



UNDP-1 Module HP HSTNN-I70C Collocated RF Analysis

80-VH688-18 Rev. C

September 1, 2009

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Revision history

Revision	Date	Description
A	April 2009	Initial release
B	August 2009	Additional collocated WLAN transmitter
C	September 2009	Corrected typographical errors; updated title

1.1 Overview

This document provides collocated SAR analysis of the notebook model HSTNN-I70C in reference to KDB 616217.

The change filed under this application is amending the grant for HP notebook model HSTNN-I70C to include an additional collocated WLAN transmitter. In addition to Bluetooth FCC ID: QDS-BRCM1010, and WLAN FCC ID: QDS-BRCM1030 that were included in Rev. A of this analysis document, HSTNN-I70C will now also include WLAN FCC ID: QDS-BRCM1044.

1.2 Definitions

$$n_x = \frac{P_x}{60/f} - 1$$

n = number of times by which an antenna's output power exceeds $60/f$, calculated to determine an antenna's user separation threshold for test reduction procedures

P = average power

f = frequency in MHz

1.3 Collocation Calculations

Table 1 Antenna Separation Distances

Antenna	Distance (cm)
WLAN Main-to-user	16.1
WLAN Aux-to-user	16.1
WWAN main-to-user	5.2
WLAN Aux-to-WWAN main	5.4
WLAN main-to-WWAN main	19.2

Table 2 Individual Transmitter SAR Evaluation

Technology	Freq (MHz)	Measured Burst Avg Pwr (GPRS only) (dBm)	Average Power (dBm)	Measured Average Power (mW)	60/F _(GHz) (mW)	n = (P / (60/f) - 1) cm	1/2*n (cm) per FCC Procedure	Minimum Antenna-User Separation Requirement (cm)	Actual Antenna-User Distance (cm)	Highest Measured SAR (mW/g 1g)
GPRS 850 MHz	850	32.6	26.58	454.9	70.6	5.4	3	8.0	5.2	0.125
EVDO R0 1900 MHz	1850		24.52	283.1	32.4	7.7	4	9	5.2	0.106
WLAN (QDS-BRCM1030)	2480		23.1	202.0	24.2	7	4.0	9	16.1	0.012
WLAN (QDS-BRCM1044)	2412		25.9	389.0	24.9	15	7.0	12	16.1	0.295

Note: Burst Average power for GPRS effectively results in peak power since it is the average power during the transmission slot. The average GPRS power represents the power over 8 slots.

Table 3 Simultaneous Transmitter SAR Requirements

Mode	(5 + 1/2 Nx + 1/2 Ny) cm	Actual Separation (cm)	Result
GPRS 850 MHz + WLAN Aux	12.0	5.4	SAR eval required. >5cm: Sum SAR
EVDO r0 1900 MHz + WLAN	13.0	5.4	SAR eval required. >5cm: Sum SAR

1.4 Summation of WWAN and WLAN SAR Values

1.4.1 QDS-BRCM1030

Table 4 Applicable SAR measurements for summation of QDS-BRCM1030

Mode	Highest Measured SAR (mW/g (1g))
WWAN 850 Max SAR (GPRS 850MHz)	0.125
WWAN 1900 MHz SAR (EVDO r0 1900MHz)	0.106
WLAN MAX SAR from QDS-BRCM1030 SAR report	0.012

WWAN 850 MHz +WLAN (QDS-BRCM1030)

WWAN 850 + WLAN SAR = 0.125 mW/g + 0.012mW/g = 0.137 mW/g (1g)

WWAN 1900 MHz +WLAN (QDS-BRCM1030)

WWAN 1900 + WLAN SAR = 0.106 mW/g + 0.012mW/g = 0.118 mW/g (1g)

1.4.2 QDS-BRCM1044

Table 5 Applicable SAR measurements for summation of QDS-BRCM1044

Mode	Highest Measured SAR (mW/g (1g))
WWAN 850 Max SAR (GPRS 850MHz)	0.125
WWAN 1900 MHz SAR (EVDO r0 1900MHz)	0.106
WLAN MAX SAR from QDS-BRCM1044 SAR report	0.295

WWAN 850 MHz +WLAN (QDS-BRCM1044)

WWAN 850 + WLAN SAR = 0.125 mW/g + 0.295mW/g = 0.42 mW/g (1g)

WWAN 1900 MHz +WLAN (QDS-BRCM1044)

WWAN 1900 + WLAN SAR = 0.106 mW/g + 0.295mW/g = 0.401 mW/g (1g)