

Maximum Permissible Exposure (MPE) Evaluation Report

Report No. : TS09120014-EME

Model No. : F7D1301 v1

Issued Date : Feb. 04, 2010

Applicant: Belkin International Inc.
501 West Walnut Street Compton, CA 90220, USA

Test Method/ FCC 1.1310

Standard:

Test By: Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Intertek Laboratory. The test result(s) in this report only applies to the tested sample(s).

The test report was prepared by: Sign on File
Julie Liu/ Assistant

These measurements were taken by: Sign on File
Leon Cheng/ Engineer

The test report was reviewed by:

Name Jacky Chen
Title Engineer



Table of Contents

Summary of Tests 3

1. Introduction 4

2. RF Exposure Limit 4

3. RF Exposure calculations 5

4 Description of EUT 5

4. Test results 6



Summary of Tests

MPE Evaluation meet FCC OET No. 65: 1997, IEEE C95.1-2005

FCC ID: K7SF7D1301V1

Test	Reference	Results
MPE Evaluation	FCC Guidelines for Human Exposure IEEE C95.1	Complies

1. Introduction

The EUT operates in the 2.4 GHz ISM band. Due to the EUT (include antenna) at its normal operation distance is at least 20 cm from the human body, the EUT was defined as a Mobile Device.

The reason to do the MPE Evaluation is to avoid the RF hazard to human body. The maximum output power and gain of the antenna were used to calculate the limited Power density (S) at 20 cm distance away from the product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 are followed.

According to 1.1307 (b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission’s guideline.

2. RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A) Limits for Occupational / Control Exposures				
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				
30-300	27.5	0.073	0.2	30
300-1500	-	-	F/1500	30
1500-100,000	-	-	1.0	30

F= Frequency in MHz

3. RF Exposure calculations

From §FCC 1.1310 table 1, the maximum permissible RF exposure for an uncontrolled environment is 1mW/(cm²)

Power density (S) is calculated by the following formula:

$$S = (P * G) / 4 \pi R^2$$

where, S = Power density (mW/cm²)

P = Output power to antenna (mW)

R = Distance between radiating structure and observation point (cm)

G = Gain of antenna in numeric

$\pi = 3.1416$

Example:

Assume a mobile device operates at 2412MHz and its maximum output power is 50mW, and the maximum gain of antenna is 1 (numeric) /0dBi.

then the power density (S) = $(50 * 1) / 4 * \pi * 20^2 = 0.0995 \text{ W/m}^2$

4 Description of EUT

The EUT is a Router, which is an 802.11b/g/n MIMO product with one transmitters and one receivers and was defined as information technology equipment. The EUT has 802.11n function which can transmitter independently and simultaneous transmit.

4.1 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain: 2 dBi max

Antenna Type: PIFA antenna

Connector Type: N/A

4. Test results

Mode	Channel	Frequency (MHz)	Antenna Gain (numeric)	Output power to antenna (mW)	Power density (mW/cm ²)	Limit of power density (mW/cm ²)	Distance (cm)
802.11b	1	2412	1.58	121.90	0.038435288	1.0	20
	6	2437	1.58	110.66	0.034892344	1.0	20
	11	2462	1.58	101.16	0.031895554	1.0	20
802.11g	1	2412	1.58	103.51	0.032638496	1.0	20
	6	2437	1.58	219.79	0.069299507	1.0	20
	11	2462	1.58	118.85	0.037474008	1.0	20
802.11n HT20	1	2412	1.58	70.79	0.022321848	1.0	20
	6	2437	1.58	211.35	0.066639257	1.0	20
	11	2462	1.58	117.22	0.036959845	1.0	20
802.11n HT40	3	2422	1.58	44.16	0.013922914	1.0	20
	6	2437	1.58	130.32	0.041089433	1.0	20
	9	2452	1.58	108.39	0.034176701	1.0	20

The Notice in Installation Manual has been stated as below:

While installing and operating this transmitter, the radio frequency exposure limit of 1 mW/ (cm²) may be exceeded at distances close to the transmitter. therefore, the user must maintain a minimum distance of 20 cm from the device at all time.