

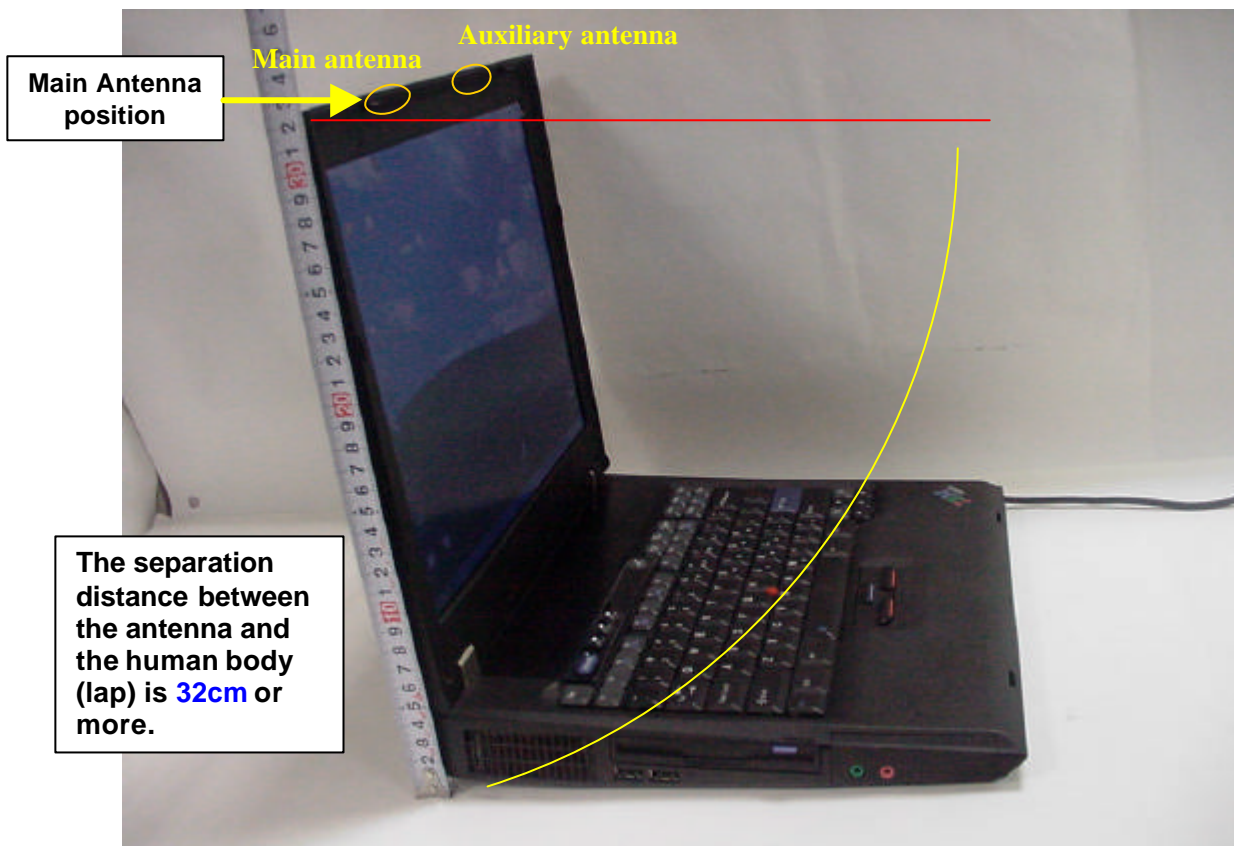
# RF Exposure

## 1. RF Exposure evaluation for the applying transmitter

As shown below, the transmitter antenna (the main antenna) of the supported host PC device is located at the top portion of display (LCD) section, and the separation distance between the antenna and the human body is 20cm or more. Therefore the applying LMA transmitter and the antenna system is categorized as a mobile device by FCC CFR 47 Section 2.1091.

Note) The auxiliary antenna is not used for transmission but receiving only, so it is not subjected to the RF exposure evaluation.

### Antenna separation of ThinkPad G40 Series



The highest conducted peak output power of the Test Report is 38.0 mW (15.8 dBm) and the maximum antenna gain of the main antenna is -0.25 dBi. (Refer to the separate "Antenna\_Info" exhibit.)

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

$$\text{EIRP} = P + G = 15.8 \text{ dBm} - 0.25 \text{ dBi} = 15.55 \text{ dBm} (35.9 \text{ mW})$$

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

$$S = \text{EIRP} / (4 \times R^2 \times \pi) = 0.0072 \text{ mW/cm}^2$$

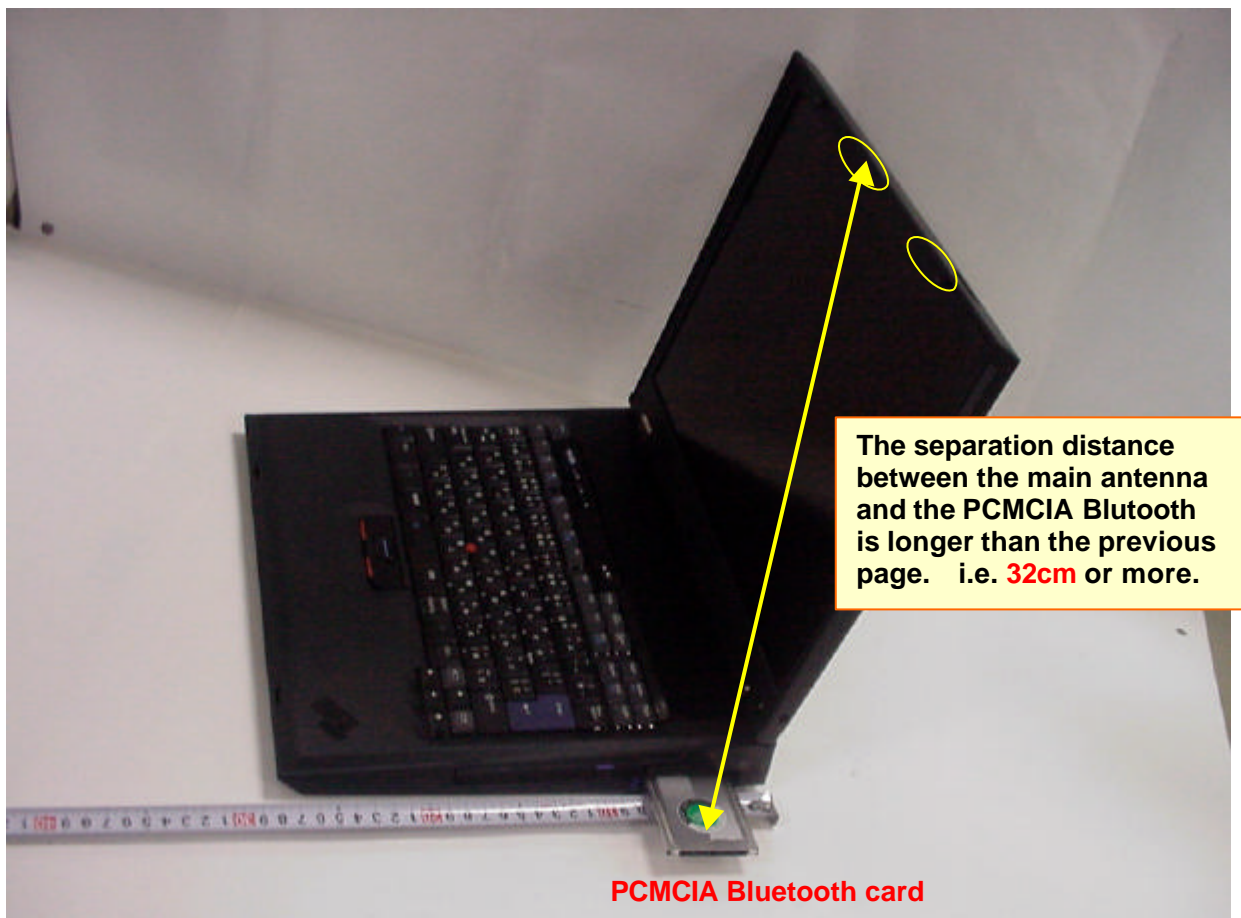
The result is far below the MPE limit ( $1.0 \text{ mW} / \text{cm}^2$ ) that keeps the sufficient margin for use of continuous RF exposure environment in normal operation. Therefore the LMA transmitter meets the MPE requirements for general Population/Uncontrolled exposure.

## 2. Collocation evaluation with Bluetooth transmitter

The applying LMA transmitter installed in ThinkPad G40 Series collocates with one Bluetooth devices as follows, and both can transmit simultaneously.

	FCC ID	Grantee Name	Product Name	Granted Date	ERP in FCC Test Report
User's option	PI4BT-IBM-PCII	TDK Systems Europe Ltd.	Bluetooth PC Card II	August/21/2001	1.0mW

### Interface to connect Wireless option



The Tx antenna located at the LCD section of the host device is assembled apart from the PCMCIA Bluetooth antenna with 20 cm or more.

Therefore the RF exposure evaluation for the Bluetooth transmitter is allowed to be examined independently of the applying main antenna. In other word, the SAR testing for the applying transmitter in collocating with this Bluetooth option is not required.

When users operate the applying host PC on ones' lap, the sufficient separation distance (minimum 20cm) between the above Bluetooth antenna and the person's body (lap) can not be maintained. That is, for the Bluetooth PC Card II (FCC ID:PI4BT-IBM-PCII), the minimum

separation distance is approximately 2 cm.

But the footnote of the Section 3 in Supplement C to OET Bulletin 65 states "<sup>14</sup> ..... 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 output power of the PCMCIA Bluetooth transmitter in the previous table does not exceed 5mW, therefore it also satisfy the RF exposure evaluation regarding CFR 47 Part 15.247(b)(4) without a SAR compliance test report, then can operate(collocate) with the applying transmitter simultaneously.

IBM Web site guides to customers about the **grant condition** related to the collaborating transmitter devices of each approved product. The next page is a draft of it.

### 3. IBM Web site for user's guidance concerning the co-located transmitters

Note) The contents will be available after the product announcement.

<http://www.pc.ibm.com/qtechinfo/MIGR-43693.html>

**IBM** Search

Home | Products & services | Support & downloads | My account

Select a language PC support home Login Profile My page Ask an expert Help

PC support home  
Warranty lookup

**Related links:**  
Support phone list  
Business Partner support  
IBM PC Institute  
IBM Publications Center  
Find a Business Partner  
IBM Supports  
Microsoft Service Packs

## TP Wireless Systems – Approved wireless Mini PCI options and additional RF option devices receive FCC certification

**Applicable countries/regions**  
United States

**Service hints & tips**  
**Affected configurations**  
Additional RF Option devices receive FCC certification for use on:  
**BIOS group 1**

LMA (Limited Modular Approval) adapters	FCC IDs	Approved ThinkPad models	PC options allowed multiple transmission		
			#1	#2	#3
IBM High Rate Wireless LAN Mini PCI Adapter	ANOM3AWEB56GA	R32 Series T30 Series X30 Series (X30)	NG	O	O
Cisco Aironet Wireless 802.11b	ANO058H004				

**BIOS group 2**

LMA (Limited Modular Approval) adapters	FCC IDs	Approved ThinkPad models	PC options allowed multiple transmission		
			#1	#2	#3
Cisco Aironet Wireless 802.11b	ANO058H004	R40 Series T40 Series X30 Series (X31)	O	O	O
Intel PRO/Wireless LAN 2100 3B Mini PCI Adapter	ANO20020201CLK				
IBM High Rate Wireless LAN Mini PCI Adapter III	ANO20020200BRX	R40 Series G40 Series	O	O	O
			NG	NG	O

NOTES:

**NG:** Not authorized to use by the FCC rule, or not recognized by BIOS.

#1: FCC ID: ANO20020100MTN      Option Name: [IBM Integrated Bluetooth with 56K Modem](#)

#2: FCC ID: P14BT-ULTRA      Option Name: [Bluetooth UltraPort Module from IBM](#)

#3: FCC ID: P14BT-IBM-PCI      Option Name: [Bluetooth PC Card II](#)

**Solution**  
The supplementary document of the ThinkPad system's "Service and Troubleshooting Guide" has the following information in "Wireless regulatory information - USA Federal Communications Commission (FCC)" section:

**Use of wireless options**

Please make sure of the following conditions on use of wireless features.

1. Visit the IBM site at [www.pc.ibm.com/qtechinfo/MIGR-43693.html](http://www.pc.ibm.com/qtechinfo/MIGR-43693.html) 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.

Document id: MIGR-43693  
Last modified: 2003-01-31  
Copyright (C) 2003 IBM Corporation

About IBM | Privacy | Legal | Contact