FCC RF EXPOSURE
TEST REPORT

FOR

802.11b/g RADIO MODULE

MODEL NUMBER: RSVLD-0608

FCC ID: B94RSVLD0608

REPORT NUMBER: 07U11162-1

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	08/02/07	Initial Issue	M. Heckrotte

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HEWLETT PACKARD COMPANY
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EUT DESCRIPTION: 802.11b/g RADIO MODULE

MODEL: RSVLD-0608

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
MPE PORTIONS OF FCC PARTS 1, 2 AND 15	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. calculated the MPE of the above equipment in accordance with the requirements set forth in the above standards. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

Note: The calculations documented in this report are based on the frequency bands, output powers and antenna gains as documented herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By: Tested By:

MICHAEL HECKROTTE   CHIN PANG
ENGINEERING MANAGER   EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES   COMPLIANCE CERTIFICATION SERVICES

2. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to calculate the results are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

3. EUT DESCRIPTION

The EUT is an 802.11b/g Radio (Model RSVLD-0608, FCC ID: B94RSVLD0608) colocated with a Bluetooth Radio (Model RSVLD-0602, FCC ID: B94RSVLD0602).

The transmitters have a maximum peak conducted output power and antenna gains as follows:

2400 to 2483.5 MHz Authorized Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Antenna Gain (dBi)
2412 - 2462	802.11b	22.54	2.8385
2412 - 2462	802.11g	23.40	2.8385
2402 - 2480	Bluetooth	-1.00	2.00

The highest power of the WLAN Radio is in the 802.11g mode, therefore this mode is used for the MPE calculations below.

4. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f²)	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				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

CALCULATIONS

Given

$$E = \sqrt{(30 * P * G)} / d$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

$$S = 0.0795 * 10^{((P + G) / 10)} / (d^2)$$

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CO-LOCATED MPE CALCULATIONS

For multiple colocated transmitters operating simultaneously the total power density can be calculated by summing the Power * Gain product (in linear units) of each transmitter.

yields

$d = 0.282 * \sqrt{((P1 * G1) + (P2 * G2) + ... + (Pn * Pn)) / S}$

where

d = distance in cm
Px = Power of transmitter x in mW
Gx = Numeric gain of antenna x
S = Power Density in mW/cm^2

In the table below, Power and Gain are entered in units of dBm and dBi respectively, then internally converted to their linear forms prior to the summation function.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

RESULTS

No non-compliance noted: (MPE distance equals 20 cm)

Mode	Band	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)	Power Density (mW/cm^2)
WLAN	2.4 GHz	23.40	2.8385		
Bluetooth	2.4 GHz	-1.00	2.00		
Combined				20.0	0.08

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

END OF REPORT