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Shen Zhen MTC Co., LTD

TEST REPORT

SCOPE OF WORK
FCC TESTING–MSAV3250Y-35533, MSAV32**Y-35533, MHAV32**Y-35533 (* can from 0 to 9, A to Z), LE32K6000, LE32****** (* can from 0 to 9, A to Z or blank), 32C11, C32M2

REPORT NUMBER
180723033SZN-001

ISSUE DATE	**[REVISED DATE]**
26 July 2018	[----------]

PAGES
36

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Shen Zhen MTC Co., LTD

Application
For
Certification
FCC ID: 2AHVH3235533

LED TV

Model: MSAV3250Y-35533
Additional Models: MSAV32Y-35533, MHAV32**Y-35533 (* can from 0 to 9, A to Z), LE32K6000, LE32****** (* can from 0 to 9, A to Z or blank), 32C11, C32M2**

Brand Name: AMTC, Haier, HITACHI

Computer Peripheral

Report No.: 180723033SZN-001

Prepared and Checked by:

Leo Li
Engineer

Approved by:

Kidd Yang
Technical Supervisor
Date: 26 July 2018

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LIST OF EXHIBITS

MEASUREMENT / TECHNICAL REPORT

Shen Zhen MTC Co., LTD

MODEL: MSAV3250Y-35533

Additional Models: MSAV32**Y-35533, MHAV32**Y-35533 (* can from 0 to 9, A to Z), LE32K6000, LE32****** (* can from 0 to 9, A to Z or blank), 32C11, C32M2

FCC ID: 2AHVH3235533

This report concerns (check one:) Original Grant X Class I 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 [10-01-17 Edition] provision.

Report prepared by:

Leo Li
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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 LED TV. The device can be used to connect PC by HDMI port and VGA port. The EUT is powered by AC 120V, 60Hz.

The Model: MSAV32**Y-35533, MHAV32**Y-35533 (* can from 0 to 9, A to Z), LE32K6000, LE32****** (* can from 0 to 9, A to Z or blank), 32C11, C32M2 are the same as the Model: MSAV3250Y-35533 in hardware aspect. The models are difference in packaging and marketing purpose only.

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: 180723032SZN-001.

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 **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 1F/2F, Building B, QiaoAn Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, P.R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: CN1188).

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, only worst case was reported.

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 turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

The frequency ranges from 30MHz to 5GHz 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 Shen Zhen MTC 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. Longhua 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
Hard Disk	Smart.drive	HD-003
USB Cable	Smart.drive	Unshielded, Length 155cm
USB Memory	SanDisk	SDCZ36-002G-P36
Dummy Load	N/A	N/A
HDMI Cable*3	N/A	UnShielded, Length 180cm
AV Cable*3	N/A	Unshielded, Length 120cm
Tuner Resister	N/A	75ohm
Remote controller	TCL	N/A
Headphone	Sony	Unshielded, Length 110cm
Coaxial cable	/	Shielded, Length 500cm
VGA Cable	/	Unshielded, 145cm
YPbPr Cable	/	Unshielded, 120cm*3
Optical cable	/	Unshielded, Length 130cm

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.

$FS = RA + AF + CF - AG$

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

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:

$FS = RA + AF + CF - AG$

3.2 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 net field strength for comparison to the appropriate emission limit is 42dBμV/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

FS = 62 + 7.4 + 1.6 – 29 = 42dBμV/m

Level in μV/m = Common Antilogarithm [(42dBμV/m)/20] = 125.9μV/m

3.3 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
At
74.7MHz (HDMI In Mode)

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

3.4 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 5.2dB margin (HDMI In Mode)

TEST PERSONNEL:

Sign on file

Leo Li, Engineer
Typed/Printed Name

Jan 19, 2018
Date

Applicant: Shen Zhen MTC Co., LTD
Date of Test: Jan 19, 2018 Model: MSAV3250Y-35533
Worst Case Operating Mode: HDMI In

Table 1

Radiated Emissions

Below 1GHz

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	74.6	42.0	20.0	8.4	30.4	40.0	-9.6
Horizontal	224.0	44.1	20.0	12.7	36.8	46.0	-9.2
Horizontal	672.6	31.6	20.0	24.4	36.0	46.0	-10.0
Vertical	74.7	46.4	20.0	8.4	34.8	40.0	-5.2
Vertical	228.9	42.6	20.0	13.0	35.6	46.0	-10.4
Vertical	671.7	31.9	20.0	24.3	36.2	46.0	-9.8

Above 1GHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)	Detector
Horizontal	1586.5	61.4	36.6	24.7	49.5	74.0	-24.5	PK
Horizontal	2981.8	53.8	36.3	28.9	46.4	74.0	-27.6	PK
Horizontal	3170.2	54.4	36.5	29.8	47.7	74.0	-26.3	PK
Horizontal	1586.5	46.8	36.6	24.7	34.9	54.0	-19.1	AV
Horizontal	2981.8	44.9	36.3	28.9	37.5	54.0	-16.5	AV
Horizontal	3170.2	45.3	36.5	29.8	38.6	54.0	-15.4	AV
Vertical	1845.3	59.1	36.6	28.4	50.9	74.0	-23.1	PK
Vertical	3167.8	53.3	36.6	29.5	46.2	74.0	-27.8	PK
Vertical	4940.7	55.4	36.5	35.9	54.8	74.0	-19.2	PK
Vertical	1845.3	43.5	36.6	28.4	35.3	54.0	-18.7	AV
Vertical	3167.8	44.6	36.5	29.5	37.6	54.0	-16.4	AV
Vertical	4940.7	46.0	36.5	35.9	45.4	54.0	-8.6	AV

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz, Peak detector and Average detector are used for frequency from 1GHz to 5GHz.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. All other emissions were at least 20 dB below the applicable limits.

Test Engineer: Leo Li

3.5 Conducted Emission at Mains Terminal

3.5.1 Conducted Emission Configuration Photograph

Worst Case Conducted Configuration
at
0.154 MHz (HDMI In 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 6.1 dB margin(HDMI In Mode)

TEST PERSONNEL:

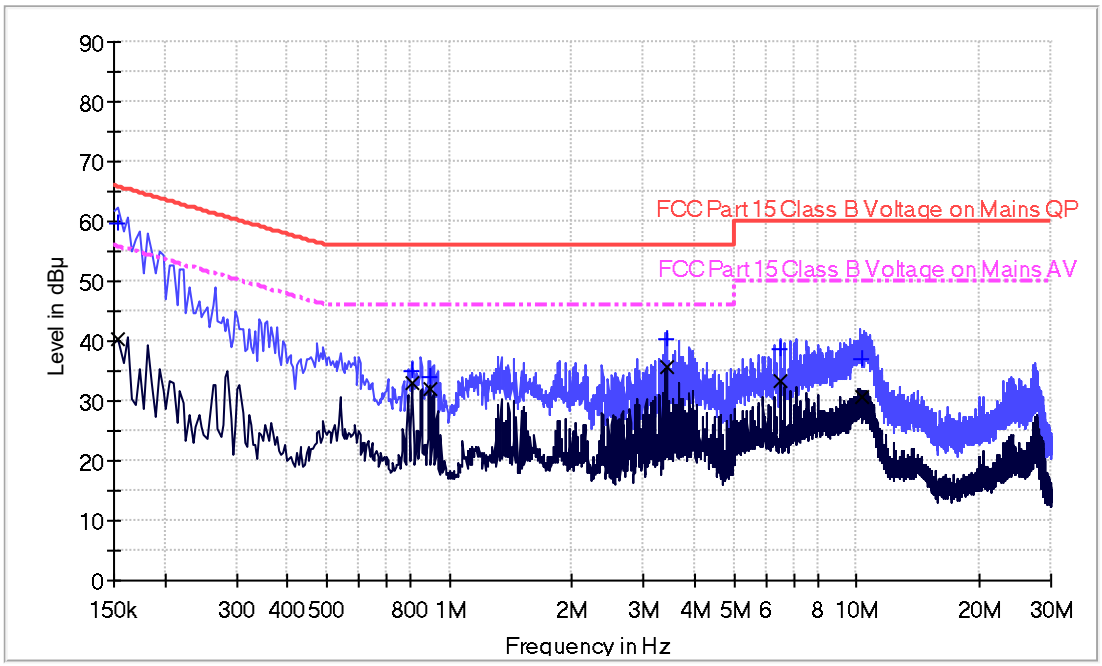
Sign on file

Leo Li, Engineer
Typed/Printed Name

Jan 19, 2018
Date

Company: Shen Zhen MTC Co., LTD
Date of Test: Jan 19, 2018
Model: MSAV3250Y-35533
Operating Mode: HDMI in with antenna grounded
Phase: Live

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.154000	59.7	9.000	L1	9.6	6.1	65.8
0.810000	34.9	9.000	L1	9.7	21.1	56.0
0.894000	34.1	9.000	L1	9.7	21.9	56.0
3.426000	40.3	9.000	L1	9.8	15.7	56.0
6.486000	38.6	9.000	L1	9.8	21.4	60.0
10.338000	37.0	9.000	L1	9.9	23.0	60.0

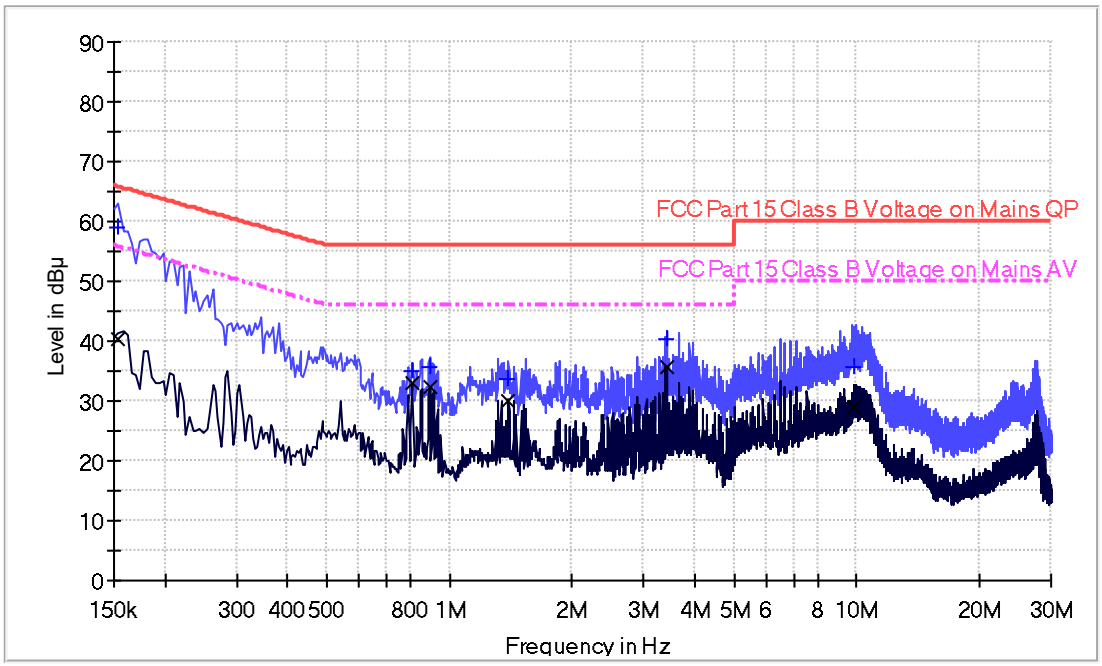
Result Table AV

Frequency (MHz)	Average (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.154000	40.5	9.000	L1	9.6	15.3	55.8
0.810000	33.2	9.000	L1	9.7	12.8	46.0
0.894000	32.1	9.000	L1	9.7	13.9	46.0
3.426000	35.8	9.000	L1	9.8	10.2	46.0
6.486000	33.3	9.000	L1	9.8	16.7	50.0
10.338000	30.6	9.000	L1	9.9	19.4	50.0

Test Engineer: Leo Li

Company: Shen Zhen MTC Co., LTD
Date of Test: Jan 19, 2018
Model: MSAV3250Y-35533
Operating Mode: HDMI In with antenna grounded
Phase: Neutral

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.154000	58.9	9.000	N	9.6	6.9	65.8
0.810000	35.0	9.000	N	9.7	21.0	56.0
0.894000	35.6	9.000	N	9.7	20.4	56.0
1.398000	33.7	9.000	N	9.7	22.3	56.0
3.426000	40.3	9.000	N	9.8	15.7	56.0
9.874000	35.7	9.000	N	9.9	24.3	60.0

Result Table AV

Frequency (MHz)	Average (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.154000	40.2	9.000	N	9.6	15.6	55.8
0.810000	33.1	9.000	N	9.7	12.9	46.0
0.894000	32.2	9.000	N	9.7	13.8	46.0
1.398000	29.9	9.000	N	9.7	16.1	46.0
3.426000	35.8	9.000	N	9.8	10.2	46.0
9.874000	28.9	9.000	N	9.9	21.1	50.0

Test Engineer: Leo 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 5GHz 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 5GHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz with RBW setting 9KHz.

8.2 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
SZ061-12	Biconilog Antenna	ETS	3142E	00166158	20-Sep-2017	20-Sep-2018
SZ061-08	Horn Antenna	ETS	3115	00092346	20-Sep-2017	20-Sep-2018
SZ056-03	Spectrum Analyzer	R&S	FSP30	101148	01-Jun-2017	01-Jun-2018
SZ185-01	EMI Receiver	R & S	ESCI	100547	9-Feb-2017	9-Feb-2018
SZ181-04	Preamplifier	Agilent	8449B	3008A02 474	24-Jan-2017	24-Jan-2018
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Jan-2017	16-Jan-2019
SZ062-02	RF Cable	RADIALL	RG 213U	--	05-Jan-2018	05-Jul-2018
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	09-Sep-2017	09-Mar-2018
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	09-Sep-2017	09-Mar-2018
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	30-Oct-2017	30-Oct-2018
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	30-Oct-2017	30-Oct-2018
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	12-Jul-2017	12-Jul-2018
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2019
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	30-Oct-2017	30-Oct-2018