

Shen Zhen MTC Co., LTD

Application
For
Certification
FCC ID: 2AHVH4965864

LED TV

Model: MUAV4960Y-65864
Additional Models: MUAV49 followed by 2 characters; followed by
Y-65864, LT-49MA877

Computer Peripheral

Report No.: 170803032SZN-001

Prepared and Checked by:

Approved by:

Sign on file

Powell Bao
Engineer

Kidd Yang
Senior Project Engineer
Date: August 14, 2017

- 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

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MEASUREMENT / TECHNICAL REPORT

Shen Zhen MTC Co., LTD

MODEL: MUAUV4960Y-65864

Additional Models: MUAUV49 followed by 2 characters; followed by Y-65864, LT-49MA877

FCC ID: 2AHVH4965864

This report concerns (check one): Original Grant Class I 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 [10-01-16 Edition] provision.

Report prepared by:

Powell Bao
Intertek Testing Services Shenzhen Ltd. Longhua Branch
1F/2F, Building B, QiaoAn Scientific Technology Park,
Shangkeng Community, Guanhu Subdistrict, Longhua
District, Shenzhen, P.R. China
Tel / Fax: 86-755-8601 6288/86-755-8601 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 TV. The device can be used to connect PC by HDMI port. The EUT is powered by 120V/60Hz.

The EUT contains a module which can be operated in the frequency band of 2412MHz to 2462MHz in 802.11b, 802.11g and 802.11n-HT20 modes, 2422MHz to 2452MHz in 802.11n-HT40 mode, and 5180MHz to 5240MHz, 5745MHz to 5825MHz in 802.11a and 802.11n (20MHz, 40MHz, 80MHz) modes.

The Models: MUAV49 followed by 2 characters; followed by Y-65864, LT-49MA877 are the same as the Model: MUAV4960Y-65864 in hardware and electronic aspect. The difference in packaging 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: 170803032SZN-002.

The host contains a WIFI module, which is in the process of being filed under the FCC ID: 2AF2K-WM524.

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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 (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 File Number: CN1188.

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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 (2014).

The device was powered by AC 120V/60Hz during the test. The host device contains a WiFi module which was installed and operating 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 29.125GHz 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.

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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	HP	HP 430G
Hard Disk	Smart.drive	HD-003
USB Cable	Smart.drive	Unshielded, Length 155cm
RJ45 Cable*1	N/A	Unshielded, Length 450cm
USB Memory*2	TOSHIBA	UHYBS-004G-BL
Dummy Load	N/A	N/A
HDMI Cable*3	N/A	Unshielded, Length 180cm
Coaxial Cable	N/A	Unshielded, Length 120cm
RJ45 Cable	N/A	Unshielded, Length 180cm
Audio Cable	N/A	Unshielded, Length 120cm
Tuner Resister	N/A	75ohm
Headphone	N/A	Unshielded, Length 120cm
Remote controller	Shen Zhen MTC Co., LTD	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.

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

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

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:

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

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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 net field strength for comparison to the appropriate emission limit is 42dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

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

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

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

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

$$FS = 62 + 7.4 + 1.6 - 29 = 42\text{dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(42\text{dB}\mu\text{V/m})/20] = 125.9\mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
At
909.000MHz (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 3.2dB margin (HDMI In Mode)

TEST PERSONNEL:

Sign on file

Powell Bao Engineer
Typed/Printed Name

August 8, 2017
Date

INTERTEK TESTING SERVICES

Company: Shen Zhen MTC Co., LTD
Date of Test: August 8, 2017
Model: MUA4960Y-65864
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	222.545	50.6	20.0	10.3	40.9	46.0	-5.1
Horizontal	668.260	46.5	20.0	15.3	41.8	46.0	-4.2
Horizontal	909.000	34.4	20.0	26.1	40.5	46.0	-5.5
Horizontal	1046.700	26.2	20.0	23.0	29.2	54.0	-24.8
Horizontal	1632.245	27.4	20.0	27.0	34.4	54.0	-19.6
Horizontal	3643.013	25.4	20.0	31.3	36.7	54.0	-17.3
Horizontal	9526.110	22.3	20.0	37.0	39.3	54.0	-14.7
Horizontal	11999.000	18.1	20.0	42.1	40.2	54.0	-13.8
Vertical	31.000	43.7	20.0	8.6	32.3	40.0	-7.7
Vertical	223.000	49.9	20.0	10.4	40.3	46.0	-5.7
Vertical	909.000	47.4	20.0	15.4	42.8	46.0	-3.2
Vertical	1241.450	24.9	20.0	23.6	28.5	54.0	-25.5
Vertical	2897.695	21.1	20.0	31.0	32.1	54.0	-21.9
Vertical	3605.421	25.0	20.0	32.3	37.3	54.0	-16.7
Vertical	9508.000	21.6	20.0	37.0	38.6	54.0	-15.4
Vertical	11875.000	18.3	20.0	41.6	39.9	54.0	-14.1

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz and Peak detector is used for frequency from 1GHz-29.125GHz.
2. All measurements were made at 3 meters.
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 1GHz-29.125GHz. are below the AV limit.

Test Engineer: Powell Bao

TRF No.: FCC 15C_PC_b
FCC ID: 2AHVH4965864

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

Worst Case Conducted Configuration
at
3.846 MHz(HDMI IN 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 7.4 dB margin(HDMI IN Mode)

TEST PERSONNEL:

Sign on file

Powell Bao Engineer
Typed/Printed Name

August 8, 2017
Date

INTERTEK TESTING SERVICES

Company: Shen Zhen MTC Co., LTD

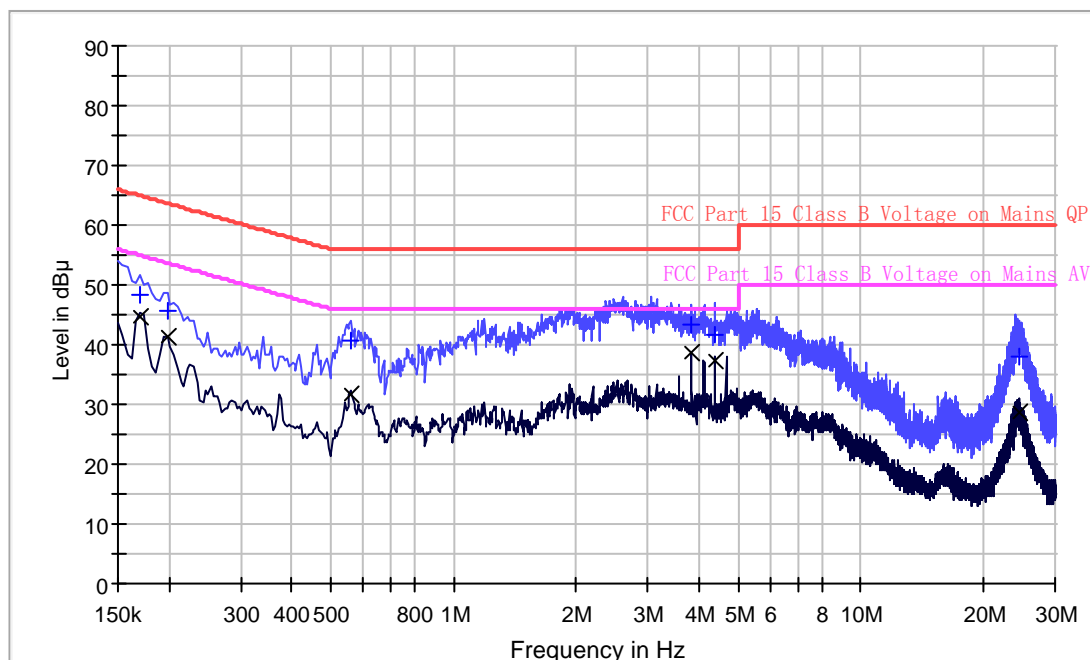
Date of Test: August 8, 2017

Model: MUAU4960Y-65864

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)
0.170000	48.2	L1	9.6	16.8	65.0
0.198000	45.5	L1	9.7	18.2	63.7
0.562000	40.8	L1	9.7	15.2	56.0
3.846000	43.2	L1	9.8	12.8	56.0
4.394000	41.8	L1	9.8	14.2	56.0
24.506000	38.1	L1	10.6	21.9	60.0

Result Table AV

Frequency (MHz)	CAverage (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.170000	44.8	L1	9.6	10.2	55.0
0.198000	41.4	L1	9.7	12.3	53.7
0.562000	31.6	L1	9.7	14.4	46.0
3.846000	38.6	L1	9.8	7.4	46.0
4.394000	37.3	L1	9.8	8.7	46.0
24.506000	28.6	L1	10.6	21.4	50.0

Test Engineer: Powell Bao

TRF No.: FCC 15C_PC_b

FCC ID: 2AHVH4965864

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Company: Shen Zhen MTC Co., LTD

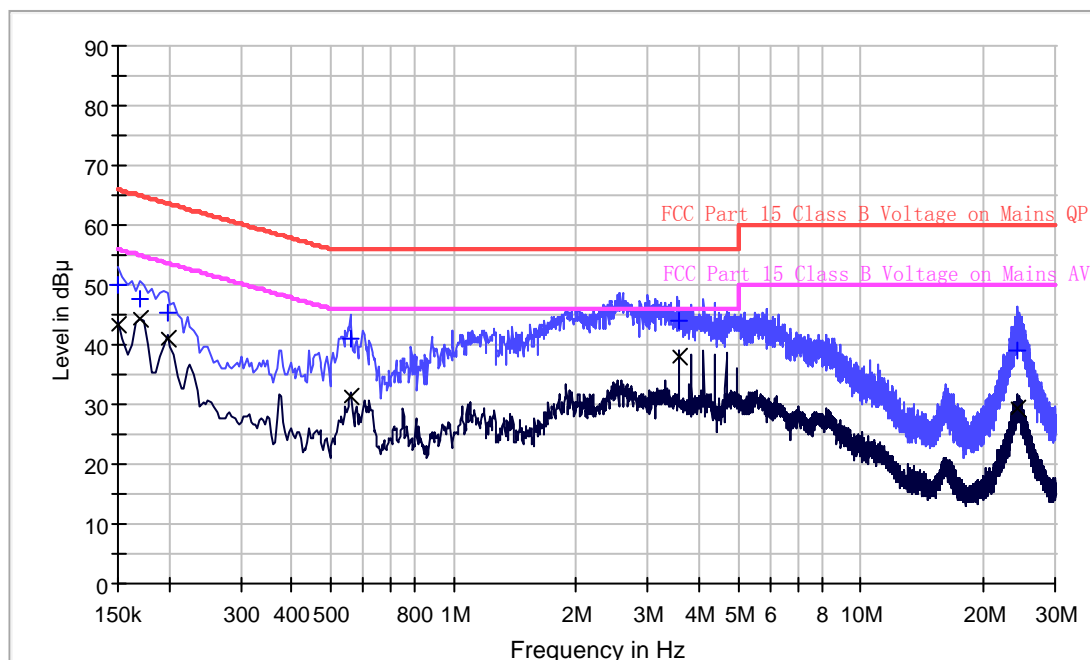
Date of Test: August 8, 2017

Model: MUA4960Y-65864

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)
0.150000	50.0	N	9.6	16.0	66.0
0.170000	47.7	N	9.6	17.3	65.0
0.198000	45.2	N	9.7	18.5	63.7
0.558000	41.0	N	9.7	15.0	56.0
3.570000	44.0	N	9.8	12.0	56.0
24.122000	39.0	N	10.6	21.0	60.0

Result Table AV

Frequency (MHz)	CAverage (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	43.4	N	9.6	12.6	56.0
0.170000	44.3	N	9.6	10.7	55.0
0.198000	40.9	N	9.7	12.8	53.7
0.558000	31.4	N	9.7	14.6	46.0
3.570000	38.0	N	9.8	8.0	46.0
24.122000	29.4	N	10.6	20.6	50.0

Test Engineer: Powell Bao

TRF No.: FCC 15C_PC_b

FCC ID: 2AHVH4965864

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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

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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 – 2014.

The computer peripheral equipment under test (EUT) is placed on a polystyrene 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 29.125GHz 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 29.125GHz. 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 – 2014.

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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
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	1-Jun-2017	1-Jun-2018
SZ182-02-01	Power Sensor	Anritsu	MA2411B	1207429	1-Jun-2017	1-Jun-2018
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	09-Sep-2016	09-Sep-2017
SZ185-01	EMI Receiver	R&S	ESCI	100547	9-Feb-2017	9-Feb-2018
SZ061-09	Horn Antenna	ETS	3115	00092346	27-Oct-2016	27-Oct-2017
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	16-Mar-2017	16-Mar-2018
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	26-May-2017	26-May-2018
SZ056-06	Spectrum Analyzer	R&S	FSV40	101101	7-Jul-2017	7-Jul-2018
SZ181-04	Preamplifier	Agilent	8449B	3008A0247 4	9-Feb-2017	9-Feb-2018
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Apr-2016	16-Apr-2018
SZ062-02	RF Cable	RADIALL	RG 213U	--	8-Jul-2017	8-Jan-2018
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	16-Mar-2017	16-Sep-2017
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	16-Mar-2017	16-Sep-2017
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	14-Jun-2017	14-Jun-2018
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	1-Nov-2016	1-Nov-2017
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	1-Nov-2016	1-Nov-2017
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	12-Jul-2017	12-Jul-2018
SZ188-03	Shielding Room	ETS	RFD-100	4100	17-Aug-2016	17-Aug-2018