



1 Cover Page

RF MPE REPORT

Application No.: SHCR2201000085AT
FCC ID: UCZ-B463AJ-Z
IC : 8575A-B463AJZ
Applicant: Lorex Technology Inc.
Address of Applicant: 250 Royal crest Court, Markham, L3R 3S1, Ontario, Canada.
Manufacturer: Lorex Technology Inc.
Address of Manufacturer: 250 Royal crest Court, Markham, L3R 3S1, Ontario, Canada.
Equipment Under Test (EUT):
EUT Name: 2K Wire-free Doorbell
Model No.: B463AJ-Z
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
RSS-102 Issue 5 Amendment 1 (February 2, 2021)
Date of Receipt: 2021-12-21
Date of Test: 2022-01-06 to 2022-01-25
Date of Issue: 2022-01-26

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan

Parlam Zhan
E&E Section Manager



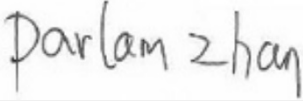
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Testing Center E&E Lab (201612)

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Revision Record			
Version	Description	Date	Remark
00	Original	2022-01-26	/

Authorized for issue by:			
			
		Micheal Niu / Project Engineer	
			
		Parlam Zhan / Reviewer	



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Testing Center EINC

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3 General Information

3.1 General Description of E.U.T.

Power supply:	16 V-24 V, AC wire-powered or DC5V 2A by USB port DC 3.6V Rechargeable Lithium ion Battery Battery Model: 18650/6200mAh/22.32Wh/LS2P Rate Voltage: 3.6V Charging Limit Voltage: 4.2V Rated Capacity: 6200mAh/22.32Wh
Serial Number:	2M0024EPAG06399
Software Version:	V2.8

3.2 Technical Specifications

2.4G

Antenna Gain:	Ant 1: 1.58dBi (Provided by the manufacturer) Ant 2: 3.42dBi (Provided by the manufacturer)
Antenna Type:	FPC Antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Data Rate:	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-7



5G

	Band	Mode	Frequency Range(MHz)	Number of channels
Operation Frequency:	UNII Band I	802.11a/n(HT20)	5180-5240	4
	UNII Band II-A	802.11a/n(HT20)	5260-5320	4
	UNII Band II-C	802.11a/n(HT20)	5500-5700	11
	UNII Band III	802.11a/n(HT20)	5745-5825	5
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM)			
Channel Spacing:	802.11a/n(HT20): 20MHz			
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-7			
Antenna Gain:	Ant 1: 2.99dBi (Provided by the manufacturer) Ant 2: 2.83dBi (Provided by the manufacturer)			
Antenna Type:	Antenna 1: FPC Antenna; Antenna 2: FPC Antenna			

Remark: For frequencies falling between 5150-5250 and 5600-5650MHz will not be used in Canada.



3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.



4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	$f/1500$	30
1.5GHz~100GHz	1.0	30

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.53W



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5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHCR220100008501-2.4GHz

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	Antenna 1 Power[mW]	Antenna 1 Power[mW]
11B	2412	15.83	15.82	38.28	38.19
11B	2437	15.88	15.82	38.73	38.19
11B	2462	16.04	15.50	40.18	35.48
11G	2412	15.34	15.44	34.20	34.99
11G	2437	15.56	15.45	35.97	35.08
11G	2462	15.95	15.69	39.36	37.07
HT20	2412	15.17	15.11	32.89	32.43
HT20	2437	15.37	15.39	34.43	34.59
HT20	2462	15.79	15.62	37.93	36.48



5GHz for FCC:

The Power Data is based on the RF Test Report SHCR220100008502-5GHz

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	Antenna 1 Power[mW]	Antenna 1 Power[mW]
11A	5180	10.89	10.73	12.27	11.83
11A	5200	10.49	10.48	11.19	11.17
11A	5240	10.00	10.02	10.00	10.05
11A	5260	10.18	10.15	10.42	10.35
11A	5300	10.22	10.23	10.52	10.54
11A	5320	9.98	10.10	9.95	10.23
11A	5500	10.95	10.98	12.45	12.53
11A	5580	10.64	10.66	11.59	11.64
11A	5700	10.75	10.75	11.89	11.89
11A	5745	10.77	10.76	11.94	11.91
11A	5785	10.34	10.35	10.81	10.84
11A	5825	10.38	9.69	10.91	9.31
11N20	5180	10.81	10.85	12.05	12.16
11N20	5200	10.45	10.41	11.09	10.99
11N20	5240	10.42	10.37	11.02	10.89
11N20	5260	10.24	10.24	10.57	10.57
11N20	5300	10.04	10.01	10.09	10.02
11N20	5320	10.02	9.85	10.05	9.66
11N20	5500	10.43	10.44	11.04	11.07
11N20	5580	10.77	10.75	11.94	11.89
11N20	5700	10.50	10.53	11.22	11.30
11N20	5745	10.16	10.15	10.38	10.35
11N20	5785	10.49	10.48	11.19	11.17
11N20	5825	10.58	10.57	11.43	11.40



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5.2 MPE Calculation

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in meter) = 20cm
- 3) MPE limit = 1mW/cm²

For FCC:

For 2.4G WiFi - Antenna1:

The max. antenna gain is		1.58	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
40.18	1.439	20	0.01150	1	Pass

For 2.4G WiFi - Antenna2:

The max. antenna gain is		3.42	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
38.19	2.198	20	0.01670	1	Pass

For 5G WiFi - Antenna1:

The max. antenna gain is		2.99	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
12.45	1.991	20	0.00493	1	Pass

For 5G WiFi - Antenna2:

The max. antenna gain is		2.83	dBi		
Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
12.53	1.919	20	0.00478	1	Pass

The 2.4GHz WiFi and 5GHz WiFi can transmit simultaneously, but the maximum rate of MPE is $0.01670/1+0.00493/1=0.02163\leq 1$. According to the KDB447498 section 7.2 determine the device is exclusion from SAR test



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For IC:

For 2.4GHz WiFi SISO mode:

Antenna 1:E.I.R.P.= $P \cdot G = 0.04018 \times 1.439 = 0.058W < 2.68W$

Antenna 2:E.I.R.P.= $P \cdot G = 0.03819 \times 2.198 = 0.084W < 2.68W$

For 5GHz WiFi SISO mode:

Antenna 1:E.I.R.P.= $P \cdot G = 0.01245 \times 1.991 = 0.025W < 4.53W$

Antenna 2:E.I.R.P.= $P \cdot G = 0.01253 \times 1.919 = 0.024W < 4.53W$

The 2.4GHz WiFi and 5GHz WiFi can transmit simultaneously, but the maximum rate of MPE is $0.084/2.68 + 0.025/4.53 = 0.0372 \leq 1$. So the device is exclusion from SAR test.

--End of the Report--

