



SPORTON International Inc.

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Project No: CB10505137

Maximum Permissible Exposure Report

Applicant's company	Belkin International, Inc.
Applicant Address	12045 East Waterfront Drive, Playa Vista, CA 90094
FCC ID	K7SF9K1115V2

Product Name	AC1750 DB Wi-Fi Dual-Band AC + Gigabit Router ; AC1600 DB Wi-Fi Dual-Band AC + Gigabit Router
Brand Name	belkin
Model Name	F9K1115V2 ; F9K1119V1
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
Received Date	Feb. 24, 2016
Final Test Date	May 03, 2016
Submission Type	Class II Change





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SPORTON INTERNATIONAL INC.



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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA4N1172-33	Rev. 01	Initial issue of report	Jun. 22, 2016

1. GENERAL DESCRIPTION

1.1. EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)

1.2. Table for Multiple List

The EUT has two equipment name and two model number which are identical to each other in all aspects except for the following table:

Equipment Name	Model No.	Description
AC1750 DB Wi-Fi Dual-Band AC+ Gigabit Router	F9K1115V2	All the models are identical, the different equipment name and model number served as marketing strategy.
AC1600 DB Wi-Fi Dual-Band AC + Gigabit Router	F9K1119V1	

From the above models, model: F9K1115V2 was selected as representative model for the test and its data was recorded in this report.

1.3. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 330737

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking	
1. Changing applicant's company to "Belkin International, Inc." from "Belkin International inc." 2. Changing applicant address to "12045 East Waterfront Drive, Playa Vista, CA 90094" from "12045 East Waterfront Drive, Playa Vista, CA 90094, USA" 3. Changing brand name to "belkin" from "Belkin". 4. Adding a new equipment name (Equipment name: AC1750 DB Wi-Fi Dual-Band AC+ Gigabit Router). 5. Adding a new model number (Model No.: F9K1119V1).	It does not need to test.	
6. Adding a new adapter (Model No.: MU30-P120250-A1).		
7. Updating radio test rule of 5GHz Band 1, 4 (5150~5250MHz, 5725~5850MHz) to "New Rules" from "Old Rules".		
		It does not affect the Maximum Permissible Exposure.
		Maximum Permissible Exposure.

Note: Maximum Permissible Exposure of 2.4GHz Band is based on original test report.

1.4. Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

2. MAXIMUM PERMISSIBLE EXPOSURE

2.1. Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

2.3. Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For 5GHz Band:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11a: 25.73 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	5200	5.80	3.8019	25.73	373.8304	0.2828	1	Complies

For 2.4GHz Band:

Antenna Type : PCB Antenna

Conducted Power for IEEE 802.11g: 28.55 dBm

Distance (cm)	Test Freq. (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	The maximum combined Average Output Power		Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
				(dBm)	(mW)			
20	2437	4.40	2.7542	28.55	715.5234	0.3922	1	Complies

Conclusion:

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

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.3922 / 1 + 0.2828 / 1 = 0.6750$, which is less than "1". This confirmed that the device complies.