

Laboratory Testing of Zebra's Z-Band® Direct Thermal Wristbands with Antimicrobial Coating



TECHNICAL REPORT 2





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Introduction

This document details the laboratory testing completed on Zebra® Z-Band direct thermal wristbands, featuring Zebra's patent-pending antimicrobial coating. An independent laboratory tested the wristbands to evaluate the antimicrobial activity on the bands over a period of time.

Since bar coded wristbands provide a convenient way to comply with positive patient identification initiatives, it is important for wristbands to be readable and scannable during the patient's stay. With the development of the Zebra's patent-pending antimicrobial coating, it has been shown that they are also able to prevent microorganisms from growing or surviving on them.

The following facility conducted the testing:

- Antimicrobial: Northland Laboratories, 1818 Skokie Blvd, Northbrook, IL 60062—Report Date: November, 2006

The next section details the tests' procedures and results.

Materials, Methods, and Results

Antimicrobial Activity Testing

Zebra's Z-Band direct thermal wristbands feature inorganic ionic silver as an antimicrobial, which the following tests demonstrate kills certain microorganisms that come into contact with it. As the silver ions are taken into the microorganisms, they react and bond to the cellular enzyme. This inhibits the microorganisms' enzyme activity and multiplication, thus killing them.

Zebra contracted with an independent laboratory to test the ability of three microorganisms—*S. aureus*, *P. aeruginosa*, and *E. coli*, the three leading causes of hospital infections in the United States—to grow and survive on Zebra's Z-Band antimicrobial-coated direct thermal wristband, as well as three competing wristbands and technologies (including PDC's ScanBand, LaserBand's Original LaserBand and Hollister's Ident-A-Band with insert cards) that did not have an antimicrobial coating.

Test articles of the Zebra wristband and three competitive wristbands were tested to the following standard methodologies:

- FDA BAM Chapter 3, total plate count
- ASTM E2180: JIS Z 2801: Antimicrobial products-testing for antimicrobial activity and efficacy

Also referencing:

- FDA BAM, Food and Drug Administration Bacteriological Analytical Manual
- ASTM E2180, American Society for Testing and Materials Standards
- JIS Z 2801, Japanese Industrial Standard

All four of the wristband test articles were individually inoculated with *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*. The 0hr wristband test articles for each microorganism were serially diluted and plated out right away to determine initial bacterial concentration levels. The 24hr wristband test articles for each microorganism were incubated under high-humidity conditions for 24 hours and plated thereafter to determine the bacterial concentration levels after 24 hours. As shown in the pictures of the samples, none of the three microorganisms tested were able to grow or survive on the Zebra Z-Band wristband during the 24-hour test period. See Figures 1-3. The activity of the microorganisms is represented graphically in Figure 4.

Figure 1. *Staphylococcus aureus* at 0 HR and at 24 HR.

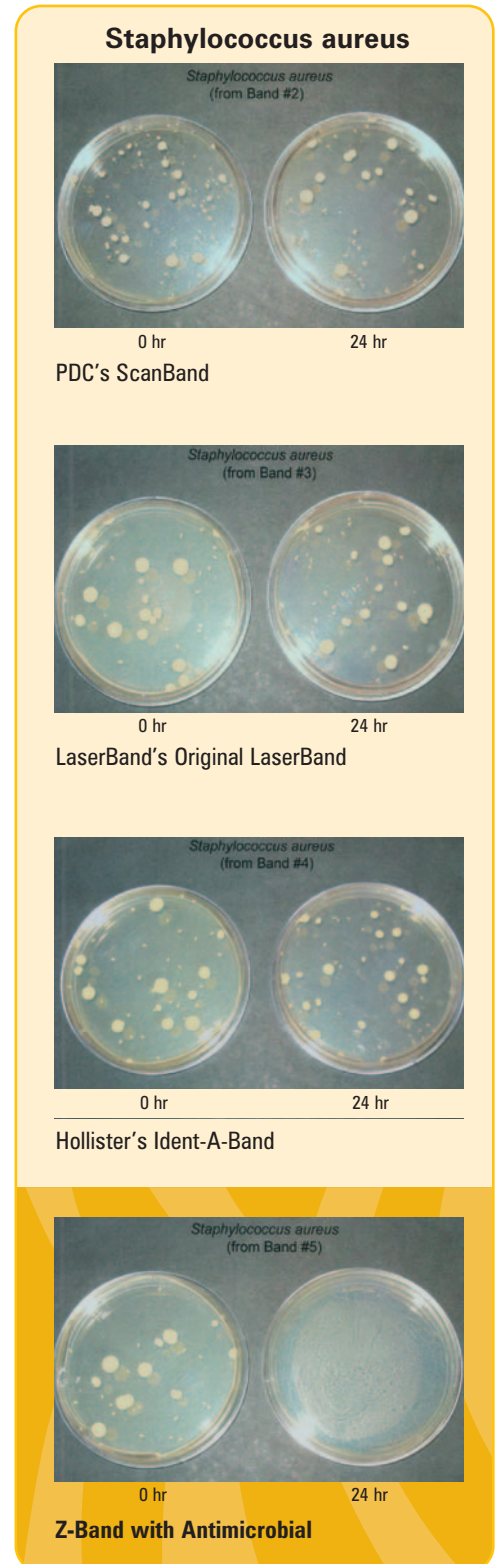


Figure 2. Escherichia coli at 0 HR and at 24 HR



Figure 3. Pseudomonas aeruginosa at 0 HR and at 24 HR

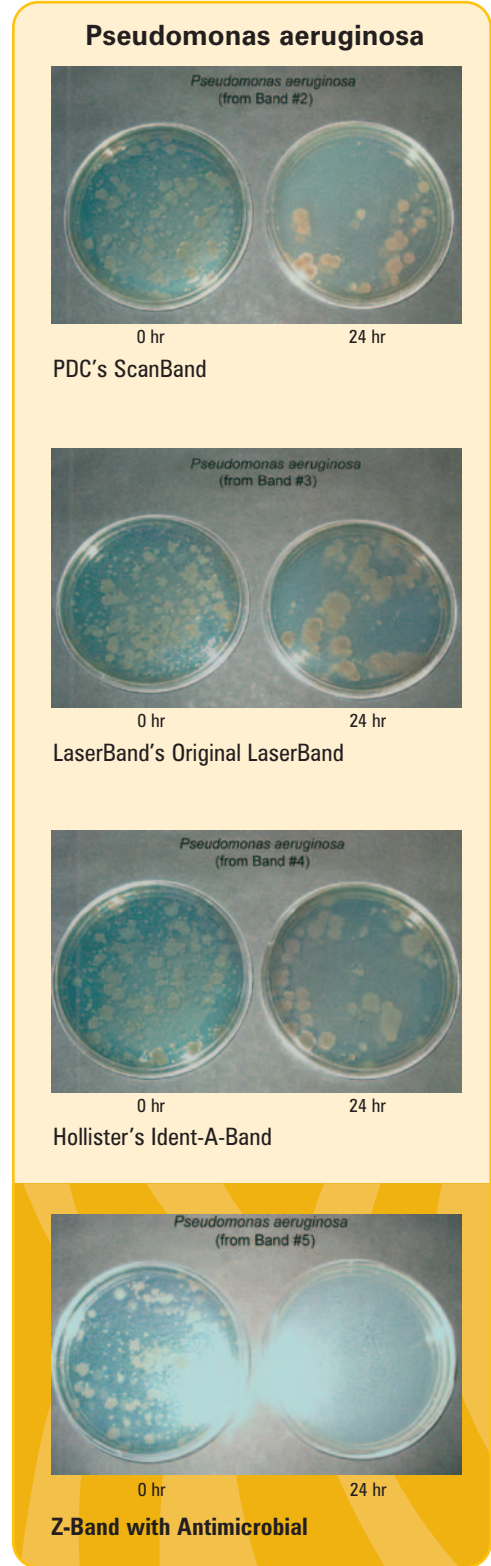
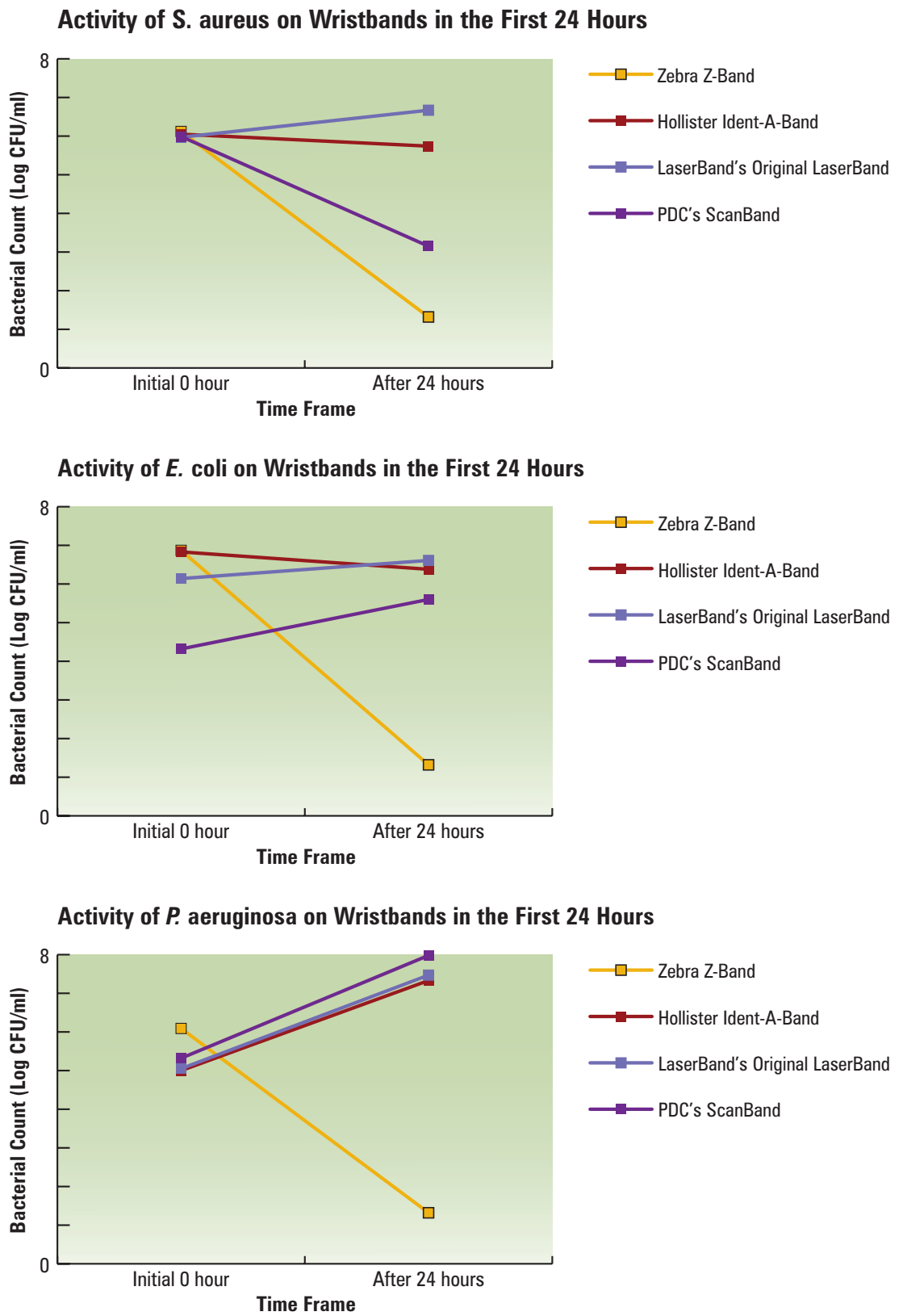


Figure 4. Activity of microorganisms within the 24 hour test period.





Conclusion

Zebra is committed to providing hospitals with wristbands that meet our high standards for image durability, scannability and comfort. Zebra's Z-Band direct thermal wristbands:

- Feature an antimicrobial coating that prevents *S. aureus*, *P. aeruginosa*, and *E. coli*, the three leading causes of infections in the United States, from growing on them.

Zebra Technologies is a world leader in bar code, RFID, and ID card printing with an installed base of more than 5 million units, including systems at healthcare facilities for unit-of-use labeling, prescription label printing, patient wristband printing, materials management, security, and employee identification. Together with its partners, Zebra has the experience, industry knowledge, and specialized products needed for successful hospital implementations. Zebra is also a leader in standards development that actively participates in the work of life sciences industry associations so that it will be prepared to meet the emerging needs of its customers. Contact Zebra at: +44 (0)1494 472872 or visit www.emea.zebra.com/eurohealth for more information about bar code printing solutions for healthcare.



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