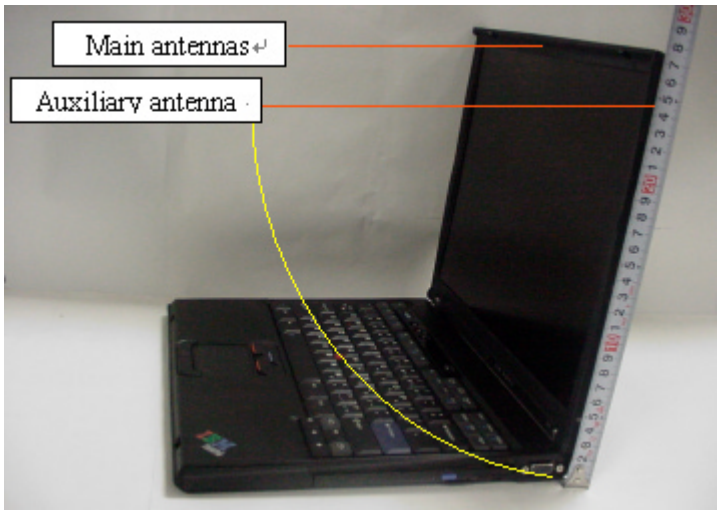
RF Exposure Evaluation

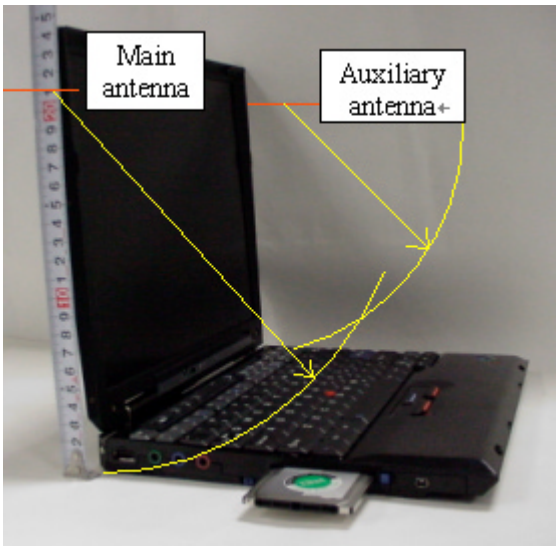
1. RF Exposure evaluation for the applying LMA transmitter

The all antenna systems of host PCs (IBM ThinkPad G40, T40, R50, X30 and X40 Series) were already certified as **Mobile** devices by FCC CFR 47 Section 2.1091. The built-in antennas connected to the applying modular transmitter are located at the top portions of each LCD section as follows.

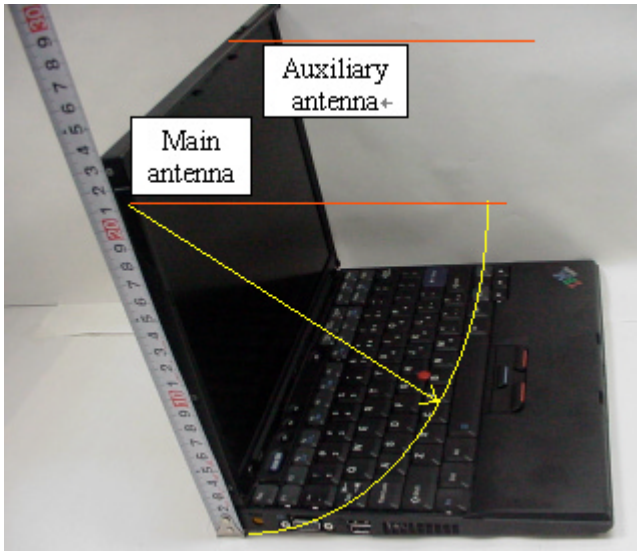
IBM ThinkPad T40/R50 Series



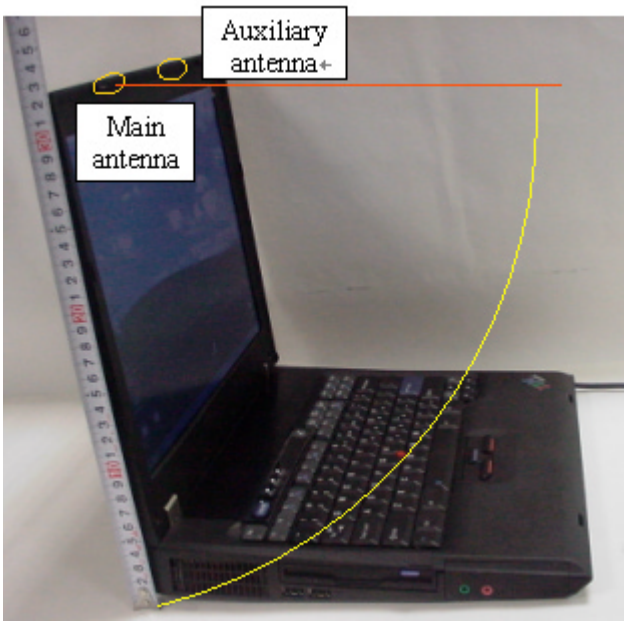
IBM ThinkPad X30 Series



IBM ThinkPad X40 Series



IBM ThinkPad G40 Series



2. RF Exposure evaluation with co-located WLAN transmitters

The applying transmitter co-locates with one of the following two Bluetooth modules.

Option type	FCC ID	Grantee Name	Product Name	Granted Date	Conducted Tx power
Built-in LMA Transmitter	ANO20040700HER	IBM Japan, Ltd.	IBM integrated Blutooth IV with 56K Modem	Under certification process separately with this application	2.0mW
Built-in LMA Transmitter	ANO20020100MTN	IBM Japan, Ltd.	IBM integrated Blutooth III with 56K Modem	Feb/26/2003 (T40 14", X30)	2.5mW
				Sep/29/2003 (R50)	
				Dec/17/2003 (X40)	
				May/04/2004 (T40 15")	

The main and auxiliary antennas located at LCD section of each host device (ThinkPad R50, T40, X30 or X40 Series) are assembled apart from each Bluetooth antenna shown in the next pages with 20 cm or more.

Therefore, those co-located Bluetooth transmitters are allowed to evaluate the RF exposure compliance independently of the applying modular transmitter. In other word, the SAR testing for the applying transmitter in co-locating with those Bluetooth transmitters is not required, when the Bluetooth transmitters could satisfy the RF exposure requirement with those own transmission powers.

When a customer operates the applying PC on one's lap, the sufficient separation distance (minimum 20cm) between the above Bluetooth antennas and the person's body (lap) can not be maintained.

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 output power of the Bluetooth transmitters does not exceed 5mW (far below 50mW). Therefore these transmitters also satisfy the RF exposure requirement regarding CFR 47 Part 15.247(b)(4) without a SAR compliance test report, and can operate with the applying transmitter simultaneously.

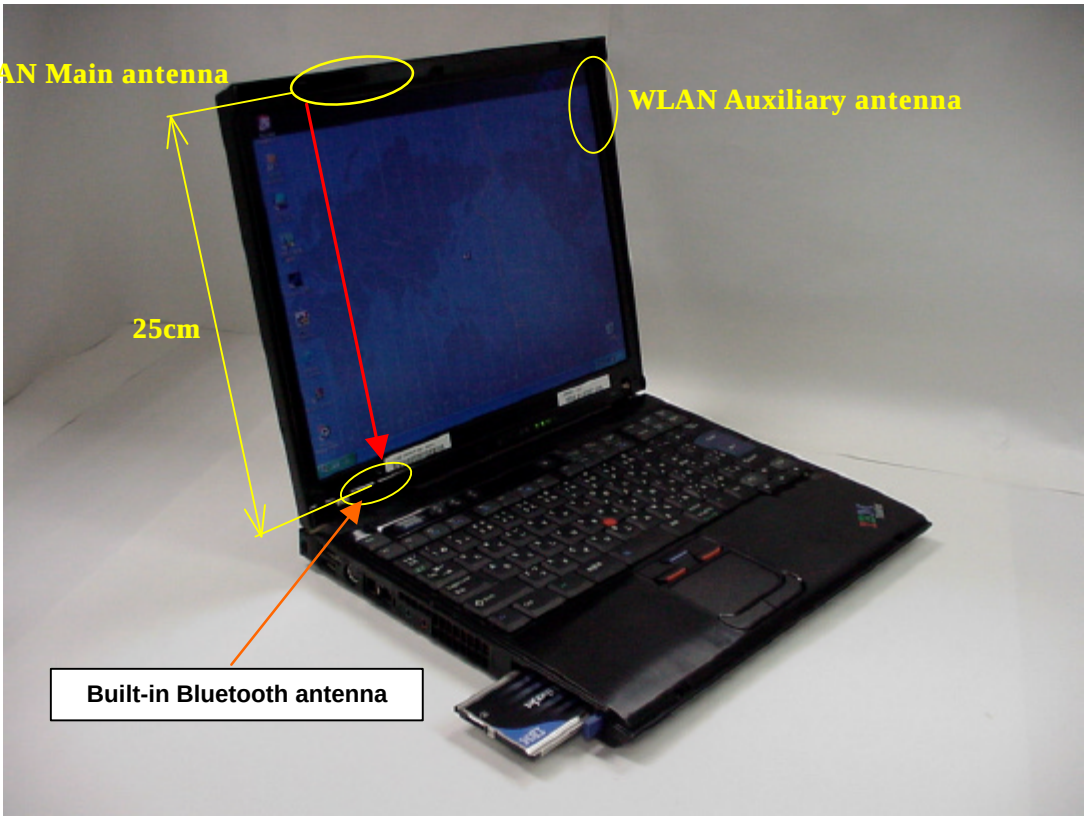
The user's manual provides the instruction to customers in use of multiple transmission with the applying transmitter and co-locating Bluetooth devices as follows.

Use of wireless options

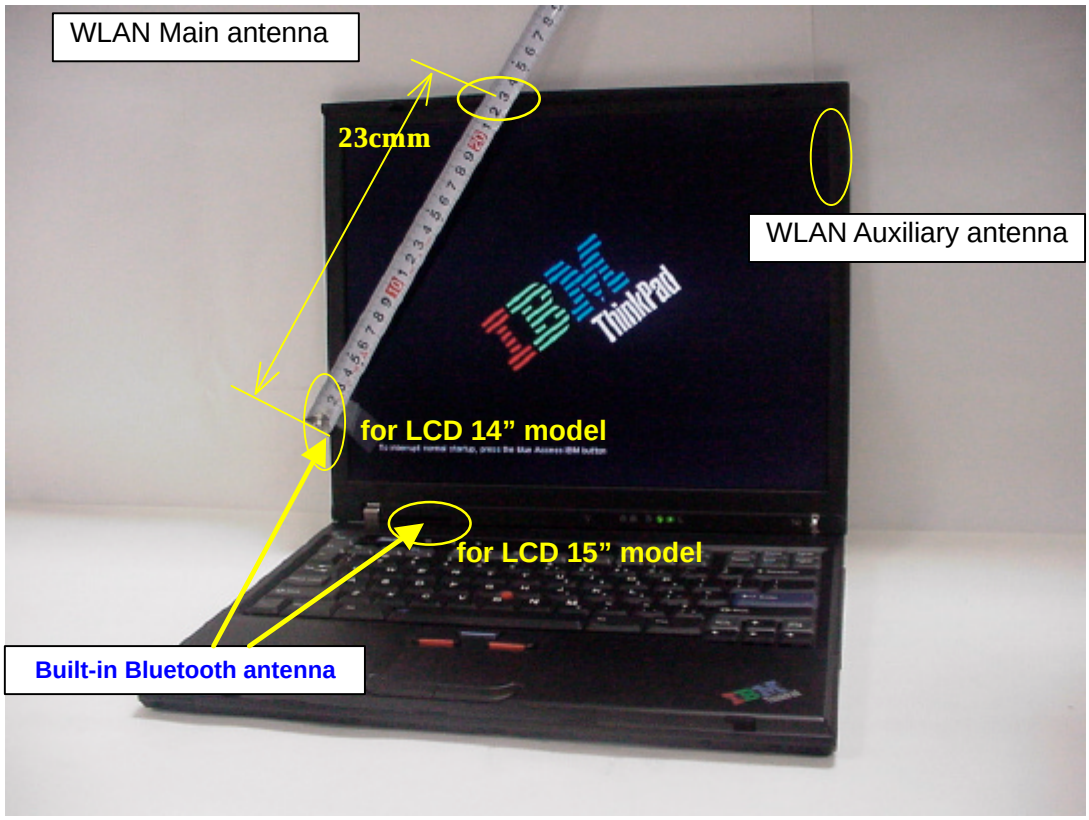
Your ThinkPad computer is approved for use of one of the granted Wireless LAN Mini-PCI Cards together with one of the granted *Bluetooth* modules (FCC ID: ANO20040700HER or ANO20020100MTN) in the CDC slot simultaneously. Make sure of the following conditions on use of these wireless features.

1. When you use any other RF option device, all other wireless features including the integrated Wireless LAN Mini-PCI Card and *Bluetooth* transmitters in your ThinkPad computer are required to be turned off.
2. Users must follow the RF Safety instructions on wireless option devices that are included in the RF option device's user's manual.

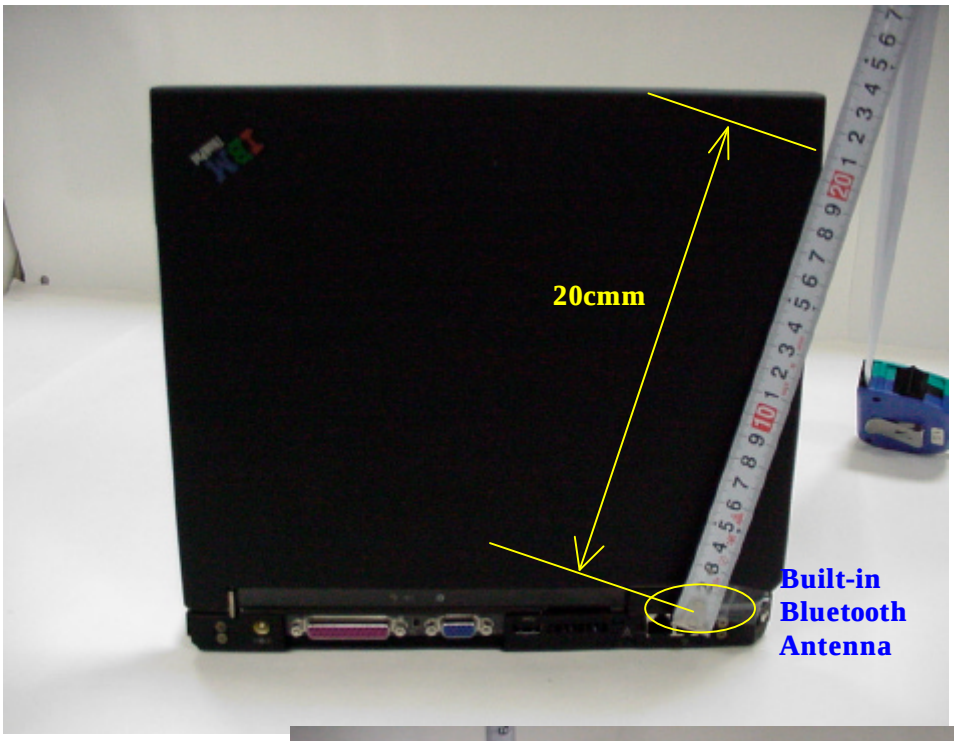
Antenna separation of ThinkPad R50 Series

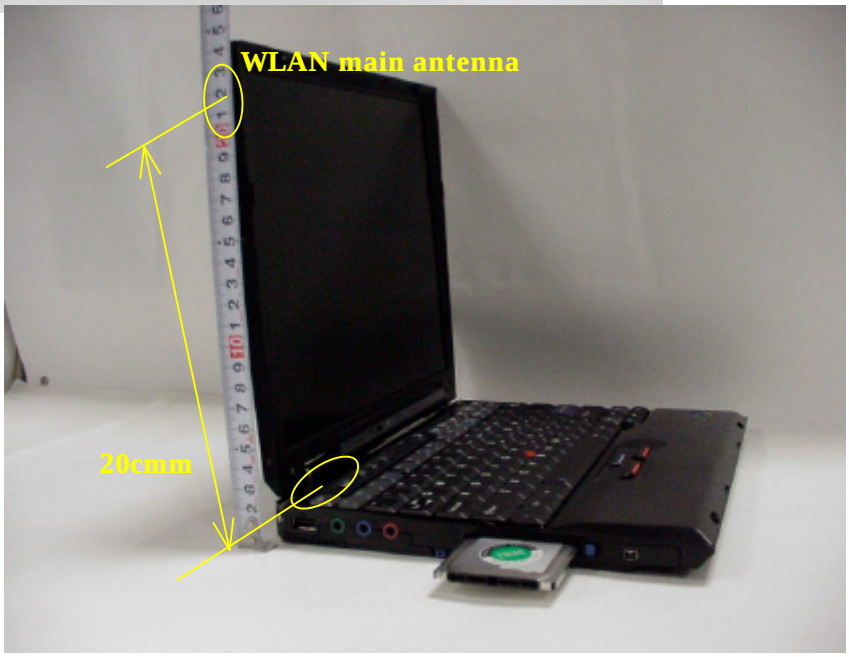
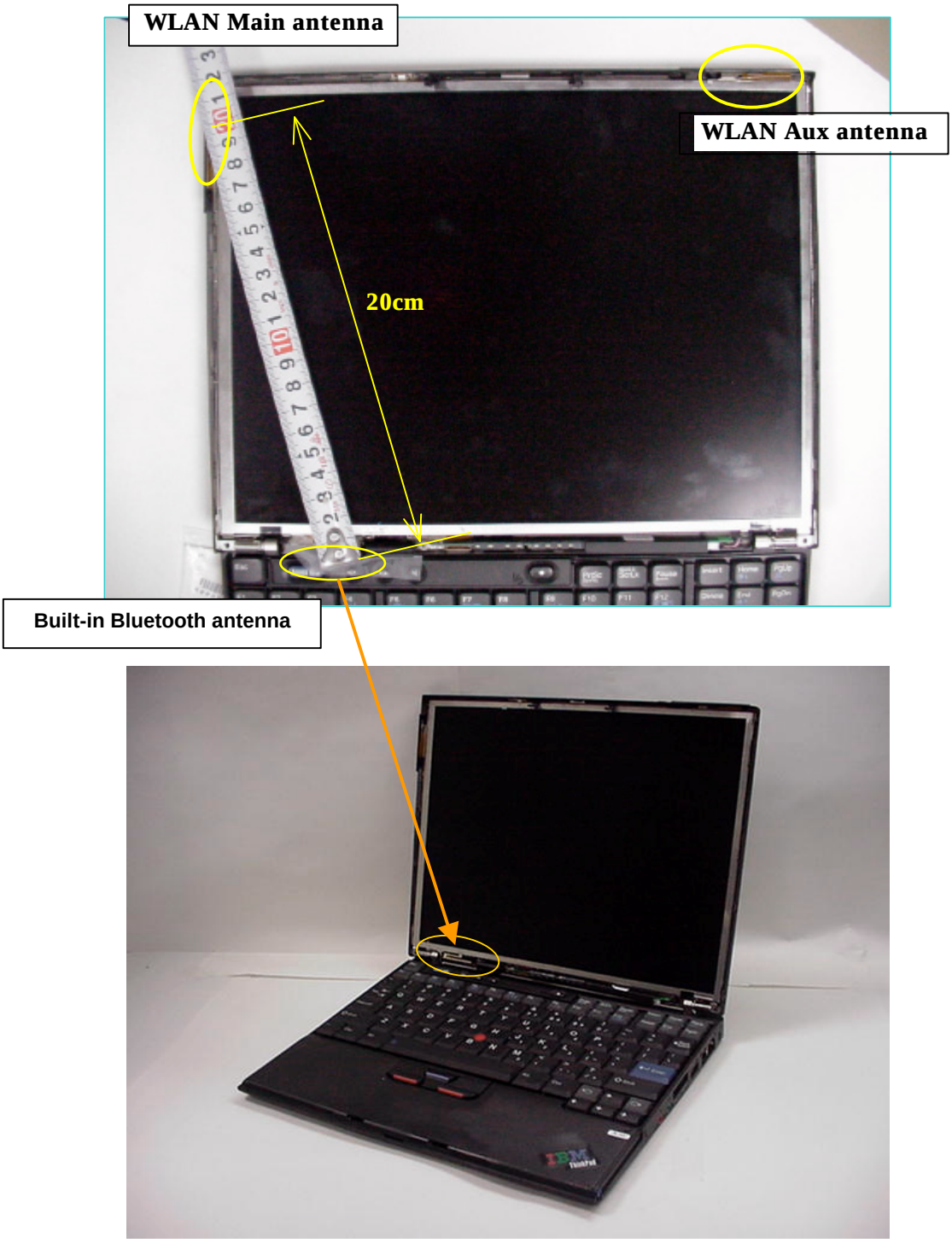


Antenna separation of ThinkPad T40 Series



Antenna separation of ThinkPad X30 Series





Antenna separation of ThinkPad X40 Series