



# RF EXPOSURE REPORT

**REPORT NO.:** SA120530E05

**MODEL NO.:** DAP-2690

**FCC ID:** KA2AP2690B1

**RECEIVED:** May 30, 2012

**TESTED:** June 13, 2012

**ISSUED:** Sep. 11, 2012

**APPLICANT:** D-Link Corporation

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**ISSUED BY:** Bureau Veritas Consumer Products Services  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA120530E05	Original release	Sep. 11, 2012

## 1. CERTIFICATION

**PRODUCT:** DAP-2690 AirPremier N Dual Band Concurrent PoE Access Point

**BRAND NAME:** D-Link

**MODEL NO.:** DAP-2690

**TEST SAMPLE:** MASS-PRODUCTION

**APPLICANT:** D-Link Corporation

**TESTED DATE:** June 13, 2012

**STANDARDS:** FCC Part 2 (Section 2.1091)  
FCC OET Bulletin 65, Supplement C (01-01)  
IEEE C95.1

The above equipment (Model: DAP-2690) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** :  , **DATE:** Sep. 11, 2012  
( Midoli Peng, Specialist )

**APPROVED BY** :  , **DATE:** Sep. 11, 2012  
( May Chen, Deputy Manager )

## 2. RF EXPOSURE LIMIT

### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm <sup>2</sup> )	AVERAGE TIME (minutes)
<b>LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b>				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3. MPE CALCULATION FORMULA

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

r = distance between observation point and center of the radiator in cm

### 4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 5. ANTENNA GAIN

1. The antennas provided to the EUT, please refer to the following table:

For 2.4GHz					
Transmitter Circuit	Manufacture	Model name	Antenna Gain	Antenna Type	Connector
			Gain (dBi)		
Chain (0)	WHA YU GROUP	NP-9022	4.29	Dipole	SMA Plug Reverse
Chain (1)	WHA YU GROUP	NP-9022	4.29	Dipole	SMA Plug Reverse
For 5GHz					
Transmitter Circuit	Manufacture	Model name	Antenna Gain	Antenna Type	Connector
			Gain (dBi)		
Chain (0)	WHA YU GROUP	SSR-12968	5G Band1: 5.646 5G Band2: 6.270 5G Band3: 5.428 5G Band4: 5.264	Dipole	SMA Plug Reverse
Chain (1)	WHA YU GROUP	SSR-12968	5G Band1: 5.646 5G Band2: 6.270 5G Band3: 5.428 5G Band4: 5.264	Dipole	SMA Plug Reverse

2. The EUT incorporates a MIMO function.

MODULATION MODE	Tx/Rx FUNCTION
802.11b	2Tx/2Rx
802.11g	2Tx/2Rx
802.11a	2Tx/2Rx
802.11n (20MHz)	2Tx/2Rx
802.11n (40MHz)	2Tx/2Rx

## 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 15.247(2.4GHz):

### 802.11b:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412-2462	283.170	7.3	20	0.30254	1

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 7.3

### 802.11g:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412-2462	424.097	7.3	20	0.45310	1

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 7.3

### 802.11n(20MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412-2462	266.886	4.29	20	0.14258	1

### 802.11n(40MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2422-2452	62.886	4.29	20	0.03360	1

**For 15.247(5GHz):**

**802.11a:**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 ~ 5825	322.157	8.27	20	0.43033	1

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 8.27

**802.11n(20MHz):**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 ~ 5825	245.093	5.26	20	0.16370	1

**802.11n(40MHz):**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5755 ~ 5795	257.526	5.26	20	0.17201	1



**For 15.407(5GHz):**

**802.11a:**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 ~ 5240	15.754	8.66	20	0.02302	1

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 8.66

**802.11n(20MHz):**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 ~ 5240	30.868	5.65	20	0.02255	1

**802.11n(40MHz):**

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5190 ~ 5230	44.335	5.65	20	0.03239	1

**CONCLUSION:**

Both of the 2.4GHz and 5GHz WLAN can transmit simultaneously, the formula of calculated the MPE is:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

**CPD = Calculation power density**

**LPD = Limit of power density**

Therefore, the worst-case situation is  $0.45310 / 1 + 0.43033 / 1 = 0.883$ , which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

**--- END ---**