



Microsoft Mobile Oy

Application
For
Certification

FCC ID: PYADT-904

Wireless Charging Plate

Model: DT-904 (HW: V2.2, MW: V2.0, WLC FW: V0068, BT FW: V1.9)

Transmitter

Report No.: 150728037SZN-001

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 [10-1-14]

Prepared and Checked by:

Approved by:

Sign on file

Leo Lai
Project Engineer

Andy Yan
Senior Project Engineer
Date: November 12, 2015

- 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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- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF No.: FCC 15C_Tx_b

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INTERTEK TESTING SERVICES

LIST OF EXHIBITS

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MEASUREMENT / TECHNICAL REPORT

Microsoft Mobile Oy

MODEL: DT-904 (HW: V2.2, MW: V2.0, WLC FW: V0068, BT FW: V1.9)

FCC ID: PYADT-904

This report concerns (check one:) Original Grant ☒ Class II Change ☐

Equipment Type: DCD-Low Power Transmitter Below 1705 KHz

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 C for intentional radiator – the new 47 CFR [10-1-14 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	Radiated photos	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
External Photo	External Photos	external photos.pdf
Internal Photo	Internal Photos	internal photos.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
Block Diagram	Block Diagram	block.pdf
ID Label / Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.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 Wireless Charging Plate operating at the frequency range 110KHz-150KHz. The EUT is powered by DC5.2V from Adapter or PC. You can charge your phone or other compatible device without the hassle of untangling charger cables. Just pop your phone on the charging plate to start charging.

Antenna Type: Integral antenna (embedded coil antenna)
For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of the Wireless Charging portion. Remaining portion is subject to the following procedures:
Bluetooth LE: 150728037SZN-003.

1.3 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. 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 shield 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).

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 C63.10 (2013).

The EUT was powered by DC 5.2V from the Adapter with AC 120V 60Hz input and simultaneous transmitting was considered during the testing, only the worst data was reported in this report.

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 3.0.

The rear of unit was flushed with the rear of the table when it was powered by adapter up to 1GHz and placed in the centre of turntable above 1GHz.

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.

2.2 EUT Exercising Software

N/A.

2.3 Special Accessories

No special accessory.

2.4 Equipment Modification

Any modifications installed previous to testing by Microsoft Mobile Oy 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.
Mobile Phone	Nokia	Lumia 820
AC Charger	Nokia	AC-60C

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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

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 62.0dB μ V 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 32dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

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

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

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

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

$$PD = 0\text{dB}$$

$$AV = -10\text{dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32\text{dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8\mu\text{V/m}$$

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3.2 Radiated Emission Data and Configuration Photograph

Worst Case Radiated Emission

At

49.860 MHz

Judgement: Passed by 5.5 dB

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

TEST PERSONNEL:

Sign on file

Leo Lai, Project Engineer

Typed / Printed Name

August 8, 2015

Date

INTERTEK TESTING SERVICES

Company: Microsoft Mobile Oy Date of Test: August 8, 2015
Model: DT-904 (HW: V2.2, MW: V2.0, WLC FW: V0068, BT FW: V1.9)
Operating Mode: Transmit with Charging

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Vertical	0.124	56.2	0.0	14.8	71.0	105.7	-34.7
Vertical	0.372	33.0	0.0	15.1	48.1	96.2	-48.1
Horizontal	30.485	34.2	20.0	8.3	22.5	40.0	-17.5
Horizontal	59.585	29.5	20.0	10.1	19.6	40.0	-20.4
Horizontal	325.365	26.2	20.0	14.4	20.6	46.0	-25.4
Vertical	31.546	34.4	20.0	14.6	29.0	40.0	-11.0
Vertical	50.161	39.6	20.0	12.1	31.7	40.0	-8.3
Vertical	220.605	33.9	20.0	9.1	23.0	46.0	-23.0

NOTES:

1. Average detector is used for 9~90 KHz, 110~490 KHz and Quasi-Peak detector is used for other frequency band.
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. Loop Antenna was used for the frequency band below 30MHz.
5. The formula of limit at frequencies below 30MHz is extrapolated according to FCC part 15.31 (f) as below.
Limit dBuV/m at 3m = Limit dBuV/m at 300m + 40log(300/3) dB
Limit dBuV/m at 3m = Limit dBuV/m at 30m + 40log(30/3) dB

Test Engineer: Leo Lai

INTERTEK TESTING SERVICES

Company: Microsoft Mobile Oy Date of Test: August 8, 2015
Model: DT-904 (HW: V2.2, MW: V2.0, WLC FW: V0068, BT FW: V1.9)
Operating Mode: Transfer initiation & termination mode at 130KHz

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Vertical	0.130	63.9	0.0	14.8	78.7	105.3	-26.6
Vertical	0.390	30.5	0.0	15.1	45.6	95.8	-50.2
Horizontal	30.001	36.4	20.0	8.3	24.7	40.0	-15.3
Horizontal	159.960	35.3	20.0	10.1	25.4	43.5	-18.1
Horizontal	441.765	33.2	20.0	14.4	27.6	46.0	-18.4
Vertical	30.000	33.3	20.0	14.6	27.9	40.0	-12.1
Vertical	49.860	42.4	20.0	12.1	34.5	40.0	-5.5
Vertical	159.980	39.6	20.0	9.1	28.7	43.5	-14.8

NOTES:

1. Average detector is used for 9~90 KHz, 110~490 KHz and Quasi-Peak detector is used for other frequency band.
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. Loop Antenna was used for the frequency band below 30MHz.
5. The formula of limit at frequencies below 30MHz is extrapolated according to FCC part 15.31 (f) as below.
Limit dBuV/m at 3m = Limit dBuV/m at 300m + 40log(300/3) dB
Limit dBuV/m at 3m = Limit dBuV/m at 30m + 40log(30/3) dB

Test Engineer: Leo Lai

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3.3 Conducted Emission and Data Configuration Photograph

Worst Case Conducted Configuration
at
4.462 MHz

Judgement: Passed by 7.2 dB margin

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

TEST PERSONNEL:

Sign on file

Leo Lai, Project Engineer
Typed/Printed Name

August 8, 2015
Date

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Applicant: Microsoft Mobile Oy

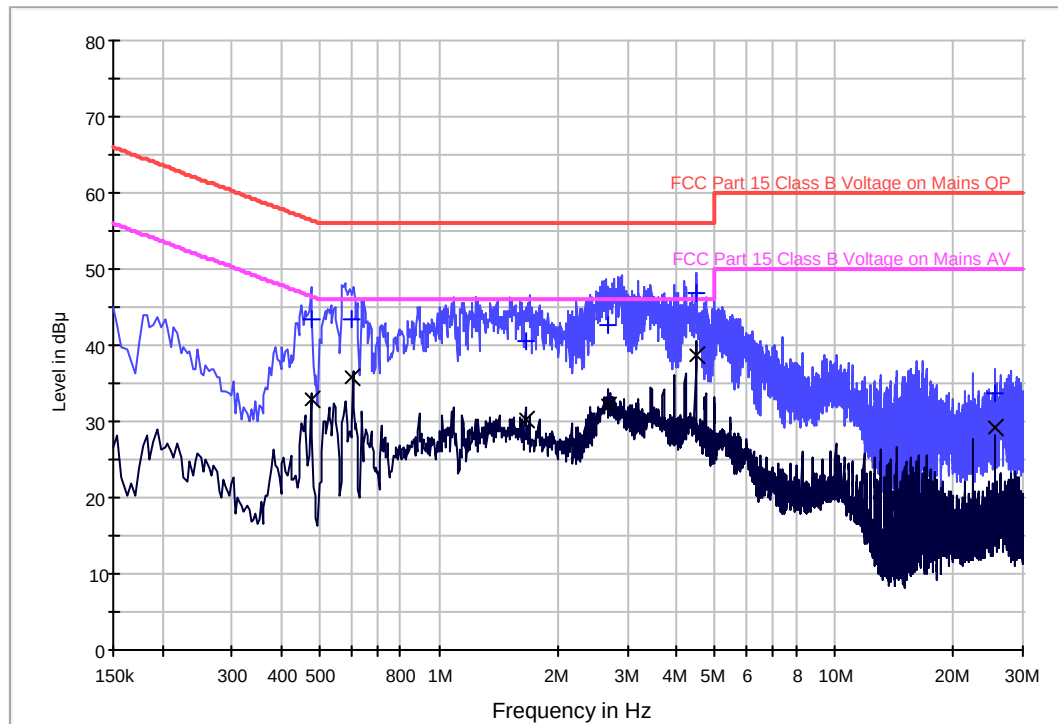
Date of Test: August 8, 2015

Model: DT-904 (HW: V2.2, MW: V2.0, WLC FW: V0068, BT FW: V1.9)

Sample: 1/1

Worst Case Operating Mode: Transmit with Charging

Conducted Emission Test - FCC



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.474000	43.4	L1	9.9	13.0	56.4
0.604500	43.4	L1	10.0	12.6	56.0
1.654000	40.7	L1	9.9	15.4	56.0
2.678000	42.6	L1	10.0	13.4	56.0
4.462000	46.9	L1	10.0	9.1	56.0
25.598000	33.7	L1	10.3	26.3	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBμV)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.474000	32.8	L1	9.9	13.6	46.4
0.604500	35.7	L1	10.0	10.3	46.0
1.654000	30.3	L1	9.9	15.7	46.0
2.678000	32.0	L1	10.0	14.0	46.0
4.462000	38.8	L1	10.0	7.2	46.0
25.598000	29.1	L1	10.3	20.9	50.0

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Applicant: Microsoft Mobile Oy

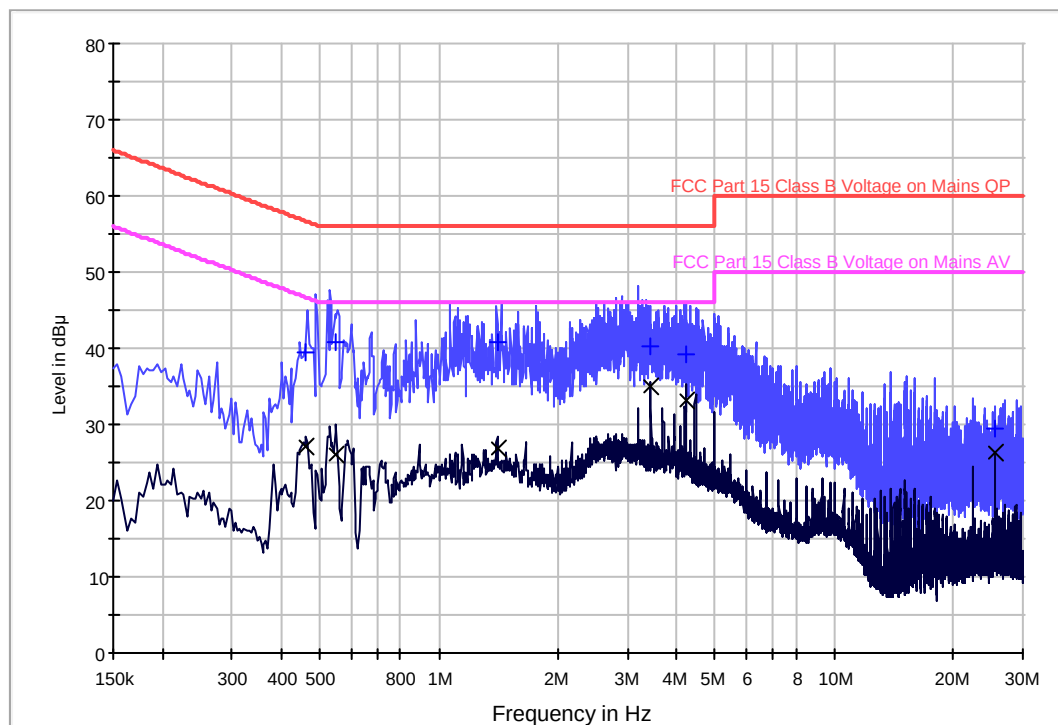
Date of Test: August 8, 2015

Model: DT-904 (HW: V2.2, MW: V2.0, WLC FW: V0068, BT FW: V1.9)

Sample: 1/1

Worst Case Operating Mode: Transmit with Charging

Conducted Emission Test - FCC



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.462000	39.4	N	10.2	17.3	56.7
0.550500	40.8	N	10.3	15.2	56.0
1.402000	40.7	N	10.3	15.3	56.0
3.438000	40.3	N	10.3	15.7	56.0
4.206000	39.1	N	10.3	16.9	56.0
25.602000	29.4	N	10.4	30.6	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBuV)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.462000	27.2	N	10.2	19.5	46.7
0.550500	26.0	N	10.3	20.0	46.0
1.402000	27.0	N	10.3	19.0	46.0
3.438000	35.0	N	10.3	11.0	46.0
4.206000	33.2	N	10.3	12.8	46.0
25.602000	26.3	N	10.4	23.7	50.0

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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.

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 and circuit.pdf respectively.

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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.

8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitter 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 Transmitter equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter, up to 1GHz 0.8m and above 1GHz 1.5m 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 adjust through all three orthogonal axes to obtain maximum emission levels. 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.

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.

For radiated emission, the frequency range scanned is 9KHz to 1GHz. For line conducted emissions, the range scanned is 150 KHz to 30 MHz.

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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	14-Jun-2015	14-Jun-2016
SZ185-01	EMI Receiver	R&S	ESCI	100547	07-Feb-2015	07-Feb-2016
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	29-Apr-2015	29-Apr-2016
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	19-Apr-2014	19-Apr-2016
SZ062-22	RF Cable	HUBER+SUHNER	SF104PE	MY1913/4PE	07-Apr-2015	07-Oct-2015
SZ062-23	RF Cable	HUBER+SUHNER	SF104PE	MY4262/4PE	07-Apr-2015	07-Oct-2015
SZ062-26	RF Cable	HUBER+SUHNER	SF104PE	MY4556/4PE	27-Jun-2015	27-Dec-2015
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	20-May-2015	20-May-2016
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

INTERTEK TESTING SERVICES

10.0 Annex

Document History

Report No.	Issue Date	Comments
150728037SZN-001	November 12, 2015	Original