RF Exposure

1. Antenna Gains of applying transmitters

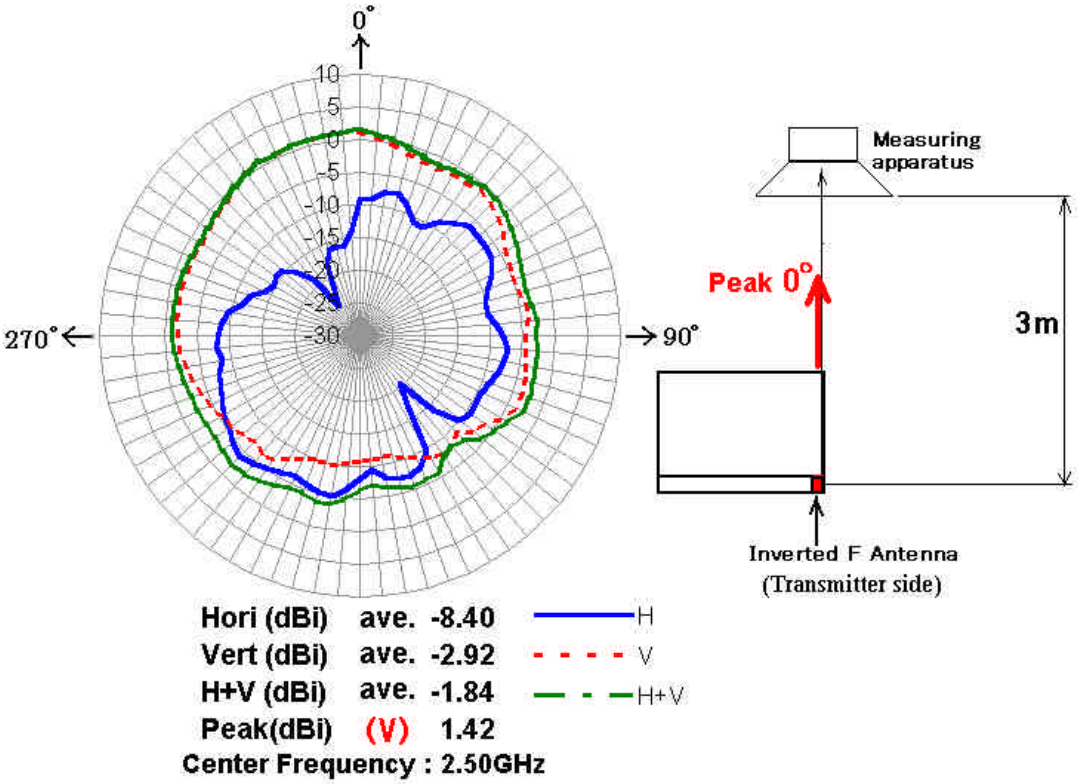


Figure A: Antenna Gain of IEEE802.11b Wireless LAN Adapter

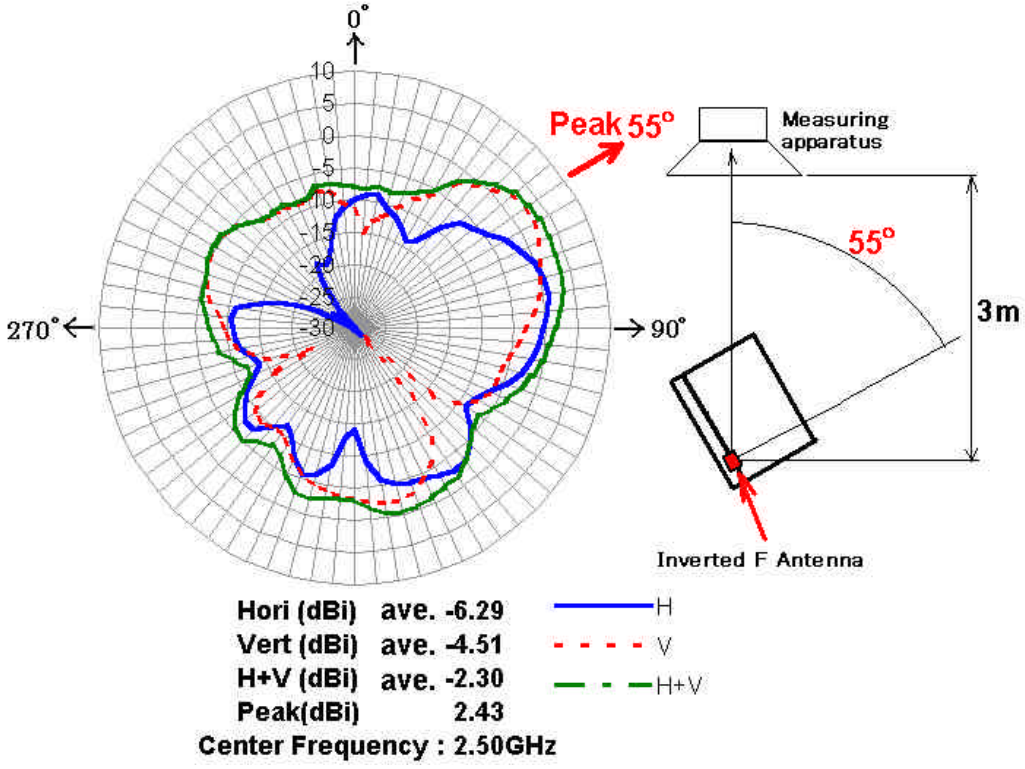
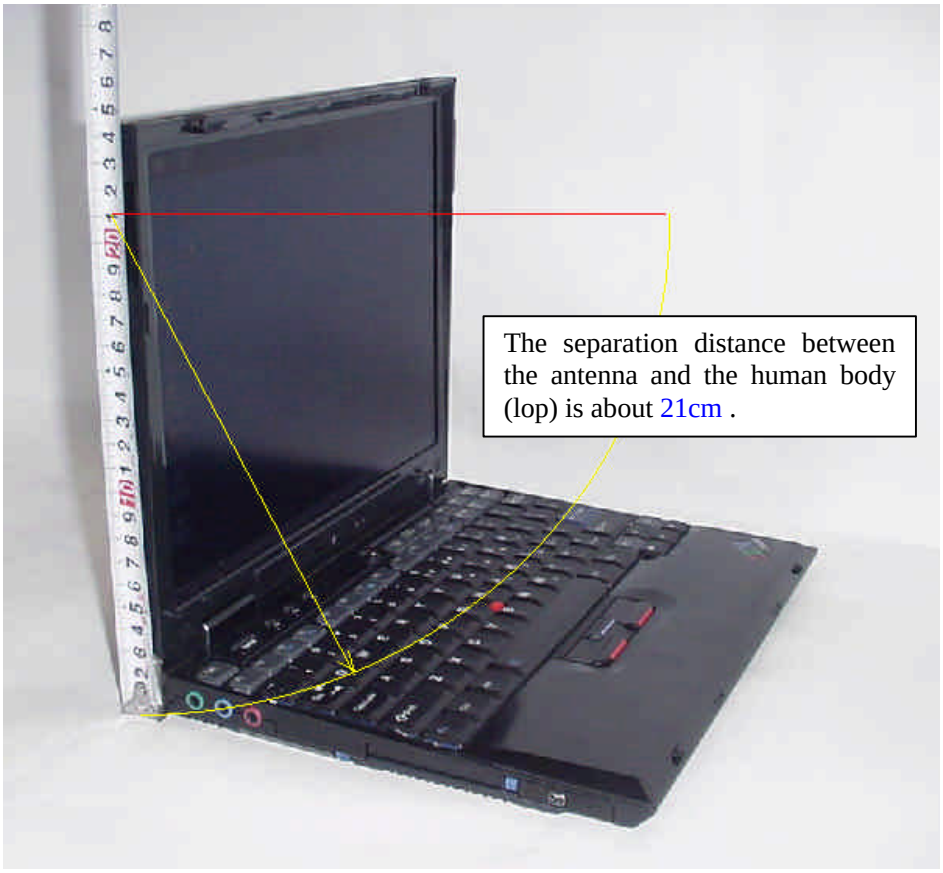


Figure B: Antenna Gain of Bluetooth Daughter Crad

2. RF Exposure evaluation of IBM High Rate Wireless LAN Mini-PCI Adapter with Modem II

The applying equipment is a compact size laptop computer. The built_in antenna for the integrated mini-PCI wireless LAN transmitter is categorized as a mobile device by FCC CFR 47 section 2.1091, because the separation distance between the antenna and the human body is 20cm or more. As shown in the following photos, the applying equipment satisfies the requirement of antenna separation.



The conducted peak output power of the IEEE802.11b Wireless LAN Adapter is 17.1dBm and the maximum antenna gain is 1.42dBi as shown the previous Figure A.

Therefore the peak radiated output power(EIRP) is calculated as follows.

EIRP = P + G = 17.1 dBm + 1.42 dBi = 18.52 dBm (71.1 mW)

Then, the maximum power density at 20cm distance is calculated as :

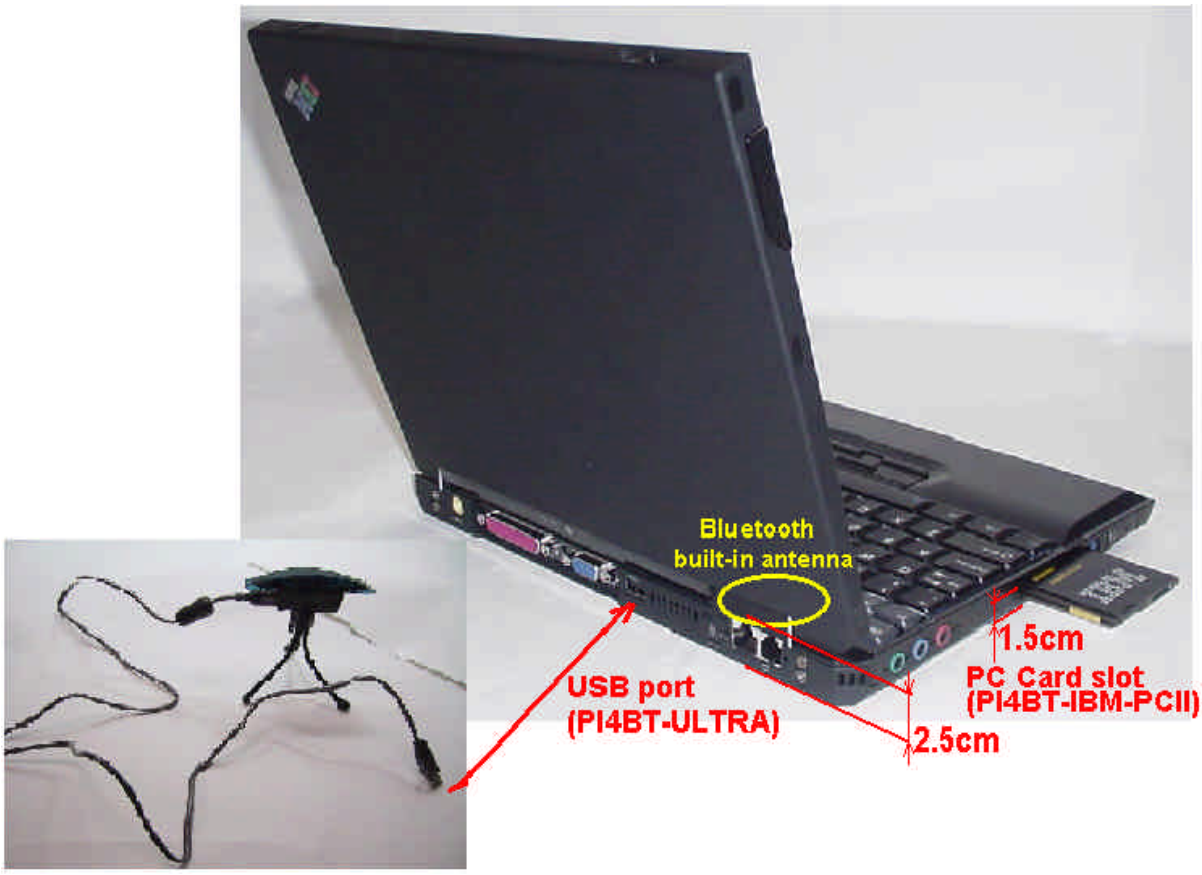
$S_1 = EIRP/(4 \times R^2 \times \pi) = 0.0142$ mW/cm^2

The maximum power density at 20cm distance of the WLAN transmitter is 0.0142 mW/ cm^2, which is below the MPE limit (1.0 mW/ cm^2). Therefore the applying WLAN transmitter with the built_in antenna meets the MPE requirements for general Population/Uncontrolled exposure.

3. RF Exposure evaluation of Bluetooth transmitters

The applying laptop PC (ThinkPad X30 Series) supports three kinds of Bluetooth devices as follows.

	FCC ID	Grantee Name	Product Name	Granted Date	EIRP in FCC test report
User's option	PI4BT-ULTRA	TDK Systems Europe Ltd.	Bluetooth Ultraport Module	May/22/2001	1.4 mW
	PI4BT-IBM-PCII		Blutooth PC Card II	August/21/2001	1.0mW
Applying transmitter	ANOTK1TP10HOP	IBM Japan, Ltd.	Blutooth Daughter Card		2.3mW



When a customer operates the applying PC on his lap, the sufficient separation distance (min. 20cm) between the antennas of above transmitters and the person's body (lap) can not be maintained. (note: approximately 1.5 cm from the PC Card slot, or 2.5 cm from the built_in Bluetooth antenna).

But the footnote of the Section 3 in Supplement C to OET Bulletin 65 states "[14] ……. If a device, its antenna or other radiating structures are operating at closer than 2.5 cm from a person's body or in contact with the body, SAR evaluation may be necessary when the output is more than 50 – 100 mW, depending on the device operating configurations and exposure conditions."

The total output power of the three Bluetooth transmitters in the above table is 4.7mW. Therefore these transmitters also satisfy the RF exposure evaluation regarding CFR 47 Part 15.247(b)(4) without a SAR compliance test report.