

American Telecommunications Certification Body Inc.

6731 Whittier Ave, McLean, VA 22101

December 11, 2003

RE: Zebra Technologies

FCC ID: I28MD-QL3021

I have a few comments on the above referenced Application.

General Issues:

1) Please adjust the modular request cover letter to address the various points we discussed.

[Response: Please see the revised limited modular request cover letter uploaded with this response.](#)

2) The label information tends to suggest there may be 4 types of assemblies. Please explain the difference in the assemblies given in this exhibit and note that the application will only cover the host devices specifically addressed in this filing.

[Response: Please see the revised label exhibit uploaded with this response. Note that the module can be seen from an external view of the host device; therefore, the module is labeled with the FCC ID \(which can be seen by the end user\) per DA 00-1407.](#)

3) Please provide photographs of the antenna. From the external and internal photographs provided it can not be determined where the antenna is located and what it looks like. Please provide top and bottom photographs if considered if applicable. Note that none of the photographs (internal or external appear to show the coax cable mentioned in this application. Additionally, these photographs should be provided for each model tested, or at least stated on the photographs that the antenna is the same for both models.

[Response: Please see the revised photographs uploaded with this response.](#)

4) Please provide internal photographs for the PCMCIA Card.

[Response: Please see the revised photographs uploaded with this response.](#)

5) Please provide external photographs of each of the hosts covered by this application being sure to label appropriately. Additionally, if the devices appear similar to each other, please explain the differences in the models.

[Response: Please see the revised photographs uploaded with this response.](#)

6) Please provide a general internal photograph for each model covered by this application to show the general internal construction of the printer and the location of the relative RF components.

[Response: Please see the revised photographs uploaded with this response.](#)

7) The 731 form mentions a frequency range of 2402 - 2480, while the theory of operation in the operational description (section 2.1.3) mentions the lowest channel is 2401. Note that other information given in the operational description mentions 2402-2480. Please explain.

[Response: Portions of the operational description include documentation from Symbol's original FCC filing for the LA-3021 card itself. Section 2.1.3 of the operational description mentions a channel operating at 2401 MHz. We believe this is a typographical error. Nonetheless, the EUT only operates between 2402 and 2480 MHz.](#)

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8) The 731 form mentions an output power of 83 mW, while section 2.1.3 of the operational description mentions an output power of 100 mW or 500 mW (model dependent), and the device in the external photographs appear to be labeled as 48.8 mW. Please explain.

[Response:](#) Portions of the operational description include documentation from Symbol's original FCC filing for the LA-3021 card itself (both the 100 mW and 500 mW filings). Zebra is using the 100 mW card and controls the card using their own firmware. There was an error with the original reported power; the maximum conducted power is 107 mW. The card labeled 48.8 mW was labeled this way by Zebra, but is not an indication of the actual power measured from that card. Please see the revised test report uploaded with this response.

EMC Report:

9) The test report should remove references to Modular approvals. Additionally 2 different models are listed. Please reference item #3 above.

[Response:](#) Please see the revised test report uploaded with this response.

10) The information in section 6 only shows the bandedge delta data. There is not enough information to show compliance to the bandedge requirement. Please provide further information.

[Response:](#) Please see the revised test report uploaded with this response.

11) The maximum dwell time measured was 10 ms in a 30 second period. Something does not appear correct regarding how the TX was behaving. Most tests show results just under the 400 msec requirement. Assuming a TX time of 419 us, this would mean the device would return to the same channel approximately every 66 msec assuming a full duplex TX. In a 31.6 sec period of time the same channel would be visited 477 times. Additionally, if the device was properly hopping through the hop table, the spacing between all TX cycles would be the same. This is not shown in plot 11-3 and therefore each channel does not appear to be used equally on the average as required by the rules. Lastly, the theory of operation mentions beacon intervals lasting 100 ms, which implies dwell times of 200 msec or longer. Note that the minimum hop cycle listed in the theory of operation is 2.5 hops per second or 400 msec dwell time maximum. Please provide more theory of dwell time information or data as necessary regarding this issue. Note that additionally, for systems with 20 dB bandwidth < 1 MHz, a 30 second measurement period is specified.

[Response:](#) Please see the revised test report uploaded with this response.

SAR Report:

12) The EMC report mentions 2 battery types (Battery Models AT16293, AT16004) while only one is used in each model. Please confirm if the QL320 and QL420 each only accept one battery type and that these batteries may not be capable of use in both models.

[Response:](#) Due to the physical characteristics of the batteries, the batteries are not interchangeable between the QL320 and QL420. Each device (that is, the QL320 and QL420) can only accept one battery type.

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13) The FCC expects that Conducted power in SAR report should be greater than or equal to what's in EMC report, but not exceeding tune-up/tolerance. The EMC report shows power listed as 19.2 dBm / 83.2 mW, while the QL320 SAR report shows 18.5 dBm, 70.79 mW. Note that the QL420 report appears fine.

[Response:](#) Please see the revised SAR reports uploaded with this response.

14) The box representing the device on the SAR plots is not very descriptive for either report. (i.e., which is the front/back or top/bottom, etc.). Is it possible to provide a better overlay, or something to clearly show this.

[Response:](#) Please see the revised SAR reports uploaded with this response.

15) From the Z-axis plot provided, it does not appear that the first 2 measurements points in a zoom scan, closest to the phantom surface, may not have been within 1 cm of the surface per the FCC requirements. This occurs in both reports.

[Response:](#) The zoom scan is confirmed to be within 1 cm from the phantom surface, providing accurate SAR measurements. Due to current limitations of the DASY4 software, a z-axis scan is unable to provide measurements within 1 cm of the phantom surface. The DASY4 manufacturer has stated that a future software version currently under development will provide z-axis measurements within 1 cm of the phantom surface.

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The items indicated above must be submitted before processing can continue on the above referenced application. Failure to provide the requested information may result in application termination. Correspondence should be considered part of the permanent submission and may be viewed from the Internet after a Grant of Equipment Authorization is issued. Please do not respond to this correspondence using the email reply button. In order for your response to be processed expeditiously, you must submit your documents through the AmericanTCB.com website. Also, please note that partial responses increase processing time and should not be submitted. Any questions about the content of this correspondence should be directed to the sender.