



Gobi2000™ Module HP HSTNN-I70C Collocated RF Analysis

80-VP948-9 Rev. C

September 1, 2009

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80-VP948-9 Rev. C

Revision history

Revision	Date	Description
A	August 18, 2009	Initial release
B	August 31, 2009	Editorial changes per FCC review response (KDB 266050)
C	September 1, 2009	Correction of technical error per FCC review response

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 adding notebook model HSTNN-I70C to module Gobi2000™ collocated with WLAN module with FCC ID QDS-BRCM1030 and WLAN/Bluetooth combo module with FCC ID QDS-BRCM1044.

The analysis shows that notebook model HSTNN-I70C is compliant for all combinations of WWAN and WLAN modules based on the SAR summation of individual SAR measurement results.

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

2 Collocated Device Information

The transmitters collocated with the Gobi2000 module have been evaluated for RF exposure as individual transmitters by their respective manufacturers. Where SAR testing was applicable, the test positions were evaluated in worst-case configurations as applicable to non-tablet notebooks; i.e., were tested with the bottom of the notebook flush to the phantom, with the display perpendicular to the phantom, and with the respective antenna positioned directly under the SAR area scan. Table 2-1 provides technical antenna details for each collocated device type installed.

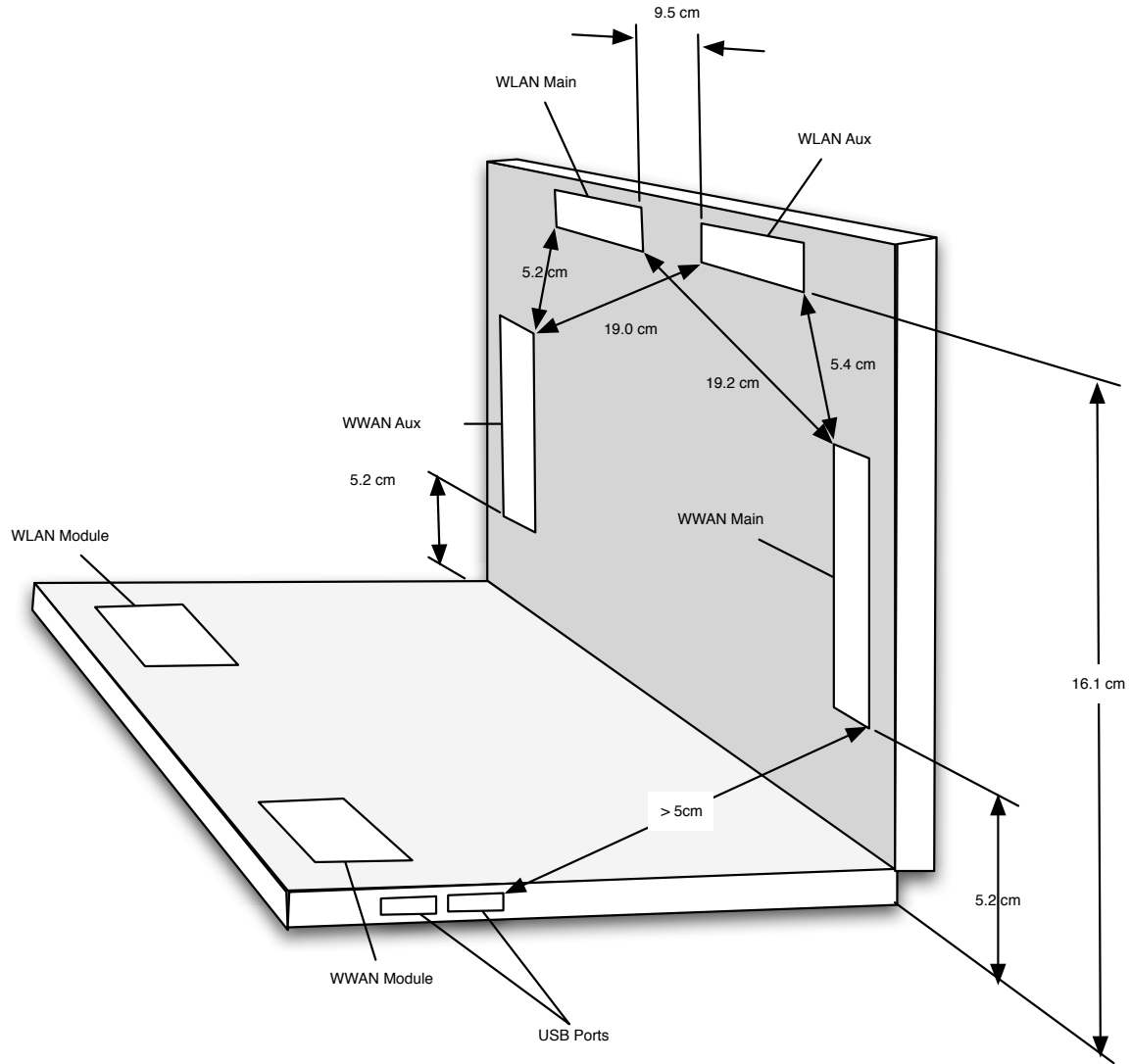
Table 2-1 Collocated Antenna Information

Antenna	Antenna Physical Dimensions	Maximum Gain
WWAN Main	87.3 x 39.4 mm	+0.86 dBi (1880 MHz)
WWAN Aux	83.2 x 4.5 mm	-1.3 dBi (1909 MHz)
WLAN Main	30 x 1.5 mm	-0.29 dBi (2450 MHz) -0.04 dBi (5600 MHz)
WLAN Aux	30 x 1.5 mm	+0.25 dBi (2450 MHz) -1.88 dBi (5470 MHz)

2.1 Antenna Locations

Figure 1 shows the locations of the antenna within the notebook model HSTNN-I70C.

Figure 1 HP Model HSTNN-I70C Antenna Locations



2.2 Collocated Transmitters

Table 2-2 lists the available collocated transmitters available at the time of this FCC filing.

Table 2-2 Available Collocated grant power levels

Freq range (MHz)	Power (W)	
	QDS-BRCM1030	QDS-BRCM1044
2402-2480	-	0.005
2412-2462	0.202	0.389

3 Collocation Calculations

This section summarizes the collocated transmitters available in the host device as well as a collocated RF safety analysis.

Table 3-1 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 3-2 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	824	31.4	25.38	345.1	72.8	3.7	2	7.0	5.2	0.125
EVDO R0 1900 MHz	1908		24.05	254.1	31.4	7.1	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 3-3 Simultaneous Transmitter SAR Requirements per KDB 616217

Mode	(5 + 1/2 Nx + 1/2 Ny) cm	Actual Separation (cm)	Result
GPRS 850 MHz + WLAN Aux	11.0	5.4	>5cm: Sum SAR
EVDO r0 1900 MHz + WLAN	13.0	5.4	>5cm: Sum SAR

3.1 Summation of WWAN and WLAN SAR Values

3.1.1 QDS-BRCM1030

Table 3-4 Applicable SAR Measurements for Summation of QDS-BRCM1030

Mode	Highest Measured SAR (mW/g (1g))
WWAN 850 Max SAR (GPRS 850MHz)	0.036
WWAN 1900 MHz SAR EVDO r0 1900MHz)	0.102
WLAN MAX SAR from QDS-BRCM1030 SAR report	0.012

WWAN 850 MHz + WLAN (QDS-BRCM1030)

WWAN 850 + WLAN SAR = 0.036 mW/g + 0.012mW/g = 0.048 mW/g (1g)

WWAN 1900 MHz + WLAN (QDS-BRCM1030)

WWAN 1900 + WLAN SAR = 0.102 mW/g + 0.012mW/g = 0.114 mW/g (1g)

3.1.2 QDS-BRCM1044

Table 3-5 Applicable SAR Measurements for Summation of QDS-BRCM1044

Mode	Highest Measured SAR (mW/g (1g))
WWAN 850 Max SAR (GPRS 850MHz)	0.036
WWAN 1900 MHz SAR EVDO r0 1900MHz)	0.102
WLAN MAX SAR from QDS-BRCM1044 SAR report	0.295

WWAN 850 MHz + WLAN (QDS-BRCM1044)

WWAN 850 + WLAN SAR = 0.036 mW/g + 0.295mW/g = 0.331 mW/g (1g)

WWAN 1900 MHz + WLAN (QDS-BRCM1044)

WWAN 1900 + WLAN SAR = 0.102 mW/g + 0.295mW/g = 0.397 mW/g (1g)

4 J9CGOBI2000-H Permissive Change History

Table 4-1 summarizes the FCC permissive change history for FCC ID J9CGOBI2000-H.

Table 4-1 FCC Permissive Change history, J9CGOBI2000-H

Grant Date	Change Description	Hosts	WWAN FCC Category	WLAN FCC IDs
Pending	Add Portable Host + collocation	HSTNN-Q44C	Portable	PPD-AR5B95-H QDS-BRCM1030 QDS-BRCM1041 QDS-BRCM1044
Pending	Add Portable Host + collocation	HSTNN-I70C	Portable	QDS-BRCM1030 QDS-BRCM1044