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Report On

FCC Testing of the
Dyson Limited
Vacuum Cleaner RF Remote Control

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FCC ID: QVHDC22TXUS

Document 75906198 Report 01 Issue 1 April 2009

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

REPORT ON

FCC Testing of the
Dyson Limited
Vacuum Cleaner RF Remote Control

Document 75906198 Report 01 Issue 1

April 2009

PREPARED FOR

Dyson Limited
Tetbury Hill
Malmesbury
SN16 0RP

PREPARED BY

A R Hubbard
EMC Test Engineer

APPROVED BY

C Gould
Authorised Signatory

DATED 30 April 2009

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Parts 15 B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

J Holcombe

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SECTION 1

REPORT SUMMARY

FCC Testing of the
Dyson Limited
Vacuum Cleaner RF Remote Control

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Dyson Limited Vacuum Cleaner RF Remote Control to the requirements of FCC CFR 47 Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Dyson Limited
Machine Part Number	16624-01
Serial Number	522-US-A11255
Software Version	14027-01-03
Hardware PCB Assembly	16212-01-01
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B: 2007
Incoming Release Date	Declaration of Build Status 28 April 2009
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	4500016918 20 March 2009
Start of Test	09 April 2009
Finish of Test	09 April 2009
Name of Engineer(s)	J Holcombe
Related Document(s)	ANSI 63.4 : 2001

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 15B, is shown below.

Configuration 1 - Transmitter attached to handle and Receiver on Vaccuum						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.109	Radiated Emissions (Enclosure Port)	Transmitter and Receiver Idle	0	Pass	ANSI 63.4
			Transmitter Operating		N/A	
2.2	15.107	Conducted Emissions (AC Power Port)	Transmitter and Receiver Idle	0	Pass	ANSI 63.4
			Transmitter Operating		N/A	

N/A – Not Applicable

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1.3 DECLARATION OF BUILD STATUS

Manufacturer	Dyson Ltd
Country of origin	Malaysia
UK Agent	Dyson Ltd
Technical Description	Vacuum cleaner with RF remote control
Model No	DC22 Motor-Head
Part No	16624-01
Serial No	522-US-A-11255
Declared Variant	DC22 Turbine Head
Build Status	Fully assembled
Software/Hardware Issue	See section 1.4.2, Test Configuration and BOM List Transmitter DC22 315M00 TX 3 Buttons - PCB Assembly Parts List 14181-01-05 Receiver DC22 Control MTH/Receiver - PCB Assembly Parts List 16212-01-01
FCC ID	QVHDC22TXUS
Signature	Jon Robinson (Approvals and Support Manager)
Date	28 April 2009
D of B S Serial No	75906198

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV Product Service as to the accuracy of the information declared in this document by the manufacturer.

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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

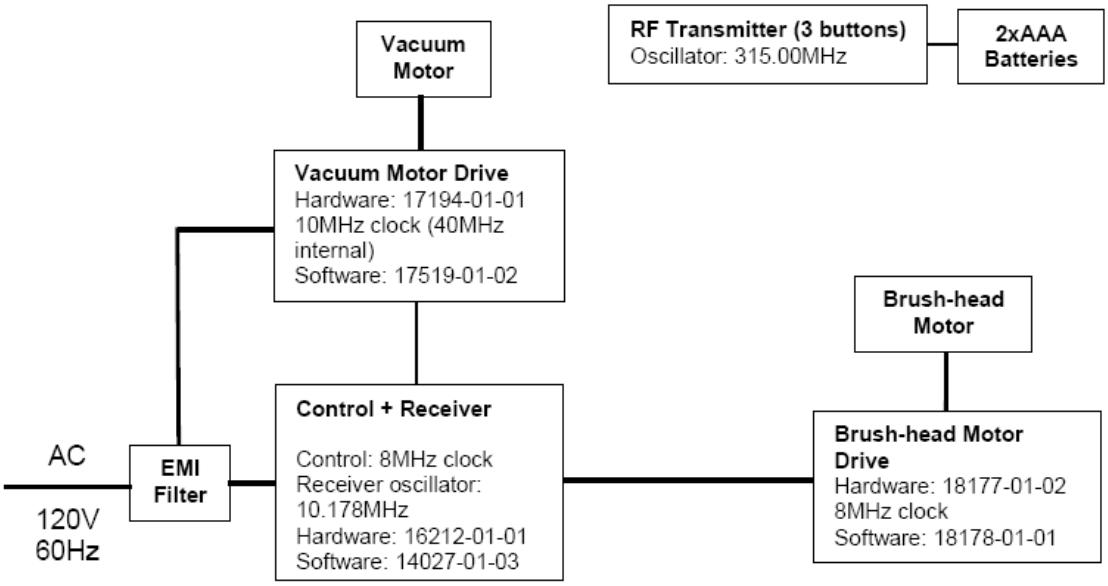
The Equipment Under Test (EUT) was a Dyson Limited Vacuum Cleaner RF Remote Control as shown in the photograph below. A full technical description can be found in the manufacturers documentation.

Equipment Under Test

Product Service

1.4.2 Test Configuration

Configuration 1: Transmitter attached to handle and Receiver on Vacuum



1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
AC Power	5m	Mains Lead	2 core	No

1.4.4 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – Transmitter and Receiver Idle
The vacuum cleaner and RF transmitter was powered from the mains but not in active operation.

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT receiver was powered from a 120V 60Hz AC supply the transmitter was powered by batteries.

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90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Dyson Limited
Vacuum Cleaner RF Remote Control

2.1 RADIATED EMISSIONS (ENCLOSURE PORT)

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109

2.1.2 Equipment Under Test

Vacuum Cleaner RF Remote Control, S/N: 522-US-A11255

2.1.3 Date of Test and Modification State

09 April 2009 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI 63.4.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.1.6 Environmental Conditions

	09 April 2009
Ambient Temperature	21°C
Relative Humidity	45%
Atmospheric Pressure	998mbar

Product Service

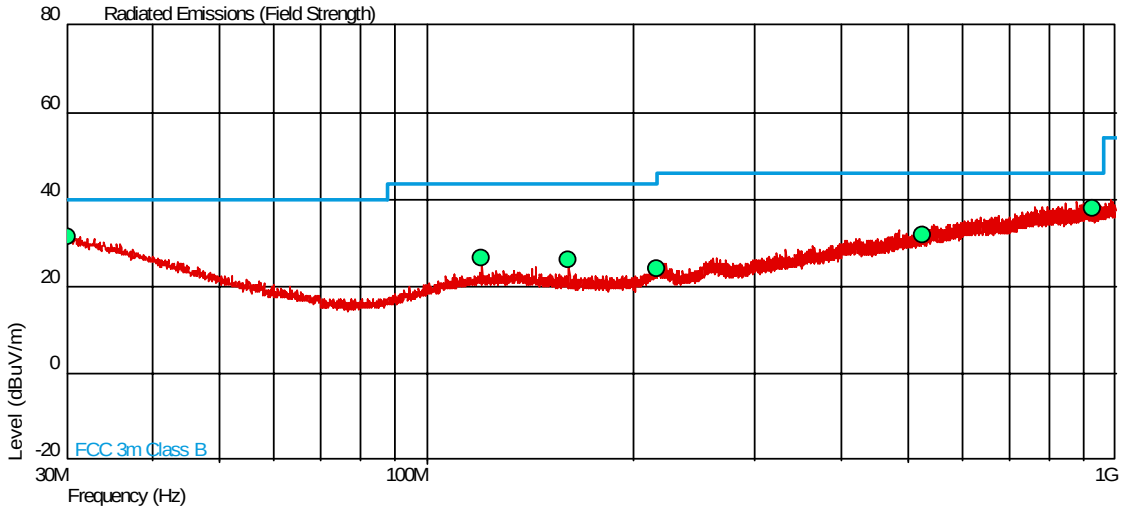
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1

30MHz to 1GHz

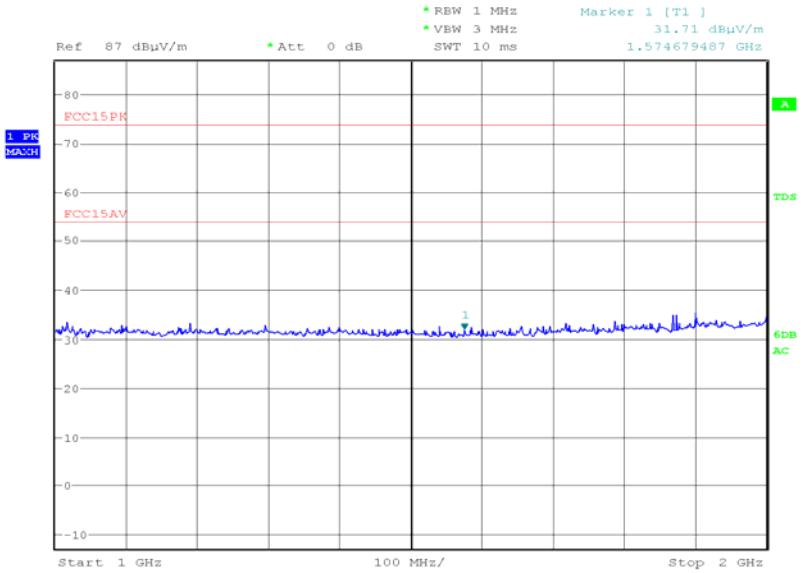


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.097	31.5	37.6	40.0	100.0	-8.5	-62.4	144	2.67	Vertical
120.347	26.4	20.9	43.5	100.0	-17.1	-79.1	322	1.00	Vertical
160.462	26.0	20.0	43.5	150.0	-17.5	130.0	241	1.00	Vertical
216.289	24.2	16.2	46.0	150.0	-21.8	133.8	252	1.00	Vertical
524.620	31.9	39.4	46.0	200.0	-14.1	-160.7	166	1.00	Horizontal
926.432	37.7	76.7	46.0	200.0	-8.3	-123.4	76	1.38	Horizontal

Product Service

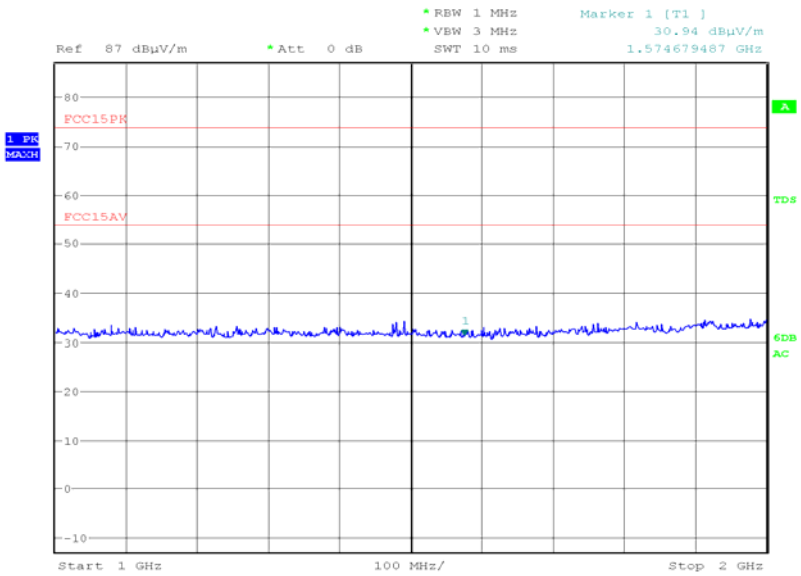
1GHz to 2GHz

Horizontal



Date: 9.APR.2009 09:54:50

Vertical



Date: 9.APR.2009 09:44:08

No emissions were detected within 20dB of the average limit. No final measurements were made as the EUT is deemed to of complied.

2.2 CONDUCTED EMISSIONS (AC POWER PORT)

2.2.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.107

2.2.2 Equipment Under Test

Vacuum Cleaner RF Remote Control, S/N: 522-US-A11255

2.2.3 Date of Test and Modification State

09 April 2009 - Modification State 0

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI 63.4.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

	09 April 2009
Ambient Temperature	21°C
Relative Humidity	45%
Atmospheric Pressure	998mbar

Product Service

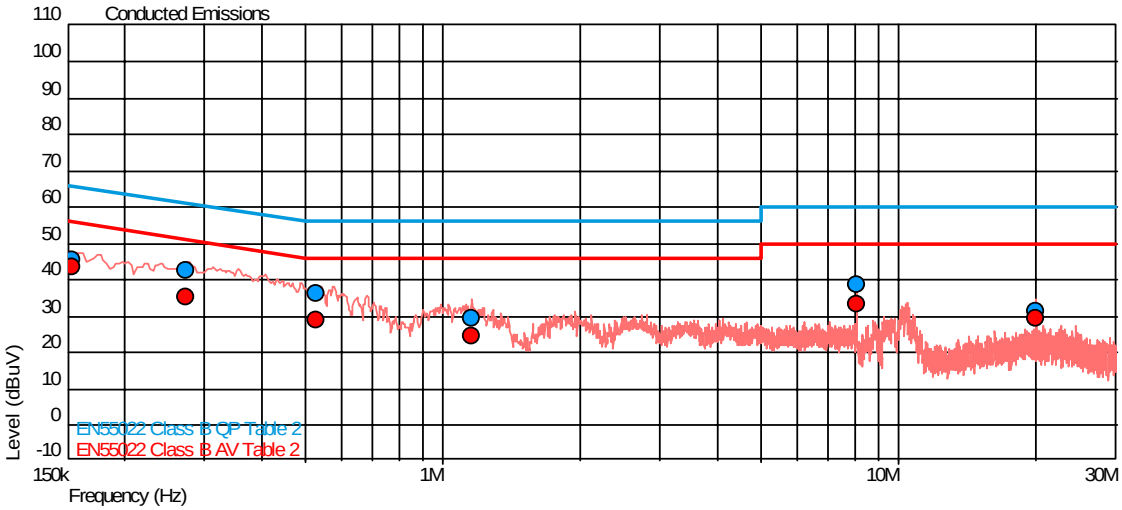
2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B for Conducted Emissions (AC Power Port).

The test results are shown below.

Configuration 1 - Mode 1

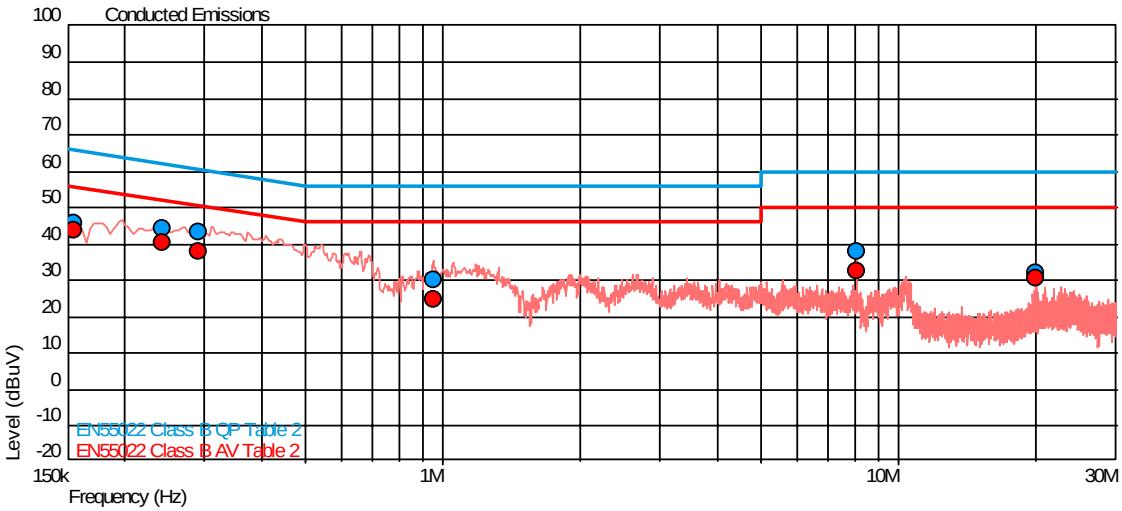
Live Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.154	45.5	65.8	-20.3	43.4	55.8	-12.4
0.272	42.5	61.1	-18.5	35.3	51.1	-15.7
0.525	36.0	56.0	-20.0	29.0	46.0	-17.0
1.156	29.4	56.0	-26.6	24.6	46.0	-21.4
8.091	38.5	60.0	-21.5	33.2	50.0	-16.8
20.059	31.2	60.0	-28.8	29.5	50.0	-20.5

Product Service

Neutral Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.154	45.6	65.8	-20.2	43.6	55.8	-12.2
0.242	44.2	62.0	-17.8	40.4	52.0	-11.6
0.290	43.1	60.5	-17.4	37.9	50.5	-12.6
0.950	29.8	56.0	-26.2	24.8	46.0	-21.2
8.089	37.6	60.0	-22.4	32.4	50.0	-17.6
20.058	32.1	60.0	-27.9	30.6	50.0	-19.4

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SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 EMC - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	6-Sep-2009
Pre-Amplifier	Phase One	PS04-0085	1532	12	15-Sep-2009
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009
Section 2.2 EMC - Conducted Emissions					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	1-May-2009
Transient Limiter	Hewlett Packard	11947A	1032	12	18-Jun-2009
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	20-Aug-2009

TU – Traceability Unscheduled

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3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
DC Input Ripple Immunity	Current Voltage	0.45% 0.91%
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4
† In accordance with UKAS Lab 34

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SECTION 4

PHOTOGRAPHS

4.1 TEST SET UP PHOTOGRAPHS

Radiated Emissions (Enclosure Port)

Conducted Emissions (AC Power Port)

Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).