



DATE: 25 June 2013

I.T.L. (PRODUCT TESTING) LTD. **FCC Radio Test Report** for **Elpas Solutions Ltd.***

Equipment under test:

Proximity Reader, BUS, 125 kHz

5-LFA00125*

* See customer's letters/declaration on pages 5-6.

Written by:

R. Pinchuck, Documentation

Approved by: _

A. Sharabi, Test Engineer

I. Raz, EMC Laboratory Manager Approved by:

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This report relates only to items tested.





Measurement/Technical Report for Elpas Solutions Ltd.

Proximity Reader, BUS, 125 kHz

5-LFA00125

FCC ID: O4X5-LFA00125

IC: 1467G-5LFA00125

This report concerns: Original Grant: X

Class I change: Class II change:

Equipment type: Part 15 Low Power Transmitter Below 1705 kHz

47CFR15 Section 15.205; 15.209

Application for Certification Applicant for this device:

prepared by: (different from "prepared by")

Ishaishou Raz

ITL (Product Testing) Ltd.

Kfar Bin Nun

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1. General Information

1.1 Administrative Information

Manufacturer: Elpas Solutions Ltd.*

Manufacturer's Address: P.O.B. 13132

30 Habarzel St. Tel Aviv 69710

Israel

Tel: +972-03-7681400 Fax: +972-03-7681415

Manufacturer's Representative: Avi Manela

Equipment Under Test (E.U.T): Proximity Reader, BUS, 125 kHz

Equipment Model No.: 5-LFA00125 **

Equipment Serial No.: Not Designated

Date of Receipt of E.U.T: 13.12.10

Start of Test: 13.12.10

End of Test: 14.12.10; 25.06.13***

Test Laboratory Location: I.T.L (Product Testing) Ltd.

Kfar Bin Nun, ISRAEL 99780

Test Specifications: FCC Part 15 Subpart C

RSS-210 Issue 8

^{*} See customer's letter on following page.

^{**} See customer's declaration on page 6.

^{***} Power lines conducted emission testing was performed on 24.06.13.





Elpas Solutions Ltd. 23 Habarzel Street Tel-Aviv 69710, Israel

Tele: +972 3 768 1400 Fax: +972 3 768 1415 www.elpas.com

From: Meir Erenkrantz, Elpas Solutions Ltd. (Formerly Visonic Technologies (1993) Ltd.)

MErenkrantz@tycoint.com

To Whom It May Concern,

As our new letterhead indicates, we have recently changed the name of our business from Visonic Technologies (1993), Ltd to Elpas Solutions, Ltd. The name change is due to a corporate merger between Visonic Technologies and Tyco Security Products.

There has been no change in management or in our current product offering, therefore we would like to keep our current

IC number.

Sincerely,

Michael Wasserstein

General Manager, Elpas

Ch.

VP Location Based Security, Tyco Security Products





Elpas Solutions Ltd. 23 Habarzel Street Tel-Aviv 69710, Israel

Tele: +972 3 768 1400 Fax: +972 3 768 1415 www.elpas.com

We, the undersigned,

Company: Elpas Solutions, Ltd.

Address: 23 Habarzel Street, Tel Aviv 69710

Country: Israel

Telephone number: +972-3-768-1400 Fax number: +972-3-768-1415

certify and declare under our sole responsibility that the tested unit was 5-LFA00125 and Door Proximity RDR 485 is its former name and no changes have been made to the unit since it was originally tested in April 2009.

Reissued by:	
Tel-Aviv, Israel	Michael Wasserstein
March 12, 2013	General Manager



1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

- 1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
- 2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
- 3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
- 4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
- 5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
- 6. TUV Product Services, England, ASLLAS No. 97201.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.



1.3 Product Description

The Elpas Proximity BUS Reader is a 125 KHz, EM4100 compatible; indoor/outdoor surface mounted proximity reader. The reader features low power consumption, high reliability, and consistent read ranges (up to 10cm/4 inches), regardless of card or tag.

Designed for harsh indoor/outdoor environments, the reader's solid state electronics is housed in an epoxy potted, IP-67 rated, weatherproof thermoplastic casing that ensures years of maintenance free deployments.

The Elpas Proximity BUS Reader contains an onboard I/O that enables the monitoring of general purpose inputs and control of one digital open-collector output. The proximity reader also includes a 2m/6.5f t. long RS-485 power/data cable for interfacing with an Elpas Local Controller or a RF IP Reader.

1.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing September 06, 2009). I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) 0.15 – 30 MHz:

Expanded Uncertainty (95% Confidence, K=2):

 \pm 3.44 dB

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

 $\pm 4.96 \, dB$



2. System Test Configuration

2.1 Justification

The E.U.T. was tested in the horizontal position simulating the actual mounting position of the unit.

2.2 EUT Exercise Software

The EUT was tested with the standard system software.

2.3 Special Accessories

No special accessories were needed.

2.4 Equipment Modifications

No modifications were needed in order to achieve compliance

2.5 Configuration of Tested System



Figure 1. Configuration of Tested System



3. Conducted and Radiated Measurement Test Set-up Photos



Figure 2. Conducted Emission From AC Mains Test



Figure 3. Radiated Emission Test



4. Conducted Emission From AC Mains

4.1 Test Specification

F.C.C., Part 15, Subpart C

4.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 3.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via a 50 Ohm / 50 μ Hn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Test Results

JUDGEMENT:

The margin between the emission levels and the specification limit is, in the worst case, 16.41 dB for the phase line at 230 kHz and 16.24 dB at 622 kHz for the neutral line.
The EUT met the F.C.C. Part 15, Subpart C specification requirements.
The details of the highest emissions are given in <i>Figure 4</i> to <i>Figure 7</i> .
TEST PERSONNEL:
Tester Signature: Date: 25.06.13
Typed/Printed Name: A. Yizhak

Passed by 16.24 dB



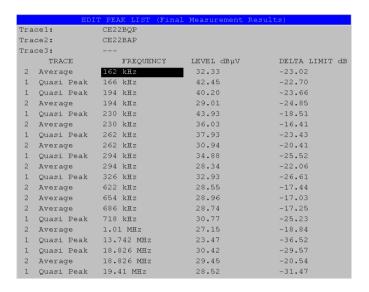
E.U.T Description Proximity Reader, BUS, 125 kHz

Type 5-LFA00125 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C

Lead: Phase

Detectors: Quasi-peak, Average



Date: 24.JUN.2013 16:56:19

Figure 4. Detectors: Quasi-peak, Average

Note: DELTA LIMIT refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.



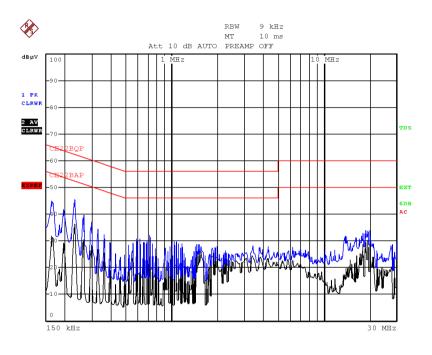
E.U.T Description Proximity Reader, BUS, 125 kHz

Type 5-LFA00125 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C

Lead: Phase

Detectors: Quasi-peak, Average



Date: 24.JUN.2013 16:50:51

Figure 5. Detectors: Quasi-peak, Average



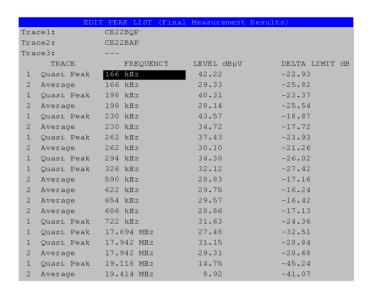
E.U.T Description Proximity Reader, BUS, 125 kHz

Type 5-LFA00125 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C

Lead: Neutral

Detectors: Quasi-peak, Average



Date: 24.JUN.2013 17:05:24

Figure 6. Detectors: Quasi-peak, Average

Note: DELTA LIMIT refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.



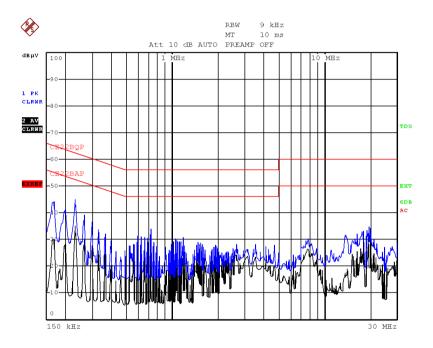
E.U.T Description Proximity Reader, BUS, 125 kHz

Type 5-LFA00125 Serial Number: Not Designated

Specification: F.C.C., Part 15, Subpart C

Lead: Neutral

Detectors: Quasi-peak, Average



Date: 24.JUN.2013 17:03:36

Figure 7 Detectors: Quasi-peak, Average



4.4 Test Equipment Used, Conducted Emission from AC Mains Test

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Period
LISN	EMCO	3810/2BR	1297	December 16, 2012	1 Year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	December 12, 2012	1Year

Figure 8 Test Equipment Used



5. Average Factor Calculation

- 1. Pulse period = N/A
- 2. Pulse duration = N/A
- 3. Burst duration = N/A
- 4. Time between bursts = N/A
- 5. Average Factor = $20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100 \text{msec}} \times \text{Num of burst within } 100 \text{msec} \right]$

Average Factor =
$$20 \log \left[\frac{1}{1} \times 1 \right] = 0 dB$$



6. Field Strength of Fundamental 125 kHz Transmitter

6.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.209

6.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.

The EMI receiver was set to the E.U.T. Fundamental Frequency (125 kHz) and Peak Detection.

The distance between the E.U.T. and test antenna was 3 meters.

The turntable and antenna were adjusted for maximum level reading on the EMI receiver. The loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter.

6.3 Test Results

JUDGEMENT: Passed by 12.82 dB

The EUT met the FCC Part 15, Subpart C, Section 15.209 specification requirements.

The details of the highest emissions are given in Figure 9.

TEST PERSONNEL:

Tester Signature: Date: 24 April 2013

Typed/Printed Name: A. Sharabi



Field Strength of Fundamental

E.U.T Description Proximity Reader, BUS,

125 kHz

Model Number 5-LFA00125
Part Number: Not Designated

Frequency	Peak Reading	Specification	Margin
(MHz)	(dBµV/m)	$(dB\mu V/m)$	(dB)
0.125	92.85	105.67	-12.82

Figure 9. Field Strength of Fundamental

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

 $L_{im300m} = 25.67 \; dB\mu V/m$ $L_{im3m} = 25.67 \; dB\mu V/m + 80.0 \; dB\mu V/m = 105.67 \; dB\mu V/m$



Field Strength of Fundamental

E.U.T Description Proximity Reader, BUS,

125 kHz

Model Number 5-LFA00125
Part Number: Not Designated

49 14:53:30 DEC 14, 2010

ACTV DET: PEAK

MEAS DET: PEAK QP AVG

MKR 123.58 kHz 92.85 dB₄V/m

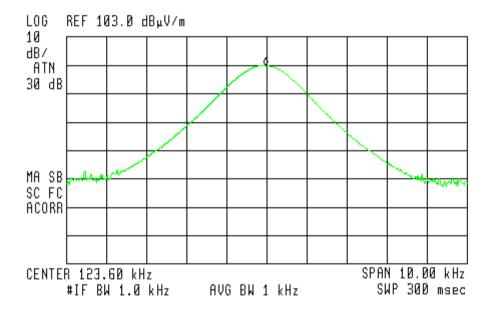


Figure 10. Field Strength of Fundamental

 $L_{im300m} = 25.67 \; dB\mu V/m$ $L_{im3m} = 25.67 \; dB\mu V/m + 80.0 \; dB\mu V/m = 105.67 \; dB\mu V/m$



6.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	НР	85422E	3906A00276	November 24, 2010	1 year
RF Section	НР	85420E	3705A00248	November 24, 2010	1 year
Passive Loop Antenna	EMCO	6509	9702-1411	October 19, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A

6.1 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB\u00e4v/m]

RA: Receiver Amplitude [dBµv]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

Example: $FS = 30.7 \text{ dB}\mu\text{V}$ (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dB μV

No external pre-amplifiers are used.



7. Radiated Emission, 9 kHz – 30 MHz

7.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

7.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was operated at the frequency of 125 kHz. This frequency was measured using a peak detector.

7.3 Test results

JUDGEMENT: Passed by 25.13 dB

The EUT was tested and it met the requirements of the FCC Part 15, Subpart C, specification.

TEST PERSONNEL:

Tester Signature:

Typed/Printed Name: A. Sharabi

Date: 24 April 2013



Radiated Emission

E.U.T Description Proximity Reader,

BUS, 125 kHz

Type 5-LFA00125 Serial Number: Not Designated

Specification: FCC Part 15, Subpart C

Antenna: 3 meters distance Frequency range: 9 kHz to 30 MHz

Detectors: Peak

Frequency	Peak Reading	Average Factor	Average Reading	Average Specification	Margin
(kHz)	$(dB\mu V/m)$	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
370.0	54.0	0.0	54.0	96.12	-42.12
1359.4	39.81	0.0	39.81	64.94	-25.13

Figure 11. Radiated Emission. Detectors: Peak, Quasi-peak

Note: Margin refers to the test results obtained minus specified requirement; thus

a positive number indicates failure, and a negative result indicates that the

product passes the test.



7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	НР	85422E	3906A00276	November 25, 2010	1 year
RF Section	НР	85420E	3705A00248	November 25, 2010	1 year
Passive Loop Antenna	EMCO	6509	9702-1411	October 19, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A

7.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB\(\mu\)v/m]

RA: Receiver Amplitude [dBµv]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

Example: $FS = 30.7 \text{ dB}\mu\text{V}$ (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dB μV

No external pre-amplifiers are used.



8. Bandwidth

8.1 Test Procedure

The E.U.T. was operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer was set to 10 kHz. The resolution bandwidth was set to 1 kHz and the video bandwidth was set to 3 kHz.

The E.U.T. bandwidth was measured.

8.2 Test Results

The measured bandwidth appears in Figure 12.

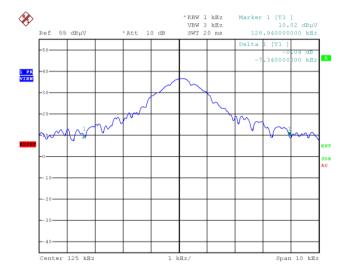


Figure 12. Bandwidth



8.3 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	Rohde & Schwarz	ESCI7	100724	July 15, 2010	1 year



9. APPENDIX A - CORRECTION FACTORS

9.1 Correction factors for

CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY	CORRECTION
FREQUENCY	
	FACTOR
(MHz)	(dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.1
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.0
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0 2000.0	9.1 9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

- 1. The cable type is RG-214.
- 2. The overall length of the cable is 27 meters.
- 3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".



9.2 Correction factors for PASSIVE LOOP ANTENNA Model 6509 S/N 9702-1411

	Magnetic	Electric
FREQUENCY	Antenna	Antenna
	Factor	Factor
(MHz)	$(dB\mu V/m)$	$(dB\mu V/m)$
0.05	99.9	101.1
0.08	92.5	93.9
0.35	86.9	88.2
0.5	81.9	83.1
0.9	84.6	83.2
2.0	84.0	85.3
10.0	83.1	84.5



10. Comparison requirements FCC with Industry Canada

FCC	According FCC Standard	IC Standard
Specification		
Radiated Emission	FCC	RSS 210 Issue 8
	Part 15.209	Clause 2.5