

TTE Technology, Inc.

Application
For
Certification
FCC ID: W8U28S3750

LED TV

Model: 28S3750
Additional Model: 28S3750A, 28S3750P, 28S3750B

Computer Peripheral

Report No.: 150730017SZN-002

Prepared and Checked by:

Approved by:

Sign on file

Jenner Liu
Engineer

Andy Yan
Senior Project Engineer
Date: August 20, 2015

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TRF No.: FCC 15C_PC_b

INTERTEK TESTING SERVICES

LIST OF EXHIBITS

INTRODUCTION

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labeling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual
<i>EXHIBIT 8:</i>	Miscellaneous Information
<i>EXHIBIT 9:</i>	Test Equipment List

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MEASUREMENT / TECHNICAL REPORT

TTE Technology, Inc.
MODEL: 28S3750
Additional Model: 28S3750A, 28S3750P, 28S3750B

FCC ID: W8U28S3750

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:

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Table of Contents

1.0	<u>General Description</u>	2
1.1	Product Description.....	2
1.2	Related Submittal(s) Grants.....	2
1.3	Test Methodology.....	3
1.4	Test Facility.....	3
2.0	<u>System Test Configuration</u>	5
2.1	Justification.....	5
2.2	EUT Exercising Software.....	5
2.3	Special Accessories.....	5
2.4	Equipment Modification.....	5
2.5	Measurement Uncertainty.....	6
2.6	Support Equipment List and Description.....	6
3.0	<u>Emission Results</u>	8
3.1	Field Strength Calculation.....	9
3.2	Radiated Emission Configuration Photograph.....	11
3.3	Radiated Emission Data.....	12
3.4	Conducted Emission at Mains Terminal.....	14
3.5	Conducted Emission Configuration Photograph.....	14
3.6	Conducted Emission.....	15
4.0	<u>Equipment Photographs</u>	19
5.0	<u>Product Labelling</u>	21
6.0	<u>Technical Specifications</u>	23
7.0	<u>Instruction Manual</u>	25
8.0	<u>Miscellaneous Information</u>	27
9.0	<u>Test Equipment List</u>	31

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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 Models: 28S3750A, 28S3750P, 28S3750B are the same as the Model: 28S3750 in hardware aspect. The difference in colour and decorative parts of appearance, 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: 150730017SZN-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 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 TTE Technology, Inc. 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	X1
Hard Disk	WYVO	AS160H-D-G
USB Memory	TOSHIBA	UHYBS-004G-BL
USB Cable	Smart.drive	Unshielded, Length 155cm
RJ45 Cable	N/A	Unshielded, Length 400cm
Dummy Load	N/A	N/A
HDMI Cable*3	N/A	Unshielded, Length 180cm
AV Cable	N/A	Unshielded, Length 120cm
Tuner Resister	N/A	75ohm
Headphone	N/A	Unshielded, Length 110cm
AC Power Cable	N/A	Unshielded, Length 180cm

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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
1800.000MHz (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 3.7dB margin (HDMI In Mode)

TEST PERSONNEL:

Sign on file

Jenner Liu Engineer
Typed/Printed Name

August 20, 2015
Date

INTERTEK TESTING SERVICES

Company: TTE Technology, Inc.

Date of Test: August 20, 2015

Model: 28S3750

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	238.550	45.0	20.0	13.4	38.4	46.0	-7.6
Horizontal	636.820	37.3	20.0	23.0	40.3	46.0	-5.7
Horizontal	741.980	35.6	20.0	24.3	39.9	46.0	-6.1
Horizontal	1098.000	35.2	20.0	23.5	38.7	54.0	-15.3
Horizontal	1800.000	42.1	20.0	28.2	50.3	54.0	-3.7
Horizontal	2946.000	37.0	20.0	30.8	47.8	54.0	-6.2
Vertical	56.190	40.2	20.0	8.7	28.9	40.0	-11.1
Vertical	148.340	43.4	20.0	10.1	33.5	43.5	-10.0
Vertical	741.767	37.7	20.0	24.3	42.0	46.0	-4.0
Vertical	1800.000	42.1	20.0	26.8	48.9	54.0	-5.1
Vertical	2561.000	30.7	20.0	28.3	39.0	54.0	-15.0
Vertical	2946.000	34.7	20.0	30.7	45.4	54.0	-8.6

NOTES:

1. Quasi-Peak detector is used for frequency up to 1GHz and Peak detector is used for frequency from 1-5GHz.
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 1-5GHz 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
0.878 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 7.9 dB margin (HDMI In Mode)

TEST PERSONNEL:

Sign on file

Jenner Liu Engineer
Typed/Printed Name

August 20, 2015
Date

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Company: TTE Technology, Inc.

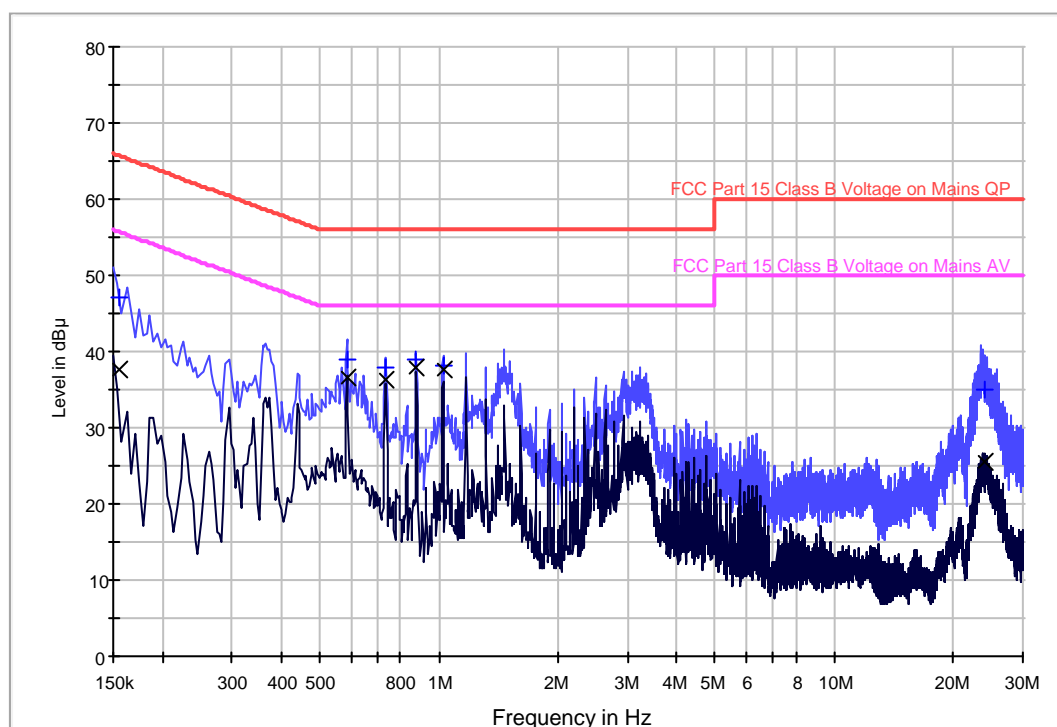
Date of Test: August 20, 2015

Model: 28S3750

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)
0.155	47.2	L1	9.8	18.6	65.8
0.586	39.1	L1	10.0	16.9	56.0
0.730	37.9	L1	10.1	18.1	56.0
0.878	38.9	L1	10.0	17.1	56.0
1.026	38.1	L1	9.9	17.9	56.0
23.950	35.1	L1	10.3	24.9	60.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.155	37.8	L1	9.8	18.0	55.8
0.586	36.5	L1	10.0	9.5	46.0
0.730	36.3	L1	10.1	9.7	46.0
0.878	37.8	L1	10.0	8.2	46.0
1.026	37.7	L1	9.9	8.3	46.0
23.950	25.6	L1	10.3	24.4	50.0

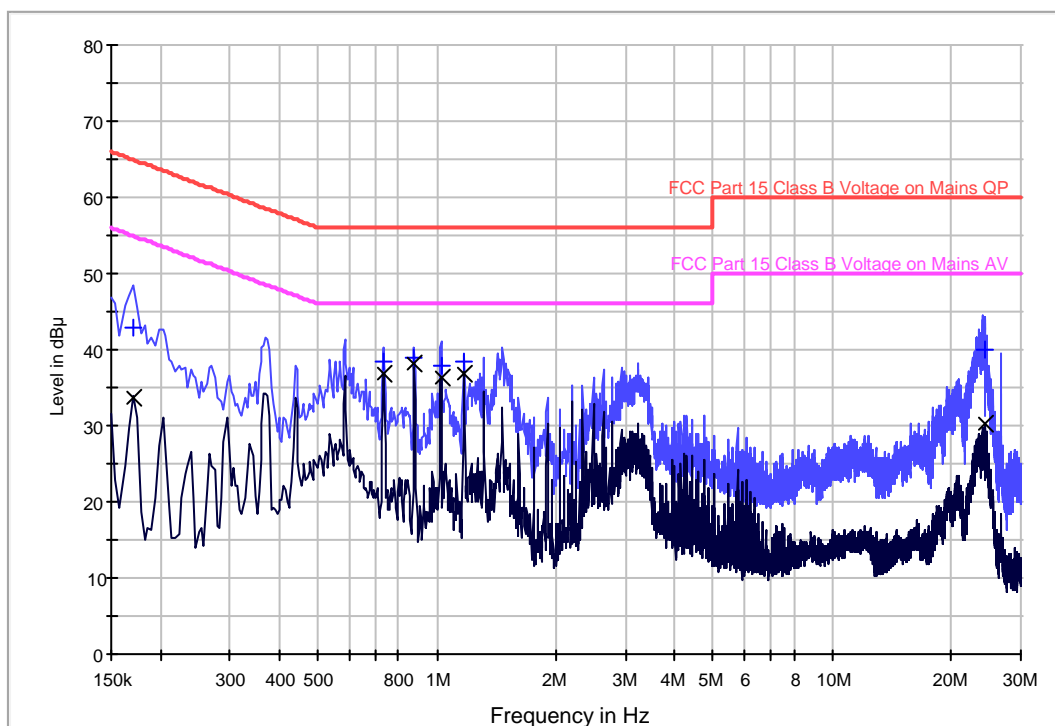
Test Engineer: Jenner Liu

TRF No.: FCC 15C_PC_b

FCC ID: W8U28S3750

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Company: TTE Technology, Inc.
 Date of Test: August 20, 2015
 Model: 28S3750
 Operating Mode: HDMI In
 Phase: Neutral
Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.170	42.9	N	10.2	22.1	65.0
0.730	38.3	N	10.3	17.7	56.0
0.878	38.9	N	10.3	17.1	56.0
1.026	38.0	N	10.3	18.0	56.0
1.170	38.5	N	10.3	17.5	56.0
24.318	39.9	N	10.4	20.1	60.0

Result Table AV

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.170	33.8	N	10.2	21.2	55.0
0.730	36.8	N	10.3	9.2	46.0
0.878	38.1	N	10.3	7.9	46.0
1.026	36.4	N	10.3	9.6	46.0
1.170	36.8	N	10.3	9.2	46.0
24.318	30.3	N	10.4	19.7	50.0

Test Engineer: Jenner Liu

TRF No.: FCC 15C_PC_b
 FCC ID: W8U28S3750

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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 – 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 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.

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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
SZ061-12	Biconilog Antenna	ETS	3142E	00166158	02-Sep-2014	02-Sep-2015
SZ061-08	Horn Antenna	ETS	3115	00092346	19-Oct-2014	19-Oct-2015
EM031-03	EXA Spectrum Analyzer	R&S	FSV40	101506	06-Jun-2015	06-Jun-2016
SZ185-01	EMI Receiver	R & S	ESCI	100547	07-Feb-2015	07-Feb-2016
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	19-Apr-2014	19-Apr-2016
SZ062-04	RF Cable	RADIALL	RG 213U	--	29-Jun-2015	28-Dec-2015
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	01-Nov-2014	01-Nov-2015
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	01-Nov-2014	01-Nov-2015
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	24-Jun-2015	24-Jun-2016
SZ188-03	Shielding Room	ETS	RFD-100	4100	23-Aug-2014	23-Aug-2016