



1 Cover Page

RF Exposure Report

Application No.: SHEM2106005464CR
FCC ID: UCZ-W482AA-Z
IC : 8575A-W482AAZ
Applicant: Lorex Technology Inc.
Address of Applicant: 250 Royal Crest Court Markham Ontario Canada L3R 3S1
Manufacturer: Lorex Technology Inc.
Address of Manufacturer: 250 Royal Crest Court Markham Ontario Canada L3R 3S1
Equipment Under Test (EUT):
EUT Name: 1080p FHD Wi-Fi Deterrence Camera
Model No.: W482CA-Z
Standard(s) : FCC Rules 47 CFR §2.1091
 KDB447498 D01 General RF Exposure Guidance v06
 RSS-102 Issue 5 (March 2015)
Date of Receipt: 2021-06-04
Date of Test: 2021-06-04 to 2021-06-13
Date of Issue: 2021-06-13

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

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record			
Version	Description	Date	Remark
00	Original	201-06-13	/

Authorized for issue by:			
		<i>Michael Niu</i>	
		<hr/>	
		Micheal Niu / Project Engineer	
		<i>Parlam zhan</i>	
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		Parlam Zhan / Reviewer	



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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 5V by Adapter
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3.2 Technical Specifications

2.4GHz

Antenna Gain:	Ant 1:3.99dBi (Provided by the manufacturer) Ant 2:3.47dBi (Provided by the manufacturer) Directional gain:6.74dBi
Antenna Type:	PIFA 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):11 802.11n(HT40):7
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz

5GHz

For FCC

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(HT20)	5180-5240	4
		802.11n(HT40)/ac(HT40)	5190-5230	2
		802.11ac(HT80)	5210	1
	UNII Band II-A	802.11a/n(HT20)/ac(HT20)	5260-5320	4
		802.11n(HT40)/ac(HT40)	5270-5310	2
		802.11ac(HT80)	5290	1
	UNII Band II-C	802.11a/n(HT20)/ac(HT20)	5500-5700	11
		802.11n(HT40)/ac(HT40)	5510-5670	5
		802.11ac(HT80)	5530~5610	2
UNII Band III	802.11a/n(HT20)/ac(HT20)	5745-5825	5	
	802.11n(HT40)/ac(HT40)	5755-5795	2	
	802.11ac(HT80)	5775	1	
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)			



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	802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Date Rate:	802.11a:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7 802.11ac:VHT MCS0-MCS7
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz
Antenna Gain:	Band 1 Ant 1:2.03dBi, Ant 2:4.35dBi (Provided by the manufacturer) Band 2 Ant 1:4dBi, Ant 2:4.08dBi (Provided by the manufacturer) Band 3 Ant 1:4.44dBi, Ant 2:3.21dBi (Provided by the manufacturer) Band 4 Ant 1:2.24dBi, Ant 2:6.81dBi (Provided by the manufacturer) Directional gain: Band 1: 6.35dBi Band 2: 7.05dBi Band 3: 6.88dBi Band 4: 8.11dBi
Antenna Type:	PIFA Antenna
DFS Function:	Slave without Radar detection
TPC Function:	Not Support

For IC

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band II-A	802.11a/n(HT20)/ac(HT20)	5260-5320	4
		802.11n(HT40)/ac(HT40)	5270-5310	2
		802.11ac(HT80)	5290	1
	UNII Band II-C	802.11a/n(HT20)/ac(HT20)	5500-5700	9
		802.11n(HT40)/ac(HT40)	5510-5670	4
		802.11ac(HT80)	5530~5610	1
	UNII Band III	802.11a/n(HT20)/ac(HT20)	5745-5825	5
		802.11n(HT40)/ac(HT40)	5755-5795	2
		802.11ac(HT80)	5775	1

Note: 5600MHz to 5650MHz band can not be operated in Canada

Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Date Rate:	802.11a:6/9/12/18/24/36/48/54Mbps 802.11n:MCS0-MCS7 802.11ac:VHT MCS0-MCS7



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Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz
Antenna Gain:	Band 1 Ant 1:2.03dBi, Ant 2:4.35dBi (Provided by the manufacturer) Band 2 Ant 1:4dBi, Ant 2:4.08dBi (Provided by the manufacturer) Band 3 Ant 1:4.44dBi, Ant 2:3.21dBi (Provided by the manufacturer) Band 4 Ant 1:2.24dBi, Ant 2:6.81dBi (Provided by the manufacturer) Directional gain: Band 1: 6.35dBi Band 2: 7.05dBi Band 3: 6.88dBi Band 4: 8.11dBi
Antenna Type:	PIFA Antenna
DFS Function:	Slave without Radar detection
TPC Function:	Not Support



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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 (ISED) Canada as an accredited testing laboratory.

CAB Identifier: CN0072.

• **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-11600, C-11707, T-11499, G-10216 respectively.



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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 SHEM210600565401-2.4GHz

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
11B SISO	2412	15.32	15.22	NA	34.04	33.27	N/A
11B SISO	2437	15.05	15.15	NA	31.99	32.73	N/A
11B SISO	2462	14.71	15.02	NA	29.58	31.77	N/A
11G SISO	2412	14.70	14.61	NA	29.51	28.91	N/A
11G SISO	2437	14.39	14.90	NA	27.48	30.90	N/A
11G SISO	2462	14.06	14.36	NA	25.47	27.29	N/A
11N20 MIMO	2412	11.67	11.35	14.52	14.69	13.65	28.31
11N20 MIMO	2437	11.33	11.26	14.31	13.58	13.37	26.98
11N20 MIMO	2462	10.94	11.12	14.04	12.42	12.94	25.35
11N40 MIMO	2422	11.58	10.96	14.29	14.39	12.47	26.85
11N40 MIMO	2437	11.13	10.91	14.03	12.97	12.33	25.29
11N40 MIMO	2452	10.86	10.86	13.87	12.19	12.19	24.38



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The Power Data is based on the RF Test Report SHEM210600565402-5GHz

Test Mode	Test Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
802.11a	5180	15.85	15.99	NA	38.46	39.72	NA
	5200	15.88	16.10	NA	38.73	40.74	NA
	5240	15.63	15.98	NA	36.56	39.63	NA
	5260	15.51	15.88	NA	35.56	38.73	NA
	5300	15.34	15.79	NA	34.20	37.93	NA
	5320	15.31	15.73	NA	33.96	37.41	NA
	5500	15.76	15.80	NA	37.67	38.02	NA
	5600	15.60	15.89	NA	36.31	38.82	NA
	5700	13.74	14.26	NA	23.66	26.67	NA
	5745	14.30	14.99	NA	26.92	31.55	NA
	5785	13.78	14.41	NA	23.88	27.61	NA
	5825	13.28	13.96	NA	21.28	24.89	NA
802.11n(HT20)	5180	12.64	12.65	15.66	18.37	18.41	36.81
	5200	12.92	12.83	15.89	19.59	19.19	38.82
	5240	12.68	12.82	15.76	18.54	19.14	37.67
	5260	11.60	11.31	14.47	14.45	13.52	27.99
	5300	11.41	11.18	14.31	13.84	13.12	26.98
	5320	11.30	11.09	14.21	13.49	12.85	26.36
	5500	11.80	11.41	14.62	15.14	13.84	28.97
	5600	10.93	11.32	14.14	12.39	13.55	25.94
	5700	10.87	11.17	14.03	12.22	13.09	25.29
	5745	11.51	12.33	14.95	14.16	17.10	31.26
	5785	10.96	11.66	14.33	12.47	14.66	27.10
	5825	10.39	11.07	13.75	10.94	12.79	23.71
802.11n(HT40)	5190	12.78	12.84	15.82	18.97	19.23	38.19
	5230	12.62	12.81	15.73	18.28	19.10	37.41
	5270	12.40	12.62	15.52	17.38	18.28	35.65
	5310	12.30	12.58	15.45	16.98	18.11	35.08
	5510	13.06	12.70	15.89	20.23	18.62	38.82
	5590	13.05	12.79	15.93	20.18	19.01	39.17



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	5670	11.32	11.55	14.45	13.55	14.29	27.86
	5755	11.60	12.33	14.99	14.45	17.10	31.55
	5795	10.94	11.59	14.29	12.42	14.42	26.85
802.11ac(VHT20)	5180	12.70	12.09	15.42	18.62	16.18	34.83
	5200	12.66	12.40	15.54	18.45	17.38	35.81
	5240	12.53	12.35	15.45	17.91	17.18	35.08
	5260	12.41	12.21	15.32	17.42	16.63	34.04
	5300	12.73	12.09	15.43	18.75	16.18	34.91
	5320	12.62	12.07	15.36	18.28	16.11	34.36
	5500	13.22	12.98	16.11	20.99	19.86	40.83
	5600	13.01	12.77	15.90	20.00	18.92	38.90
	5700	11.16	10.92	14.05	13.06	12.36	25.41
	5745	12.44	12.76	15.61	17.54	18.88	36.39
	5785	12.10	11.91	15.02	16.22	15.52	31.77
	5825	11.51	11.20	14.37	14.16	13.18	27.35
802.11ac(VHT40)	5190	12.58	11.24	14.97	18.11	13.30	31.41
	5230	12.51	12.79	15.66	17.82	19.01	36.81
	5270	12.36	12.68	15.53	17.22	18.54	35.73
	5310	12.45	12.64	15.56	17.58	18.37	35.97
	5510	13.13	12.68	15.92	20.56	18.54	39.08
	5590	13.09	12.78	15.95	20.37	18.97	39.36
	5670	11.71	11.56	14.65	14.83	14.32	29.17
	5755	12.29	12.68	15.50	16.94	18.54	35.48
	5795	11.56	11.90	14.74	14.32	15.49	29.79
802.11ac(VHT80)	5210	12.65	12.23	15.46	18.41	16.71	35.16
	5290	11.85	12.27	15.08	15.31	16.87	32.21
	5530	13.51	13.65	16.59	22.44	23.17	45.60
	5610	13.09	13.37	16.24	20.37	21.73	42.07
	5775	11.79	12.04	14.93	15.10	16.00	31.12



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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 2.4G WiFi –Antenna1:

The max. antenna gain is 3.99 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
34.04	2.506	20	0.01697	1	Pass

For 2.4G WiFi –Antenna2:

The max. antenna gain is 3.47 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
33.27	2.223	20	0.01472	1	Pass

In MIMO mode:

The max. antenna gain is 6.88 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
28.31	4.875	20	0.02746	1	Pass



For 5G WiFi-Antenna1:

The max. antenna gain is 2.03 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
38.73	1.596	20	0.01230	1	Pass

For 5G WiFi-Antenna2:

The max. antenna gain is 4.35 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
40.74	2.723	20	0.02207	1	Pass

In MIMO mode:

The max. antenna gain is 6.28 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
45.6	4.246	20	0.03852	1	Pass

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.02746/1.0+0.03852/1.0=0.07\leq 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

For IC:

For 2.4GHz WiFi SISO mode:

Antenna 1:E.I.R.P.= $P \times G = 0.03404 \times 2.506 = 0.085W < 2.68W$

Antenna 2:E.I.R.P.= $P \times G = 0.03327 \times 2.223 = 0.074W < 2.68W$

For 2.4GHz WiFi MIMO mode: E.I.R.P.= $P \times G = 0.02831 \times 4.875 = 0.14W < 2.68W$

For 5GHz WiFi SISO mode:

Antenna 1:E.I.R.P.= $P \times G = 0.03873 \times 1.596 = 0.079W < 4.50W$

Antenna 2:E.I.R.P.= $P \times G = 0.04074 \times 2.723 = 0.093W < 4.50W$

For 5GHz WiFi MIMO mode: E.I.R.P.= $P \times G = 0.0456 \times 4.246 = 0.3W < 4.50W$

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.24/2.68+0.30/4.50=0.16\leq 1$

So the device is exclusion from SAR test

--End of the Report--



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