



**MOTOROLA**

**Date:** .September 27, 2004

**Subject:** Request for additional information regarding FCC ID: IHDT6EK2 (Portable PCS GSM transceiver with embedded Bluetooth)

**Reference:**

Application Received:	08/12/2004
Correspondence Reference Number:	240922A.IHD
Confirmation Number:	TC4284 & TC4285
Date of Original Email:	09/22/2004

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**Questions and responses follow:**

Bluetooth Application:

1. The measured 20 dB bandwidth exceeds the measured channel spacing. The current FCC Rules (15.247(a)(1)) do not permit this. Please address. (Please note that the newest version of Part 15, R&O FCC 04-165, permits the channel spacing to be greater than two thirds of the 20 dB bandwidth, provided that the output power is less than 125 mW, however, these changes do not become effective until October 7, 2004).

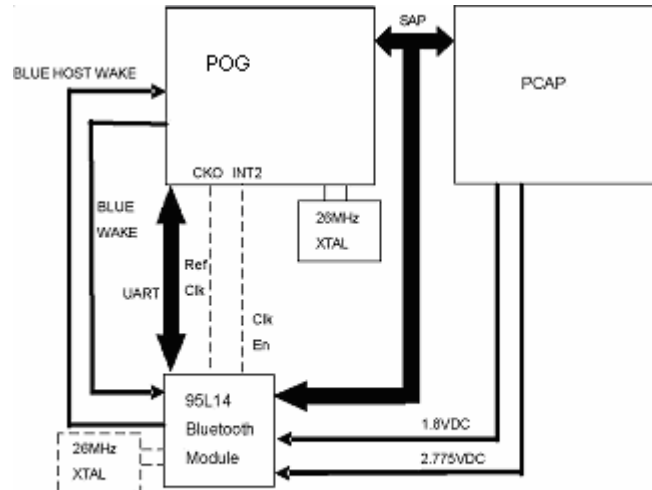
**Response:** Please refer to the revised Bluetooth report (exhibit 6A) which replaces the originally submitted report. This new report addresses the 20 dB bandwidth issue. No other characteristics are updated.

2. Please provide a technical description of the Bluetooth device.

**Response:** Bluetooth implementation is accomplished with the Broadcom Blutionium BCM2035 IC. This device is a standalone baseband processor with an integrated 2.4 GHz transceiver. It is completely compliant with the Bluetooth 1.1 specification and Part 15.247. The rx has the ability to hop in sync with the tx, and the rx BW is approximately equal to the tx BW. Frequency hopping is pseudorandom and average channel usage is equal. All part 15.247 requirements are met when the device is presented with a continuous data stream.

The HCI interface will utilize an UART. There are two data signals (TXD and RXD) and two flow control signals (RTS and CTS). The BT module assumes a role as DTE and the POG IC acts as a DCE. Therefore when the BT module is connected to POG IC the RXD and TXD lines must be crossed, while CTS and RTS on POG connect directly to CTS and RTS on the BT module. RXD and TXD have been crossed on the BT module already; therefore, BLUE\_TX (pin 5) of the BT module is connected to TXD2 and BLUE\_RX (pin 33) of the BT module is connected to RXD2 on POG IC.

The Bluetooth UART is a dedicated UART from POG IC. This bus is not shared with external peripherals.



### **Bluetooth System Block**

Although most signaling is done over the HCI, wake-up signaling is done with dedicated signals. POG IC uses a GPIO to wake up the BT module. The BT module uses a dedicated signal BLUE\_HOST\_WAKEB (Pin 9) connected to a POG IC interrupt to wake-up the host processor.

The codec is connected onto a shared 4 wire bus with POG IC and PCAP referred to as the BB\_SAP (Base Band Serial Audio Codec Port). The PCAP acts as the master and provides the clock and frame sync signals for the bus. The labeling on the Bluetooth module is in reference to the POG IC. Therefore, the ASAP\_TX line is an input and ASAP\_RX is the output from Bluetooth.

Bluetooth is reset in a number of different ways. When software first initializes Bluetooth, it sends an HCI reset command over the UART interface to place the BCM2035 into a known state.

If software fails to detect a response to the initial HCI reset command, it will power cycle the RF and Core voltages thus forcing a power on reset on the BCM2035.

Bluetooth is reset in start-up using the RESETB signal; it is connected to RESET\_N (pin 22) of the BT module. RESET\_N is active low.

The Broadcom chipset requires two different frequency references, a lower frequency low power reference (32.768 kHz), and a high frequency main reference (15.36 MHz, 26 MHz, etc.). The low power reference is a standard frequency available on the GSM phone whenever the phone is powered. As such, this reference is directly connected to CLK\_32KHZ, the buffered port from the oscillator on PCAP.

As this module will be primarily used on GSM platform, PLL components on the module were tuned for 26 MHz with the intent to share the crystal frequency oscillator of the phone, Neptune LTS XTAL OSC.

3. The User's Manual does not contain the statement required by Section 15.21. Please verify that this statement will be included prior to marketing.

**Response:** Yes, confirmed; a Section 15.21 compliance statement will be included in the final User's manual.

Phone Application:

4. Please verify that the Bluetooth device was active during spurious radiated emission tests.

**Response:** The affect of the secondary (Bluetooth) transmitter on radiated emission tests is verified.

5. An item on p.5 of the EMC report is listed as being past its cal due date. Please address.

**Response:** The calibration due date for the HP83623B is corrected to: 6/20/2005.

6. Please verify that the following is a typo: p.5 of the SAR report- the Verification Test recommended limit should be 40.7, per the Dipole Characteristics Certificate.

**Response:** Motorola confirms that the Recommended SAR Limit in the System Accuracy Verification should be 40.7 W/kg. Please see the updated table below.

$f$ (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			$\epsilon_r$	$\sigma$ (S/m)		
1800	Measured, 07/29/2004	39.85	39.0	1.35	20.0	19.7
	Measured, 07/30/2004	40.2	38.8	1.35	21.0	19.5
	Measured, 09/09/2004	39.6	39.0	1.35	20.0	19.5
	<b>Recommended Limits</b>	40.7	40.0 $\pm 5\%$	1.4 $\pm 5\%$	18-25	18-25