Hisense Electric Co., Ltd.

Application
For
Certification
FCC ID: W9HLCDC0028

LED LCD TV

Model: LHD32D36US
Additional Model: 32D36, 32H3C, LHD32D37US, 32D37, 32H3E

Computer Peripheral

Report No.: 140327003SZN-002

Prepared and Checked by:	Approved by:
Sign on file	Digitally signed by Billy Li Location: Intertek Testing Services
Jenner Liu Assistant Engineer	Billy Li Supervisor Date: April 09, 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.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results referenced from this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF No.: FCC 15C_PC_b

Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch
6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China
Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751 Website: www.china.intertek-etlsemko.com

LIST OF EXHIBITS

MEASUREMENT / TECHNICAL REPORT

Hisense Electric Co., Ltd.
MODEL: LHD32D36US
Additional Model: 32D36, 32H3C, LHD32D37US, 32D37, 32H3E

FCC ID: W9HLCDC0028

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 [10-01-13 Edition] provision.

Report prepared by:

Jenner Liu
Intertek Testing Services Shenzhen Ltd.
Kejiyuan Branch
6F, D Block, Huahan Building, Langshan Road
Nanshan District, Shenzhen, P. R. China
Phone: (86 755) 8614 0639
Fax: (86 755) 8601 6751

Table of Contents

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 LED LCD TV. The device can be used to connect PC by HDMI and VGA port. The EUT is powered by 120V/60Hz.

The Models: 32D36, 32H3C, LHD32D37US, 32D37, 32H3E are the same as the Model: LHD32D36US in hardware aspect. The difference in front plastic cabinet and model number serves as marketing strategy.

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: 140327003SZN-001.

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).

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 (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 2GHz 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 Hisense Electric 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.

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	SanDisk	SDCZ36-002G-P36
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*3	N/A	UnShielded, Length 180cm
PC Audio Cable	N/A	Unshielded, Length 150cm
AV Cable	N/A	Unshielded, Length 120cm
YPbPr Cable	N/A	Unshielded, Length 120cm
Digital Audio Out Cable	N/A	Unshielded, Length 120cm
Tuner Resister	N/A	75ohm
Headphone	N/A	Unshielded, Length 110cm
Remote controller	Hisense	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
148.524MHz (HDMI 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 5.6dB margin (HDMI In Mode)

TEST PERSONNEL:

Sign on file

Jenner Liu Assistant Engineer
Typed/Printed Name

April 09, 2014
Date

Company: Hisense Electric Co., Ltd.
Date of Test: April 09, 2014
Model: LHD32D36US
Operating Mode: HDMI 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	151.461	47.8	20.0	9.6	37.4	43.5	-6.1
Horizontal	235.576	44.6	20.0	12.2	36.8	46.0	-9.2
Horizontal	593.943	40.8	20.0	18.8	39.6	46.0	-6.4
Horizontal	1243.000	34.5	20.0	25.3	39.8	54.0	-14.2
Vertical	148.524	48.7	20.0	9.2	37.9	43.5	-5.6
Vertical	235.640	40.1	20.0	12.2	32.3	46.0	-13.7
Vertical	742.516	35.4	20.0	20.4	35.8	46.0	-10.2
Vertical	1385.000	31.7	20.0	27.5	39.2	54.0	-14.8

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz and Peak detector is used for frequency from 1-2GHz.

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.

4. All emissions up to 1GHz are below the QP limit and all emissions between 1-2GHz are below the AV limit.

Test Engineer: Jenner Liu

Company: Hisense Electric Co., Ltd.
Date of Test: April 09, 2014
Model: LHD32D36US
Operating Mode: VGA

Table 2

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	30.480	24.2	20.0	16.8	21.0	40.0	-19.0
Horizontal	192.000	34.6	20.0	10.3	24.9	43.5	-18.6
Horizontal	695.880	31.9	20.0	19.8	31.7	46.0	-14.3
Horizontal	1104.000	17.0	20.0	25.1	30.1	54.0	-23.9
Vertical	31.940	33.8	20.0	16.1	22.1	40.0	-17.9
Vertical	192.000	41.8	20.0	10.3	29.9	43.5	-13.6
Vertical	599.875	32.2	20.0	19.9	32.1	46.0	-13.9
Vertical	1866.000	31.8	20.0	29.4	41.2	54.0	-12.8

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz and PEAK detector is used for frequency from 1-2GHz.

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.

4. All emissions up to 1GHz are below the QP limit and all emissions between 1-2GHz are below the AV limit.

Test Engineer: Jenner Liu

3.4 Conducted Emission at Mains Terminal

3.5 Conducted Emission Configuration Photograph

Worst Case Conducted Configuration
at
0.492 MHz(VGA Mode)

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

3.6 Conducted Emission Data

Judgement: Passed by 10.7 dB margin (VGA Mode)

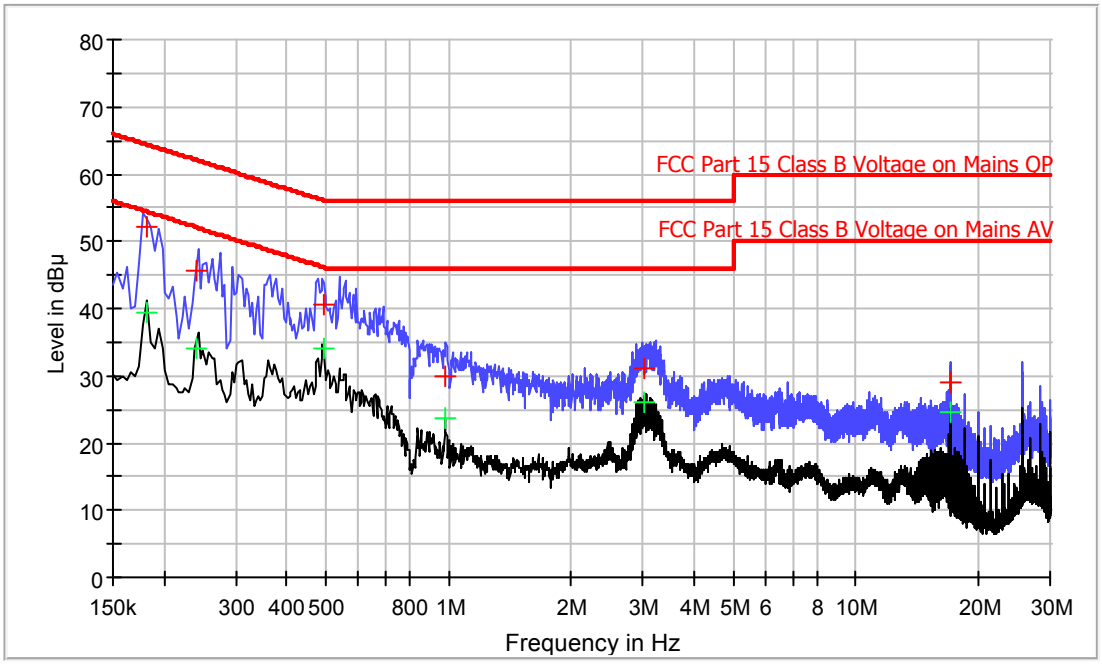
TEST PERSONNEL:

Sign on file

Jenner Liu Assistant Engineer
Typed/Printed Name

April 09, 2014
Date

Company: Hisense Electric Co., Ltd.
Date of Test: April 09, 2014
Model: LHD32D36US
Operating Mode: VGA
Phase: Live
Conducted Emission Test - FCC



Result Table QP

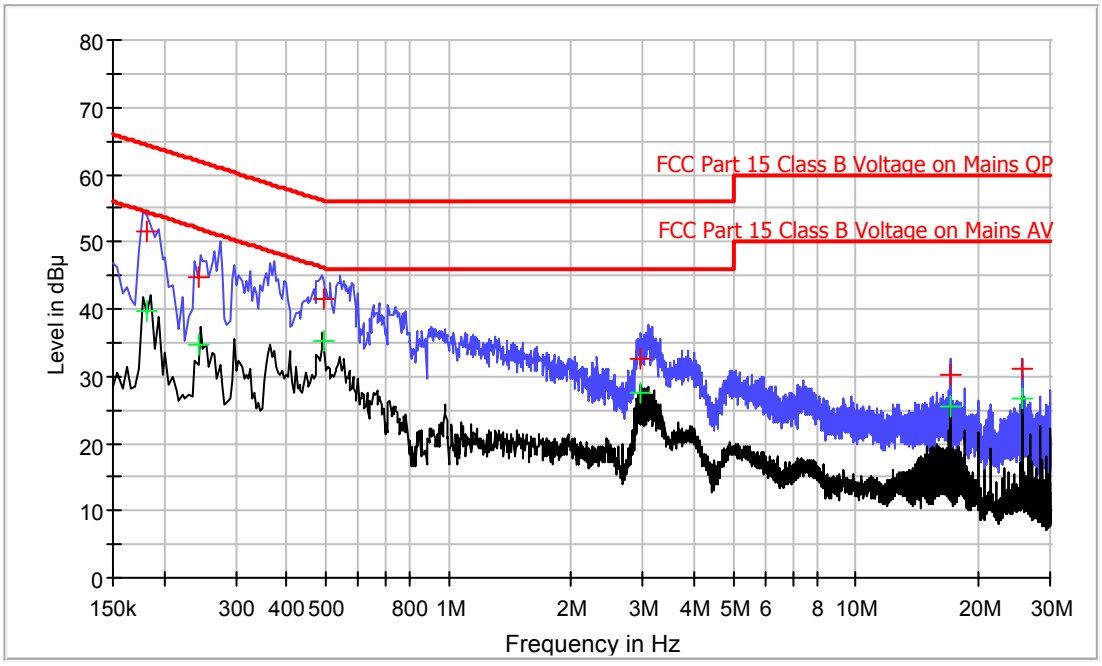
Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182	52.2	L1	9.8	12.2	64.4
0.240	45.6	L1	9.7	16.5	62.1
0.492	40.7	L1	9.7	15.4	56.1
0.983	30.1	L1	9.8	25.9	56.0
3.017	31.1	L1	9.8	24.9	56.0
17.084	28.9	L1	10.3	31.1	60.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182	39.5	L1	9.8	14.9	54.4
0.240	34.0	L1	9.7	18.1	52.1
0.492	34.0	L1	9.7	12.1	46.1
0.983	23.6	L1	9.8	22.4	46.0
3.017	26.2	L1	9.8	19.8	46.0
17.084	24.7	L1	10.3	25.3	50.0

Test Engineer: Jenner Liu

Company: Hisense Electric Co., Ltd.
Date of Test: April 09, 2014
Model: LHD32D36US
Operating Mode: VGA
Phase: Neutral
Conducted Emission Test - FCC



Result Table QP

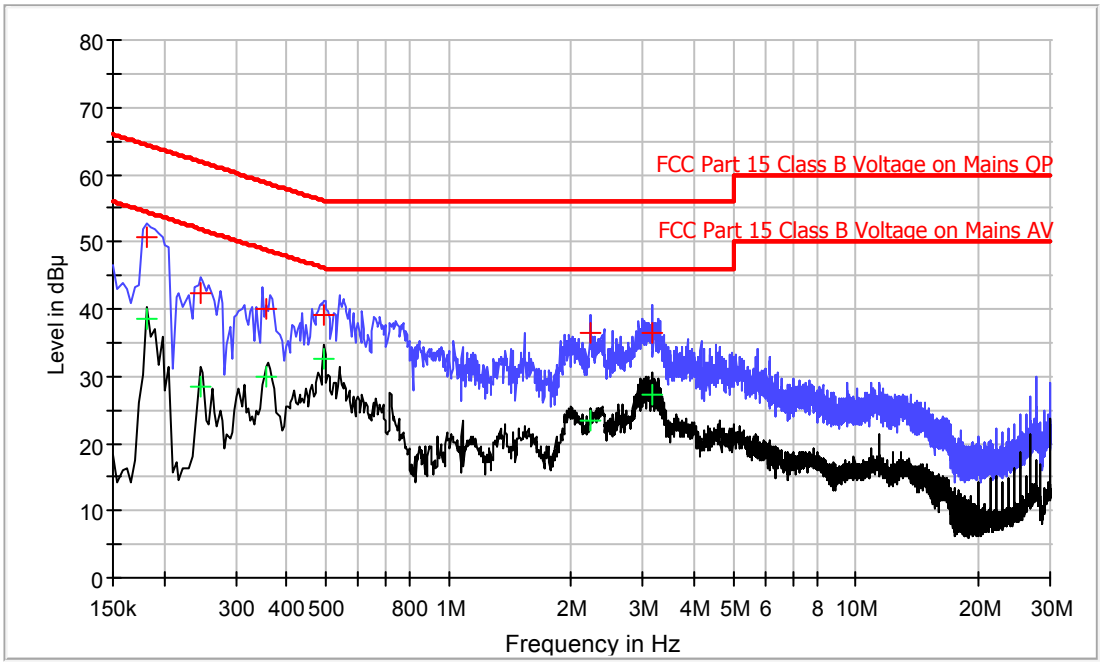
Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182	51.4	N	10.2	13.0	64.4
0.245	44.7	N	10.2	17.2	61.9
0.492	41.5	N	10.2	14.6	56.1
2.972	32.5	N	10.3	23.5	56.0
17.129	30.2	N	10.7	29.8	60.0
25.670	31.2	N	10.7	28.8	60.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182	39.8	N	10.2	14.6	54.4
0.245	34.7	N	10.2	17.2	51.9
0.492	35.4	N	10.2	10.7	46.1
2.972	27.6	N	10.3	18.4	46.0
17.129	25.4	N	10.7	24.6	50.0
25.670	26.6	N	10.7	23.4	50.0

Test Engineer: Jenner Liu

Company: Hisense Electric Co., Ltd.
Date of Test: April 09, 2014
Model: LHD32D36US
Operating Mode: HDMI In
Phase: Live
Conducted Emission Test - FCC



Result Table QP

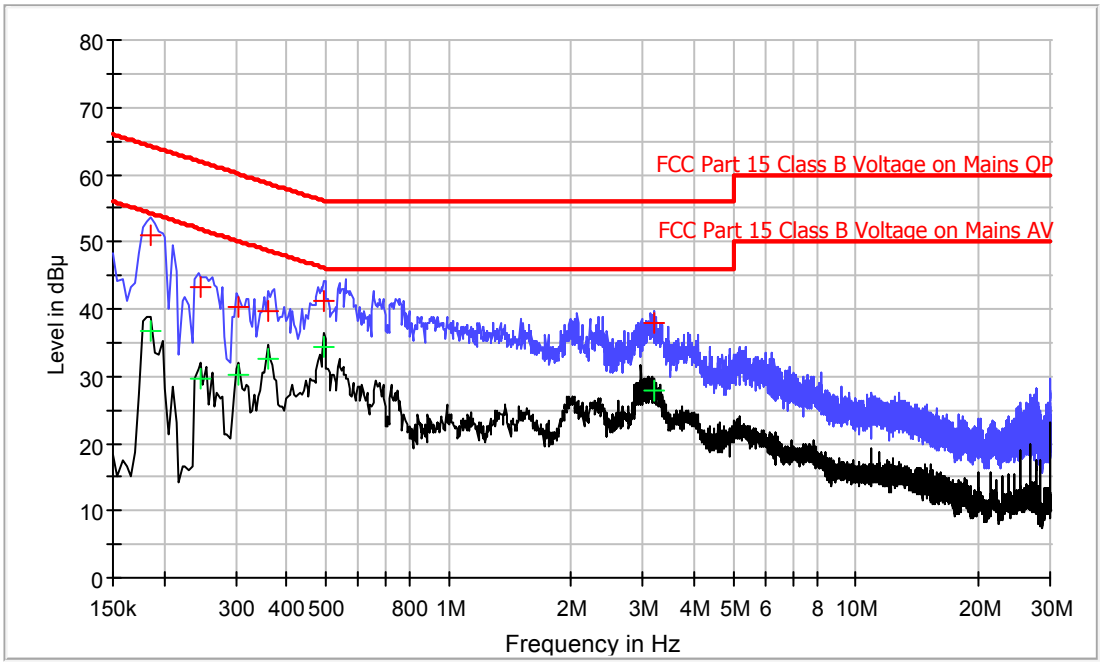
Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182	50.6	L1	9.8	13.8	64.4
0.246	42.5	L1	9.7	19.4	61.9
0.358	40.1	L1	9.7	18.7	58.8
0.494	39.1	L1	9.7	17.0	56.1
2.226	36.3	L1	9.9	19.7	56.0
3.170	36.3	L1	9.8	19.7	56.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.182	38.6	L1	9.8	15.8	54.4
0.246	28.3	L1	9.7	23.6	51.9
0.358	29.8	L1	9.7	19.0	48.8
0.494	32.5	L1	9.7	13.6	46.1
2.226	23.5	L1	9.9	22.5	46.0
3.170	27.4	L1	9.8	18.6	46.0

Test Engineer: Jenner Liu

Company: Hisense Electric Co., Ltd.
Date of Test: April 09, 2014
Model: LHD32D36US
Operating Mode: HDMI 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)
0.186	50.9	N	10.2	13.3	64.2
0.246	43.2	N	10.2	18.7	61.9
0.306	40.2	N	10.2	19.9	60.1
0.362	39.7	N	10.2	19.0	58.7
0.494	41.1	N	10.2	15.0	56.1
3.202	37.8	N	10.3	18.2	56.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.186	36.8	N	10.2	17.4	54.2
0.246	29.7	N	10.2	22.2	51.9
0.306	30.1	N	10.2	20.0	50.1
0.362	32.6	N	10.2	16.1	48.7
0.494	34.5	N	10.2	11.6	46.1
3.202	28.0	N	10.3	18.0	46.0

Test Engineer: Jenner Liu

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 – 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 and in PK & AV mode from frequency band 1GHz to 2GHz 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 2GHz. 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 – 2009.

EXHIBIT 9

TEST EQUIPMENT LIST

9.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	Biconilog Antenna	ETS	3142C	00066460	29-Jun-13	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	02 Mar 2013	02-Mar-2013	02-Mar-2015
SZ062-04	RF Cable	RADIALL	RG 213U	--	08-Jan-2014	08-Jul-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	09-Nov-2013	09-Nov-2014
SZ188-03	Shielding Room	ETS	RFD-100	4100	23-Aug-2013	23-Aug-2014