

FCC RF EXPOSURE REPORT

FCC ID: KA2IR825G1

Project No. : 1607C226
Equipment : AC1200 Wi-Fi Gigabit Router
Model : DIR-825
Applicant : D-Link Corporation
Address : 17595 Mt. Herrmann, Fountain Valley,
California
United States

According: : FCC Guidelines for Human Exposure IEEE
C95.1

B T L I N C .

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MPE CALCULATION METHOD:

Calculation Method of RF Safety Distance:

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

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	Dongguan City Xinsheng Electronics Co., Ltd	8000000008581341	Dipole	N/A	5
2	Dongguan City Xinsheng Electronics Co., Ltd	8000000008581341	Dipole	N/A	5

Note:

The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R), all transmit signals are completely uncorrelated, then, Direction gain = G_{ANT} , that is Directional gain=5.

Operating Mode	TX Mode	1TX	2TX
802.11b		V (ANT 1)	-
802.11g		V (ANT 1)	-
802.11n(20MHz)		-	V (ANT 1+ANT 2)
802.11n(40MHz)		-	V (ANT 1+ANT 2)

ANT 1 for 1TX was found to be the worst case and recorded.

For 5G:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Dongguan City Xinsheng Electronics Co., Ltd	8000000008581341	Dipole	N/A	5
2	Dongguan City Xinsheng Electronics Co., Ltd	8000000008581341	Dipole	N/A	5

Note:

The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (2T2R), all transmit signals are completely uncorrelated, then, Direction gain = G_{ANT} , that is Directional gain=5.

Operating Mode TX Mode	1TX	2TX
802.11a	V (ANT 1)	-
802.11n (20MHz)	-	V (ANT 1+ANT 2)
802.11n (40MHz)	-	V (ANT 1+ANT 2)
802.11ac (20MHz)	-	V (ANT 1+ANT 2)
802.11ac (40MHz)		V (ANT 1+ANT 2)
802.11ac (80MHz)		V (ANT 1+ANT 2)

ANT 1 for 1TX was found to be the worst case and recorded.

TEST RESULTS

2.4G:

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX B MODE /CH01, CH06, CH11		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	25.11	324.3396	0.20415046	1	Complies
5	3.1623	27.17	521.1947	0.32805780	1	Complies
5	3.1623	26.26	422.6686	0.26604210	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX G MODE /CH01, CH06, CH11		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	26.77	475.3352	0.29919227	1	Complies
5	3.1623	28.39	690.2398	0.43446057	1	Complies
5	3.1623	26.91	490.9079	0.30899423	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N20 Mode_CH01/06/11_Total		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	27.91	618.0164	0.38900069	1	Complies
5	3.1623	29.04	801.6781	0.50460363	1	Complies
5	3.1623	27.20	524.8075	0.33033179	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	TX N40 Mode_CH03/06/09_Total		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	25.14	326.5878	0.20556557	1	Complies
5	3.1623	29.17	826.0379	0.51993658	1	Complies
5	3.1623	25.18	329.6097	0.20746764	1	Complies

5G:

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-1/TX A Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	22.65	184.0772	0.11586449	1	Complies
5	3.1623	26.62	459.1980	0.28903496	1	Complies
5	3.1623	26.80	478.6301	0.30126617	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature :	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-1/TX N20 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	23.38	217.7710	0.13707251	1	Complies
5	3.1623	26.01	399.0249	0.25115994	1	Complies
5	3.1623	26.94	494.3107	0.31113608	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-1/TX N40 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	23.05	201.8366	0.12704289	1	Complies
5	3.1623	27.20	524.8075	0.33033179	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-3/ TX A Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	23.99	250.6109	0.15774310	1	Complies
5	3.1623	23.21	209.4112	0.13181061	1	Complies
5	3.1623	22.90	194.9845	0.12272990	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-3/TX N20 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	24.71	295.8012	0.18618744	1	Complies
5	3.1623	23.66	232.2737	0.14620101	1	Complies
5	3.1623	23.26	211.8361	0.13333690	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-3/ TX N40 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	24.82	303.3891	0.19096350	1	Complies
5	3.1623	23.89	244.9063	0.15415243	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-1/TX AC20 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	21.72	148.5936	0.09352988	1	Complies
5	3.1623	26.26	422.6686	0.26604210	1	Complies
5	3.1623	27.34	542.0009	0.34115392	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-1/TX AC40 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	21.42	138.6756	0.08728716	1	Complies
5	3.1623	26.58	454.9881	0.28638507	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-1/TX AC80 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	23.07	202.7683	0.12762929	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-3/TX AC20 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	24.15	260.0160	0.16366295	1	Complies
5	3.1623	23.26	211.8361	0.13333690	1	Complies
5	3.1623	22.36	172.1869	0.10838031	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-3/TX AC40 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	23.73	236.0478	0.14857658	1	Complies
5	3.1623	23.12	205.1162	0.12910717	1	Complies

EUT :	AC1200 Wi-Fi Gigabit Router	Model Name :	DIR-825
Temperature:	25 °C	Relative Humidity:	55 %
Test Voltage :	AC 120V/60Hz		
Test Mode :	UNII-3/TX AC80 Mode		

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
5	3.1623	26.11	408.3194	0.25701021	1	Complies

So for 2.4G and 5G simultaneous transmission:

$$0.5199/1+0.3412/1=0.8611<1$$

Note: the calculated distance is 20 cm.