UNDP-1 HP HSTNN-I71C Collocated RF Analysis

80-VH688-19 Rev. A

June 30, 2009

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Revision history

Revision	Date	Description
A	May 2009	Initial release

1 Overview

This document provides collocated SAR analysis of the notebook model HSTNN-I71C in reference to KDB 616217.

The change filed under this application is adding notebook model HSTNN-I71C collocated with Bluetooth FCC IDs: QDS‑BRCM1043 and QDS-BRCM1018, and WLAN FCC IDs: QDS-BRCM1041, PD9512ANHU, QDS-BRCM1030.

The analysis shows that notebook model HSTNN-I71C is compliant for all combinations of WWAN and WLAN modules based on the SAR summation of individual SAR measurement results.

1.1 Definitions

$N_x = P_x / (60/f) - 1$

P = average power

F = frequency in MHz

1.2 Collocation Calculations

Table 1-1 Antenna Separation Distances

Antenna	Distance (cm)
WLAN Main-to-user	16.5
WLAN Aux-to-user	16.5
WWAN main-to-user	16.5
WLAN Aux-to-WWAN main	7.7
WLAN main-to-WWAN main	15.1

Table 1-2 Individual Transmitter SAR Evaluation (Worst Case)

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	824.2	31.4	25.38	345.1	72.8	3.7	2	7.0	5.2	0.047
UMTS 1900 MHz	1908.75		24.87	306.9	31.4	8.8	4	9	5.2	0.105
WLAN (QDS‑BRCM1041)	5600		25.47	352.0	10.7	32	16	21	16.1	0.119
WLAN (PD9512ANHU)	5600		16.62	45.9	10.7	3	2	7	16.1	0.294
WLAN (QDS-BRCM1030)	2400		23.10	202.0	25.0	7	4	9	16.1	0.005

Table 1-3 Simultaneous Transmitter SAR Requirements

Mode	(5 + 1/2 Nx + 1/2 Ny) cm	Actual Separation (cm)	Result
GPRS 850 MHz + WLAN Aux	23.0	7.7	SAR eval required. >5cm: Sum SAR
UMTS 1900 MHz + WLAN	25.0	15.1	SAR eval required. >5cm: Sum SAR

1.2.1 Collocation with QDS-BRCM1041

Table 1-4 Simultaneous SAR Summation QDS-BRCM1041

Mode	Highest Measured SAR (mW/g (1g)
WWAN 850 Max SAR (GPRS 850MHz)	0.047
WWAN 1900 MHz SAR (UMTS 1900MHz)	0.105
WLAN MAX SAR from QDS-BRCM1041 SAR report	0.119

WWAN 850MHz + WLAN (QDS-BRCM1041):

WWAN 850 + WLAN SAR = 0.047 mW/g +0.119 mW/g = 0.166 mW/g (1g)

WWAN 1900MHz + WLAN (QDS-BRCM1041):

WWAN 1900 + WLAN SAR = 0.105 mW/g +0.119mW/g = 0.224 mW/g (1g)

1.2.2 Collocation with FCC ID PD9512ANHU

Table 1-5 Simultaneous SAR Summation PD9512ANHU

Mode	Highest Measured SAR (mW/g (1g)
WWAN 850 Max SAR (GPRS 850MHz)	0.047
WWAN 1900 MHz SAR (UMTS 1900MHz)	0.105
WLAN MAX SAR from PD9512ANHU SAR report	0.294

WWAN 850MHz + WLAN (PD9512ANHU):

WWAN 850 + WLAN SAR = 0.047 mW/g +0.294 mW/g = 0.341 mW/g (1g)

WWAN 1900MHz + WLAN (PD9512ANHU) :

WWAN 1900 + WLAN SAR = 0.105 mW/g +0.294mW/g = 0.339 mW/g (1g)

1.2.3 Collocation with FCC ID QDS-BRCM1030

Table 1-6 Simultaneous SAR Summation QDS-BRCM1030

Mode	Highest Measured SAR (mW/g (1g)
WWAN 850 Max SAR (GPRS 850MHz)	0.047
WWAN 1900 MHz SAR (UMTS 1900MHz)	0.105
WLAN MAX SAR from PD9512ANHU SAR report	0.005

WWAN 850MHz + WLAN (PD9512ANHU):

WWAN 850 + WLAN SAR = 0.047 mW/g +0.005 mW/g = 0.052 mW/g (1g)

WWAN 1900MHz + WLAN (PD9512ANHU) :

WWAN 1900 + WLAN SAR = 0.105 mW/g +0.005mW/g = 0.110 mW/g (1g)

2 Permissive Change History

Table 2-1 summarizes the FCC permissive history for FCC ID J9CUNDP-1H.

Table 2-1 Permissive Change History for J9CUNDP-1H

Grant Date	Change Description	Hosts	WWAN FCC Category	WLAN FCC IDs
1/23/2008	Change of FCC ID from J9CUNDP-1			
5/16/2008	Mobile with end user install and simultaneous TX	Mobile hosts	Mobile	QDS-BRCM1036 QDS-BRCM1028
7/8/2008	Added portable host with collocation and end user install	HSTNN-W47C	Portable	QDS-BRCM1036 QDS-BRCM1028
7/30/2008	Add collocated WLAN modules to mobile configurations	Mobile hosts	Mobile	PD9533ANMU PD9512ANMU PD9512ANM QDS-BRCM1036 QDS-BRCM1028 PD9533ANM
10/21/2009	Add portable host + collocation	HP HSTNN-I57C	Portable	
4/23/2009	Add portable host + collocation	HSTNN-I70C	Portable	QDS-BRCM1010 QDS-BRCM1030
Pending	Add collocated WLAN modules to mobile configurations	Mobile hosts	Mobile	QDS-BRCM1031 QDS-BRCM1041 PPD-AR5BHB92-H PPD-AR5B95-H
	Add Portable Host + collocation	HSTNN-I71C	Portable	QDS-BRCM1043 QDS-BRCM1018 QDS-BRCM1041 PD9512ANHU QDS-BRCM1030