Test Report – Products
Prüfbericht – Produkte

Certificate # 3331.02

Test Repot No. *Prüfbericht-Nr.:*	**US24PCQR.001 Rev. 01**	**Order No.** Auftrags-Nr.:	P01233817 234208189-20	Page **1** of **16** *Seite **1** von **16***
Client Reference No.: *Kunden-Referenz-Nr.:*	2218280	**Order date:** *Auftragsdatum:*	2023-09-29	
Client: *Auftraggeber:*	Hunter Douglas Windows Fashions, Inc. 1 Duette Way Broomfield CO 80020 USA			
Identification/ Type No.: *Bezeichnung / Typ-Nr*	Silent Curtain Motor/HD60G-PV			
Order content: *Auftrags-Inhalt:*	RF Exposure report for FCC ID: UXUMOTG3K			
Test specification: *Prüfgrundlage*	Title 47 Chapter I, Subpart A Part 2 Subpart J §2.1091 FCC KDB 447498 D04 v01			
Date of sample receipt: *Wareneingangsdatum:*	11/28/2023			
Test sample No: *Prüfmuster-Nr.:*	SN001-00010			
Testing period: *Prüfzeitraum*	8/29/2024 - 8/29/2024			
Place of testing: *Ort der Prüfung:*	TUV Rheinland of North America Inc. 5015 Brandin Ct Fremont CA 94538 USA			
Testing laboratory: *Prüflaboratorium*	TUV Rheinland of North America, Inc.			
Test result*: *Prüfergebnis*:*	Pass			

Tested by: *geprüft von:* **Date:** 9/4/2024 *Datum:*	Isaac Aguilar	**Authorized by:** *genehmigt von:* **Issue Date:** 9/4/2024 *Ausstellungsdatum:*	Osvaldo Casorla
Position / Stellung:	Test Engineer	**Position** / Stellung:	Expert
Others / *Sonstiges*:			
Condition of the test item at delivery: *Zustand des Prüfgegenstandes bei Anlieferung:*			

* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
** Legende:*	*P(ass) = entspricht o.g. Prüfgrundlage(n)*	*F(ail) = entspricht nicht o.g. Prüfgrundlage(n)*	*N/A = nicht anwendbar*	*N/T = nicht getestet*

This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

Remarks
Anmerkungen

1	The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request. *Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.* *Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.*
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3	Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report. *Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.* *Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.*
4	Electromagnetic Compatibility Test Report. The above product was found to be Compliant to the above test standard(s).

Product description
Produktbeschreibung

1	**Product details:** *Produktdetails:*	Bluetooth Low Energy wireless connected motor drive for windows shades
2	**Dimensions / Weight:** *Maße / Gewicht:*	10.16 x 6.35 x 30.48 cm^3/1.36 kg
3	**Operating elements:** *Bedienelemente:*	100 – 240 VAC/50 – 60 Hz; 1.6A
4	**Equipment / Accessories:** *Ausstattung / Zubehör:*	--
5	**Used materials:** *Verwendete Materialien:*	--
6	**Other:** *Sonstiges:*	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
7	**Test sample obtaining:** *Prüfmusterbereitstellung:*	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

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Revisions

Revision No.	Date	Reason for Change	Author
01	9/4/2024	Original Report	Isaac Aguilar

Note: Latest revision report will replace all previous reports.

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of 47 CFR §2.1091 based on the results of evaluation performed on 8/29/2024 to 8/29/2024 on HD60G-PV manufactured by Hunter Douglas Windows Fashions, Inc. .

This report only applies to the specific sample evaluated under the stated conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

This report will evaluate compliance of RF exposure to the human body of HD60G-PV according to Title 47 Chapter I, Subpart A Part 2 Subpart J §2.1091. Transmitters and/or configurations that are not exempt from routine evaluation are assessed according to acceptable FCC measuremnet procedures as defined in KDB 447498 D04v01.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Regulation	Test/Evaluation Method	Worst Case	Result
47 CFR §15.247 (i), 47 CFR §2.1093	47 CFR §1.1307(b)(3)(i) FCC KDB 447498 D04 v01	3.96 mW EIRP @ 20 cm	**Complies**
Note: None.			

1.4 Special Accessories

None

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 US Federal Communications Commission, US1131

TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont Ca., 94538, are recognized by the Commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Pleasanton Registration No. US1131, Fremont Registration No. US1131). The laboratory Scopes of Accreditation include Title 47 CFR Parts 15, 18 and 90. The accreditations are updated every three years.

2.2 NIST / A2LA, Testing Cert #3331.02

TUV Rheinland of North America EMC test facilities are accredited by the American Association for Laboratory Accreditation (A2LA). The laboratories have been assessed and accredited by A2LA in accordance with ISO Standard 17025:2017 (Testing Certificate #3331.02). The Scope of Laboratory Accreditation includes emission and immunity testing. The accreditations are updated annually.

2.3 Canada – Innovation, Science and Economic Development (ISED), 2932D

Innovation, Science and Economic Development Canada | Innovation, Sciences et Développement économique Canada

The Fremont 10-meter Semi-Anechoic Chamber, Registration No. 2932D, has been accepted by ISED to perform testing to 3 and 10 meters based on the test procedures described in ANSI C63.4-2014.

2.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct. Fremont Ca., 94538, have been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Fremont: A-409

2.5 Acceptance by Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TÜV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member country.

2.6 BSMI

Registration No.: SL2-IN-E-1150R. The BSMI accreditation was obtained by NIST MRA with the BSMI

2.7 Korea

(Designation No.: US0185). Recognized by National Radio Research Agency (RRA) as an accredited Conformity Assessment Body (CAB) under the terms for Korea Phase I of the APEC TEL.

2.8 Test Facilities

Test facilities are located at 5015 Brandin Ct, Fremont, California, 94538, USA and 1279 Quarry Lane, Pleasanton, California 94566, USA (Fremont is the Pleasanton Annex).

country.

2.9 Test Facilities

Test facilities are located at 5015 Brandin Ct, Fremont, California, 94538, USA and 1279 Quarry Lane, Pleasanton, California 94566, USA (Fremont is the Pleasanton Annex).

2.9.1 Emission Test Facility

The Semi-Anechoic Chambers and AC Line Conducted measurement facilities used to collect radiated and conducted emissions data have been constructed in accordance with ANSI C63.7:1992. The Fremont 10 meter semi-anechoic chamber has been measured in accordance with and verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2014 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04), at test distances of 3 and 10 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02). The Pleasanton 5 meter semi-anechoic chamber has been verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2014 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04) at a test distance of 3 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02).

2.10 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurement and the fraction may be viewed as the coverage probability or level of confidence of the interval.

2.1 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2017. Equipment calibration records are kept on file at the test facility.

3 Equipment Under Test

3.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and manufacturer details. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

3.2 Customer

Table 2: Customer Information

Client	Hunter Douglas Windows Fashions, Inc.
Address 1	1 Duette Way Broomfield CO 80020 USA
Contact Person	Mike Rockwood
Telephone	+1 (720) 778-0205
Fax	--

Table 3: Technical Contact Information

Contact Person	Mike Rockwood
Telephone	+1 (720) 778-0205
E-Mail	mike.rockwood@hunterdouglas.com

3.3 Equipment Under Test Specifications

Table 4: EUT Specifications

EUT Specifications	
Exposure Type	☒ General Population / Uncontrolled ☐ Occupational / Controlled
Dimensions	10.16 x 6.35 x 30.48 cm^3
Power Input	24 VDC
Operating Temperature Range:	-25 to 65ºC
Multiple Feeds:	☐ Yes: ☒ No
Hardware Version/Model	HD60G-PV
Firmware Version	1
RF Software Version	1
Product Marketing Name	Silent Curtain Motor
Operating Mode	Bluetooth Low Energy
Transmitter Frequency Band	BLE: 2402 – 2480 MHz
Antenna Manufacturer	YAGEO Group
Antenna Model	ANTX1000P011B24003
Antenna Type	Linear Passive PCB Antenna
Antenna Gain	+1.5 dBi
Modulation Type	GFSK
Data Rate	1, 2 Mbps
Supported Bandwidths	1 MHz
TX/RX Chain (s)	1 Spatial Stream
Directional Gain Type	N/A
Type of Equipment	Indoor/Residential
Note: 1. All EUT specifications are provided by the manufacturer or the TUV direct customer. Information supplied by the customer and can affect the validity of results.	

Table 5: EUT Test Samples

Equipment	Manufacturer	Model	Serial	Used for
1	Hunter Douglas Window Fashions, Inc	HD60G-PV	010001	Conducted testing
2	Hunter Douglas Window Fashions, Inc	HD60G-PV	010027	Radiated emissions
Note: None.				

Table 6: Power Settting/Specifcation

Freq. (MHz)	BLE 1Mbps	BLE 2MBps	--	--	--	--	--	--
2400-2480	+ 6 dBm	+6 dBm	--	--	--	--	--	--
Note: None								

Table 7: General Product Infromation

Dimensions	Height:	10.16 cm	Width:	6.35 cm	Length:	30.48 cm
Weight	1.36 kg		**Fork-lift Needed:**		No	
Note: None						

Table 8: Electrical Power Type

Name	Type	Voltage		Frequency (Hz)	Current (A)
		Min	Max		
AD0481-2401600UB	Class 2 Power Supply	100	240	50 – 60	1.6
Note: None					

Table 9: EUT Interface/Port Specifications

EUT Port	Connect To	Location	Length	Shielded/ Unshielded
--	--	--	--	--

4 Product Information

4.1 Product Description

The EUT is a Bluetooth Low Energy wireless connected motor drive for windows shades.

4.2 Equipment Configuration

A description of the equipment configuration is given in the Equipment Under Test Section. The EUT was tested/evaluated as called for in the test standard and was configured and operated in a manner consistent with its intended use. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst-case radiation for emissions testing.

4.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst-case radiation for emissions testing.

5 RF Exposure Evaluation

The evaluation was performed accordance with 47 CFR §2.1091 and FCC KDB 447498 D04 v01. The evaluation was performed to assess if the EUT meets the exemption criteria allowed per 47 CFR §2.1091.

5.1 RF Exposure Exemption Assessment

According to Part 2 Subpart J §2.1091, RF exposure evaluation is exempt when the device operates under the prescribed values listed in §1.1307(b)(3)(i).

In this assessment, the method used to evaluate the EUT for RF Exposure Exemption is from §1.1307(b)(3)(i)(B). A single RF source is exempt if the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

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

Where:

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

And:

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

d = the separation distance (cm)

5.2 EUT Power

Table 10: EUT Power

Interface	Data Rate	Modulation	Maximum Duty Cycle (%)	Band (MHz)	Frequency (MHz)	Maximum Output Power[1] (dBm)
Antenna Port	1 Mbps	GFSK	100	2400 – 2480	2480	4.48
Antenna Port	2 Mbps	GFSK	100	2402 – 2480	2480	4.47

Note:
1. Includes tune-up tolerance of ± 0.5 dB

5.3 Evaluation calculations

The EUT is professionally installed, and the installation position provides a minimum separation distance of 20 cm from all persons.

Table 11: Exemption Calculations

Band (MHz)	Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Total Power (mW)	Distance, *d* (cm)	Threshold, P_{th} (mW)	Margin (mW)
2400 – 2480	2480	4.48	+1.5	3.96	20	3060	3056.04
2400 – 2480	2480	4.47	+1.5	3.95	20	3060	3056.05

Note:
1. Calculations for this report are based on the device's highest power measurement and its antenna gain.

5.4 Conclusion

The EUT was found to be compliant to the requirements of Title 47 Chapter I, Subpart A Part 2 Subpart J §2.1091 with a minimum distance of 20 cm.