



IBM Japan Ltd.
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Kanagawa-ken 242-8502, Japan

December 25, 2002

To whom this may concern

OET Requested Information

FCC ID : ANO20020300D3L
Applicant : International Business Machines Corporation
Correspondence Reference Number : 221220a.ANO
731 Confirmation Number : TC1374
Original Requested Date : December 20, 2002

Subject 1) Please confirm if all optional transmitters can transmit simultaneously? If no, how is that prevented? If yes, please submit a MPE estimation for 2.4GHz and 5.8GHz simultaneously. Please note each antenna/transmitter combination must have a separate RF evaluation (MPE or SAR) and that there were no RF evaluation performed on 5.8GHz or 5.2GHz. Please clarify.

Answer 1) Yes, 3 Bluetooth transmitters certified separately can transmit simultaneously with the applying equipment. According to the FCC's acceptance, the RF Exposure evaluation described in the submittal exhibits (RF_Exposure_xx.pdf) are valid for the configuration of this application.
i.e. The separation distance between the applying transmitter's antenna and each subjected Bluetooth antenna is 20 cm or more, and total emission power of the 3 Bluetooth transmitters meets the power threshold (5mW) for the collocation.
Therefore the configuration of this application is allowed to be certified in making a reference to the footnote 14 of the Section 3 in Supplement C to OET Bulletin 65.
Please refer the "Discussion Item 4" in the Attachment of this exhibit.

And please find a revised exhibit "RF Exposure_C_up.pdf" for Subpart C. We updated the MPE estimation for each 2.4GHz and 5.8GHz band. There is no change for Subpart E.

Subject 2) Please confirm if the Bluetooth and UNII card will be available as an option. Recent FCC policy requires separate FCC ID for each transmitter combination.

Answer 2) IBM will answer later with a separated exhibit.

Subject 3) Please confirm if this application is for a composite device (Part 15C and Part 15E). Please provide EMC test data, RF exposure evaluation, and FCC documentation for Part 15E, as appropriate.

Answer 3) IBM will answer later with a separated exhibit.

Subject 4) Please confirm the frequency range of operation of the transmitters in the laptop. 2400 to 2483.5, 2412 to 2462, 5150 to 5350, 5725 to 5825, and/or 5725 to 5850 MHz. Please revise the cover letter, as necessary.

Answer 4) Please find enclosed cover letters for each Subpart C and Subpart E.

Subject 5) Please confirm if Philips Components is the only OEM transmitter module (IEEE 802.11 a/b) available for this laptop? Do you have a second source card, Argon? What is the reference to Argon in this submission? Please note that new test data may be required upon further review.

Answer 5) No, we have no plan to announce Argon for a second source.

Note) Argon is entirely the same card with the application except an unique code for the BIOS lock logic. We only refer their original documents (Schematics, Block diagram, Circuitry description, Parts list) for the submission purpose.

Subject 6) Test report states that ART software was used to operate the program. What mode was used for all testing, T100 or another mode. Please state which mode were used for the tests.

Answer 6) We reported the measurements for 24Mbps normal transmission mode for UNII device, 11Mbps for DTS 2.4GHz band, and 24Mbps for DTS 5.8GHz band. We have no driver software for 802.11a Turbo mode nor 802.11g 2.4GHz OFDM mode, so those modes are not supported. We measured all patterns of transmission power, then selected the worst case for the report. The selection process can be referred to the Section D "Operation mode of EUT" and Section E "Justification".

Subject 7) Data for the 5150 to 5350 MHz and the 5725 to 5825 MHz band of operation must be submitted. Clarify which rule parts you intend your device to operate under.

Answer 7) Please refer the cover letter. The following is the combination of submittal documents.
Documents Number: FCC 19-0205-0 : UNII 5180-5320MHz
FCC 19-0206-0 : DTS 2412-2462MHz and 5745-5825MHz

Subject 8) Can the user select the 2.45 GHz band or the 5 GHz band as their option. If not, how is this ability restricted. Which antenna is used by each band ? Please list all available transmitters for the product.

Answer 8) Please refer the supported transmission modes to the Section D "Operation mode of EUT" and Section E "Justification" in the each test report for subpart C or E.
The system supports both automatic or manual selection modes for the transmission channel, rate, or emission antenna port (right or left). As for the indoor use restriction of 5150-5250MHz band, users can disable those channels manually but the channel selection is usually controlled by an Access Point device.

Subject 9) Please repeat all conducted peak power measurements, and run all new peak power tests using a peak reading power meter or use a spectrum analyzer band power measurement with the VBW > 3 RBW.

Answer 9) The measurement results of the Table 2-2-3 (according the Method I of FCC Notice DA 02-2138) was just for a reference. Please take the results of Table 2-2-2 (Method III) for the official results. Since the Notice explains "If sweep time $\leq T$, use Method #1." But the actual sweep time is 50mS(auto) and $T = 0.8mW$ (page 8). Therefore the Method III is the most suitable way for the applying transmitter.
The VBW defined by the Method III is $\geq 1/T$.. i.e. 1.3KHz or more.
We measured with VBW=30KHz and got the equivalent values as the power meter method. To prevent the confusion, we would like to eliminate the Method I. Please replace with the attached "Test_Report-UNII_up.pdf".

Subject 10) Please make radiated emissions measurements in all adjacent restricted bands for all modes and bands of operation. It is noted that this type of equipment can be operated in a OFDM modulation scheme in the 2.45 MHz band.

Answer 10) IBM will answer later with a separated exhibit.

Subject 11) Please be advised that the test report shows an emission outside of the 5.725 to 5.825 GHz band for UNII operation. Please clarify.

Answer 11) The 5.725 to 5.825GHz band is submitted as DTS, not UNII operation. Please see the Answer 7).

Subject 12) The user's manual refers to FCC ID's that are not granted. Please revise accordingly.

Answer 12) Please find the new revised version.

Note) ANO20020200BRX and ANO20020100MTN are not eliminated since these are under inspection by PCTEST simultaneously with this applying device.

Subject 13) Please revise the confidentiality letter to include the BIOS lock documentation, if requested.

Answer 13) Please find the revised confidentiality requests for both Subpart C and E.

Subject 14) Please note that the line-conducted limits specified in Part 15 has changed to CISPR 22 limits as of Sept. 2002. A condition on the grant (code 05) will be added with marketing restrictions and transition period ending July 2005. Please supply AC mains conducted measurements using CISPR 22 limits if IBM do not wish to have this conditional grant (code 05) and have grant code CE instead (see below).

Answer 14) Please accept the current measurement result.

IBM will change the Line-conducted measurement to CISPR 22 in an appropriate timing.

Sincerely, December 25, 2002



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

Attachment

Reply comments from FCC/OET/Lab/EAB, 3 Sep. 2002.

General comments:

- 1) TCBs can do BIOS lock LMAs. The BIOS lock grant condition must be on the grants. EAB will circulate a processing info sheet for TCBs.
- 2) Only 5mW PCMCIA options were shown by IBM. Other powers may have separate considerations.

>>> "George Kavelak" <kavelakg@us.ibm.com> 08/12/02 09:36AM >>>
>>> Re: Confirmation of August 8, 2002 Meeting Results >>>

Thank you for taking the time to meet with us to answer our questions regarding TCB authorization capability for LMA and co-located transmitters. Projected quantities of IBM application submissions will necessitate our ability to use of TCBs for expedient application processing.

This note is to document our understanding of the results of our meeting with you on August 8, 2002 at the FCC Columbia Lab. Please confirm or correct any misunderstanding.

Attendees:

Joe Dichoso, FCC, OET Laboratory Division, Equipment Authorization Branch
Tim Harrington, FCC, OET Laboratory Division, Equipment Authorization Branch
Toshiya Murota, IBM-Japan
George Kavelak, IBM

We presented the four "Discussion Items" in the attached file:
(See attached file: FCC-Aug2002.pdf)

Discussion Item 1:

This laptop configuration of co-transmitters (a 50-100 mW 2.4 GHz WLAN LMA [with BIOS Lock] with transmit antenna in the top of the laptop display panel and a 5 mW wireless PCMCIA device in the PCMCIA slot in the laptop base) represents that which IBM currently has obtained FCC certification by submission directly to the FCC.

You have agreed that this configuration of co-transmitters can be submitted to an appropriate TCB for certification. It does not violate conditions of the TCB Exclusion List of 17 July 2002. TCB Exclusion List II) b) is compliant and TCB Exclusion List II) f) is compliant.

You indicated that TCB Exclusion List II) h) would not be an applicable condition for determination due to the separation (>15-20 cm; even 10-20 cm may be acceptable for these low Bluetooth device transmit powers) between the transmit antennas and their relative powers.

EAB:

As discussed in meeting, if display section antenna can be treated as mobile, July 02 TCB Excl List II) h) 2) does not apply. II) h) 2) also depends on colocation conditions and definition, where in general above 1 GHz colocation should be considered if devices are within 20 cm of each other. For example, per II) h) 2) TCB could not do 50mW LAN and 2mW Bluetooth if antennas for both are in base section. Devices used within 20 cm of a person's body are subject to SAR limits. For subnotebooks with separation less than 20 cm to display section antenna, EAB may establish power thresholds relative to base section antenna where SAR evaluation is not needed.

Discussion Item 2:

This laptop configuration is the same as Discussion Item 1 with the addition of a low power Bluetooth transmitter built into the laptop.

You agreed that this configuration of co-transmitters could be submitted to an appropriate TCB for

certification. TCB Exclusion List II) h) would not be an applicable condition for determination due to the separation (>15-20 cm; even 10-20 cm may be acceptable with these transmit powers) of the transmit antennas and their relative powers.

EAB:

Comments from Discussion Item 1 apply. Converse situation of 50-100mW LAN in keyboard section with Bluetooth in display requires separate consideration. IBM picture states "FCC ID: zzzzz (for PC)" - note that ID goes with transmitter configuration, not PC.

Discussion Item 3:

This laptop configuration is the same as Discussion Item 2 with the exception that the built-in Bluetooth transmitter card would be an LMA certified device, similar to the WLAN LMA device.

You agreed that this Bluetooth card could be processed as an LMA option card and that an appropriate TCB could process the Bluetooth LMA application. You indicated that our BIOS Lock condition would also have to be implemented for this Bluetooth transmitter card.

EAB:

Comments from Discussion Items 1, 2 apply. Class II not needed to add hosts for 5mW Bluetooth LMA with configurations as described, but is needed to add hosts for 50-100mW LAN LMA.

Discussion Item 4:

This laptop configuration of co-transmitters consists of a 50 mW 5 GHz U-NII device built-in to the laptop with transmit antenna in the top of the laptop display panel and a 5 mW combination of wireless PCMCIA device in the PCMCIA slot in the laptop base and a 2.4 GHz Bluetooth LMA transmitter with antenna in the laptop base.

The built-in U-NII card contains a connector for the antenna cable to attach. You agreed the built-in U-NII card in the base with its connected transmit antenna in the top of the laptop display is considered to comply to the requirement of 15.407(d), "Any U-NII device that operates in the 5.15-5.25 GHz band shall use a transmitting antenna that is an integral part of the device."

This configuration can be processed by an appropriate TCB as well.

EAB:

To fulfill integral requirement, antenna and card cannot be removable. Note that if antenna was in base section, SAR evaluation may be needed, also collocation evaluation with Bluetooth and PCMCIA options. For subnotebooks with separation less than 20 cm to display section antenna, EAB may establish power thresholds relative to base section antenna where SAR evaluation is not needed.

You indicated the term "unlicensed" in TCB Exclusion List II) h) referred to the fact of the operator being unlicensed and thus all the Part 15 intentional radiators. It was not meant to differentiate between "Subpart C - Intentional Radiators" and "Subpart E - Unlicensed National Information Infrastructure Devices". Therefore, TCB Exclusion List II) h) is applicable to all applications under Part 15, but as indicated above in Discussion Item 2, it would not be applicable due to the transmit powers and separations of the various antennas.

EAB: Agree.

Other discussion items at the meeting follow:

Replacement of a broken transmit card:

Given a transmit card which is certified as built-in to a laptop (i.e. system unit certification with the FCC ID on the laptop host), you indicated that the replacement of a broken transmit card could be performed by the customer without the need to return the laptop to IBM or IBM's authorized repairer. Certification did not cover repair actions, other than to return the product to its certificated state.

IBM indicated that the replacement of a broken part would only be that identical to that of the FCC certification.

You indicated that the replacement instructions must be supplied with the replacement part. You also indicated that these instructions should not be supplied with the normal User Manual.

Follow up question: Given that a Grant has been issued for a built-in intentional radiator and the User Manual indicated that the laptop was required to be repaired by IBM or an IBM authorized repairer, is a Class I or Class II permissive change required in order to implement a change allowing the customer to replace the broken part (with proper replacement instructions provided)? In other words, do we have process a Class II change to change the User Manual statement?

EAB: Class II is for changes to transmitter or exposure conditions.

Selection of TCB:

As you have indicated the TCB Exclusion List would not prevent a TCB from processing applications for Grant of Equipment Authorization (Certification) of our typical wireless product configurations, you requested IBM to notify you about one week prior to submittal to ensure that the FCC lab time to notify the TCBs of the specific Notes to be included on our LMA Grants of Equipment Authorization. These Notes would pertain to the LMA approval based upon BIOS Lock and co-location of approved transmitters listed on IBM's Web page.

U-NII Composite Device:

You indicated that a 5 GHz transmitter could be authorized as a composite device (one FCC ID; two applications; two FCC certification fees) for operation in the following:

- 5.15-5.25 GHz (Part 15 Subpart E, U-NII operational characteristics)
- 5.25-5.35 GHz (Part 15 Subpart E, U-NII operational characteristics)
- 5.725-5.850 GHz (Part 15 Subpart C, DTS operational characteristics)

IBM Formal Request to FCC:

IBM would like to formally request the FCC to consider that LMA approval be granted to a U-NII option device with the antenna separately built into the laptop as long as the BIOS Lock condition is applied to meet the requirements of 15.407(d). This would be similar to that which is done for the 2.4 GHz WLAN Mini-PCI transmitter option card.

EAB:

IBM Formal Request to FCC:

Once an LMA certification is obtained for a transmitter option card for laptop family or series of families, it has been the custom to submit Class II permissive changes to add any additional laptop family to the series. Is it possible to eliminate the need for the Class II change if the additional laptop family being added is of similar form factor and similar antenna/antenna gain?

EAB:

New antenna requires Class II. For mobile exposure conditions with same antenna, installation and configuration similarity is applicable, but not for portable exposure conditions with antennas in base section with power greater than 60/f.

Regards,

George Kavelak
IBM Corp.