



# Washington Laboratories, Ltd.

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May 5, 2005

Mr. Tim Johnson  
American Telecommunications Certification Body Inc.  
6731 Whittier Ave  
McLean, VA 22101

RE: Comments of May 3, 2005  
APPLICATION: HP9MC906RC Symbol Technologies, Inc.

Dear Mr. Johnson:

Below are the comments that you have provided regarding the application for certification referenced above. Our responses to those comments are in ***bold italic***. Many responses refer you to additional exhibit(s) which has been uploaded to the application folder at the ATCB website.

Thank you for your attention. Please feel free to contact us for any additional information that you may require.

Regards,

*Gregory M. Snyder*  
Chief EMC Engineer, Wireless/Telco Services Manager

*Brian J. Dettling*  
Documentation Specialist

WLL Project: 8596/7

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1) From review of this application and our conversations, it is my understanding that we are approving this device under its own FCC ID as a system and not relying on any modular approvals. Please confirm that our understanding is correct.

***R. This device is to be approved as a system under its' own FCC ID.***

2) Additionally, data from various reports from previous approvals have been provided. You have stated that there are not any changes to the approved radios. However, justify the use of this data and additionally please explain if there are any changes to the antennas or surrounding circuitry that would affect spurious emissions.

***R. No changes to the approved radios has occurred except that the antenna used for the RFID radio has been changed. With the exception of the radiated emissions/co-location data the data from the existing radio testing is being used for this approval as nothing has changed.***

3) FYI.....It would be suggested that for future applications of this kind, that a separate cover letter explaining the nature of the application be provided to help clarify all aspects of the application. I have attached 2 files as an example of this for your reference regarding a previous application of significant complexity.

***R. Noted.***

4) The label mentions "This device contains Radio Approved Modules". This is not appropriate labeling for the device as a module or system. However, assuming this is a system approval, this statement is not relevant and should be removed.

***R. The label has been modified to remove the irrelevant statement. Please see "MC906RC Label Location Rev 1.pdf".***

5) The 2 part FCC statement information appears to possibly be placed elsewhere on the device. Additionally, the labeling information references 2 other documents for more regulatory information. Please provide sample labels and information showing the location on the device of any other labels relevant to FCC or IC compliance.

***R. Due to limited space on the label and device the 2- part FCC statement is located in the Quick Reference Guide as indicated on the label. A significant amount of precedence has been set where the FCC has accepted these statements to be on the Quick Reference Guide for all previous versions of this same device. The remaining area on the device is reserved for other international marks that are specifically required to be on the product.***

6) If this is being granted as a system, then the device is being approved for a combined device containing both TX's (900 MHz DSS and an 2.4 GHz DTS device). This will be considered a composite application as 2 grants will need to be issued for the FCC. Please update the 731 form, section III – 4(a) to list both types of devices (DSS and DTS). Additionally, the equipment specifications for section III – 6(b) should report the RF power output for each TX separately.

***R. The form has been revised per the above. Please see exhibit "MC906RC Application Form - 731 revised.pdf".***

7) The block diagram appears to only have been provided for the 900 MHz portion of the device. Please provide the block diagram for the 2.4 GHz Radio as well.

***R. The block diagram for the 2.4GHz radio has been provided. Please see exhibit "MC906RC Block Diagram.pdf". Please refer to page 4 of the Block Diagram.***

8) Internal photographs do not appear to be provided showing the 2.4 GHz radio location, antenna, and top/bottom views as required by the FCC. Additionally, due to the integrated radio, and RF ID support board, internal photographs of all boards in within the device should be provided. Please note that generally, for unlicensed devices the FCC desires to see photographs of all boards as well.

***R. Additional internal photographs have been provided Please see exhibit "MC906RC Internal Photos Rev 1.pdf".***

9) Antenna specification information appears to be provided for the 900 MHz device. Please provide detailed specifications on the antennas for the 2.4 GHz?

***R. The revised internal photograph exhibit now contains the 1dBi gain dipole antenna used for the 2.4GHz. In addition, a spec sheet for the antenna has been provided. Please see exhibit "MC906RC Antenna info.pdf".***

10) The operational description states that the antenna gain is maximum -6 dBi (page 37 of 45). The additional antenna information given in the antenna specification sheet is + 6 dBi. The MPE exhibits appears to utilize a +6 dBi antenna gain in the calculations. What is correct? Please correct all affected exhibits.

***R. The operational description has revised to show the correct gain of +6dBi. Please see exhibit "MC906RC Operational Description Rev 1.pdf".***

11) The operational description mentions an integrated 2.4 GHz radio, but also mentions a non-radio version. The manufacturer should be aware that this device as approved will require the device to always contain both TX's. Depopulation of the 2.4 GHz radio would not be allowed under the FCC ID of this application.

***R. Please see the revised operational description.***

12) The operational description mentions a Bluetooth Radio (page 12 of 45). The manufacturer should be aware that this device as approved will not cover this Radio.

***R. This version of the system does not contain a Bluetooth radio. The revised operational description has removed the reference to a Bluetooth radio.***

13) Please explain if the data vs. CW signal is transmitted on each channel hop. The FCC has typically only allowed CW signal if it is half-duplexed with a modulated signal and a CW signal on each hop frequency.

***R. The RFID device is half-duplexing a CW signal (listen mode) with an AM modulated signal (interrogate mode) for each hop channel.***

14) System receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals (15.247(a)(1)). Please provide information that shows this device complies with this.

***R. The transceiver uses homodyne architecture. Refer to block diagram: The VCO output is split between TX and RX circuits so the TX and RX channel bandwidths are identical. The filters shown are bandpass filters, not channel filters. Channel bandwidth for both RX and TX is function of the VCO, which is the same for both.***

15) Please provide a sample hopping list to show compliance with the pseudo random hopping requirements.

***R. A hopping list has been provided. Please see exhibit "WJ MPR7XXX Operational Desc- Freq Hop .pdf".***

16) Please provide information in order to explain compliance to 15.247(g) & (h).

***R. 15.247(g): The reader employs 50 hopping frequencies. Each frequency is used equally on average by the transmitter. The MPR RFID readers use pseudorandom hopping frequency sets and use all 50 channels. The maximum channel occupancy is 0.4 seconds in a 20 second period. The reader transmits short bursts of RF then ‘listens’ for the return backscattered reflected signal from the RFID tags, one at a time.***

***15.247(h): The MPR RFID readers do not have any intelligence that would allow them to recognize other users within their operating spectrum. Under normal usage only one RFID reader is intended to be used in any particular location. If more than one reader is required to cover a large warehouse, for example, the reader antennas would need to be directed away from each other so that both readers could function properly.***

17) The device is considered to be a portable device and therefore should be rotated about all 3 axis in attempt to determine worse case results. Was this performed?

***R. The device was tested in all three orthogonal planes with the worst case emissions reported.***

18) Please provide radiated bandedge compliance data for 2.4 GHz restricted bands.

***R. Bandedge data for the 2.4GHz restricted bands has been added to the revised test report. Please see exhibit “MC906RC Test Report Rev 1.pdf”.***

19) The internal photographs of the board given in the 2.4 GHz report do not appear to match the board drawings (page 44 of 45) for the TX portion of the circuit. Please explain.

***R. The revised Operational Description now shows the correct layout of the 2.4GHz board.***

20) Please provide information regarding antenna to user distance. It is unknown where the 2.4 GHz antenna is located.

***R. Please see the revised Internal Photo exhibit. A photo has been added to the RF Exposure exhibit to indicate the separation distance. Please see exhibit “MC906RC RF Exposure Info rev 1.pdf”.***

21) Users manual does not provide any necessary 15.21, 15.105, or RF exposure statements. Please note that information to the user should caution proper usage, distance between user and antenna, non-colocation, etc. Please update the manual as necessary.

***R. This information is included in the Quick Reference Guide supplied with the unit.***

22) MPE states the RF ID has a maximum 75% duty cycle based upon the theory of operation. Where can this information be found in the operational description information provided.

***R. Reference page 36 Section 3.1.31 of the operational description for information concerning the control of the duty cycle for the RFID unit.***

23) The total percentage of the 2.4 GHz TX in the MPE exhibit appears to be 2.9%. Combination with the 900 MHz device will just exceed the limit. Please review.

***R. The MPE has been recalculated based on the correct 2.9% calculation. Please see the revised exhibit. Additionally, the operational duty cycle of the RFID device has been limited to 73% so the MPE does not exceed the limit.***

24) FYI.....Comments provided are assuming this is being approved as a system that will always contain both transmitters. If this is not correct, then further review and comments would be necessary to address this application from a different perspective.

***R. The device is being approved as a system.***