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Test report No: 4907809.52

TEST REPORT
Radio Spectrum Matters (RF)

Identification of item tested	Refrigerator
Trademark	BLUETTI
Model and /or type reference	F045D
FCC/IC ID	2AYT3-F045D
Features	Adaptor input: 100-240VAC 50/60Hz， Refrigerator input: 12/24VDC, Rated power(Fridge): 65W, Rated power(Making ice): 140W
Applicant´s name / address	SHENZHEN POWEROAK NEWENER CO., LTD F19, BLD No.1, Kaidaer Tongsha Rd No.168, Xili Street, Nanshan Shenzhen China
Test method requested, standard	KDB 447498 D01V06 FCC Part 1.1310
Verdict Summary	COMPLIANCE
Tested by (name & signature)	Kenny Liang
Approved by (name & signature)	Tim Yan
Date of issue	2024-11-28
Report template No	TRF_EMC 2017-06- FCC_Exposure

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GENERAL CONDITIONS

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. This report will not be used for social proof function in China market.

UNCERTAINTY

For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in EN 55016-4-2 (CISPR 16-4-2), EN/IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards.

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%
Atmospheric pressure	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

☒ Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.				
☐ Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.				
Decimal separator used in this report	☐	Comma (,)	☒	Point (.)

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	:	Equipment Under Test
QP	:	Quasi-Peak
CAV	:	CISPR Average
AV	:	Average
CDN	:	Coupling Decoupling Network
SAC	:	Semi-Anechoic Chamber
OATS	:	Open Area Test Site
BW	:	Bandwidth
AM	:	Amplitude Modulation
PM	:	Pulse Modulation
HCP	:	Horizontal Coupling Plane
VCP	:	Vertical Coupling Plane
U_N	:	Nominal voltage
*T*x	:	Transmitter
*R*x	:	Receiver
N/A	:	Not Applicable
N/M	:	Not Measured

DOCUMENT HISTORY

Report nr.	Date	Description
4907809.52	2024-11-28	First release.

REMARKS AND COMMENTS

The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item .....:	Refrigerator
Trademark.....:	BLUETTI
Model / Type number.....:	F045D
FCC ID .....:	2AYT3-F045D
Ratings.....:	Adaptor input: 100-240VAC 50/60Hz， Refrigerator input: 12/24VDC, Rated power(Fridge): 65W, Rated power(Making ice): 140W
Manufacturer.....:	Same as applicant
Factory.....:	Same as applicant

Operating frequency range(s) – Tx.:	2402-2480 MHz
Operating frequency range(s) – Rx :	2402-2480 MHz
Maximum RF output power (conducted) .....:	7.1 dBm
E.I.R.P. .....:	-0.1 dBm
Type of Modulation .....:	GFSK
PHYs.....:	LE 1M
Data Rate.....:	1 Mbit/s
Antenna type.....:	Integral Antenna
Antenna gain.....:	-7.2 dBi
Number of channel .....:	40
Operating Temperature Range.....:	-5 – +55 ℃

Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 100–240 V, 50/60 Hz	☒	☐	☐	☒	☐
	☒	DC: 12/24 V					
	☐	Battery:					
Mounting position.....:	☒	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☐	Other:					

Intended use of the Equipment Under Test (EUT)
The apparatus as supplied for the test is refrigerator which intended for residential use, the product contains electronic control circuitry. Hence, model F045D was chosen for full test.

Copy of marking plate:
No provide.

1.2 Test data

Test Location	DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch Block 5, No.3, Qiyun Road, Huangpu District, Guangzhou, Guangdong, China FCC Designation Number: CN1324; ISED CAB identifier: CN0130
Date of receipt of test item	2024-04-11
Date (s) of performance of tests	2024-04-11 to 2024-05-15

1.3 The environment(s) in which the EUT is intended to be used

The equipment under test (EUT) is intended to be used in the following environment(s):

☒	Residential (domestic) environment.
☒	Commercial and light-industrial environment.
☐	Industrial environment.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Operating mode	Operating mode description	Used for methos	
		Conducted	Radiated
1	Transmitting at 1 Mbit/s,	☒	☐
2		☐	☐
3		☐	☐
Supplemental information: ---			

2.2 Support / Auxiliary equipment / unit / software for the EUT

The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment / unit / software	Type / Version	Manufacturer	Supplied by
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Supplemental information: ---			

2.3 Test Configuration / Block diagram used for tests

Refer to Annex 3.

3 RF EXPOSURE EVALUATION

3.1 Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)
LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula
Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$
Power Density: $Pd(W/m^2)=E^2/377$

Where
Pd = power density in mW/cm2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
R = distance between observation point and center of the radiator in cm
E=Electric Field (V/m)

Pd is the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

3.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 23℃and 54％ RH.

3.3 Test Result

Test Mode	Frequency Band (MHz)	Conducted RF Power Output (dBm)	Maximum Power (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit of Power Density $S(mW/cm^2)$
BLE	2402-2480	7.1	5.1	0.001	1

Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$

For example,: $Pout*G = 5.1$ mW

$E=5.1/(4*pi*20^2)=0.001$ mW/cm^2

--- END ---