IBM Japan Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa-ken 242-8502, Japan
April 15, 2002

To whom this may concern

OET Requested Information

FCC ID   :   ANOCORN1TASUHOP
Applicant :   International Business Machines Corporation
Correspondence Reference Number :   22603
731 Confirmation Number   :   EA935585
Original Requested Date   :   April 13, 2002

Subjects : EMC portion
With regard to your new request to implement method for replacing a broken WLAN card by the user themselves.
Subject 1) Please provide correspondence for the acceptance by FCC on February 2002 about your proposal.
Answer 1) Please refer the Attechment-1 of this correspondence.

Subject 2) Will this be only for broken WLAN cards and not for upgrade options?
Answer 2) We plan to support only broken WLAN cards for the **ANOCORN1TASUHOP**.

Subject 3) Will the (BIOS Lock) be used with other notebook computers?
Subject 4) Will the WLAN card be used with other notebook computers?
Answer 3/4) Yes, we plan to add other notebook computers with BIOS Lock mechanism, and will have the FCC authorizations for each PC model with different FCC IDs.

Subject 5) If the WLAN card will be used with other computers, will a different output power be used? Will different antennas be used?   How would you ensure that SAR compliance?
Answer 5)- We have no plan to modify the applying WLAN card.   i.e. The conducted output power must be the same.
- Yes, different antennas will be used for other computers after being certified with different FCC IDs.
- Usually the antennas of our products are located at the top of LCD panel, so they may be subjected to MPE. If we will have a different design (like a keyboard antenna), we will have the SAR testing in accordance with the latest FCC rule.
  note) We need to confirm the treatment for transmitters below 10mW whether it may be allowed MPE or not.

Subject 6) Does the (BIOS Lock) check the proper antenna and card combination?
Answer 6) The BIOS Lock checks the peculiar information of each authorized card, not checks any antenna info. Because the integrated antenna is (will be) unique for each PC model, so the BIOS does not need to detect the antenna type of its own host unit. Please refer the Attechment-2 adding more details of the BIOS Lock.

Subject 7) Does the (BIOS Lock) check the proper antenna and output power combination?
Answer 7) The BIOS Lock dose not check output power, but checks the detail RF chipset info
           instead.   IBM will not modify the power of authorized RF cards, so the function must be
           equal to the detection of the card manufacturing level.
           Also please refer the Attechment-2 adding more details of the BIOS Lock.

Subject 8) The FCC identifier and label can only be placed on a complete transmitter. How is this
ensured when the WLAN card is sold without the antenna? You'll be shipping/marketing incomplete
transmitters.
Subject 9) How does this proposal comply with 15.204 requirement that a complete system is
marketed together? This replacement does not have an antenna.
Answer 8/9) As for the **ANOCORN1TASUHOP**, the RF WLAN card will be delivered to the
           customers for replacing broken cards only, not marketed for sales independently.
           To allow customers to install the repair parts, we implement the BIOS Lock to
           guarantee the Part 15.203.
           When we will market the card as the IBM option, we will process the proper
           certification of LMA (by the card supplier) in line with the new rule of Attachment-1.

Subject 10) Please provide any additional information to ensure that the system will comply with
           EMC and SAR requirements when any changes to antenna or output power is made.
           Will Class II permissive changes be filed for all notebooks using this system?
Answer 10) Usually we have the FCC IDs for each system unit, not for card. So we measure all test
           items for each model even though a same card was used for several models. If antenna
           will be changed, we re-measure the Part 15.205/207/209(EMC) and do class II change.
           ANOCH126H8056 is the case of it. We don't modify the card, so we have no case of
           power change.
           As for SAR, we have used MPE, so we could proceed with only the calculation using
           the conducted power and antenna gain. The Class II change is very rare for us,
           because we take a system grant approach (not LMA). Almost submissions are done
           as original filings with different new FCC IDs.

Subject : RF Safety portion

Subject: FYI - in future filings please do not submit MPE "estimation" analyses for distances less
           than 20 cm.
Answer: Thank you but we still need a confirmation whether the rule will be applied to a low power
           transmitter below 10mW (e.g. Bluetooth 3mW).

Subject: Concerning revised RF exposure statement in users manual: there are typographical
           errors, and we have the following comments for your consideration only:

Answer: Thank you very much. We will fully follow your advice, and would like to attach the update
           for the sure. Please see the Attachment-3.

Sincerely,   April 15, 2002

Toshiya Murota
Staff Engineer,   EMC Engineering
Yamato Laboratory,   IBM Japan Ltd.

Attachment-1: <u>Response from the FCC on February/2002</u>

"Rich Fabina" <RFABINA@fcc.gov>
02/06/02 11:12 AM
To: George Kavelak/Raleigh/IBM@IBMUS
cc:
Subject: Re: Awaiting Your Response

George,

Yes, we find the proposal attached acceptable.

Sorry for not getting back to you sooner but things just keep getting
busier and busier.

Rich

>>> "George Kavelak" <kavelakg@us.ibm.com> 02/04/02 12:40PM >>>
Rich, at our meeting Friday, January 25, 2002 you indicated that you would
try to get back with your answer by Friday February 1, 2002 on our proposal
regarding **a label on the bottom of the laptop near the Customer Access
Panel for the Mini-PCI transmitter card (limited modular approval with an
FCC ID on the card).   The label would indicate that an FCC ID for an
installed transmitter card is viewable under the cover (i.e. "TXFCC ID for
installed transmitter card viewable under this customer access cover").**

Have you reached a decision?   Thanks.

George Kavelak
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Corporate Program Manager of Electromagnetic Compatibility
EMC Program Standards Project Authority
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ATTACHED FCC MINI-PCI CERTIFICATION MEETING TRIP REPORT

Meeting Purpose:
We met with the Federal Communications Commission (FCC), Office of
Engineering and Technology, Equipment Authorization Branch regarding FCC
Certification requirements of Mini-PCI transmitter cards as separately
sold options for customer installation into wireless-ready ThinkPads.

Meeting Attendees:
Richard Fabina, FCC, Chief, Equipment Authorization Branch
Tim Harringon, FCC, Electronics Engineer, Equipment Authorization Branch
George Kavelak, IBM, Corporate Program Manager - EMC
Barry Pate, IBM RTP EMC Coordinator
Daryl Cromer, IBM, Manager, Communications Option/BldgBlock Development

Meeting Date:
January 25, 2002

Meeting Location:
FCC Laboratory
7435 Oakland Mills Road
Columbia, MD 21046

At the onset of the meeting, the FCC restated that Limited Modular
Approval radios sold separately were not allowed as described in the
Public Notice of June 26, 2000
(http://www.fcc.gov/Bureaus/Engineering_Technology/Public_Notices/2000/da001
407.doc). Their major points of concern were the requirement for a unique
antenna connection and allowing a customer to install FCC ID labels.
Limited Modular Approval would allow only an authorized dealer or
manufacturer to install the radio and add an external FCC ID label.

Information in the following two files was presented to the FCC:
(attachments removed)

Meeting Results:
The FCC will allow the Mini-PCI card to be certified under a Limited
Modular Approval. The application should be for use in a ThinkPad family
(chassis and antenna) such as ThinkPad X series. The application can
include data for multiple ThinkPad families. Class II permissive changes
can be made to the original Grant to include additional ThinkPad
families. (The IBM Grants that I have seen have notes indicating:
"ThinkPad X23 Laptop Personal Computer", "Laptop PC IBM ThinkPad R30",
"Full size Notebook type PC integrating IEEE 802.11", "IBM ThinkPad T23",
"IBM Laptop PC, ThinkPad A22", "IBM ThinkPad", "Notebook Type PC IBM
ThinkPad Series", and no reference.) The Grantee for the Limited Modular
Approval could be IBM or our OEM supplier. However, the OEM supplier as
the grantee must make the application for the Permissive Change and may
balk at performing Class II applications for IBM as we introduce
additional ThinkPad series.

The FCC will accept unique operability of Mini-PCI cards to only IBM
Options in a ThinkPad via control of BIOS or other software mechanism in
meeting the intent of 15.203's requirement for a "unique coupling" between
the antenna and the transmitter.

The FCC will allow the Mini-PCI card to be customer installed.

The FCC accepts the FCC ID Number on the Limited Modular Approval Mini-PCI
transmitter card. The Limited Modular Approval does not allow
installation of a certification label by the customer on the exterior of
the product under the current process. The FCC wants indication of the
presence of a radio on the exterior label of the product. The requirement
has been to include the FCC ID on an exterior label of the host product.

Remaining FCC issue - In conjunction with having the FCC ID Number on the
Mini-PCI transmitter card, we suggested a label on the ThinkPad indicating
to the user that a transmitter FCC ID Number is under the customer access
panel. The FCC seemed favorable towards this but wants to discuss further
within the FCC with a target to respond by February 1, 2002. If the FCC
does not accept our proposed approach for FCC ID Number labeling, we will

be relegated to having IBM or IBM authorized assemblers install the transmitter option card and an FCC ID Number label to the ThinkPad.

Co-located Unlicensed Radios - Industry is moving to utilize operation of multiple radios in the same host system. This has created situations were the Grant for a specific host required the listing of all supported radios on the Grant. The basic problem is that the FCC requires the radio or radios to demonstrate compliance with FCC Part 2.1091, RF radiation exposure evaluation requirements, as part of the Grant of Equipment Authorization. This becomes complex with more and more radio combinations available since the combination must also meet this requirement. Discussion with the Commission on this topic indicated a move to allow low power radio's (probably less than 1 milliwatt EIRP) to be exempted from this requirement.

Other items:
Changes to unintentional radiator portions of the ThinkPad such as processor and DASD upgrades are processed under the DoC process. They would not require a Class II permissive change for the intentional radiator unless those changes affected the intentional radiator performance. (I believe this is "business as usual" conducted by Yamato. The only Class II changes I have seen have been for the addition of a new antenna or inclusion of additional Bluetooth co-transmitters.)

The Grant issued by the European FCC Telecommunications Certification Body (TCB) to Agere for the DELL TrueMobile 1150 Series Mini-PCI option card is still under FCC audit. The FCC will be discussing this Grant with the TCB. The FCC is quite aware that the justification used for "unique operation" within a DELL unit is not valid.

The DELL TrueMobile 1150 Mini-PCI option card and pubs we had with us was borrowed by the FCC.

The FCC has a conference call meeting with their TCBs the 2nd Tuesday of every month to address authorization issues and procedures.

The FCC is working on a Notice of Proposed Rule Making to be issued this year that will address the requirements for RF exposure when co-transmitters of very low power are used. It is expected that there will be ranges of exemption for various combinations of transmitted powers.

The FCC has periodic training sessions for TCBs. For a non-TCB to attend, they need to register with the American Council of Independent Laboratories (ACIL). (02/13-15/2002, Training Session on SAR; Columbia MD; $750.00 for non-TCB; limited to 75 seats, TCB have priority; see http://www.acil.org/meetings/FEB2002workshop.pdf)

Submitted by,

Daryl Cromer
Manager, Communications Option/BldgBlock Development
8-441-0115

Barry Pate
RTP EMC Coordinator

8-441-6333

George Kavelak
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Attachment-2: <u>BIOS Lock Function</u>

Antenna Coupling Mechanism
regarding the FCC Part 15.203 and RSS 210 §5.5

The following is the mechanism regarding the FCC Part 15.203 and RSS 210 Section 5.5 to prevent an unauthorized connection between the applying mini-PCI wireless card and the built_in antenna of the applying host unit (IBM ThinkPad T30 Series).

1. If the BIOS of ThinkPad T30 Series finds that the base class code of the applying mini-PCI card is "02h", the BIOS regards it as a network mini-PCI card.

2. If the BIOS detects a network mini-PCI code (i.e. ="02h"), the BIOS checks the vender ID, device ID, subvendor ID and subsystem ID of it.

    vender ID   :   Chipset manufacturer ID
    device ID   :   Chipset device ID
    subvendor ID :   WLAN assemble manufacturer ID
    subsystem ID :   Dealer ID → IBM unique code will be assigned by the card supplier.

3. If one or more of these IDs was(were) different from supported IBM options **which were authorized by the FCC and Industry Canada to use for ThinkPad T30 Series**, the BIOS will stop the boot and show a POST error with beeps.

The following step 4 is backup logic if a wireless card will not be specified with the above IDs.

4. The BIOS also checks PCI VPD(Vital Product Data) contents. If a product name of mini-PCI card written in VPD, which is provided from Flash ROM of the applying mini-PCI wireless card, was different from supported IBM options, **which were authorized by the FCC and Industry Canada to use for ThinkPad T30 Series**, the BIOS will stop the boot and show a POST error with beeps.

Attachment-3:   Revision of the user's Manual

Appendix C. Wireless regulatory notice

The ThinkPad T30 Series computer 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 Commissions (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 T30 shall be used in such a manner that the potential for human contact during normal operation is minimized as follows:

Multiple Transmitter model

If you find the FCC ID "**ANOCORN1TASUHOP**" on the label at the bottom side of your ThinkPad computer, your computer is approved as a Multiple Transmitters device that is permitted to use the integrated Wireless LAN Mini-PCI card and Bluetooth card with two or more wireless option PC Cards in the PC slot simultaneously.

The integrated wireless features (Wireless LAN Mini-PCI card and Bluetooth card) are preinstalled by IBM.

- You are not permitted to install nor replace the integrated Bluetooth card by yourself. If you will have any problem on the integrated Bluetooth card, please contact the IBM HelpCenter(s) shown in "Chapter 3. Getting help and service from IBM" of the ThinkPad T30 Series Service and Troubleshooting Guide.
- If your integrated Wireless LAN Mini-PCI Card requires replacement via the proper step shown in "Chapter 3. Getting help and service from IBM", IBM will request you to send your computer with the Card to IBM so that IBM will repair it, or IBM will provide the repair parts that you can install. If you will install an unauthorized module, your ThinkPad computer does not start but only displays an error message and emits beeps.

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 for the integrated Wireless LAN Mini-PCI card built in to the screen section and all persons.

The Bluetooth antenna is located in the left edge portion of keyboard. Transmitted energy from the Bluetooth device is very low compared to other RF devices. Therefore a 20 cm separation from the Bluetooth antenna is not required.
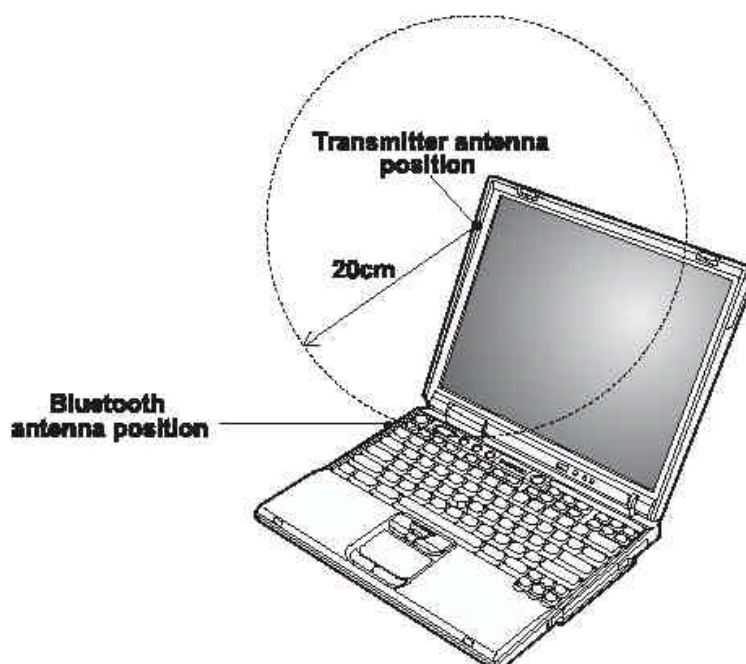
Use of Wireless options

Please make sure of the following when you use a Bluetooth option or wireless option PC Card in your ThinkPad computer.

1. Visit the IBM® site at **www.ibm.com/pc/qtechinfo/MIGR-39377.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.

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 68 for more detail.