



#217100

February 2017

Commissioned by Spectralink Corp.

Spectralink PIVOT:SC (8744) with Enhanced Barcode Scanning

Camera Barcode Scanning Performance and Features Versus Zebra

EXECUTIVE SUMMARY

For years, dedicated hardware barcode scanners were the only solution for scanning needs - even in situations like clinical healthcare and retail where use might be sporadic. Depending upon the environment, users might be required to carry both a company smartphone and a scanner. Spectralink integrates optimized camera and barcode scanning into its PIVOT:SC phone thus providing both economic and weight advantages for customer's requiring both telephony and barcode scanning capabilities on the job.

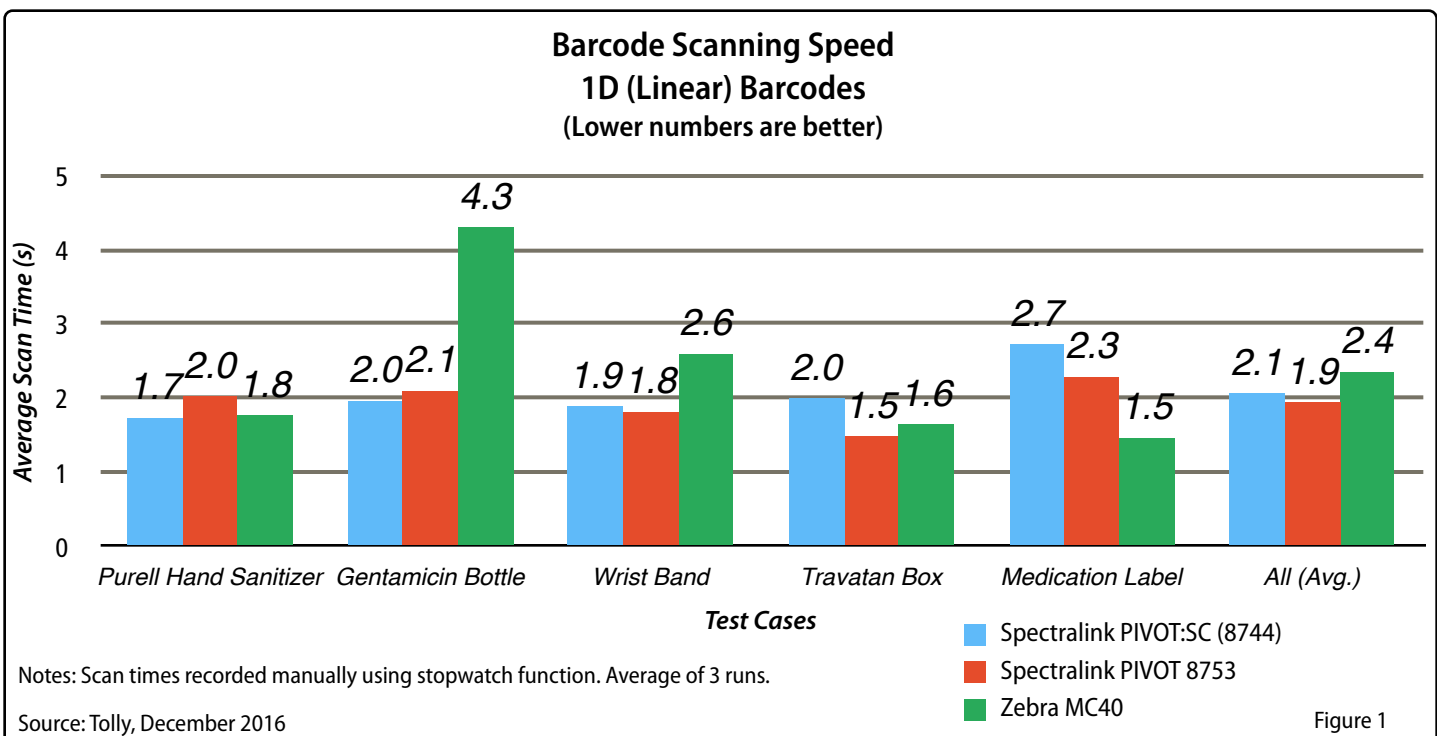
Spectralink commissioned Tolly to evaluate the performance and symbology support features of its PIVOT:SC and compare that to two phones with dedicated hardware scanners.

Tests showed that the Spectralink PIVOT:SC was faster, on average, than the dedicated hardware-based Zebra MC40. Additionally, tests showed that the Spectralink PIVOT:SC recognized more symbologies than Zebra at 37 to 24 and could match Zebra's scanning accuracy when angled 15 degrees.

THE BOTTOM LINE

Spectralink PIVOT:SC

- 1 Demonstrated faster average scan time than Zebra MC40
- 2 Supported 37 of 40 barcode symbologies compared to 24 for the Zebra MC40
- 3 Costs approximately 30% less than the Zebra MC40
- 4 Matches scanning accuracy of Zebra MC40 when angled at 15 degrees and six inch distance from target





Test Results

Barcode Scanning Speed

The goal of this test was to establish the time required for each scanner to recognize the barcode of items that would be found in a clinical healthcare environment. As noted earlier, clinical healthcare is representative of environments where barcode scanning is required, but the volume of items to be scanned is generally quite low.

It is safe to assume that most workers in this environment already carry a company-issued smartphone in order to be reachable wherever they are in the medical complex. Using that same device to carry out scanning saves time, effort, expense and weight.

In fact, it is likely that many companies and users would be willing to give up speed - meaning slower performance - for the convenience of using a single device.

This test illustrated that the PIVOT:SC scanning performance was effectively the same as that of the dedicated hardware scanner from Zebra. (For details of how tests were conducted, see the Test Setup & Methodology section.)

Barcode recognition time was effectively the same for all three solutions tested. See Figure 1.

The average scan time for the five items used in the test was approximately two seconds for all solutions. (Scan time was

measured using a stop watch application so timing is as precise as a human can respond to hitting "stop" when the barcode is recognized.)

The test shows that user productivity should remain the same when replacing a dedicated hardware scanner like the Zebra MC40 with a dual-purpose Spectralink PIVOT:SC.

Supported Barcode Symbologies

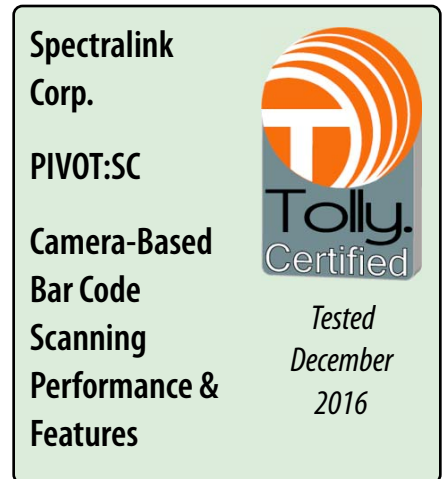
The usefulness of a barcode scanner is certainly related to the scope of barcodes that it can recognize within the different classes of barcodes that are available.

The more traditional barcodes that most of us have grown familiar with are known as 1D barcodes (for one dimensional) and consist of a "bar" of vertical lines.

More recently, 2D barcodes (for two dimensional) have come to market. The "QR code" is probably the most recognizable 2D barcode to most of us.

Finally, there are barcodes that contain both 1D and 2D elements. These composites of 1D and 2D technology are appropriately referred to as Composite barcodes.

Tolly engineers used a collection of 40 different barcode types across these three categories to test the recognition capability of each barcode scanner under test.



The Spectralink PIVOT:SC recognized 37 of the barcodes compared to only 24 for the Zebra MC40. The Spectralink PIVOT 8753 recognized 31 of the test barcodes. See Table 1 for the listing of each barcode type and the detailed results of that test.

Angle of Scanning

The more precision required for lining up the scanner with respect to the barcode, the longer the scanning process can take.

For this test, engineers selected a single, representative 1D barcode and a single, representative 2D barcode.

The scanner was positioned approximately six inches away from the bar code and 15 degrees off from a direct scan angle.

Tests showed that both the Spectralink PIVOT:SC and the Zebra MC40 could register accurate scans under these conditions. See Table 2.



Supported Barcode Symbologies

Symbology	Barcode Type	System Under Test		
		Spectralink PIVOT:SC	Spectralink PIVOT 8753	Zebra MC40
	Summary Support of 40 Types Tested	37	31	24
1D	Codabar	✓	✓	✓
	Codabar (fewer than 6 characters)	✓	✓	✗
	Code 11	✓	✓	✓
	Code 32	✓	✓	✓
	Code 39	✓	✓	✓
	Code 93	✓	✓	✓
	Code 128	✓	✓	✓
	Code 128-A	✓	✓	✓
	Code 128-B	✓	✓	✓
	Code 128-C	✓	✓	✓
	Hong Kong 2 of 5	✓	✗	✗
	IATA 2 of 5	✓	✗	✗
	Interleaved 2 of 5	✓	✓	✗
	GS1 DataBar	✓	✓	✓
	GS1 DataBar - Limited	✓	✓	✓
	Matrix 2 of 5	✗	✗	✗
	MSI Plessey	✓	✓	✗
	NEC 2 of 5	✓	✗	✗
	Plessey	✓	✓	✗
	Straight 2	✓	✓	✗
	Telepen	✓	✓	✗
	Tri-Optic	✗	✗	✗
	UPC-A	✓	✓	✓
	UPC-E	✓	✓	✓
	EAN-13	✓	✓	✓
	EAN-8	✓	✓	✓
2D	Codablock F	✓	✓	✓
	Code 49	✓	✗	✗
	Micro PDF417	✓	✓	✓
	PDF417	✓	✓	✓
	Aztec Code	✓	✓	✓
	Data Matrix	✓	✓	✓
	Micro QR Code	✓	✗	✗
	QR Code	✓	✓	✓
	Han Xin	✓	✗	✗
	Maxicode	✗	✗	✓
Composite	GS1 Composite	✓	✓	✓
	GS1-DataBar Limited Composite	✓	✓	✓
	GS1-DataBar Stacked Composite	✓	✓	✗
	GS1-128 Composite	✓	✓	✗

Source: Tolly, December 2016

Table 1



Angle of Scanning Test 15 Degrees at 6 Inches Distance

Symbology	Barcode Target	System Under Test		
		Spectralink PIVOT:SC (8744)	Spectralink PIVOT 8753	Zebra MC40
1D	Medical wrist band	✓	✓	✓
2D	Aztec Bar Code	✓	✗	✓

Notes: Pass/fail test to determine whether barcode could be read successfully at the angle/distance specified.

Source: Tolly, December 2016

Table 2

Solutions Under Test

Vendor	Product Name	Part No.	Android Version	Kernel Version	Price (USD)	Notes
Spectralink Corp.	PIVOT:SC (8744)	PBK87440	5.1.1	3.14.38-138040-g38c74ff	\$1,030	Includes scanning license (\$250) and battery (\$89)
Spectralink Corp.	PIVOT 8753	PBK87530	5.1.1	3.14.38-138040-g38c74ff	\$1,363	Includes battery (\$89)
Zebra Technologies	MC40	MC40N0-HCJ3R01	4.4.4	3.4.48	\$1,350	Healthcare model

Note: Price is selling price on CDW.com as of February 2017.

Source: Tolly, December 2016 & February 2017

Table 3



Test Setup & Methodology

Systems Under Test

For details of the scanner solutions under test, see Table 3.

Environment & Setup

Barcode Scanning Speed

Engineers measured the time to successfully scan five common type of products found in a healthcare environment. Each of the healthcare products was measured at the same location and distance from the barcode scanners. The distance of the barcode scanners from the products (medication label excepted) was 6 inches. Given the smaller size of the medication label barcode it was placed 1 inch away from the barcode scanners.

Scanning times were measured manually using the stopwatch function of a smartphone not being used for the scanning test. Timings for results should be understood to be within the reaction time of the tester pressing "stop," once the a successful scan is registered.

Supported Barcode Symbologies

A collection of 40 barcodes across 1D, 2D and Composite categories were tested to verify support. For each failed verification the test was conducted a total of three times and engineers allowed 10 seconds for the barcode scanners to attempt to verify the barcode. Thus, a failure would indicate zero good reads out of three read attempts.

Angle of Scanning

A 1D (Medical Wrist Band) and 2D (Aztec) barcode were each placed 6 inches away with a 15 degree angle from the barcode scanner. For each failed verification the test was conducted a total of three times and engineers allowed 10 seconds for the barcode scanners to attempt to verify the barcode. Thus, a failure indicates zero good reads out of three read attempts.



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