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

To whom this may concern

January 15, 2003

TCB Requested Information

FCC ID : ANO20020100MTN
Applicant : International Business Machines Corporation
Correspondence Reference Number : 230114e.ANO
731 Confirmation Number : TC1375
Original Requested Date : January 15, 2003

Subject 1) Please confirm all transmitters (FCC IDs) this device will be collocated or installed. Please clarify whether all these transmitters can transmit simultaneously ?

Answer 1) The application does not refer any collocated transmitter.

But according to the acceptance of the FCC, a low power Bluetooth transmitter like this application is allowed collocation with a domain WLAN transmitter, when the RF Safety evaluation **for the WLAN device** meets the requirement. Please refer the Attachment of this exhibit.
Currently the following three WLAN transmitters are being inspected including the collocation with the applying Bluetooth transmitter on the same host system (IBM ThinkPad R40 Series).

- FCC ID: ANO20020300D3L
- FCC ID: ANO20020200BRX
- FCC ID: ANOU58H004

Subject 2) Please address the references in the users manual (pages 7, 14) regarding operation in the 5.2GHz Band (5.15 - 5.25 GHz). Please send test data, if available, or revise users manual accordingly.

Answer 2) Please see the Answer 1). We already submitted the RF Safety evaluation for the application of the domain transmitter(ANO20020300D3L).

Subject 3) Please clarify the FCC IDs that are listed in the users manual (pages 6, 7, 8, 10). Please confirm if these FCC IDs are valid for this device. Please revised accordingly.

Answer 3) Please see the Answer 1). The all FCC IDs including this application are being certified.

Subject 4) The 20dB BW plots shown on pages 35-37 are labeled as "Band-edge". Please clarify.

Answer 4) The plots are conducted traces required by the FCC Notice DA 00-705. So the page 36 must not be necessary but is just a reference.
We also attach the radiated band-edge plots in this exhibit for a sure.

Sincerely, January 15, 2003

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

Prepared by T. Murota.

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:

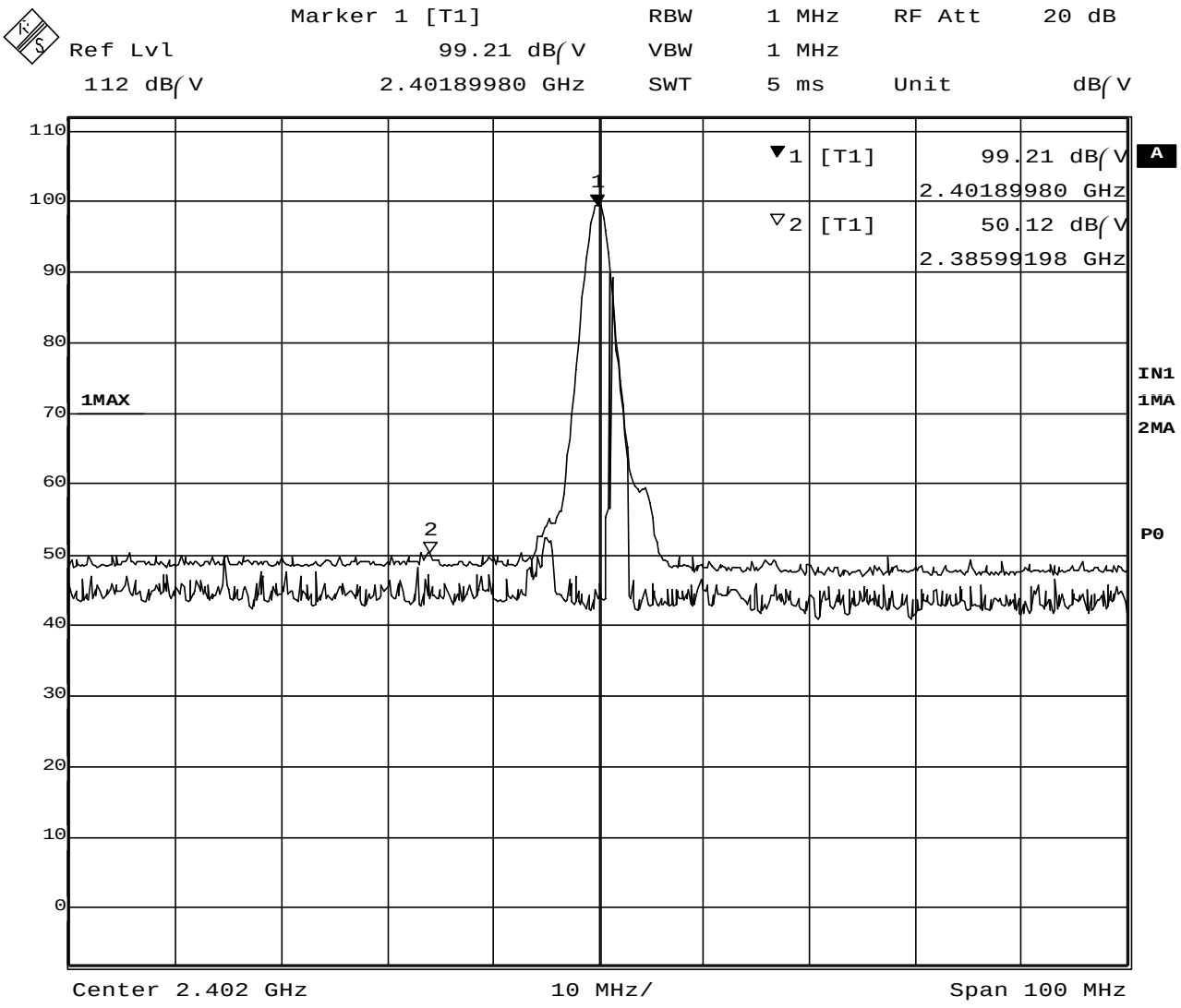
IBM Formal Request to FCC:
Once an LMA certification is obtained for a transmitter option card for laptop family or series of families, it has been the custom to submit Class II permissive changes to add any additional laptop family to the series. Is it possible to eliminate the need for the Class II 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.

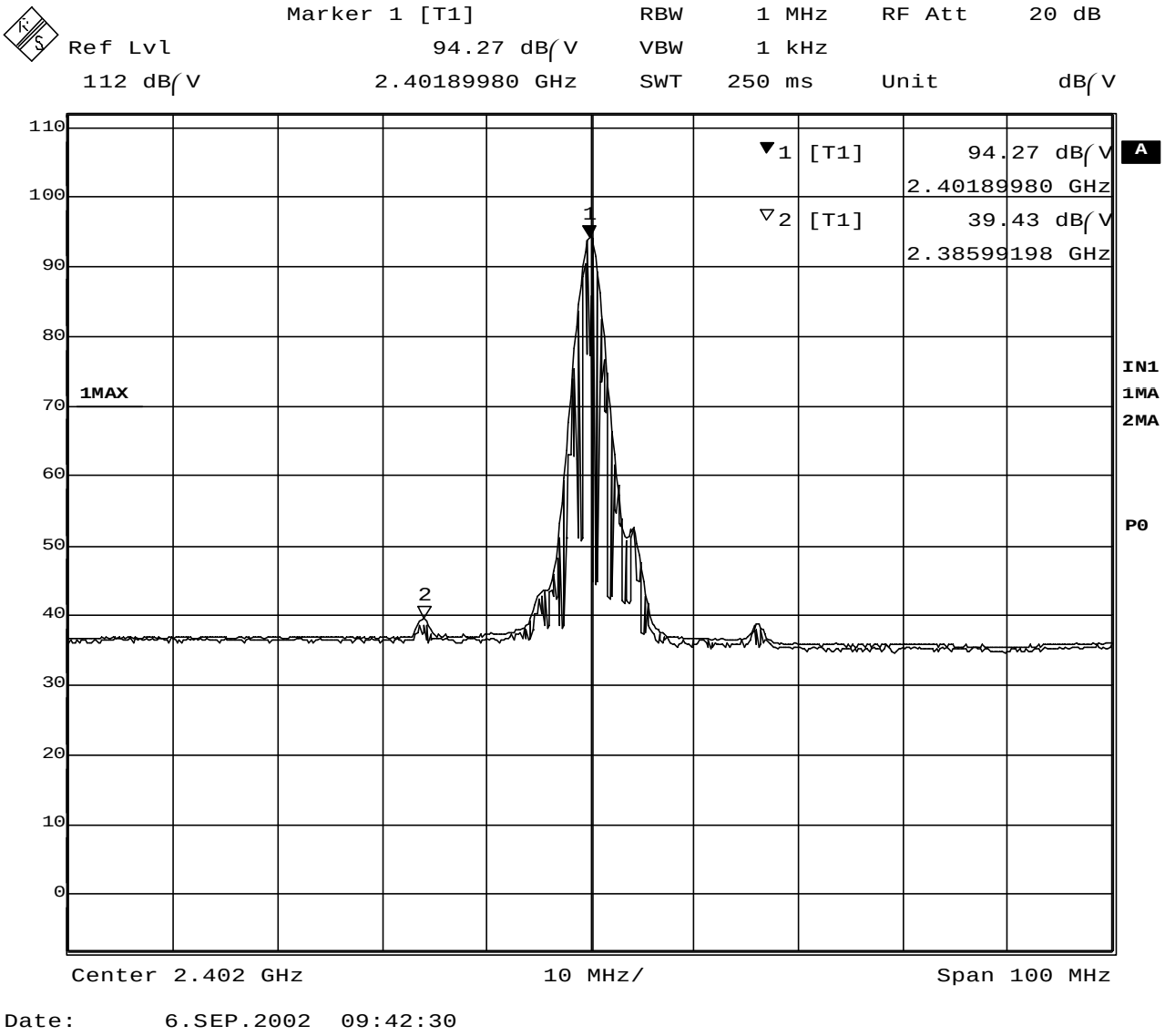
Regards,

George Kavelak
IBM Corp.

Additional measurement plots for adjacent restricted band

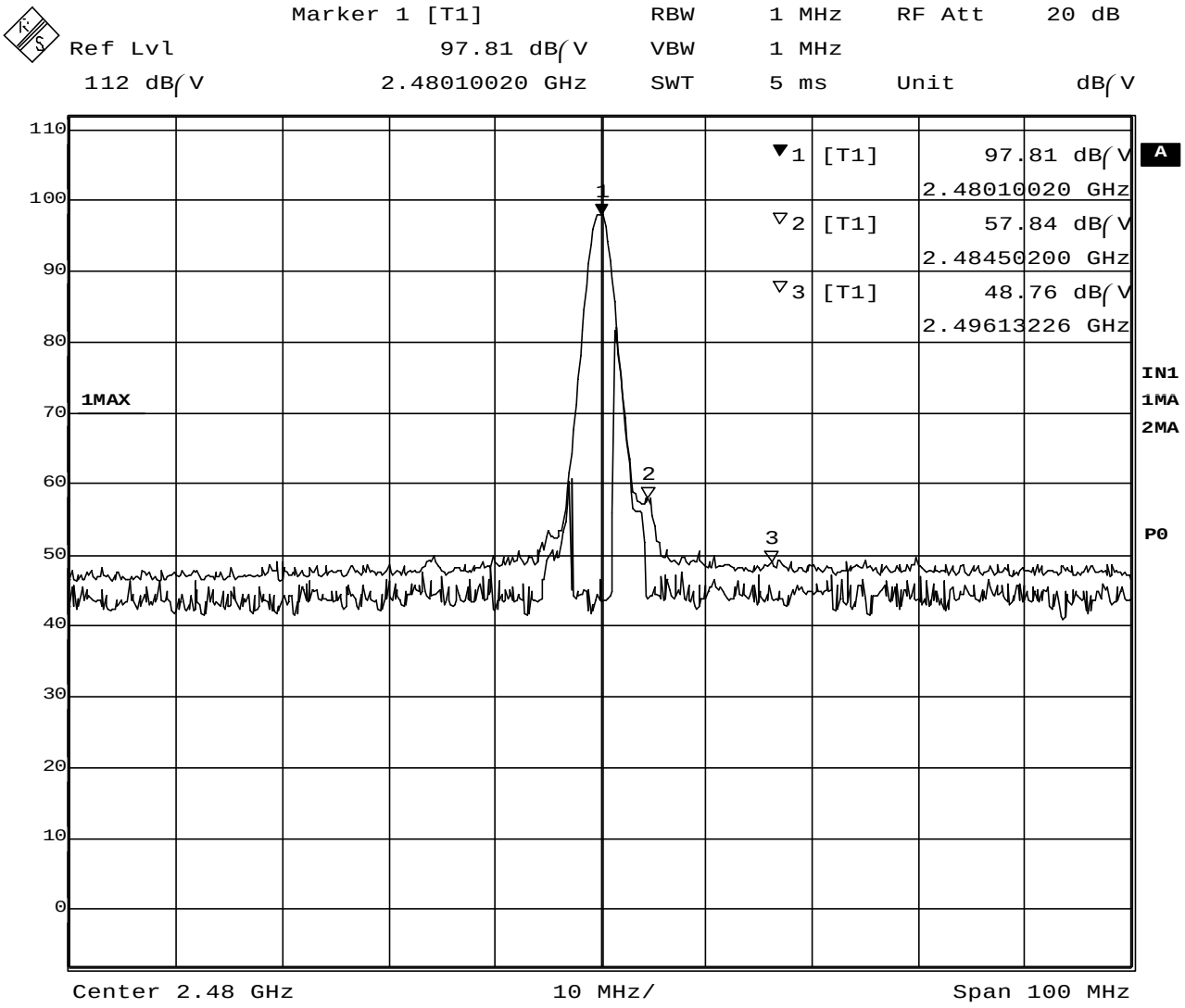


Ch1. (2402MHz), TX, Peak



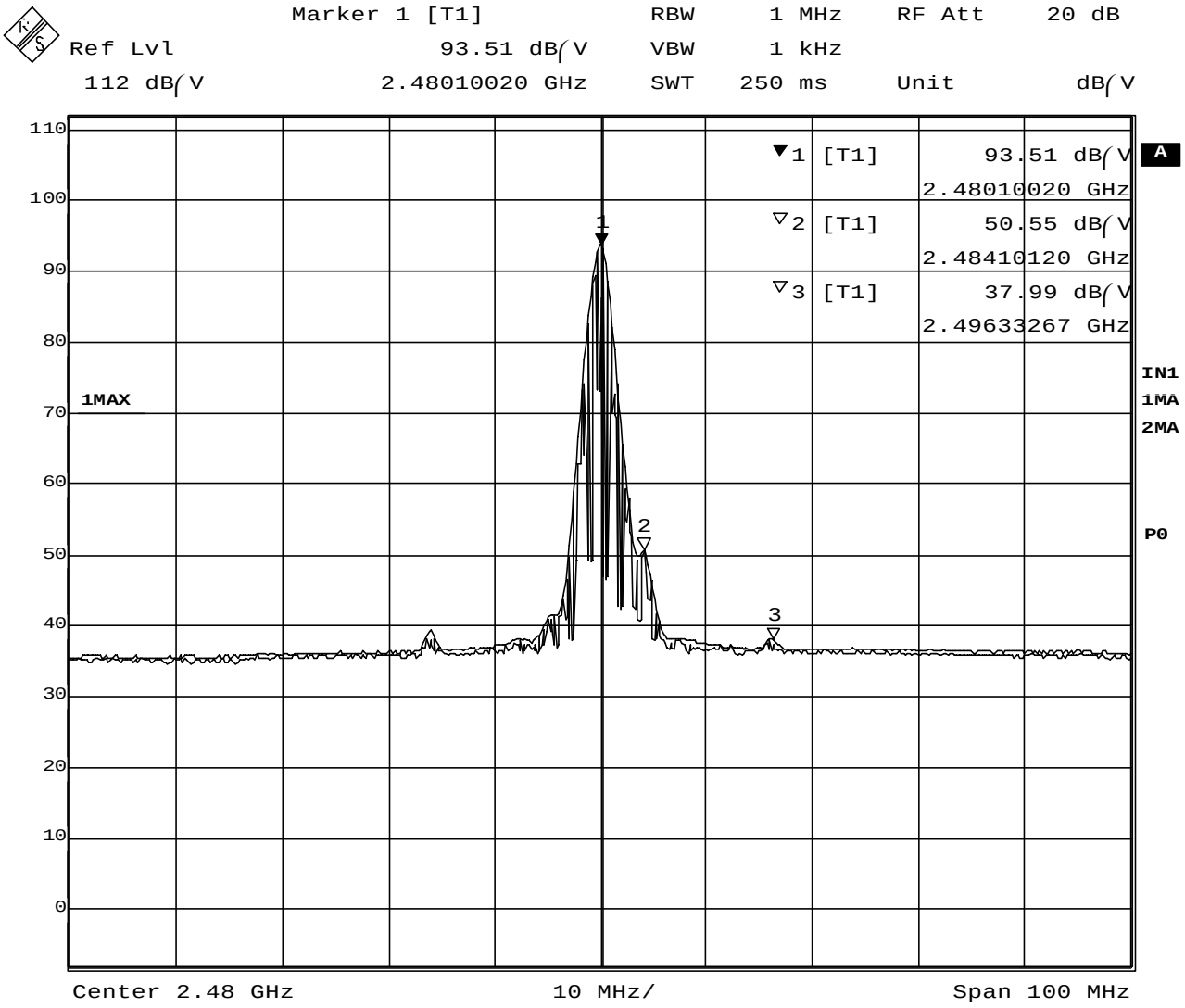
Ch1. (2402MHz), TX, Average

Prepared by T. Murota.



Ch79. (2480MHz), TX, Peak

Prepared by T. Murota.



Ch79. (2480MHz), TX, Average

Prepared by T. Murota.