

Hisense Electric Co., Ltd.

Application
For
Certification
FCC ID: W9HLCDD0041

LED LCD TV

Model: LTDN40D36US
Additional Model: 40D36, 40H3C, LTDN40D37US, 40D37, 40H3E

Computer Peripheral

Class II Permissive Change

Report No.: 140504029SZN-001

Prepared and Checked by:

Approved by:

Sign on file

Jenner Liu
Assistant Engineer

Andy Yan
Project Engineer
Date: May 12, 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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TRF No.: FCC 15C_PC_b

INTERTEK TESTING SERVICES

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MEASUREMENT / TECHNICAL REPORT

Hisense Electric Co., Ltd.
MODEL: LTDN40D36US
Additional Model: 40D36, 40H3C, LTDN40D37US, 40D37, 40H3E

FCC ID: W9HLCDD0041

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:

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

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

The Models: 40D36, 40H3C, LTDN40D37US, 40D37, 40H3E are the same as the Model: LTDN40D36US in hardware aspect. The difference in front cabinet and model number serves as marketing strategy.

This report is based on previous report with report number 140319026SZN-002 dated April 09, 2014 (original signatory: Jenner Liu, Billy Li on file). Due to it has been added an alternative panel, fully tests have been re-conducted.

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: 140504028SZN-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 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.

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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	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

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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
37.061MHz (HDMI In 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 2.6dB margin (HDMI In Mode)

TEST PERSONNEL:

Sign on file

Jenner Liu Assistant Engineer
Typed/Printed Name

May 12, 2014
Date

INTERTEK TESTING SERVICES

Company: Hisense Electric Co., Ltd.

Date of Test: May 12, 2014

Model: LTDN40D36US

Operating Mode: HDMI In

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	167.740	39.4	20.0	10.0	29.4	43.5	-14.1
Horizontal	222.540	47.1	20.0	10.5	37.6	46.0	-8.4
Horizontal	292.385	43.0	20.0	13.3	36.3	46.0	-9.7
Horizontal	1160.000	35.8	20.0	26.2	42.0	54.0	-12.0
Vertical	37.061	44.3	20.0	13.1	37.4	40.0	-2.6
Vertical	175.985	42.1	20.0	13.5	35.6	43.5	-7.9
Vertical	600.020	49.3	20.0	10.4	39.7	46.0	-6.3
Vertical	1396.000	27.5	20.0	27.6	35.1	54.0	-18.9

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

INTERTEK TESTING SERVICES

Company: Hisense Electric Co., Ltd.
Date of Test: May 12, 2014
Model: LTDN40D36US
Operating Mode: VGA

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	65.880	43.6	20.0	5.3	28.9	40.0	-11.1
Horizontal	192.750	48.2	20.0	10.7	38.9	43.5	-4.6
Horizontal	267.165	46.8	20.0	14.5	41.3	46.0	-4.7
Horizontal	1137.000	27.6	20.0	26.0	30.0	54.0	-24.0
Vertical	40.680	39.3	20.0	10.9	33.6	40.0	-6.4
Vertical	66.860	51.3	20.0	5.2	30.2	40.0	-9.8
Vertical	267.163	42.0	20.0	14.5	36.5	46.0	-9.5
Vertical	1394.000	23.9	20.0	27.6	31.5	54.0	-22.5

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

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- 3.4 Conducted Emission at Mains Terminal
- 3.5 Conducted Emission Configuration Photograph

Worst Case Conducted Configuration
at
0.250 MHz(VGA Mode)

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

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3.6 Conducted Emission Data

Judgement: Passed by 11.1 dB margin (VGA Mode)

TEST PERSONNEL:

Sign on file

Jenner Liu Assistant Engineer

Typed/Printed Name

May 12, 2014

Date

INTERTEK TESTING SERVICES

Company: Hisense Electric Co., Ltd.

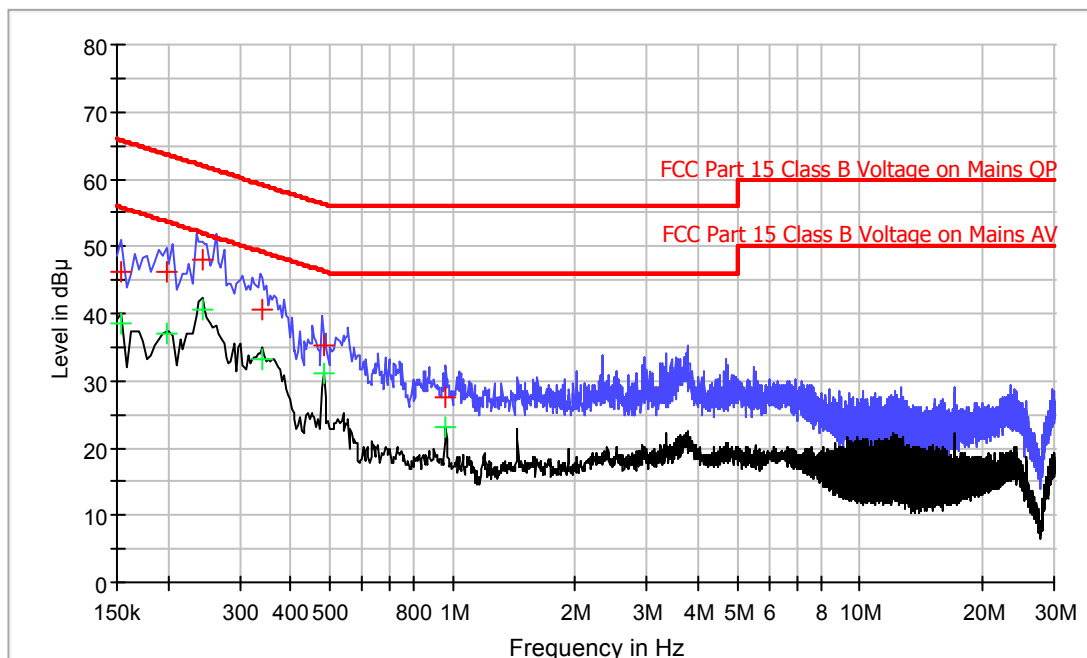
Date of Test: May 12, 2014

Model: LTDN40D36US

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)
0.154	46.2	L1	9.8	19.6	65.8
0.198	46.2	L1	9.7	17.5	63.7
0.242	47.9	L1	9.7	14.1	62.0
0.342	40.6	L1	9.7	18.6	59.2
0.482	35.4	L1	9.7	20.9	56.3
0.962	27.4	L1	9.8	28.6	56.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154	38.6	L1	9.8	17.2	55.8
0.198	37.1	L1	9.7	16.6	53.7
0.242	40.5	L1	9.7	11.5	52.0
0.342	33.1	L1	9.7	16.1	49.2
0.482	31.1	L1	9.7	15.2	46.3
0.962	23.1	L1	9.8	22.9	46.0

Test Engineer: Jenner Liu

TRF No.: FCC 15C_PC_b

FCC ID: W9HLCDD0041

INTERTEK TESTING SERVICES

Company: Hisense Electric Co., Ltd.

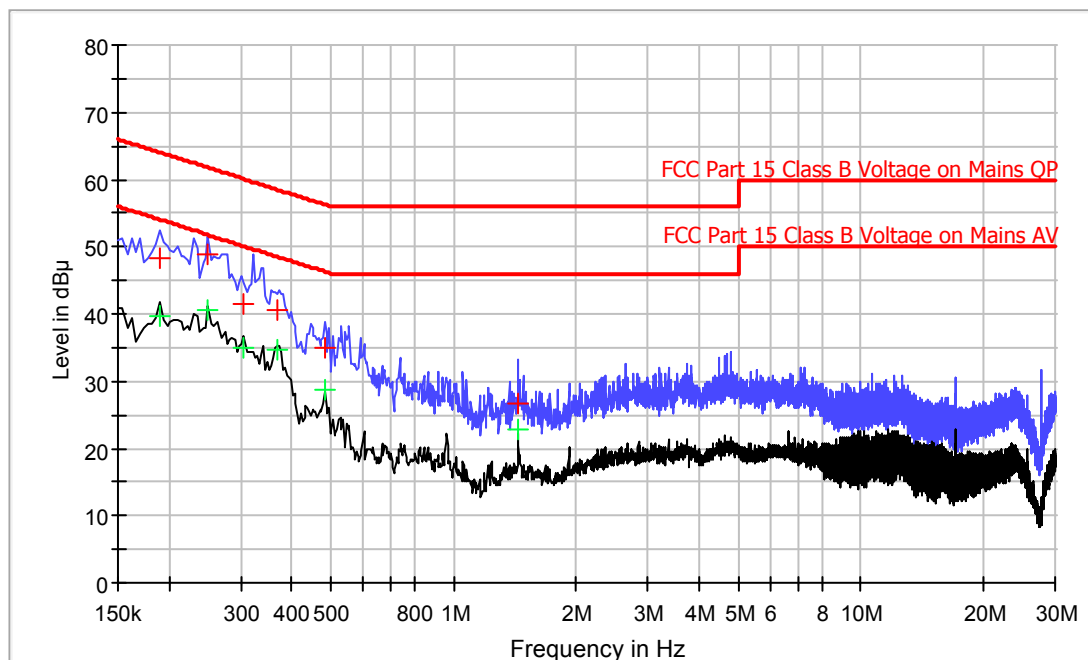
Date of Test: May 12, 2014

Model: LTDN40D36US

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)
0.190	48.2	N	10.2	15.8	64.0
0.250	48.8	N	10.2	13.0	61.8
0.306	41.6	N	10.2	18.5	60.1
0.370	40.6	N	10.2	17.9	58.5
0.482	34.8	N	10.2	21.5	56.3
1.442	26.7	N	10.4	29.3	56.0

Result Table AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.190	39.7	N	10.2	14.3	54.0
0.250	40.7	N	10.2	11.1	51.8
0.306	35.1	N	10.2	15.0	50.1
0.370	34.8	N	10.2	13.7	48.5
0.482	28.8	N	10.2	17.5	46.3
1.442	22.8	N	10.4	23.2	46.0

Test Engineer: Jenner Liu

TRF No.: FCC 15C_PC_b
FCC ID: W9HLCDD0041

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Company: Hisense Electric Co., Ltd.

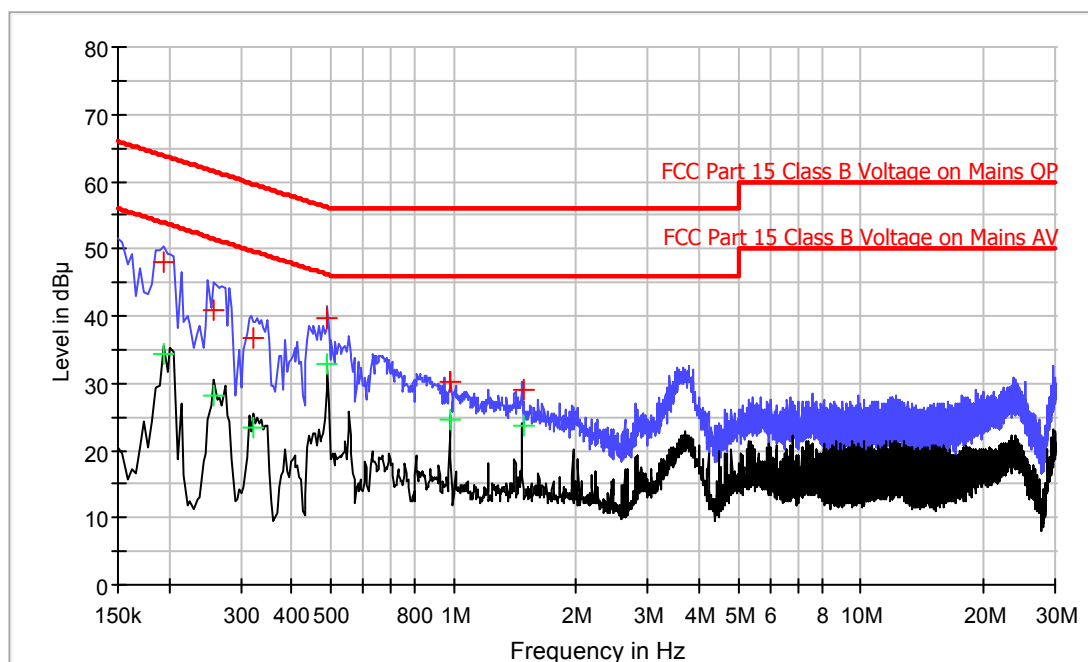
Date of Test: May 12, 2014

Model: LTDN40D36US

Operating Mode: HDMI In

Phase: Live

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.194	48.1	L1	9.7	15.8	63.9
0.258	40.9	L1	9.7	20.6	61.5
0.322	36.6	L1	9.7	23.1	59.7
0.490	39.8	L1	9.7	16.4	56.2
0.982	30.1	L1	9.8	25.9	56.0
1.486	28.9	L1	9.8	27.1	56.0

Result Table AV

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.194	34.3	L1	9.7	19.6	53.9
0.258	28.2	L1	9.7	23.3	51.5
0.322	23.5	L1	9.7	26.2	49.7
0.490	32.8	L1	9.7	13.4	46.2
0.982	24.6	L1	9.8	21.4	46.0
1.486	23.7	L1	9.8	22.3	46.0

Test Engineer: Jenner Liu

TRF No.: FCC 15C_PC_b

FCC ID: W9HLCDD0041

INTERTEK TESTING SERVICES

Company: Hisense Electric Co., Ltd.

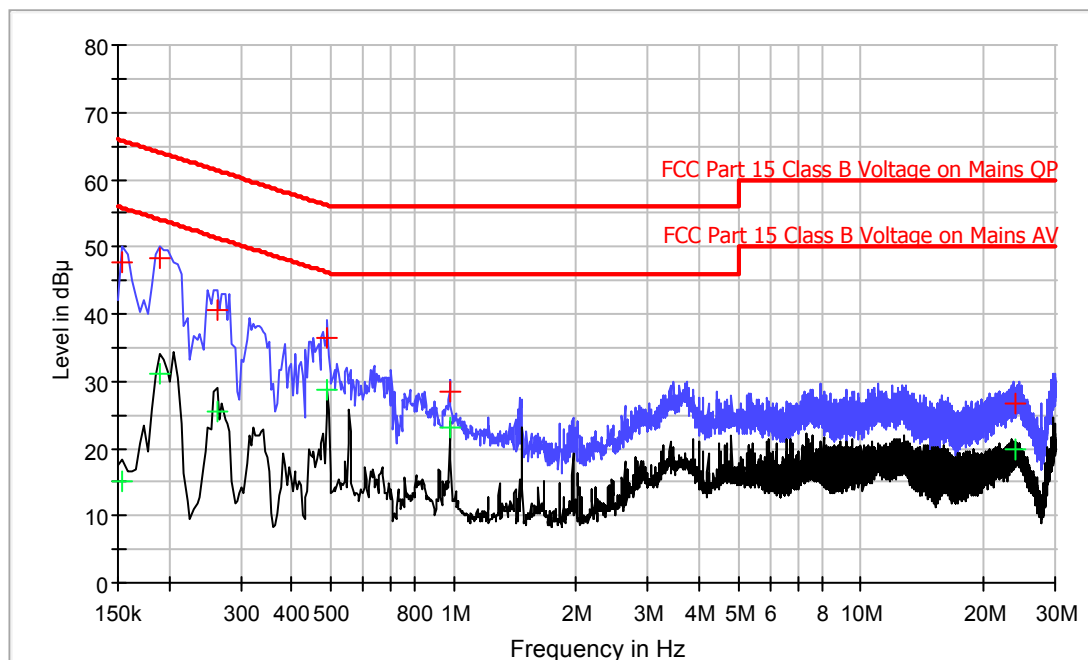
Date of Test: May 12, 2014

Model: LTDN40D36US

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)
0.154	47.8	N	10.2	18.0	65.8
0.190	48.2	N	10.2	15.8	64.0
0.262	40.7	N	10.2	20.7	61.4
0.490	36.5	N	10.2	19.7	56.2
0.982	28.4	N	10.3	27.6	56.0
23.980	26.6	N	10.7	33.4	60.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.154	15.0	N	10.2	40.8	55.8
0.190	31.2	N	10.2	22.8	54.0
0.262	25.6	N	10.2	25.8	51.4
0.490	28.7	N	10.2	17.5	46.2
0.982	23.2	N	10.3	22.8	46.0
23.980	19.8	N	10.7	30.2	50.0

Test Engineer: Jenner Liu

TRF No.: FCC 15C_PC_b

FCC ID: W9HLCDD0041

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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.

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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

INTERTEK TESTING SERVICES

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 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.

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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	00066460	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	02 Mar 2013	19-Apr-2014	19-Apr-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