402-2480MHz. User can listen to audio data playing on a PC with USB Type A – Type B cable. The EUT is powered by AC100-240V, 50/60Hz, 22W. The NFC tag is passive. For more detail information pls. refer to the user manual.

1.2 Related Submittal(s) Grants

This is an application for certification of a computer peripheral, and related report for Bluetooth function (BT 2.1+EDR) is subjected to FCC Report No.: 170224003GZU-001, is filed at the same time.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2014). 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 **EMTEK (Shenzhen) Co., Ltd.** and located at Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052, China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 406365).

EXHIBIT 2

SYSTEM TEST CONFIGURATION

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 (2014).

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 12GHz 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

No special accessory attached.

2.4 Equipment Modification

Any modifications installed previous to testing by S&O ELECTRONICS (MALAYSIA) SDN. BHD. will be incorporated in each production model sold / leased in the United States.

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

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	Manufacture	Model No.
Laptop	HP	ProBook 5220m
Hard Disk	Smart Drive	HD-003
USB Cable	N/A	Unshielded, Length 110cm
LAN Cable with Load	N/A	Unshielded, Length 450cm
iPod	Apple	A1367
PC In Cable (USB Type A - Type B)	N/A	Unshielded, Length 110cm
Line In Cable	N/A	Unshielded, Length 120cm
USB Disk	TOSHIBA	UHYBS-004G-BL
Audio In Cable	N/A	Unshielded, Length 120cm
Speaker x 2	N/A	N/A, 8 ohm
Speaker wires x 2	S&O	Unshielded, Length 250cm
Earphone	N/A	Unshielded, Length 110cm
Optical Cable with load	N/A	Unshielded, Length 110cm
Dummy Load	N/A	N/A
FM Antenna	S&O	N/A
AM loop Antenna	S&O	N/A
Remote Control	S&O	N/A

EXHIBIT 3

EMISSION RESULTS

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.

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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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

3.1 Field Strength Calculation (cont'd)

Example

Assume a receiver reading of 62.0dBμV 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 32dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0dBμV
AF = 7.4dB/m
CF = 1.6dB
AG = 29.0dB
PD = 0dB

AV = –10dB

FS = 62 + 7.4 + 1.6 – 29 + 0 + (–10) = 32dBμV/m

Level in μV/m = Common Antilogarithm [(32dBμV/m)/20] = 39.8μV/m

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
At
684.240MHz (PC In Mode)

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

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 10.0dB margin (PC In Mode)

TEST PERSONNEL:

Sign on file

Robert Li Senior Project Engineer
Typed/Printed Name

07 March 2017
Date

Company: S&O ELECTRONICS (MALAYSIA) SDN. BHD. Date of Test: 07 March 2017
Model: XL-HF203B
Operating Mode: PC In

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	275.940	37.5	20.0	16.3	33.8	46.0	-12.2
Horizontal	413.640	30.9	20.0	23.2	34.1	46.0	-11.9
Horizontal	684.240	26.4	20.0	29.6	36.0	46.0	-10.0
Horizontal	6100.220	12.4	20.0	35.3	27.7	54.0	-26.3
Horizontal	10088.080	10.4	20.0	39.2	29.6	54.0	-24.4
Vertical	56.220	24.5	20.0	23.2	27.7	40.0	-12.3
Vertical	88.080	41.5	20.0	8.1	29.6	43.5	-13.9
Vertical	276.840	38.9	20.0	13.1	32.0	46.0	-14.0
Vertical	6031.646	20.8	20.0	35.4	36.2	54.0	-17.8
Vertical	11041.975	12.3	20.0	39.1	31.4	54.0	-22.6

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz, and Peak detector is used for frequency from 1G to 12 GHz.

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: Robert Li

3.4 Conducted Emission Configuration Photograph

Worst Case Conducted Configuration
at
0.266 MHz (PC In Mode)

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

3.5 Conducted Emission Data

Judgement: Passed by 13.4 dB margin(PC In Mode)

TEST PERSONNEL:

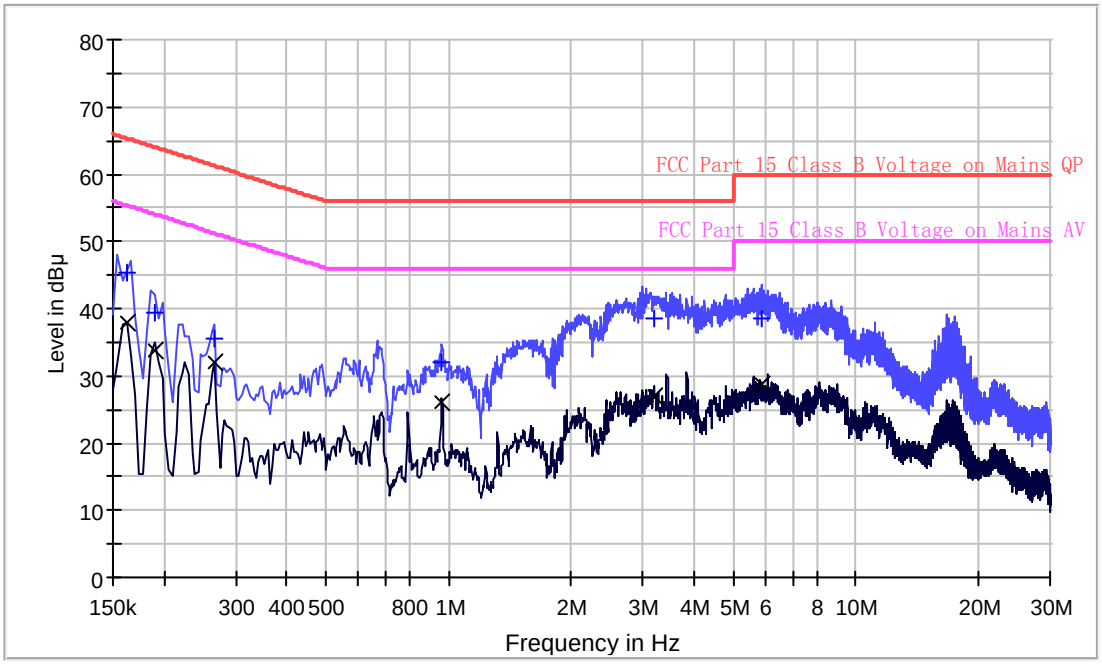
Sign on file

Robert Li Senior Project Engineer
Typed/Printed Name

07 March 2017
Date

Company: S&O ELECTRONICS (MALAYSIA) SDN. BHD. Date of Test: 07 March 2017
Model: XL-HF203B
Operating Mode: PC In
Phase: Live

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.162	45.4	L1	9.6	20.0	65.4
0.190	39.3	L1	9.7	24.7	64.0
0.266	35.5	L1	9.7	25.7	61.2
0.962	32.0	L1	9.7	24.0	56.0
3.206	38.4	L1	9.8	17.6	56.0
5.862	38.4	L1	9.8	21.6	60.0

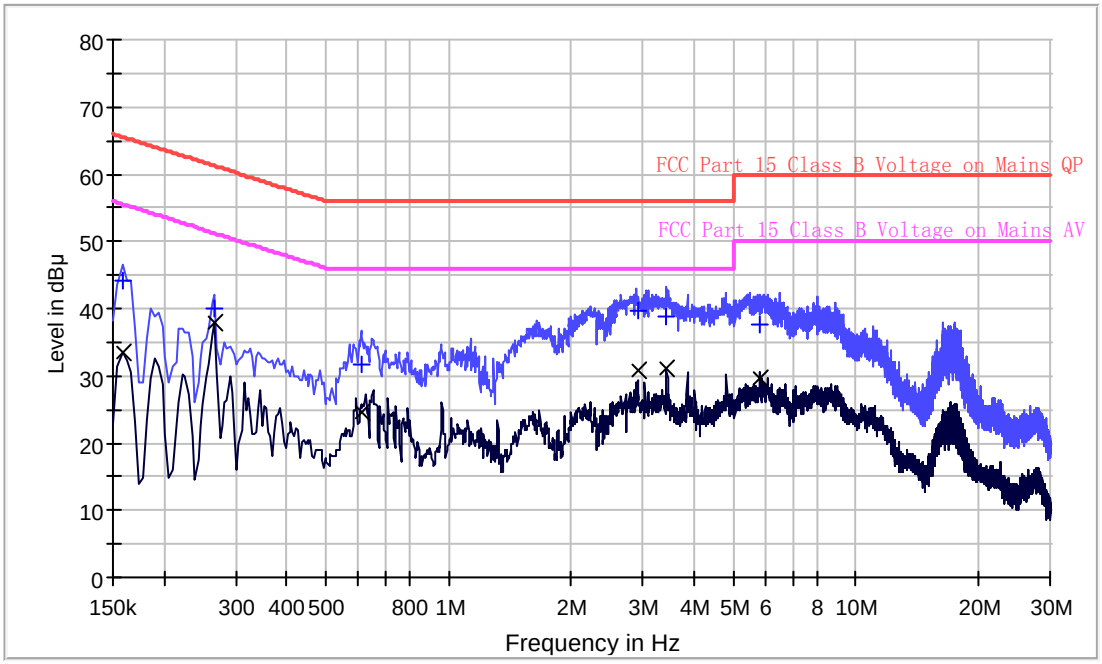
Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.162	37.9	L1	9.6	17.5	55.4
0.190	33.7	L1	9.7	20.3	54.0
0.266	32.1	L1	9.7	19.1	51.2
0.962	26.2	L1	9.7	19.8	46.0
3.206	26.9	L1	9.8	19.1	46.0
5.862	28.6	L1	9.8	21.4	50.0

Test Engineer: Robert Li

Company: S&O ELECTRONICS (MALAYSIA) SDN. BHD. Date of Test: 07 March 2017
Model: XL-HF203B
Operating Mode: PC In
Phase: Neutral

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.158	44.2	N	9.6	21.4	65.6
0.266	39.9	N	9.7	21.3	61.2
0.610	31.7	N	9.7	24.3	56.0
2.910	39.7	N	9.8	16.3	56.0
3.438	38.8	N	9.8	17.2	56.0
5.786	37.6	N	9.8	22.4	60.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.158	33.6	N	9.6	22.0	55.6
0.266	37.8	N	9.7	13.4	51.2
0.610	24.5	N	9.7	21.5	46.0
2.910	30.9	N	9.8	15.1	46.0
3.438	31.2	N	9.8	14.8	46.0
5.786	29.7	N	9.8	20.3	50.0

Test Engineer: Robert Li

EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

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

5.0 **Product Labelling**

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

EXHIBIT 6

TECHNICAL SPECIFICATIONS

6.0 Technical Specifications

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

EXHIBIT 7

INSTRUCTION MANUAL

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.

EXHIBIT 8

MISCELLANEOUS INFORMATION

8.0 **Miscellaneous Information**

This miscellaneous information includes emission measuring procedure.

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 – 2014.

The computer peripheral equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 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 and in PK & AV mode from frequency band 1GHz to 12GHz with RBW setting 1MHz. 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 12GHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

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 – 2014.

EXHIBIT 9

TEST EQUIPMENT LIST

9.0 **Test Equipment List**

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
EE089	EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	17-May-2016	17-May-2017
EE040	Pre-Amplifier	HP	8447F	2944A07999	17-May-2016	17-May-2017
EE043	Bilog Antenna	Schwarzbeck	VULB9163	142	17-May-2016	17-May-2017
EE147	Cable	Schwarzbeck	AK9513	ACRX1	17-May-2016	17-May-2017
EE170	Cable	Schwarzbeck	AK9513	CRRX2	29-May-2016	29-May-2017
EE343	EMI Test Receiver	Rohde & Schwarz	FSV40	132.1-3008K39-100967-AP	29-May-2016	29-May-2017
EE094	Horn Antenna	Schwarzbeck	BBHA 9120	768	28-May-2016	28-May-2017
EE096	Pre-Amplifier	A.H.	PAM-0126	2944A08998	28-May-2016	28-May-2017
EE313	Cable	A.H	SAC-40G-1	413	17-May-2016	17-May-2017
EE023	Test Receiver	Rohde & Schwarz	ESCS30	879	29-May-2016	29-May-2017
EE145	L.I.S.N.	Rohde & Schwarz	ENV216	590	29-May-2016	29-May-2017
EE021	L.I.S.N.	ROHDE & SCHWARZ	ESH2-Z5	236	29-May-2016	29-May-2017