Intertek ETL SEMKO

Maximum Permissible Exposure (MPE) Evaluation Report

Report No. : EME-050128
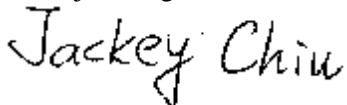
Model No. : WR254

Issued Date : May 2, 2005

Applicant : AboCom Systems, Inc.
1F, No. 21, Yanfa 2nd Rd., SBIP, HsinChu City 300, Taiwan

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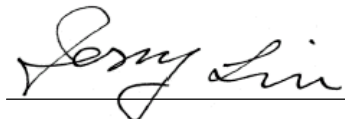Shiang-Shan District, Hsinchu City, Taiwan

This test report consists of 5 pages in total. 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 ITS Laboratory. The test result in this report only applies to the tested sample.

Project Engineer

Jackey Chiu

Jackey Chiu

Reviewed By

Jerry Liu

Jerry Liu

Table of Contents

Summary of Tests

MPE Evaluation meet FCC OET No. 65: 1997/ IEEE C95.1-1999

Wireless Router-Model: WR254
FCC ID: MQ4WR254

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

1. Introduction

The EUT operates in the 2.4GHz 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 20cm distance away from the product.   The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed.

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/(cm^2)
Power density (S) is calculated by the following formula:

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

where, S = Power density (mW/cm^2)
P = Output power to antenna (mW)
R = Distance between radiating structure and observation point (cm)
G = Gain of antenna in numeric
π = 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) = $(50 * 1)/4*\pi*20^2$ = 0.00995 (mW/cm^2)

4. Test results

Test Mode: 802.11b operation mode (DSSS Modulation)

Channel	Channel Frequency (MHz)	Maximum antenna gain (numeric)	Output power to antenna (mW)	Power density (mW/cm^2)	Limit of power density (mW/cm^2)
1	2412	1.58	62.81	0.019804275	1.0
6	2437	1.58	66.37	0.020926758	1.0
11	2462	1.58	63.97	0.020170028	1.0

Test Mode: 802.11g operation mode (OFDM Modulation)

Channel	Channel Frequency (MHz)	Maximum antenna gain (numeric)	Output power to antenna (mW)	Power density (mW/cm^2)	Limit of power density (mW/cm^2)
1	2412	1.58	135.83	0.042827808	1.0
6	2437	1.58	137.09	0.043225091	1.0
11	2462	1.58	138.68	0.043729579	1.0

The Notice in Installation Manual has been stated as below:
While installing and operating this transmitter, the radio frequency exposure limit of 1mW/(cm*cm) 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.