OttLite Technologies, Inc.

TEST REPORT

SCOPE OF WORK
FCC TESTING–HZ-X21C

REPORT NUMBER
181126007SZN-014

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TEST REPORT

Intertek Report No.: 181126007SZN-014

OttLite Technologies, Inc.

Application
For
Certification

FCC ID: 2AI7B-HZ-X21C

LED Shine Desk Lamp with Wireless Charging

Model: HZ-X21C

Transmitter

Report No.: 181126007SZN-014

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-17]

Prepared and Checked by:

Steven Zhou

Steven Zhou
Engineer
Date: 22 January 2019

Approved by:

Kidd Yang
Technical Supervisor
Date: 22 January 2019

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

LED Shine Desk Lamp with Wireless Charging

Model: HZ-X21C

FCC ID: 2AI7B-HZ-X21C

This report concerns (check one) Original Grant ___X___ Class II Change _____

Equipment Type: DCD - Part 15 Low Power Transmitter Below 1705 kHz

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 C for intentional radiator - the new 47 CFR [10-01-17] Edition] provision.

Report prepared by:

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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

EXHIBIT 1

SUMMARY OF TEST RESULTS

1.0 Summary of Test results

LED Shine Desk Lamp with Wireless Charging

Model: HZ-X21C

FCC ID: 2AI7B-HZ-X21C

TEST ITEM	REFERENCE	RESULTS
Power Line Conducted Emissions	15.207	Pass
Transmitter Radiated Emissions	15.209	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

EXHIBIT 2

GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a LED Shine Desk Lamp with Wireless Charging operating at the frequency range 110-205 kHz. The EUT is powered by DC 12V from adapter. For more detailed features description, please refer to the user's manual.

Antenna Type: Integral Antenna(embedded coil antenna)

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for certification of the LED Shine Desk Lamp with Wireless Charging portion.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). 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. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are Intertek **Testing Services Shenzhen Ltd. Longhua Branch** and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

EXHIBIT 3

SYSTEM TEST CONFIGURATION

3.0 System Test Configuration

3.1 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 C63.10 (2013).

The EUT was powered by an adaptor with 120V/60Hz input during the test. The test system was pre-scanning tested based on the consideration of following EUT operation mode. Only the worst case data is shown in the report.

Pertest mode	Description
Mode 1	Standby mode
Mode 2	Mobile phone is charging at 1% battery power
Mode 3	Mobile phone is charging at 50% battery power
Mode 4	Mobile phone is charging at 99% battery power

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, 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. This step by step procedure for maximizing emissions led to the data report in Exhibit 4.0.

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 mounted to a plastic stand if necessary and placed on the styrene turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

3.3 Special Accessories

There is no special accessories necessary for compliance of this product.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

3.5 Equipment Modification

Any modifications installed previous to testing by OttLite Technologies, Inc. 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.

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Detail
Adapter	HP24G-1202000-AU (Provided by applicant)	Input: AC 100-240V 50/60Hz 1A Output: DC 12V 2A
Mobile Phone	Samsung	S7
USB Cable	(Provided by Intertek)	Unshielded, 80cm
Resister	(Provided by Intertek)	2.5Ω

EXHIBIT 4

MEASUREMENT RESULTS

4.0 Measurement Results

4.1 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
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

Example

Assume a receiver reading of 62.0dBµV is obtained. The antenna factor of 7.4dB 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
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

4.2 Radiated Emission Configuration Photograph

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

4.3 Radiated Spurious Emission

Worst Case Radiated Spurious Emission
at
39.790MHz

Judgement: Passed by 3.9dB margin

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

Applicant: OttLite Technologies, Inc.
Date of Test: 27 December 2018 Model: HZ-X21C
Worst Case Operating Mode: Mode 2

Radiated Emissions (30MHz – 1000MHz)

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	85.775	43.9	20.0	8.4	32.3	40.0	-7.7
Horizontal	168.710	45.5	20.0	10.1	35.6	43.5	-7.9
Horizontal	230.305	48.1	20.0	12.4	40.5	46.0	-5.5
Vertical	39.790	44.0	20.0	12.1	36.1	40.0	-3.9
Vertical	85.324	46.9	20.0	8.4	35.3	40.0	-4.7
Vertical	165.315	48.1	20.0	9.7	37.8	43.5	-5.7

NOTES:
1. Quasi-Peak detector is used for frequency below 1GHz.
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 are below the QP limit.

Applicant: OttLite Technologies, Inc.
Date of Test: 27 December 2018 Model: HZ-X21C
Worst Case Operating Mode: Mode 2

Fundamental & Spurious Emission Below 30MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calculated at 300m (dBµV/m)	Limit at 300m (dBµV/m)	Margin (dB)
Vertical	0.126	76.6	0.0	7.6	84.2	80	4.2	25.6	-21.4
Vertical	0.377	53.9	0.0	7.3	61.2	80	-18.8	16.1	-34.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calculated at 30m (dBµV/m)	Limit at 30m (dBµV/m)	Margin (dB)
Vertical	0.493	49.2	0.0	6.8	56.0	40	16.0	33.7	-17.7

Notes:

1. The specified limits of frequency band 9~90 KHz, 110~490 KHz are in average and measurements are made with peak detectors. Quasi-Peak detector is used for other frequency band.

2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance 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.Loop antenna is used for the emission under 30MHz.

5.Horizontal and Vertical polarization were tested and Only the worst Case data is shown.

4.4 Conducted Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: conducted photos.pdf.

4.5 Conducted Emission

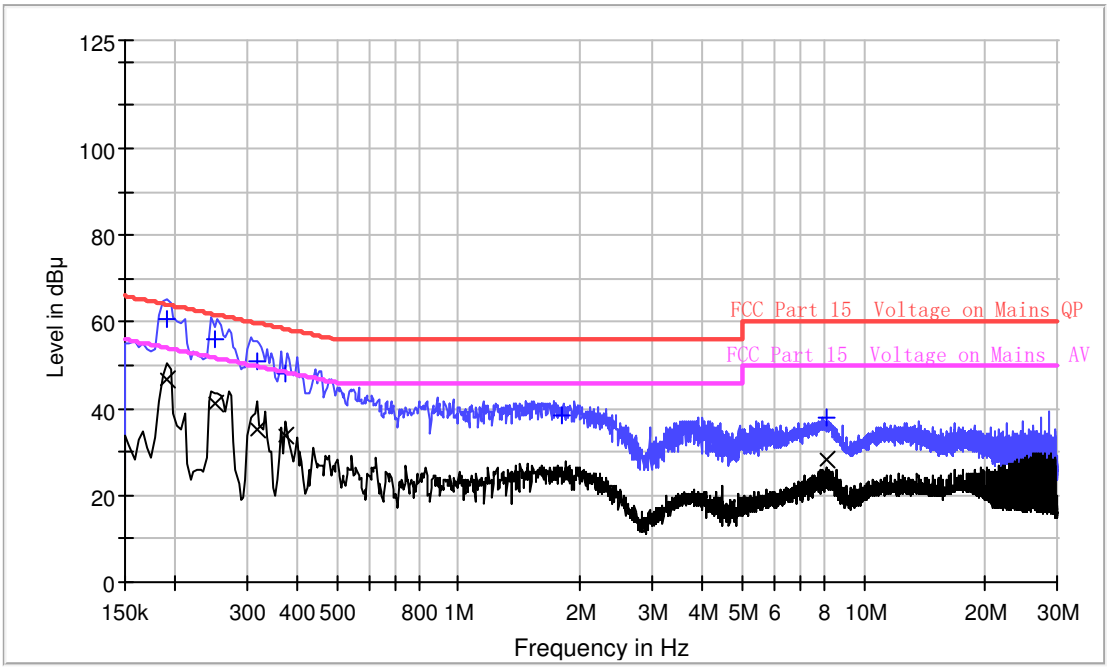
Worst Case Conducted Configuration
at
0.182MHz

Judgement: Passed by 3.0dB margin

Applicant: OttLite Technologies, Inc.
Date of Test: 18 December 2018 Model: HZ-X21C
Worst Case Operating Mode: Mode 2 Phase: Live

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.207: Emissions
Requirement



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.190000	60.9	9.000	L1	9.6	3.2	64.0
0.250000	55.9	9.000	L1	9.6	5.9	61.8
0.318000	50.9	9.000	L1	9.6	8.9	59.8
0.374000	48.1	9.000	L1	9.6	10.3	58.4
1.794000	38.4	9.000	L1	9.7	17.6	56.0
8.106000	37.9	9.000	L1	9.8	22.1	60.0

Limit and Margin AV

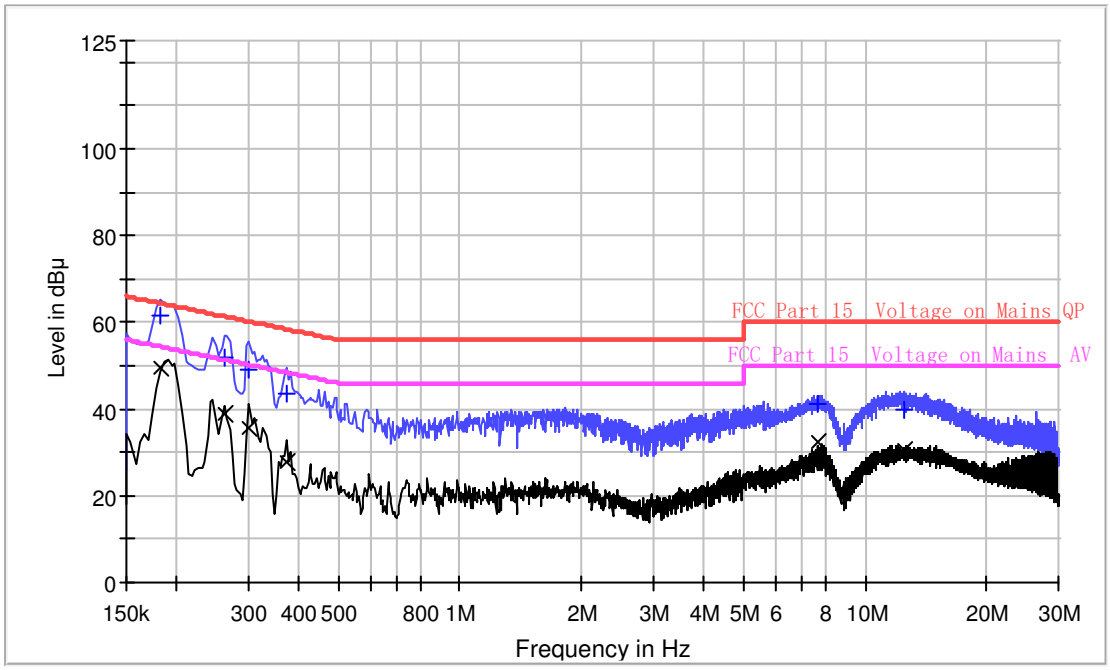
Frequency (MHz)	Average (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.190000	46.6	9.000	L1	9.6	7.4	54.0
0.250000	41.4	9.000	L1	9.6	10.4	51.8
0.318000	35.2	9.000	L1	9.6	14.6	49.8
0.374000	33.6	9.000	L1	9.6	14.8	48.4
1.794000	24.9	9.000	L1	9.7	21.1	46.0
8.106000	28.1	9.000	L1	9.8	21.9	50.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: OttLite Technologies, Inc.
Date of Test: 18 December 2018 Model: HZ-X21C
Worst Case Operating Mode: Mode 2 Phase: Neutral

Graphic / Data Table

Conducted Emissions
Pursuant to FCC 15.107: Emissions Requirement



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.182000	61.4	9.000	N	9.6	3.0	64.4
0.262000	52.1	9.000	N	9.6	9.3	61.4
0.302000	49.3	9.000	N	9.6	10.9	60.2
0.374000	43.5	9.000	N	9.6	14.9	58.4
7.650000	41.2	9.000	N	9.8	18.8	60.0
12.542000	39.7	9.000	N	10.0	20.3	60.0

Limit and Margin AV

Frequency (MHz)	Average (dB¦ÌV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB¦ÌV)
0.182000	49.4	9.000	N	9.6	5.0	54.4
0.262000	39.0	9.000	N	9.6	12.4	51.4
0.302000	35.6	9.000	N	9.6	14.6	50.2
0.374000	27.7	9.000	N	9.6	20.7	48.4
7.650000	32.3	9.000	N	9.8	17.7	50.0
12.542000	30.5	9.000	N	10.0	19.5	50.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

EXHIBIT 5

EQUIPMENT PHOTOGRAPHS

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

EXHIBIT 6

PRODUCT LABELLING

6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

EXHIBIT 7

TECHNICAL SPECIFICATIONS

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

EXHIBIT 8

INSTRUCTION MANUAL

8.0 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 9

MISCELLANEOUS INFORMATION

9.0 Miscellaneous Information

This miscellaneous information includes emission measuring procedure

9.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 - 2013.

The transmitting 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 EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Average detector is used for 9–90 KHz, 110–490 KHz and Quasi-Peak detector is used for other frequency band. The IF bandwidth used for measurement of radiated signal strength was 10 KHz for emission below 30 MHz and 120 KHz for emission from 30 MHz to 1000 MHz.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz up to the 1GHz. For line-conducted emissions, the range scanned is 150kHz to 30MHz.

9.2 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.10 - 2013.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 9.1).

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

EXHIBIT 10

CONFIDENTIALITY REQUEST

10.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

EXHIBIT 11

TEST EQUIPMENT LIST

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	14-Sep-2018	14-Sep-2019
SZ185-01	EMI Receiver	R&S	ESCI	100547	24-Jan-2018	24-Jan-2019
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	11-May-2018	11-May-2019
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	05-Jun-2018	05-Jun-2019
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	05-Jun-2018	05-Jun-2019
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	24-Jan-2018	24-Jan-2019
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Jan-2017	16-Jan-2019
SZ062-02	RF Cable	RADIALL	RG 213U	--	02-Jul-2018	02-Jan-2019
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	31-Aug-2018	28-Feb-2019
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	31-Aug-2018	28-Feb-2019
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	26-Oct-2018	26-Oct-2019
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	04-Jul-2018	04-Jul-2019
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2019

**********End of Report**********