

TIMCO ENGINEERING INC.

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7/08/2003

MR. TRI M. LUU
ULTRATECH ENGINEERING LABS, INC.
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SUBJECT: FUTURECOM SYSTEMS GROUP INC. - FCC ID: LO6-MBX700

REFERENCE: JOB 906UC3

Dear MR. LUU:

This application is on hold until these questions are resolved. Please answer all question(s) together and only respond to tei@timcoengr.com. Any other method will cause **unnecessary delay. DO NOT HIT REPLY!** Responses should also contain the Reference information, as shown at the top of this message.

Based upon our review of this application we have the following questions:

1. 731 form: The power is variable from the value listed to less than 0.5 Watt. The FCC uses the grant note BB for such power range. Is the power switchable as suggested by form 731 or variable?
2. Part 90.203(e)(g) – Frequency programming capability: Please, show compliance with this section. What does prevent the user from programming the device outside the authorized band? (An attestation from the manufacturer is acceptable).
3. Schematics: The schematic provided is for the PA only. Please, provide a complete schematic for the transmitter portion of the device.
4. Tuning procedures: The exhibit provides information on how the user can program the radio. It does not provide specific tune-up procedure over the power range, or at specific operating power levels at the factory level. Please, upload such exhibit.
5. Parts list: Please, provide a part list (or Bill of Material), as none was received.
6. RF exposure: The user's manual requires a MPE distance of 86.5 cm which is larger than ½ the width of an average passenger car. Such distance requires the operator to be an occupational user, who can control bystander's exposure conditions. It should be stated clearly in the manual. The User's manual must include specific operations and installation instructions, maximum authorized antenna gain, any applicable source-based time averaging or duty cycle factor,

minimum cable loss, warning label on the unit referring the manual for specific operating restrictions, etc. It is the responsibility of the applicant to determine vehicle size and other environmental parameters to satisfy the minimum separation distance. Applicants can consider one or more of the following approaches to demonstrate compliance with the RF exposure limits when the MPE distance extends beyond the edge of the physical boundary of the vehicle. The most conservative approach is listed first:

- 1) Maximum radiated power could be reduced in order to lower the MPE distance.
- 2) Warning label at the base of the antenna could be used to advise bystanders of the exposure.
- 3) Demonstrate shorter MPE distance using measurement rather than estimate.
- 4) Limit installation to roof top only on specific vehicle which usually provides greater separation than other installation points.

Please, provide additional information.

7. Necessary bandwidth: The calculations assume frequency deviations which are not obtained from measurements and therefore overestimate the bandwidth. The measured occupied bandwidth takes precedence. The measurement is more representative of the actual necessary bandwidth. Please, review 731 form accordingly.
8. Occupied bandwidth: The plots do not appear to show the 99% occupied bandwidth. The RBW can be set to approximately 1% of the measured bandwidth. The 20dB bandwidth shall be measured in reference to the amplitude obtained with a wider RBW. Please, revise measurement and justify the reference level for the 20dB.
9. Part 90.543 (e) requires that the device be tested with an antenna that is representative of the type that will be used with the equipment in normal operation. It does not appear that the device was tested according to this section. Please, explain.
10. Emission designator: Is the radio capable of voice operation using F1E? Is it capable of 4 level FM modulation such as P25 (Project 25) which specifies a 8.1kHz Necessary bandwidth per P25 protocols? Is it capable of encryption?
11. Confidential request for internal pictures: The FCC normally does not allow internal photos to be held confidential, as the product is available for investigation by the buyer/user, unless it can be demonstrated that the unit is sealed and cannot be opened with typical tools. Please, remove from your request the internal photos.

Sincerely,

Bruno Clavier

July 17, 2003

TIMCO ENGINEERING INC.
849 NW State Road 45
Newberry, Florida 32669
888.472.2424 F 352.472.2030 email: tei@timcoengr.com

SUBJECT: FUTURECOM SYSTEMS GROUP INC. - FCC ID: LO6-MBX700

REFERENCE: JOB 906UC3

Dear Mr. Clavier:

Please find our answer as follows:

1. *731 form: The power is variable from the value listed to less than 0.5Watt. The FCC uses the grant note BB for such power range. Is the power switchable as suggested by form 731 or variable?*

Answer: The power is programmed by the user for any power from 0.035 to 12 Watts.

2. *Part 90.203(e)(g) - Frequency programming capability: Please, show compliance with this section. What does prevent the user from programming the device outside the authorized band? (An attestation from the manufacturer is acceptable).*

Answer: The programming software does not allow the user to program frequencies outside the authorized band.

3. *Schematics: The schematic provided is for the PA only. Please, provide a complete schematic for the transmitter portion of the device.*

Answer: The power amplifier schematic is very similar to L06-MBXVHF, L06-MBXUHF and L06-MBX800 repeater schematics submitted to and approved by FCC. There never was any complaint from FCC. The schematic supplied is that of the complete transmitter board.

4. *Tuning procedures: The exhibit provides information on how the user can program the radio. It does not provide specific tune-up procedure over the power range, or at specific operating power levels at the factory level. Please, upload such exhibit.*

Answer: Calibration is done at the factory. There is no repeater tune-up over the power range or at specific power levels. That is why no tuning procedures were supplied. When the frequencies are programmed, the user simply programs the desired power level in the allowed power range.

5. *Parts list: Please, provide a part list (or Bill of Material), as none was received.*

Answer: Please find the parts list along with the revised letter request for confidentiality filing

6. *RF exposure: The user's manual requires a MPE distance of 86.5 cm which is larger than ½ the width of an average passenger car. Such distance requires the operator to be an occupational user, who can control bystander's exposure conditions. It should be stated clearly in the manual. The User's manual must include specific operations and installation instructions, maximum authorized antenna gain, any applicable source-based time averaging or duty cycle factor, minimum cable loss, warning label on the unit referring the manual for specific operating restrictions, etc. It is the responsibility of the applicant to determine vehicle size and other environmental parameters to satisfy the minimum separation distance. Applicants can consider one or more of the following approaches to demonstrate compliance with the RF exposure limits when the MPE distance extends beyond the edge of the physical boundary of the vehicle. The most conservative approach is listed first:*

- (a) Maximum radiated power could be reduced in order to lower the MPE distance.*
- (b) Warning label at the base of the antenna could be used to advise bystanders of the exposure.*
- (c) Demonstrate shorter MPE distance using measurement rather than estimate.*
- (d) Limit installation to roof top only on specific vehicle which usually provides greater separation than other installation points. Please, provide additional information.*

Answer: The Mobexcom repeater is for Occupational Use only. It is not available for sale for non-professional users. The re-calculated Antenna Separation Distance for Occupational/Control Exposure is 38.6 cm. Please see the revised RF Exposure Information, User's Manual and the label warning for Occupational Use is attached with the with this reply.

7, 8 & 10 *Emission designator: Is the radio capable of voice operation using F1E?*

Answer: Initially the manufacturer did not want to certify his product for voice operation and they will disable this voice operation on production unit. However, they have just changed their mind to include voice operation. Please find the revised test report and Form 731 to include voice operation.

**** Is it capable of 4 level FM modulation such as P25 (Project 25) which specifies a 8.1kHz Necessary bandwidth per P25 protocols?** Answer: Yes, please find our revised calculation of necessary bandwidth based on level 4 FM modulation.

**** Is it capable of encryption?** Answer: No.

Our 99% OBW measurements are correct. The Calculation of NB is not correct by using level 2 FM

9. Part 90.543 (e) requires that the device be tested with an antenna that is representative of the type that will be used with the equipment in normal operation. It does not appear that the device was tested according to this section. Please, explain.

Answer: The power density in 1559-1610 MHz per section 90.543(e) is only applicable for signals which are not wideband or discrete emissions.

11. *Confidential request for internal pictures: The FCC normally does not allow internal photos to be held confidential, as the product is available for investigation by the buyer/user, unless it can be demonstrated that the unit is sealed and cannot be opened with typical tools. Please, remove from your request the internal photos.*

Answer: Please see the revised request for confidentiality filing.

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