RF Exposure Evaluation

FOR

D-Link Corporation

AC Powered Wi-Fi Water Sensor

Test Model: SW-A1

Prepared for	:	D-Link Corporation
Address	:	14420 Myford Road Suite 100 Irvine California United States 92606
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Tel	:	(+86)755-82591330
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Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	March 03, 2025
Number of tested samples	:	2
Sample No.	:	A250218003-1, A250218003-2
Sample number	:	Prototype
Date of Test	:	March 03, 2025 ~ March 19, 2025
Date of Report	:	March 20, 2025

RF Exposure Evaluation		
Report Reference No.	:	**LCSA02135024EC**
Date of Issue.....	:	March 20, 2025
Testing Laboratory Name.....	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Testing Location/ Procedure.....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	:	**D-Link Corporation**
Address.....	:	14420 Myford Road Suite 100 Irvine California United States 92606
Test Specification		
Standard.....	:	ANSI C95.1–2019 FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06 FCC CFR 47 part1 1.1310 FCC CFR 47 part2 2.1091
Test Report Form No.....	:	TRF-4-E-215 A/0
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2011-03

Test Item Description.....	:	**AC Powered Wi-Fi Water Sensor**
Trade Mark.....	:	D-link
Test Model.....	:	SW-A1
Ratings.....	:	Input: AC 100-125V,50/60HZ,0.04A
Result	:	**Positive**

Compiled by:	Supervised by:	Approved by:
Li Huan/ Administrator	Jack Liu/ Technique principal	Gavin Liang/ Manager

RF Exposure Evaluation

Test Report No. :	**LCSA02135024EC**	March 20, 2025 Date of issue

Test Model.....	: SW-A1
EUT.....	: AC Powered Wi-Fi Water Sensor
Applicant.....	**: D-Link Corporation**
Address.....	: 14420 Myford Road Suite 100 Irvine California United States 92606
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: D-Link Corporation**
Address.....	: 14420 Myford Road Suite 100 Irvine California United States 92606
Telephone.....	: /
Fax.....	: /
Factory.....	**: DONGGUAN JUYANG ELECTRONIC COMPANY LIMITED**
Address.....	: No. 46, Huangtang Road, Xinsi, Hengli Town, Dongguan City, Guangdong Province
Telephone.....	: /
Fax.....	: /

Test Result	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Report Version	Issue Date	Revision Content	Revised By
000	March 20, 2025	Initial Issue	--

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FCC RF Exposure Evaluation

1. Product Information

EUT	:	AC Powered Wi-Fi Water Sensor
Test Model	:	SW-A1
Ratings	:	Input: AC 100-125V,50/60HZ,0.04A
Hardware Version	:	V1.2
Software Version	:	V1.3
WIFI(2.4G Band)	:	
Frequency Range	:	2412MHz~2462MHz
Channel Number	:	11 Channels for 20MHz bandwidth (2412~2462MHz) 7 Channels for 40MHz bandwidth (2422~2452MHz)
Channel Spacing	:	5MHz
Modulation Type	:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	PCB Antenna, 1.62dBi(Max.)
Frequency Range	:	915MHz
Channel Number	:	1 Channel
Modulation Type	:	GFSK
Antenna Description	:	Internal Antenna, -4.34dBi(Max.)
Exposure category	:	General population/uncontrolled environment
EUT Type	:	Production Unit
Device Type	:	Mobile Devices
Note: For a more detailed antenna description, please refer to the antenna specifications or the antenna report provided by the customer.		

2. Evaluation method and Limit

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.
In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0. The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3. Limit

3. 1 Refer Evaluation Method

ANSI C95.1–2019: IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz
FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.
FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.

3. 2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Uncontrolled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f²)*	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
*=Plane-wave equivalent power density

4. MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator
R=distance to the center of radiation of the antenna

5. Conducted Power

[2.4G WIFI]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
IEEE 802.11b	1	2412	15.1
	6	2437	14.29
	11	2462	14.29
IEEE 802.11g	1	2412	14.32
	6	2437	13.33
	11	2462	13.6
IEEE 802.11n HT20	1	2412	14.74
	6	2437	13.89
	11	2462	14.13
IEEE 802.11n HT40	3	2422	12.26
	6	2437	11.18
	9	2452	12.02

Test Procedure

TX frequency range: 915MHz
Device category: Portable device (Distance: 20cm)
Max. Field Strength: 80.08dBuV/m @3m
EIRP=E-104.8+20logD=80.08-104.8+20log3=-15.18dBm
Maximum Conducted Output Power: -15.18dBm
Turn-up: -15±1

6. Manufacturing Tolerance

[2.4G WIFI]

IEEE 802.11b(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	15.0	14.0	14.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11g(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	13.0	13.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n20(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	13.0	14.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n40(Peak)			
Channel	Channel 03	Channel 06	Channel 09
Target (dBm)	12.0	11.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0

7. Evaluation Results

7.1 As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r =20cm, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[2.4G WIFI]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11b	16.0	39.8107	1.62	1.4521	0.0115	1.0000
IEEE 802.11g	15.0	31.6228	1.62	1.4521	0.0091	1.0000
IEEE 802.11n HT20	15.0	31.6228	1.62	1.4521	0.0091	1.0000
IEEE 802.11n HT40	13.0	19.9526	1.62	1.4521	0.0058	1.0000

[915MHz]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
GFSK	-14.0	0.0398	-4.34	0.3681	0.000003	0.6100

Remark:
1. Output power including tune up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.

7.2 Simultaneous Transmission for SAR Exclusion

The sample support one 2.4GWIFI transmit antenna, another one 915MHz transmit antenna, so need consider simultaneous transmission;

Simultaneous transmission MPE
According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
∑∑of MPE ratios ≤ 1.0

Mode	WIFI MPE (mW/cm^2)	915MHz MPE (mW/cm^2)	∑MPE ratios	Limit	Results
2.4GWIFI+915MHz	0.0115	0.000003	0.011503	1.0	PASS

8. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

9. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

.....THE END OF REPORT.....