FCC RF EXPOSURE REPORT

FCC ID:KA2IRX1860B1

Project No.	:	2104H029
Equipment	:	1) AX1800 Mesh Wi-Fi 6 Router 2) AX1500 Mesh Wi-Fi 6 Router
Brand Name	:	D-Link
Test Model	:	DIR-X1860
Series Model	:	DIR-X1550
Applicant	:	D-Link Corporation
Address	:	14420 Myford Road Suite 100 Irvine California United States
Manufacturer	:	D-Link Corporation
Address	:	14420 Myford Road Suite 100 Irvine California United States
Date of Receipt	:	Apr. 12, 2021
Date of Test	:	Apr. 12, 2021~May. 26, 2021
Issued Date	:	Jun. 17, 2021
Report Version	:	R00
Test Sample	:	Engineering Sample No.: SH20210412101-18 fro radiated; SH20210412101-19 for conducted; SH20210412101-5 adapter.
Standard(s)	:	FCC Part 2.1091 FCC Title 47 Part 2.1091 KDB 447498 D01 General RF exposure guidance v06

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Maker Qi

Prepared by : Maker Qi

Issac Song

Approved by : Issac Song

Certificate # 5123.03

Add: No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210,China
TEL: +86-021-61765666
Web: www.newbtl.com

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jun. 17, 2021

1. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi r^2} = \frac{EIRP}{4\pi r^2}$$

where:
S = power density
P = power input to the 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

Table for Filed Antenna

For 2.4G

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	N/A	N/A	Dipole	N/A	5
2	N/A	N/A	Dipole	N/A	5

Note:

1.This EUT supports Beamforming and CDD, all antennas have the same gain, any transmit signals are correlated with each other, so

1) Beamforming:

Directional gain = $10\log[(10^{G1/20}+10^{G2/20+....+}10^{GN/20})^2/N_{ANT}]$dBi,

that is Directional gain=$10\log[(10^{G1/20}+10^{G2/20+....+}10^{GN/20})^2/N_{ANT}]$dBi =8.01;

So output power limit is 30-8.01+6=27.99, the power spectral density limit is 8-8.01+6=5.99.

2) CDD:

For power spectral density measurements, For power spectral density measurements, the Directional gain=G_{ANT}+Array Gain, that is Directional gain=5+10log(2/1) =8.01;

So power spectral density limit is 8-8.01+6=5.99.

For power meansurements, Directional gain =$G_{ANT\ MAX.}$+Array Gain, Array Gain=0dB($N_{ANT}\leq4$), so the Directional gain=5.

2. The antenna gain and beamforming gain are provided by the manufacturer.

Operating Mode / TX Mode	Ant. 1	Ant. 2	Ant. 1+2
IEEE 802.11b	✓	✓	×
IEEE 802.11g	✓	✓	×
IEEE 802.11n(HT20)	✓	✓	✓
IEEE 802.11n(HT40)	✓	✓	✓
IEEE 802.11ax(HE20)	✓	✓	✓
IEEE 802.11ax(HE40)	✓	✓	✓

For 5G

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	N/A	N/A	Dipole	N/A	5
2	N/A	N/A	Dipole	N/A	5

Note:

1.This EUT supports Beamforming and CDD, all antennas have unequal gains, any transmit signals are correlated with each other, so

1) Beamforming:
Directional gain = $10\log[(10^{G1/20}+10^{G2/20}+....+10^{GN/20})^2/N_{ANT}]$dBi,
that is Directional gain=$10\log[(10^{G1/20}+10^{G2/20}+....+10^{GN/20})^2/N_{ANT}]$dBi =8.01;
Then, the UNII-1, UNII-3 output power limit is 30-8.01+6=27.99, the UNII-2A,UNII-2C output power limit is 23.98-8.01+6=21.97. The UNII-1 power spectral density limit is 17-8.01+6=14.99,UNII-2A,UNII-2C power spectral density limit is 11-8.01+6=8.99, the UNII-3 power spectral density limit is 30-8.01+6=27.99.

2) CDD:
For power spectral density measurements, the Directional gain=G_{ANT}+Array Gain,
that is Directional gain=5+10log(2/1) =8.01;
Then, the UNII-1 power spectral density limited is 17-8.01+6=14.99, UNII-2A,UNII-2C power spectral density limit is 11-8.01+6=8.99, the UNII-3 power spectral density limit is 30-8.01+6=27.99.
For power meansurements, Directional gain= $G_{ANT\ MAX.}$+Array Gain.Array Gain=0dB($N_{ANT}\leq4$), so the Directional gain=5.

2.The antenna gain and beamforming gain are provided by the manufacturer.

Operating Mode / TX Mode	Ant. 1	Ant. 2	Ant. 1+2
IEEE 802.11a	✓	✓	×
IEEE 802.11n(HT20)	✓	✓	✓
IEEE 802.11n(HT40)	✓	✓	✓
IEEE 802.11ac(VHT20)	✓	✓	✓
IEEE 802.11ac(VHT40)	✓	✓	✓
IEEE 802.11ac(VHT80)	✓	✓	✓
IEEE 802.11ax(HE20)	✓	✓	✓
IEEE 802.11ax(HE40)	✓	✓	✓
IEEE 802.11ax(HE80)	✓	✓	✓

2. TEST RESULTS

For 2.4GHz:

Beamforming

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
8.01	6.32410	23	199.5262	0.20746	1	Complies

CDD：

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
5.00	3.1623	23.5	223.8721	0.11640	1	Complies

For 5GHz :

Beamforming

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
8.01	6.3241	28	630.9573	0.65606	1	Complies

CDD：

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. tune up Power (dBm)	Max. tune up Power Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
5.00	3.1623	28	630.9573	0.32810	1	Complies

For the max simultaneous transmission MPE:

2.4G+5G

Power Density (S) (mW/cm^2) 2.4GHz	Power Density (S) (mW/cm^2) 5GHz	Total	Limit of Power Density (S) (mW/cm^2)	Test Result
0.20746	0.65606	0.86352	1	Complies

Note: The calculated distance is 22 cm.
Output power including tune up tolerance.

End of Test Report