EMI TEST REPORT

Report Number: 3072558.EMI.FCCC.RFID.02
Project Number: 3072558

Testing performed on the:

High Security Card Printer

Model: P640i

To:
FCC CFR47 Part 15 Subpart C Section 15.225

For:

Zebra/Atlantek

Issue Date: 6/01/05

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
Zebra/Atlantek
10 High Street
Wakefield, RI, 02879

Prepared by: _____ Date: _____
Nicholas Abbondante

Reviewed by: _____ Date: _____
Vathana F. Ven

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Prepared by: _____ Date: 6/1/05
Nicholas Abbondante

Reviewed by: _____ Date: 6/6/05
Vathana F. Ven

1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: Zebra/Atlantek

Contact: Jack Wirtz
Telephone: 401-783-5700
Fax: 401-783-9881
Email: jwirtz@zebra.com

1.2 Equipment Under Test

Equipment Type: High Security Card Printer
Model Number(s): P640i
Serial number(s): 0406015 during frequency stability testing, EM 19 during all other testing
Manufacturer: Zebra/Atlantek
EUT receive date: 3/1/2005
EUT received condition: Good
Test start date: 3/1/2005
Test end date: 4/29/2005

1.3 Test Plan Reference: Tested according to the standards listed and ANSI C63.4-2003

1.4 Test Configuration

1.4.1. Cables:

Cable	Shielding	Connector	Length (m)	Qty.
AC Mains	None	Plastic	2	1
Crossover Ethernet	None	Plastic	4	1
Parallel Cable	Braid	Metal/360	4	1
USB Cable	Braid	Metal/360	4	1

1.4.2. Support Equipment:

Name: Dell Laptop
Model No.: PA-10
Serial No.: CN-0G5152-48643-43N-4315

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC CFR47 Part 15 Subpart C Section 15.225		
SUB-TEST	**TEST PARAMETER**	**COMMENT**
Radiated and Line-Conducted Emissions and RF Output Power	Emissions below specified limits	Pass
Frequency Stability	Transmit frequency must not deviate by more than 0.01% across the temperature range from –20 to +50 celsius and during voltage variations of ±15%.	Pass

Revision Summary:
5/31/2005 – added reference to ANSI C.63.4:2003 to section 1.3
5/31/2005 – updated reference to ANSI C63.4:1992 in Emissions Site Description to ANSI C63.4:2003
5/31/2005 – added radiated and line-conducted emissions sample calculations
6/1/2005 – replaced magnetic field strength data table with correct engineer and company name

3.0 Test Results: Pass

3.1 Test Standard: FCC CFR47 Part 15 Subpart C Section 15.225

3.2 Test: Radiated and Line-Conducted Emissions and RF Power Output

3.3 Test Environment:

See Data Table

3.4 Maximum Test Disturbance Parameters: Readings below specified limits.

Test Date: 3/1-4/2005, 4/20/05, 4/29/05 **Test Engineer Initials:**_____**Date:**_____
Test Engineer: Nicholas Abbondante **Reviewer Initials:**_____**Date:**_____

3.5 Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
LOOP2	Empire	LP-105	905	06/17/2005
CBL022	Belden	RG-58/U	CBL022	11/17/2005
BAR2	Mannix	0ABA116	BAR2	07/02/2005
REC2	Hewlett Packard	8542E	3520A00125	02/08/2006
RECFL2	Hewlett Packard	85420E	3427A00126	02/08/2006
S2 10M FLR	ITS	RG214B/U	S2 10M FLR	09/15/2005
LOG2	EMCO	3142	9711-1223	12/13/2005
SA0001	Hewlett Packard	8591E	3308A01445	07/23/2005
LISN11	Solar Electronics	9252-50-R-24-BNC	941713	06/06/2005
DS22A	Mini Circuits	20 dB, 50 Ohm	DS22A	11/17/2005

3.6 Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

3.7 Test Results:

Radiated Emissions

Company: Zebra/Atlantek Site 2 Model #: P640i
Engineer: Nicholas Abbondante Location: Parking Lot Serial #: EMI 19
Project #: 3072558 Pressure: 982mB Receiver: HP 8591 (SA0001) 7-23-05
Date: 03/02/05 03/04/05 Temp: 5c Antenna: LOOP2-H 6-17-05.ant LOOP2-H 6-17-05.ant
Standard: Part 15.225 Humidity: 29% PreAmp: NONE.
Class: None Group: None Cable(s): CBL022 11-17-2005.cbl NONE.
Limit Distance: 30 meters Test Distance: 1 meters
Voltage/Frequency: 120V/60Hz Frequency Range: 9kHz to 30MHz
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Polycarbonate Enclosure											
PK	V	13.560	29.6	9.2	0.4	0.0	29.5	9.6	84.0	-74.4	9/30 kHz
PK	V	27.120	-4.1	11.7	0.6	0.0	29.5	-21.3	29.5	-50.8	9/30 kHz

3.0 Test Results: Pass

3.1 Test Standard: FCC CFR47 Part 15 Subpart C Section 15.225

3.2 Test: Radiated and Line-Conducted Emissions and RF Power Output

3.3 Test Environment:

See Data Table

3.4 Maximum Test Disturbance Parameters: Readings below specified limits.

Test Date: 3/1-4/2005, 4/20/05, 4/29/05 **Test Engineer Initials:** NNA **Date:** 6/1/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** VFV **Date:** 6/6/05

3.5 Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
LOOP2	Empire	LP-105	905	06/17/2005
CBL022	Belden	RG-58/U	CBL022	11/17/2005
BAR2	Mannix	0ABA116	BAR2	07/02/2005
REC2	Hewlett Packard	8542E	3520A00125	02/08/2006
RECFL2	Hewlett Packard	85420E	3427A00126	02/08/2006
S2 10M FLR	ITS	RG214B/U	S2 10M FLR	09/15/2005
LOG2	EMCO	3142	9711-1223	12/13/2005
SA0001	Hewlett Packard	8591E	3308A01445	07/23/2005
LISN11	Solar Electronics	9252-50-R-24-BNC	941713	06/06/2005
DS22A	Mini Circuits	20 dB, 50 Ohm	DS22A	11/17/2005

3.6 Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

3.7 Test Results:

Radiated Emissions

Company: Zebra/Atlantek Site 2 Model #: P640i
Engineer: Nicholas Abbondante Location: Parking Lot Serial #: EMI 19
Project #: 3072558 Pressure: 982mB Receiver: HP 8591 (SA0001) 7-23-05
Date: 03/02/05 03/04/05 Temp: 5c Antenna: LOOP2-H 6-17-05.ant LOOP2-H 6-17-05.ant
Standard: Part 15.225 Humidity: 29% PreAmp: NONE.
Class: None Group: None Cable(s): CBL022 11-17-2005.cbl NONE.
Limit Distance: 30 meters Test Distance: 1 meters
Voltage/Frequency: 120V/60Hz Frequency Range: 9kHz to 30MHz
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Polycarbonate Enclosure											
PK	V	13.560	29.6	9.2	0.4	0.0	29.5	9.6	84.0	-74.4	9/30 kHz
PK	V	27.120	-4.1	11.7	0.6	0.0	29.5	-21.3	29.5	-50.8	9/30 kHz

Radiated Emissions / Interference

Company: Zebra/Atlantek
Engineer: Nicholas Abbondante
Project #: 3072558
Date: 03/01/05 04/20/05
Standard: FCC Part 15.209
Class: -
Limit Distance: 3 meters
Voltage/Frequency: 120V/60Hz
Barometer: BAR2
Pressure: 994mB
Temp: 23c
Humidity: 32%
Group: None
Model #: P640i
Serial #: EM19
Receiver: HP 8542E (REC2/RECFL2)
Antenna: LOG2 12-13-05 V3.txt LOG2 12-13-05 H3.txt
PreAmp: NONE.
Cable(s): Site2, 10M Floor 9-15-05.cbl NONE.
Test Distance: 10 meters Location: Site 2
Frequency Range: 30-1000 MHz
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Polycarbonate Enclosure, 03/01/2005, 10 meter test distance											
QP	V	35.780	10.9	13.9	0.9	0.0	-10.5	36.2	40.0	-3.8	120/300 kHz
QP	V	40.030	12.4	11.5	1.0	0.0	-10.5	35.4	40.0	-4.6	120/300 kHz
QP	V	74.500	19.5	6.6	1.3	0.0	-10.5	38.0	40.0	-2.0	120/300 kHz
QP	V	86.950	18.8	7.5	1.4	0.0	-10.5	38.2	40.0	-1.8	120/300 kHz
QP	V	109.300	16.9	7.5	1.6	0.0	-10.5	36.6	43.5	-6.9	120/300 kHz
QP	V	109.700	18.7	7.5	1.6	0.0	-10.5	38.3	43.5	-5.2	120/300 kHz
QP	V	111.500	19.8	7.4	1.6	0.0	-10.5	39.3	43.5	-4.2	120/300 kHz
QP	V	119.600	15.8	6.8	1.7	0.0	-10.5	34.8	43.5	-8.7	120/300 kHz
QP	V	124.500	13.0	6.8	1.7	0.0	-10.5	32.0	43.5	-11.5	120/300 kHz
QP	H	136.700	10.9	7.5	1.8	0.0	-10.5	30.8	43.5	-12.7	120/300 kHz
QP	V	156.000	13.0	9.1	2.0	0.0	-10.5	34.6	43.5	-8.9	120/300 kHz
QP	V	166.000	13.2	9.3	2.1	0.0	-10.5	35.1	43.5	-8.4	120/300 kHz
QP	V	195.000	9.3	10.2	2.3	0.0	-10.5	32.3	43.5	-11.2	120/300 kHz
QP	V	203.800	11.6	10.4	2.3	0.0	-10.5	34.8	43.5	-8.7	120/300 kHz
QP	V	214.100	14.1	10.8	2.4	0.0	-10.5	37.8	43.5	-5.7	120/300 kHz
QP	V	249.700	10.6	12.2	2.6	0.0	-10.5	35.9	46.0	-10.1	120/300 kHz
QP	V	278.300	8.5	13.1	2.8	0.0	-10.5	34.8	46.0	-11.2	120/300 kHz
QP	V	284.700	7.6	13.2	2.8	0.0	-10.5	34.1	46.0	-11.9	120/300 kHz
QP	V	336.000	9.6	14.8	3.1	0.0	-10.5	38.0	46.0	-8.0	120/300 kHz

Conducted Emissions / Interference

Company:	Zebra/Atlantek			Model #:	P640i		
Engineer:	Nicholas Abbondante	Barometer:	BAR2	Serial #:	EM19		
Project #:	3072558	Pressure:	1002mB	Receiver:	HP 8542E (REC2/RECFL2)		
Date:	03/01/05 04/29/05	Temp:	17c	Cable:	CBL022 11-17-2005.cbl		
Standard:	FCC Part 15.207	Humidity:	33%	LISN 1, 2:	LISN11 [1] 6-06-05.lsn	LISN11 [2] 6-06-05.lsn	
Class:	-	Group:	None	LISN 3, N:	NONE.	NONE.	
				Attenuator:	DS22A 11-17-2005.att	Location:	Site 2

Voltage/Frequency: 120V/60Hz Frequency Range: 150 kHz - 30 MHz

Net is the sum of worst-case lisn, cable, & attenuator losses, preamp gain, and initial reading

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	QP Limit dB(uV)	Margin dB	Bandwidth
QP	0.184	28.0	23.5			50.3	64.3	-14.0	9/30 kHz
QP	0.499	14.4	12.9			35.7	56.0	-20.3	9/30 kHz
QP	9.629	24.2	18.4			44.8	60.0	-15.2	9/30 kHz
QP	16.130	23.9	20.4			44.7	60.0	-15.3	9/30 kHz
QP	24.000	12.4	12.2			33.4	60.0	-26.6	9/30 kHz
QP	30.000	17.3	17.2			38.5	60.0	-21.5	9/30 kHz

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	Average Limit dB(uV)	Margin dB	Bandwidth
AVG	0.184	22.4	21.7			44.7	54.3	-9.6	9/30 kHz
AVG	0.499	12.2	12.1			33.5	46.0	-12.5	9/30 kHz
AVG	9.629	18.0	12.4			38.6	50.0	-11.4	9/30 kHz
AVG	16.130	15.9	10.2			36.7	50.0	-13.3	9/30 kHz
AVG	24.000	4.5	10.8			31.8	50.0	-18.2	9/30 kHz
AVG	30.000	-1.4	7.8			29.0	50.0	-21.0	9/30 kHz