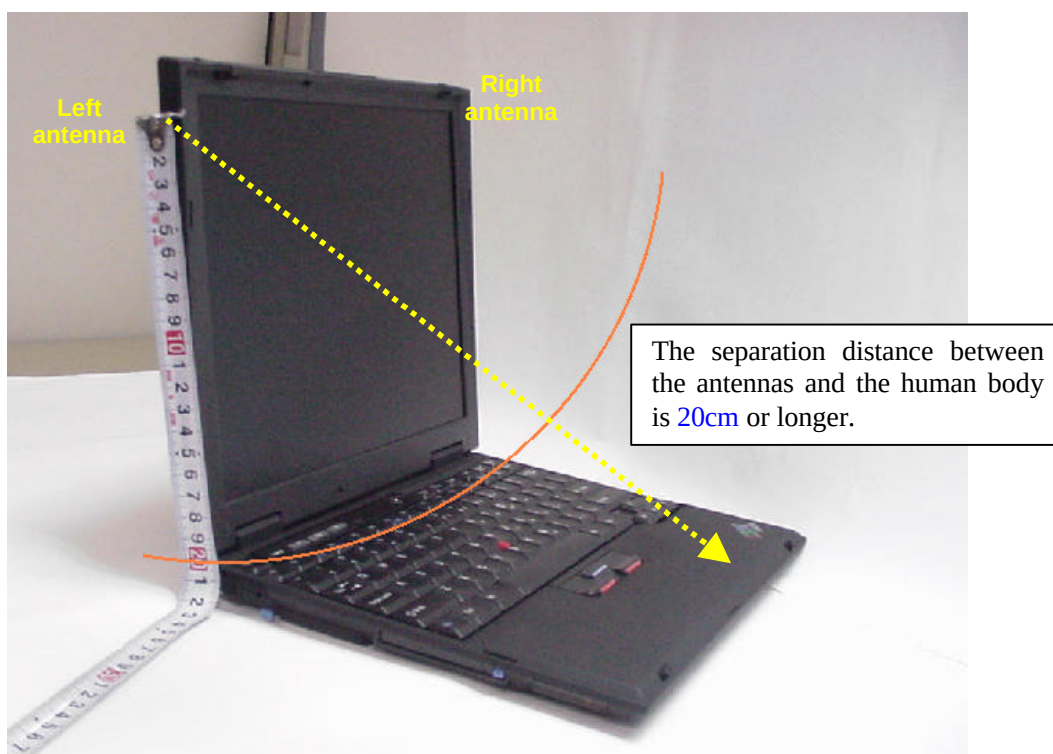


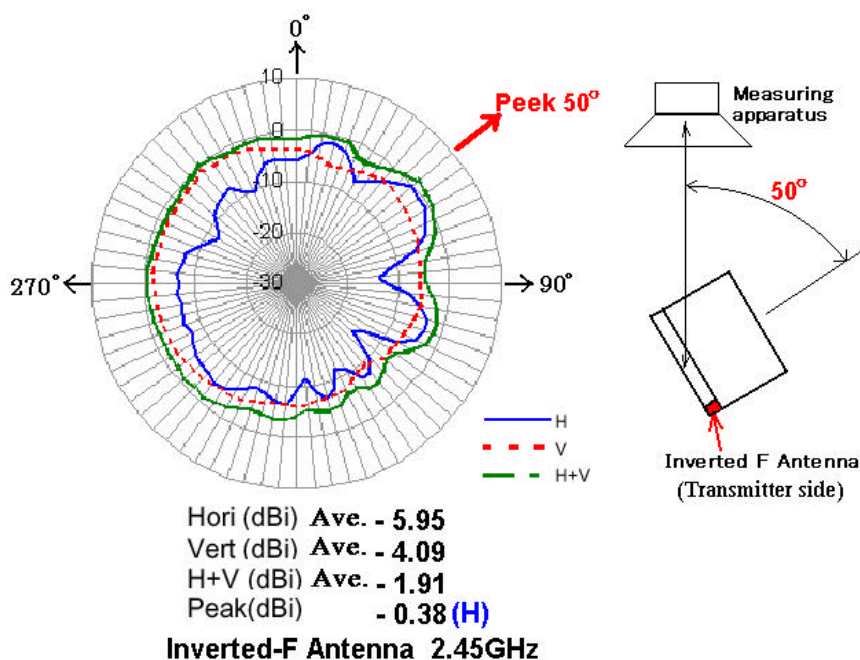
RF Exposure

The applying equipment is a compact size laptop computer which is categorized as a mobile device by FCC CFR 47 Section 2.1091. Therefore the separation distance between the antenna and the human body is 20cm or more. As shown in the following photo, the applying equipment satisfies the requirement with a sufficient distance of antenna separation.

1. IBM ThinkPad 802.11b Wireless LAN Mini-PCI Adapter



The peak conducted output power of the Wireless LAN Mini-PCI Adapter is 15.5dBm and the maximum antenna gain is -0.38dBi as shown below.



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

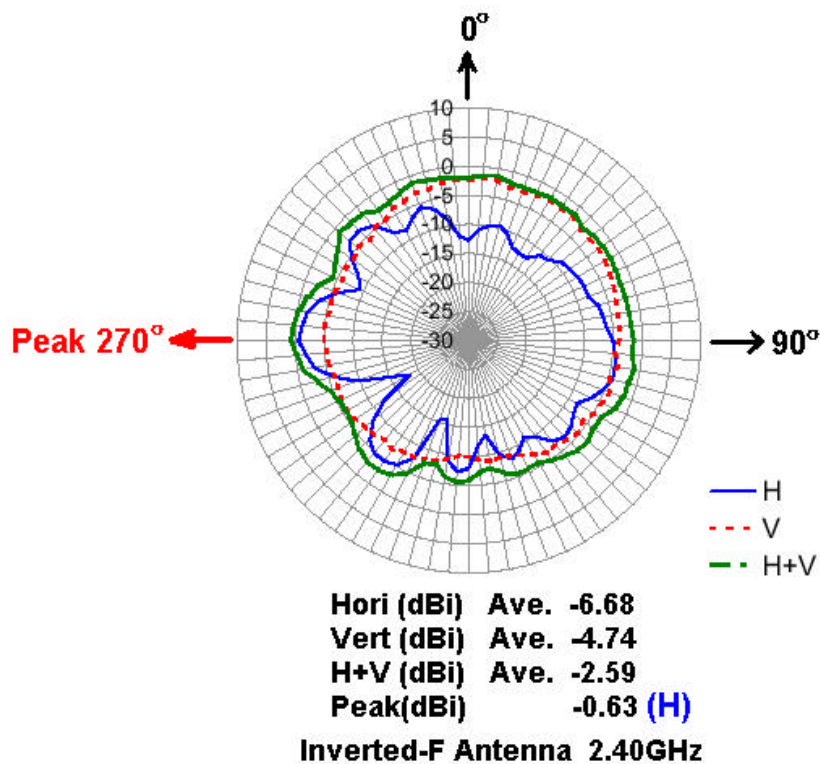
$$\text{EIRP} = P + G = 15.5 \text{ dBm} - 0.38 \text{ dBi} = 15.12 \text{ dBm} (32.5 \text{ mW})$$

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

$$S_1 = \text{EIRP} / (4 \times R^2 \times \pi) = 0.0065 \text{ mW/cm}^2$$

2. IBM Bluetooth Daughter Card

The peak conducted output power of the Bluetooth Daughter Card is 3.8 dBm and the maximum antenna gain is - 0.63 dBi as shown below.



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

$$\text{EIRP} = P + G = 3.8 \text{ dBm} - 0.63 \text{ dBi} = 3.17 \text{ dBm} (2.07 \text{ mW})$$

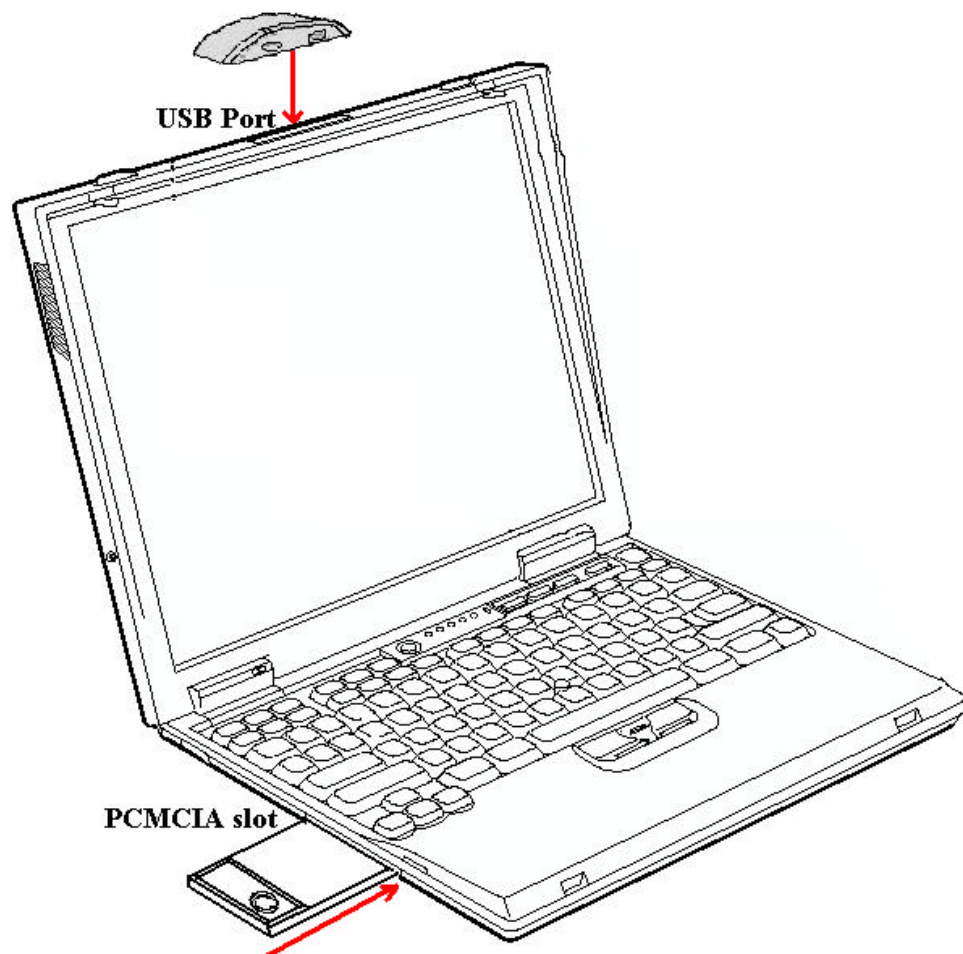
Then, the maximum power density at 20cm distance is calculated as :

$$S_2 = \text{EIRP} / (4 \times R^2 \times \pi) = 0.00041 \text{ mW/cm}^2$$

3. User option Wireless cards

The applying equipment has two interfaces to connect user's option wireless cards. The following wireless cards are used in the PC slot or USB port of the equipment.

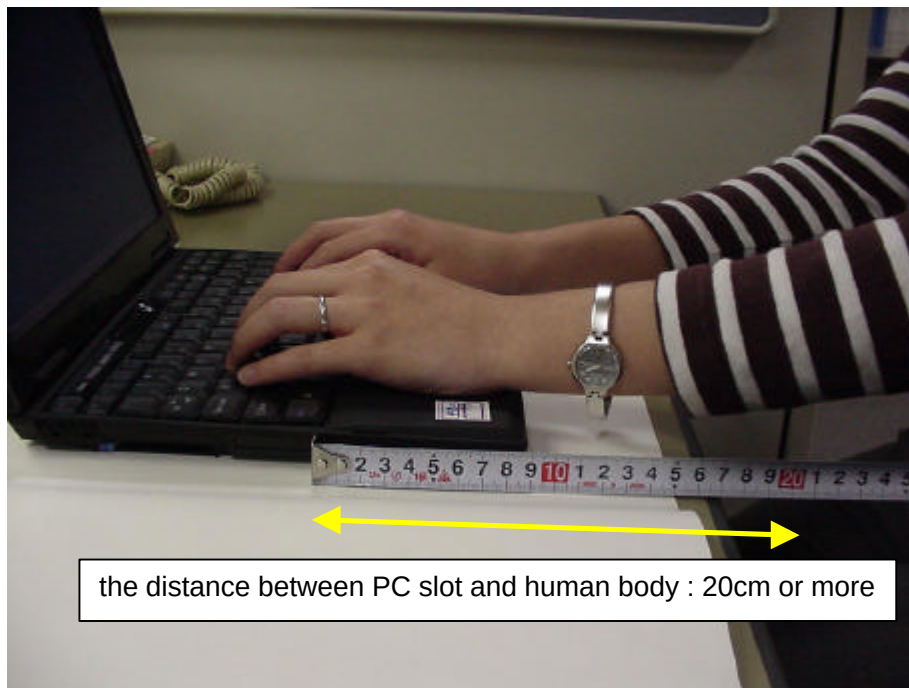
FCC ID : PI4BT-ULTRA
Grantee Name : TDK Systems Europe Ltd.
Product Name : Bluetooth Ultraport Module
EIRP in FCC test report : 1.4 mW
Granted Date : May/22/2001



FCC ID : O2OBTPCM101
Grantee Name : Deigianswer A/S
Product Name : Motorola Bluetooth 0dBm PC-Card
(type no.: BTPCM100)
EIRP in FCC test report : 2.7mW
Granted Date : October/18/2000

FCC ID : P4IBT-IBM-PCII
Grantee Name : TDK Systems Europe Ltd.
Product Name : Bluetooth PC Card II
EIRP in FCC test report : 1.0 mW
Granted Date : August/21/2001

The distance from the USB port to the human body is more than 20cm, also operators can maintain the sufficient antenna separation from the PC slot as shown in the next page.



The minimum antenna separation to satisfy the MPE limits ($1\text{mW}/\text{cm}^2$), and the maximum power density at 20cm distance of each card are :

Interface	FCC ID	EIRP	Min. separation to satisfy the MPE limits *1	Max. power density at 20cm *2
USB port	PI4BT-ULTRA	1.4mW	0.34cm	$S_3 = 0.00028 \text{ mW}/\text{cm}^2$
PCMCIA slot	O2OBTPCM101	2.7mW	0.47cm	$S_4 = 0.00054 \text{ mW}/\text{cm}^2$
	PI4BT-IBM-PCII	1.0mW	0.28cm	$S_5 = 0.00020 \text{ mW}/\text{cm}^2$

$$*1 = \sqrt{\text{EIRP} / (1\text{mW}/\text{cm}^2 \times 4 \times \pi)}$$

$$*2 = \text{EIRP} / (4 \times 20\text{cm}^2 \times \pi)$$

4. Total RF Exposure Evaluation

When an operator uses the integrated Wireless LAN Mini-PCI Adapter and two option cards (FCC ID: PI4BT-ULTRA and O2OBTPCM101) simultaneously, the total intentional radiation power emitted from the applying equipment becomes maximum.

So the source-based time-averaging duty factor during 30 minutes is calculated as :

$$(S_1 + S_3 + S_4) \times 30 = (0.0065 + 0.00028 + 0.00054) \times 30 = 0.22$$

Therefore the source-based time-averaging duty factor is considered as 100% duty, and the applying equipment meets the MPE requirements for general Population/Uncontrolled exposure.

5. RF Exposure Info of User's Manual

- 1) The user's notification concerning the use of third party transmitters.

Page v (in the front portion of the user's manual)

Important Notice for Users

The FCC RF Safety Requirement

When you use a Bluetooth option or wireless PCMCIA card in your ThinkPad X23 computer,

please make sure of the following.

1. Visit the IBM site at www.ibm.com/pc/support and confirm the updated list of RF option devices that have been approved to cooperate with the integrated wireless feature.
2. When you use any other RF option device that is not listed on the IBM site, all other wireless features including the integrated transmitter in your ThinkPad computer are required to be turned off.
3. Users are requested to follow the RF Safety instructions on wireless option devices that are included in the RF option device's user's manual.

See 'Appendix C. Wireless Regulatory Information' for more details.

- 2) Other related operating instructions regarding the RF exposure requirement are described in the Appendix C (page 77). The followed pages are the copy of Appendix C.

Appendix C. Wireless Regulatory information

The ThinkPad X23 must be installed and used in strict accordance with the instructions as described hereafter. This product complies with the following radio frequency and safety standards.

USA - Federal Communications Commission (FCC)

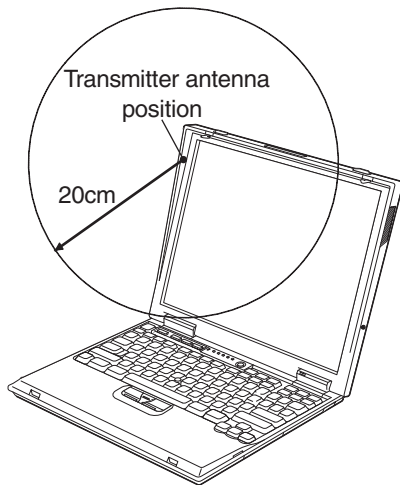
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

The FCC RF Safety Requirement

The radiated output power of Wireless LAN Mini-PCI Adapter is far below the FCC radio frequency exposure limits. Nevertheless, the ThinkPad X23 shall be used in such a manner that the potential for human contact during normal operation is minimized as follows:

- **CAUTION:** To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm (8 inches) must be maintained between the antenna of this device and all persons.



- When you use a Bluetooth option or wireless PCMCIA card in your ThinkPad X23 computer, please make sure of the following.
 1. Visit the IBM site at **www.ibm.com/pc/support**, and confirm the updated list of RF option devices that have been approved to cooperate with the integrated wireless feature.
 2. When you use any other RF option device that is not listed on the IBM site, all other wireless features including the integrated transmitter in your ThinkPad computer are required to be turned off.

3. Users are requested to follow the RF Safety instructions on wireless option devices that are included in the RF option device's user's manual.

Interference Statement

An improper installation or unauthorized use may cause harmful interference to radio communications. Also any tampering of the internal antenna will void the FCC certification and your warranty. Refer to the "Electronic emission notices" on page 63 for more detail.

Canada - Industry Canada (IC)

Low Power License-Exempt Radiocommunication Devices (RSS-210)

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Permis d'émission à faible puissance - Cas des appareils de communications radio (CNR-210)

Le fonctionnement de ce type d'appareil est soumis aux deux conditions suivantes : (1) Cet appareil peut perturber les communications radio, et (2) cet appareil doit supporter toute perturbation, y compris les perturbations qui pourraient provoquer un dysfonctionnement.

Europe - CE Declaration of Conformity

- Hereby Actiontec Electronics, Inc. and TDK Systems Europe, Ltd. declare that the RLAN(Actiontec) and Bluetooth(TDK) devices integrated in this product are in conformity with the essential requirements and other relevant provisions of Directive 1999/5/EC.
IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of these products.
- Actiontec Electronics, Inc. et TDK Systems Europe, Ltd. déclarent par la présente que les dispositifs RLAN(Actiontec) et Bluetooth(TDK) intégrés à ce produit sont en conformité avec les principales exigences et autres dispositions appropriées de la Directive 1999/5/EC.
IBM décline toute responsabilité en cas de modification non recommandée de ces produits.
- Actiontec Electronics, Inc. und TDK Systems Europe, Ltd. erklären hiermit, dass die in diesem Produkt integrierte drahtlose RLAN-Einheit (Actiontec) und Bluetooth-Einheit (TDK) die Voraussetzungen sowie alle wichtigen