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Report on the Radio Testing of: CORDLESS VACCUM CLEANER

Model(s): SV53-A

In accordance with
47 CFR FCC Part 1.1310
47 CFR FCC Part 2.1093
(BLUETOOTH LOW ENERGY)

Prepared for:
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Plo 208, Jalan Cyber 14,
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COMMERCIAL-IN-CONFIDENCE

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
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Prepared By	Quek Keng Huat	14 Mar 2025	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD PSB document control rules.

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with the mentioned standard(s).



LA-2007-0380-A
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0383-G
LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C
LA-2010-0464-D
LA-2018-0702-B
LA-2018-0703-G
LA-2020-0747-L

The results reported herein have been performed in accordance with the terms of accreditation under the Singapore Accreditation Council. Inspections/Calibrations/Tests marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our inspection body/laboratory.

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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	15 Mar 2025





1.2 Introduction

Applicant	:	Dyson Manufacturing Sdn. Bhd. Plo 208, Jalan Cyber 14, Senai Industrial Estate IV, 81400 Senai, Johor, Malaysia
Manufacturer	:	Dyson Technology Limited Tetbury Hill, Malmesbury, Wiltshire, SN16 0RP, United Kingdom.
Factory	:	Refer to manufacturer
Model Number(s)	:	SV53-A
Serial Number(s)	:	1. 7RK-KR-TMA0058A (Conducted Unit) 2. 7RK-KR-TMA0066A (Radiated Unit)
Number of Samples Tested	:	2
Test Sample(s) Condition	:	Good
Quotation Reference	:	8052973
Test Specification/Issue/Date	:	47 CFR FCC Part 1.1310 47 CFR FCC Part 2.1093
Test Sample(s) Received Date	:	03 Mar 2025
Start of Test	:	03 Mar 2025
Finish of Test	:	13 Mar 2025



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with specifications as shown below.

Specification Clause	Test Description	Result	Comments/Base Standard
<i>47 CFR FCC Part 15</i>			
2.1093	Maximum Permissible Exposure	Pass	KDB 447498 D01 General RF Exposure Guidance v06: 2015

Notes

1. Nil.





1.4 Product Information

1.4.1 Technical Description

Description	:	The Equipment Under Test(s) (EUT(s)) is a CORDLESS VACUUM CLEANER with Bluetooth Low Energy wireless technology.
Microprocessor	:	Refer to manufacturer
Operating Frequency	:	2.402GHz – 2.480GHz
Clock / Oscillator Frequency	:	Refer to manufacturer
Modulation	:	Gaussian Frequency Shift Keying (GFSK)
Antenna Gain	:	3.8dBi
Port / Connectors	:	1 x AC Inlet
Rated Power	:	- Vacuum Cleaner 25.9V, 450W - Battery Charger Input:100-240Vac; 50/60Hz; 1.0A Output: 30.45Vdc; 1.1A
Accessories	:	Nil



1.4.2 Test Configuration and Modes of Operation

Mode(s)	Description								
Maximum RF power transmission	The EUT was configured into RF test mode by running Renesas Electronics SmartSnippets Toolbox (v5.0.26.4228). The EUT was exercised in the mode, transmitting at lower, middle and upper channels as shown below one at a time with all supported modulation schemes were evaluated. For Band Edge Compliance, only lower and upper channels were evaluated. <table><tr><th>Transmit Channel</th><th>Frequency (GHz)</th></tr><tr><td>Channel 0 (Lower Channel)</td><td>2.402</td></tr><tr><td>Channel 19 (Middle Channel)</td><td>2.440</td></tr><tr><td>Channel 39 (upper Channel)</td><td>2.480</td></tr></table>	Transmit Channel	Frequency (GHz)	Channel 0 (Lower Channel)	2.402	Channel 19 (Middle Channel)	2.440	Channel 39 (upper Channel)	2.480
Transmit Channel	Frequency (GHz)								
Channel 0 (Lower Channel)	2.402								
Channel 19 (Middle Channel)	2.440								
Channel 39 (upper Channel)	2.480								

1.4.3 Performance Criteria and Monitoring Methods

Not Applicable.



1.5 Deviations from the Standard

Nil.

1.6 EUT Modification Record

No modifications were made.

1.7 Test Location(s)

TÜV SÜD PSB Pte Ltd
Electrical & Electronics Centre (EEC), Product Services,
15 International Business Park
TÜV SÜD @ IBP
Singapore 609937

1.8 Test Facilities Registrations

Requirements	Registration Numbers
FCC	994109 (Test Firm Registration Number) SG0002 (Designation Number)
ISED	SGAP01 (CAB Identifier) 2932N-1 (10m Semi-Anechoic Chamber)
VCCI	R-13324 (10m ANC), G-10203 (10mANC) R-20151 (3m RF Chamber - Lab 7), G-20149 (3m RF Chamber - Lab 7) C-14933 (C.E @ CEIBP) T-12403 (Telecom Ports @ CEIBP)
BSMI	SL2-IS-E-6001R [CNS-13803 (ISM Equipment)] SL2-IN-E-6001R [CNS-13438, CNS-15936 (IT Equipment)] SL2-R1/R2-E-6001R [CNS-13439, CNS-15936 (Broadcast Receivers)] SL2-A1-E-6001R [CNS-13783-1 (Household Appliances)] SL2-L1-E-6001R [CNS-14115 (Lighting Equipment)]
SABS	SABS/A-LAB/0030/2018
ASCA	TL-86



1.9 Supporting Equipment

Not applicable as no measurement was done and the EUT's MPE levels are below the threshold level.





2 Test Details

2.1 Maximum Permissible Exposure (MPE)

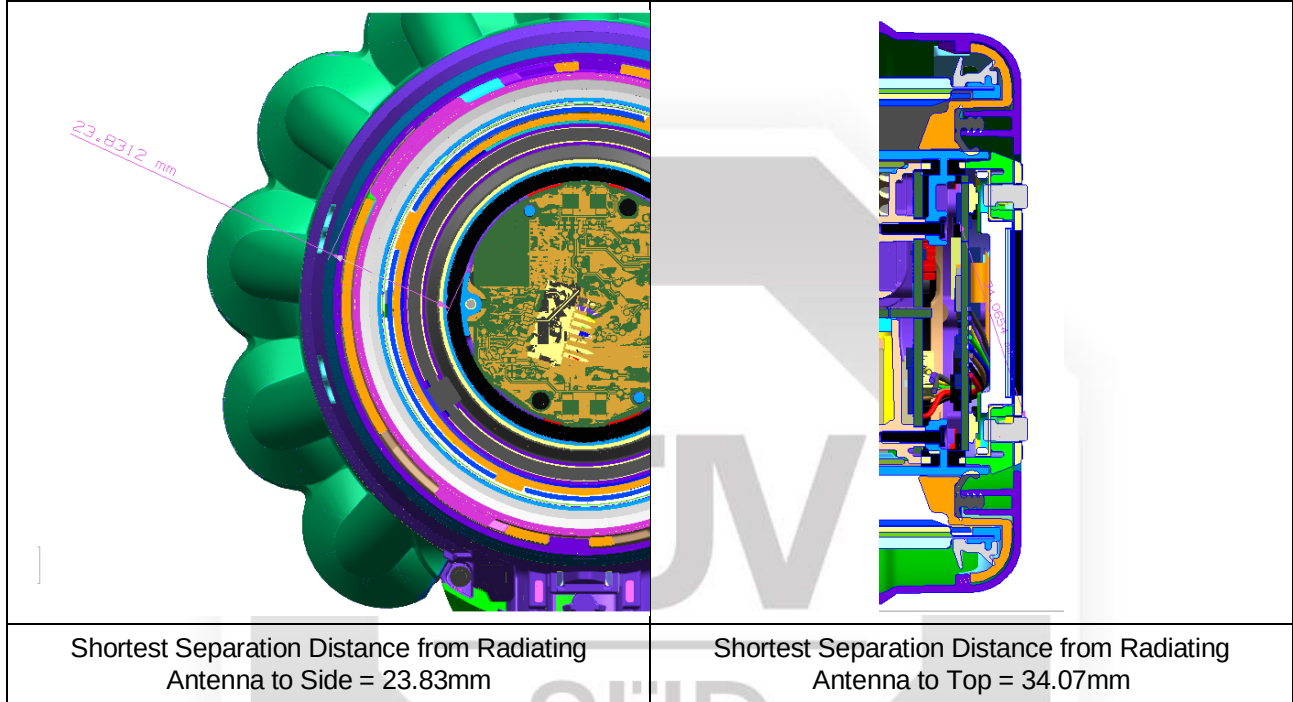
2.1.1 Test Limits

The EUT shows compliance to the requirements of this section, which states the MPE limits for general population / uncontrolled exposure are as shown below:

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (min)
0.3 - 1.34	614	1.63	100 ^{Note 2}	30
1.34 - 30	824 / f	2.19 / f	180 / f ² ^{Note 2}	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f / 1500	30
1500 - 100000	-	-	1.0	30
Notes				
1. f = frequency in MHz				
2. Plane wave equivalent power density				

2.1.2 Maximum Permissible Exposure Computation

The shortest separation distance between the user and the device's radiating element is 2.38cm, therefore Option B SAR-based exemption is applicable.



Applying Option B in § 1.1307(b)(3)(i)(B)

The Threshold ERP (W) was computed with the following formula:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);



Calculating P^{th} with the following parameters:

$$P^{th} = ERP_{20cm} (d / 20cm)^x$$

where $f = 2402MHz,$
 $d = 2.38cm$

∴ Threshold ERP, P^{th} @ 2.38cm = 53.9mW

Description	Bluetooth Low Energy *See Note 1
Frequency (MHz)	2402
Maximum Conducted Power (dBm)	4.0
Tune-up Tolerance (dB)	2.0
EUT Maximum Conducted Power (mW)	4.0
Antenna Gain (dBi)	3.8
EIRP (dBm)	9.8
ERP (dBm)	7.7
EUT ERP (mW)	5.9
Threshold ERP, P^{th} @ 2.38cm (mW)	53.9

Based on the above computations, the following comparisons were made.

- 1) EUT Maximum Conducted Power (mW) < Threshold ERP, P^{th} @ 2.38cm &
- 2) EUT ERP (mW) < Threshold ERP, P^{th} @ 2.38cm

Since the EUT Maximum Conducted Power & EUT ERP were both found to be lower than the Threshold ERP at the shortest separation distance to the radiated antenna at 2.38cm. ∴ the EUT is SAR exempted, and no routine evaluation is required.

Simultaneous Transmissions Computation

Since the EUT comes with Bluetooth Low Energy wireless operating mode only, the EUT does not have simultaneous co-transmission scenarios, simultaneous transmissions computation is not applicable.

*See Note 1: The maximum e.i.r.p combination of antenna gain and maximum conducted power were used for the computation.



3 Test Equipment

Not Applicable.





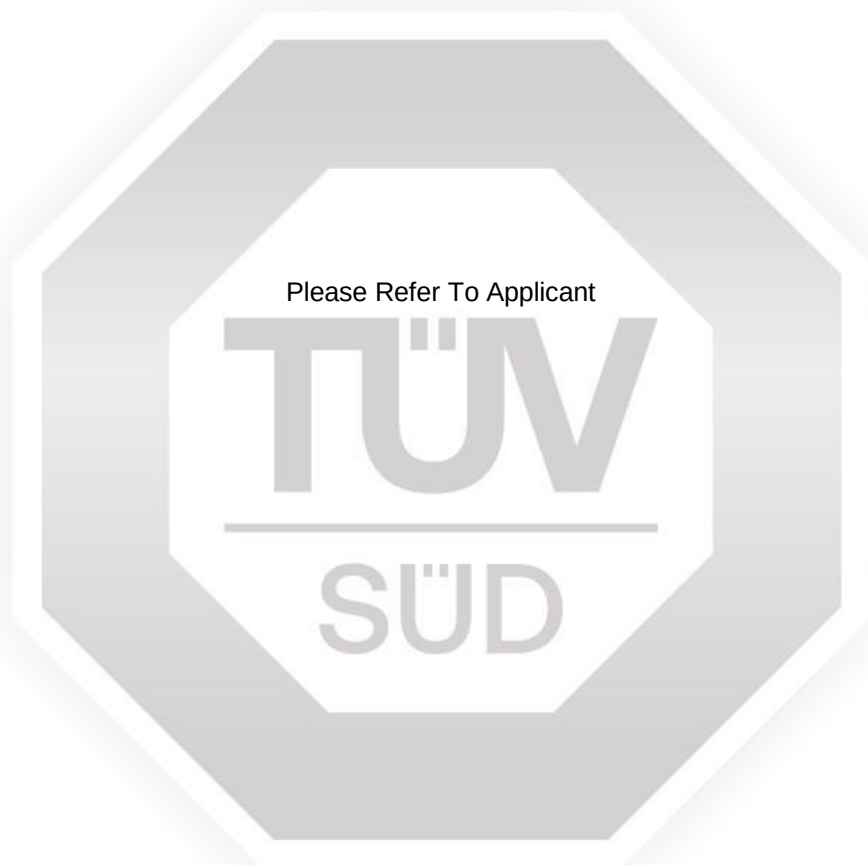
4 Measurement Uncertainty

Not Applicable.





5. EUT PHOTOS, TEST SETUP PHOTOS, PCB PHOTOS, FCC & IC LABELS





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Effective 27 March 2024

