



DATE: 09 February 2015

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

Elpas Solutions Ltd.

Equipment under test:

**ALC LF BUS Beacon
(125 kHz)**

**5-ALC11121-0; 5-ALC11122-0;
5-ALC11123-0; 5-ALC01121-0*;
5-ALC01122-0*; 5-ALC01123-0*;**

* See customer's declaration on page 5

Tested by:

M. Zohar

Approved by:

D. Shidlowsky

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This report relates only to items tested.



Measurement/Technical Report for Elpas Solutions Ltd.

ALC LF BUS Beacon

5-ALC11121-0

FCC ID: O4X5-ALC01121-0

IC: 1467G-5ALC011210

This report concerns:

Original Grant: X

Class I change:

Class II change:

Equipment Type:

Part 15 Low Power Transmitter
Below 1705 kHz

Limits used:

47CFR15 Section 15.209

Application for Certification
prepared by:

R. Pinchuck
ITL (Product Testing) Ltd.
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Applicant for this device:
(different from "prepared by")

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1. General Information

1.1 Administrative Information

Manufacturer:	Elpas Solutions Ltd.
Manufacturer's Address:	23 Habarzel St., Tel-Aviv, 6971031, Israel Tel: +972-3-768-1400 Fax: +972-3-768-1415
Manufacturer's Representative:	Arick Elshtein
Equipment Under Test (E.U.T):	ALC LF BUS Beacon
Equipment Model No.:	5-ALC11121-0;5-ALC11122-0; 5ALC11123-0 ; 5-ALC01121-0*; 5-ALC01122-0*; 5-ALC01123-0*
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	22.06.14
Start of Test:	22.06.14
End of Test:	22.01.15
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, 2010

*See customer's Declaration on following page.



From Tyco Security Products

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23 Habarzel Street
Tel-Aviv 69710, Israel

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

Date February 9, 2015

DECLARATION

**I HEREBY DECLARE THE FOLLOWING AS IT RELATES TO THE BELOW
ELPAS BUS EXCITER ALC MODELS:**

Elpas 2:

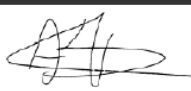
- 5-ALC01121-0 - LF Exciter 125 kHz Weigand indoor TX
- 5-ALC01122-0 - LF Exciter 125 kHz Weigand outdoor TX
- 5-ALC01123-0 - LF Exciter 125 kHz Weigand outdoor TX loop

Elpas 3:

- 5-ALC11121-0 - LF Exciter 125 kHz Weigand indoor TX
- 5-ALC11122-0 - LF Exciter 125 kHz Weigand outdoor TX
- 5-ALC11123-0 - LF Exciter 125 kHz Weigand outdoor TX loop

1. All models contain the identical 125 kHz transmitter.
2. All models contain the identical 433 MHz transmitter.
3. The 5-ALC01121-0 and 5-ALC11121 have an identical indoor enclosure and the 5-ALC01122-0, 5-ALC01123-0, 5-ALC11122-0 and 5-ALC11123-0 have an identical outdoor enclosure.
4. The 5-ALC01121-0, 5-ALC01122-0, 5-ALC11121-0, 5-ALC11122-0 have integral loop antennas.
5. The 5-ALC01123-0 and 5-ALC11123-0 have an external antenna which can vary from 10-80 meters in length. The 5-ALC11123-0 was tested using both a 10 meter and 80 meter antenna to cover the 10-80 meter length variations.
6. The 5-ALC01121-0 and 5-ALC11121-0 have a mechanical tamper switch and the 5-ALC01122-0, 5-ALC01123 -0, 5-ALC11122-0 and 5-ALC11123 -0 have an optical tamper sensor.
7. The Elpas 2 models have continuous transmission LF NRZ in ASK modulation with a 50% duty cycle.
8. The Elpas 3 models have LF Manchester transmission in GFSK transmission with a 0.0889 duty cycle.

Please relate to all of them (from a radio point of view) as the same product.

Reissued by:	
Tel-Aviv, Israel 9 February 2015	 Arick Elshtein Certification Manager



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.

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.



1.2 Product Description

The Elpas ALC LF BUS Beacon is a fully supervised, 125 kHz emitter that adds instantaneous location, choke-point (a door or any other opening that controls ingress and egress from a protected area), awareness to RTLS security, and safety applications

The LF BUS Beacon generates a user-adjustable, elliptically shaped electromagnetic field up to 4m/13ft (perpendicular to the device) and 3.5m/11.5ft (parallel to the device) in radius that can be used to cover a single interior doorway. Optionally, up to four ALC LF BUS Beacons can be deployed in 'Primary-Secondary' (up to three secondary devices) star or daisy-chain topologies to cover large double-doors or architectural complex indoor entrance/exit areas. The DIP Switch setting determines which is primary and which is secondary.

The ALC LF BUS Beacon contains two general purpose analog inputs (IN1 and IN2) and two open collector outputs (OC1 and OC2). The device forces a choice between IN2 and OC2. The device also provides the choice of either two digital inputs or two 26-bit Wiegand device outputs. The DIP Switches setting determines these selections.

Note: An Elpas RS-485 BUS may contain up to fifteen Elpas BUS devices (such as RF or IR Readers, Elpas Display Panels, LF Beacons or other Primary BUS Beacons) which are wired together with Elpas RS-485 Junction Boxes (P/N:5-JBA10485).

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2009 and RSS-Gen, Issue 4. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.4 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 November 21, 2012).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.



1.5 Measurement Uncertainty

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):

± 4.96 dB

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):

± 3.44 dB

2. System Test Configuration

2.1 *Justification*

The following units were tested:

- 5-ALC11121-0 – indoor unit, integral antenna for 125 kHz transmitter
- 5-ALC11122-0 – outdoor unit, integral antenna for 125 kHz transmitter
- 5-ALC11123-0 – outdoor unit, external antenna (ranging from 10m-80m) – tested separately with a 10 meter and 80 meter antenna for 125 kHz transmitter.

The EUT's were tested in three orthogonal orientations. The worst case orientation was the installation position.

2.2 *Special Accessories*

No special accessories were needed to achieve compliance.

2.3 *Equipment Modifications*

No equipment modifications were required to achieve compliance.

2.4 *Configuration of Tested System*

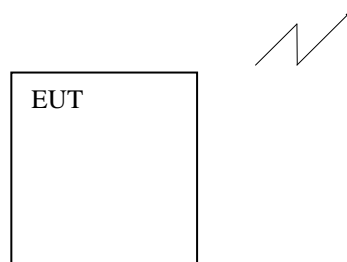


Figure 1. Configuration of Tested System

3. Test Set-up Photos



Figure 2. Conducted Emission Test



Figure 3. Radiated Emission Test – 5-ALC11121-0

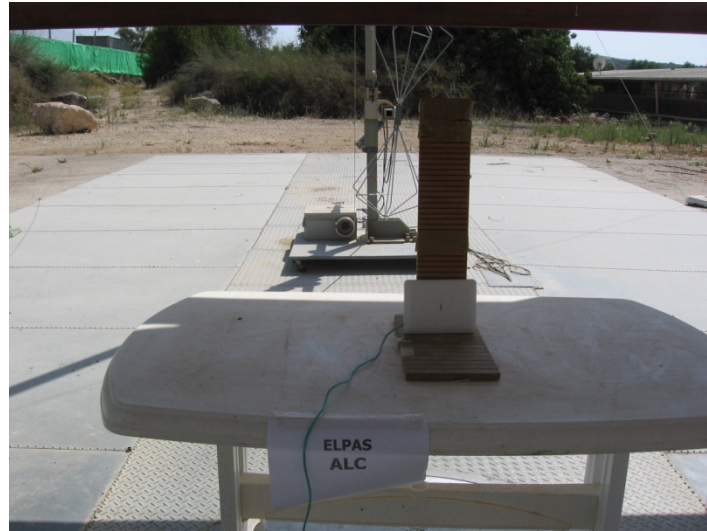


Figure 4. Radiated Emission Test - 5-ALC11121-0



Figure 5. Radiated Emission Test - 5-ALC11122-0



Figure 6. Radiated Emission Test - 5-ALC11122-0

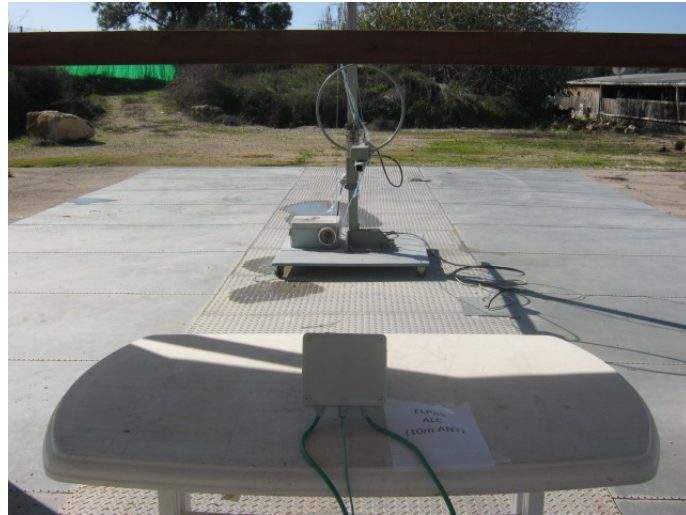


Figure 7. Radiated Emission Test - 5-ALC11123-0 10m antenna



Figure 8. Radiated Emission Test - 5-ALC11123-0 10m antenna



Figure 9. Radiated Emission Test - 5-ALC11123-0 80m antenna



Figure 10. Radiated Emission Test - 5-ALC11123-0 80m antenna



4. Conducted Emission From AC Mains

4.1 Test Specification

0.15 - 30 MHz, FCC Part 15, Subpart C, CLASS B

4.2 Test Procedure

The E.U.T operation mode and test setup are as described in Section 4.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T placed on a 0.4 meter high wooden table. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered via 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.'s 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 effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in the photograph, *Figure 2*.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are pre-loaded to the receiver 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, 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

The E.U.T met the requirements of the FCC Part 15, Subpart C, Class B specifications.

The margin between the emission levels and the specification limit is, in the worst case, 0.72 dB for the phase line at 21.626 MHz and 1.38 dB at 21.498 MHz for the neutral line.

The details of the highest emissions are given in *Figure 11* to *Figure 14*.

TEST PERSONNEL:

Tester Signature: _____  _____ Date: 24.01.15

Typed/Printed Name: M. Zohar



Conducted Emission

E.U.T Description ALC LF BUS Beacon
Type 5-ALC11121-0
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Phase
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP			
Trace2:	CE22BAP			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB	
2 Average	274 kHz	32.74	-18.24	
1 Quasi Peak	398 kHz	49.79	-8.09	
2 Average	406 kHz	35.37	-12.35	
2 Average	1.342 MHz	21.70	-24.29	
1 Quasi Peak	1.486 MHz	35.93	-20.06	
2 Average	2.002 MHz	24.92	-21.07	
1 Quasi Peak	2.266 MHz	35.27	-20.72	
2 Average	2.75 MHz	28.68	-17.31	
1 Quasi Peak	3.498 MHz	32.21	-23.78	
2 Average	3.878 MHz	24.12	-21.87	
1 Quasi Peak	7.874 MHz	42.12	-17.87	
2 Average	7.874 MHz	35.25	-14.74	
1 Quasi Peak	11.874 MHz	46.94	-13.05	
2 Average	11.874 MHz	39.82	-10.17	
1 Quasi Peak	17.25 MHz	55.10	-4.89	
2 Average	17.75 MHz	46.46	-3.53	
2 Average	21.626 MHz	49.27	-0.72	
1 Quasi Peak	21.75 MHz	57.15	-2.84	

Date: 22.JAN.2015 14:23:01

Figure 11. 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.

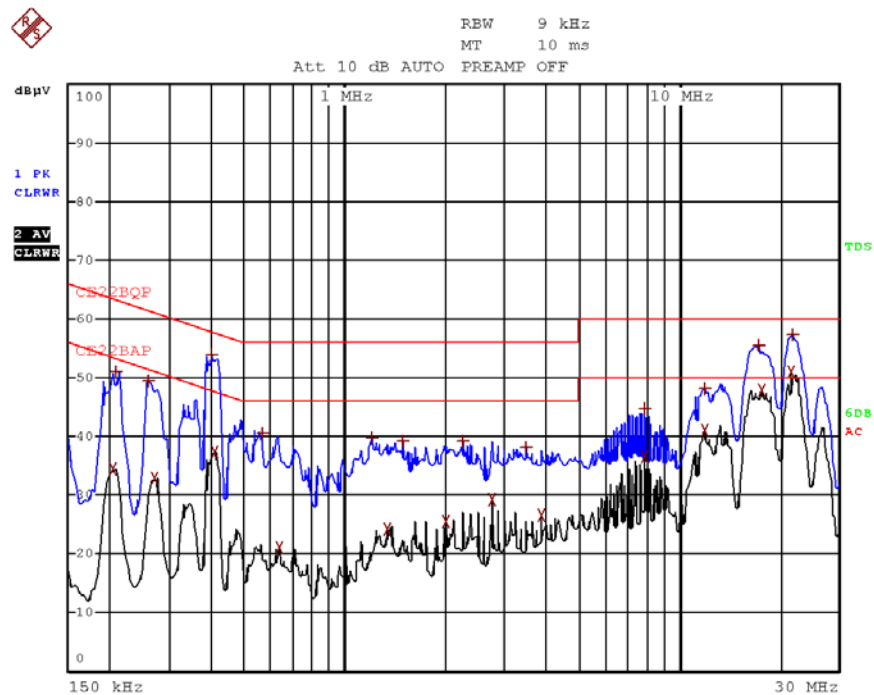
Conducted Emission

E.U.T Description ALC LF BUS Beacon
Type 5-ALC11121-0
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B

Lead: Phase

Detectors: Quasi-peak, Average



Date: 22.JAN.2015 14:17:08

Figure 12 Detectors: Quasi-peak, Average



Conducted Emission

E.U.T Description ALC LF BUS Beacon

Type 5-ALC11121-0

Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B

Lead: Neutral

Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CE22BQP			
Trace2:	CE22BAP			
Trace3:	---			
	TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1	Quasi Peak	266 kHz	45.02	-16.21
1	Quasi Peak	402 kHz	48.36	-9.44
2	Average	414 kHz	34.04	-13.52
1	Quasi Peak	566 kHz	37.44	-18.55
2	Average	1.346 MHz	23.43	-22.56
2	Average	1.414 MHz	27.56	-18.43
1	Quasi Peak	1.558 MHz	38.83	-17.16
1	Quasi Peak	2.126 MHz	37.23	-18.76
2	Average	2.626 MHz	30.03	-15.96
1	Quasi Peak	3.75 MHz	34.92	-21.07
2	Average	4.122 MHz	26.89	-19.10
2	Average	7.75 MHz	37.27	-12.72
1	Quasi Peak	7.874 MHz	44.04	-15.95
1	Quasi Peak	11.874 MHz	48.70	-11.29
2	Average	12.126 MHz	40.59	-9.40
2	Average	16.874 MHz	48.39	-1.60
1	Quasi Peak	17.25 MHz	55.45	-4.54
2	Average	21.498 MHz	48.61	-1.38
1	Quasi Peak	21.75 MHz	57.06	-2.93

Date: 22.JAN.2015 14:28:57

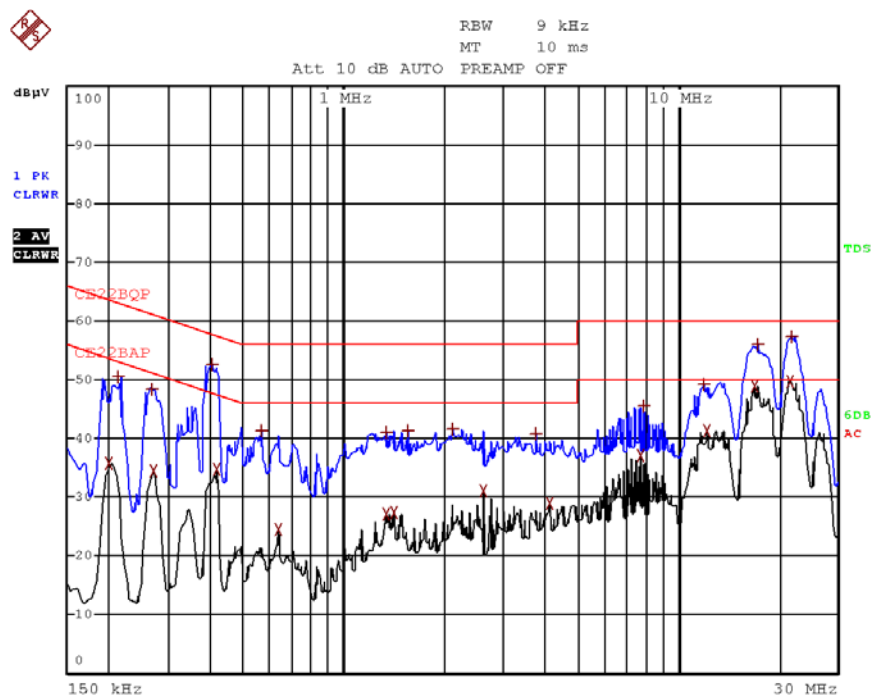
Figure 13. Detectors: Quasi-peak, Average

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.

Conducted Emission

E.U.T Description ALC LF BUS Beacon
Type 5-ALC11121-0
Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, Class B
Lead: Neutral
Detectors: Quasi-peak, Average



Date: 22.JAN.2015 14:27:01

Figure 14 Detectors: Quasi-peak, Average



4.1 Test Instrumentation Used; Conducted Emission

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
LISN	Fischer	FCC-LISN-25A	127	June 23, 2014	1 year
Transient Limiter	HP	11947A	3107A03041	May 13, 2014	1 year
EMI Receiver	Rohde & Schwarz	ESCI7	100724	January 4, 2015	1 year

Figure 15 Test Equipment Used

5. 26dB Minimum Bandwidth

5.1 Test Specification

F.C.C. Part 15, Subpart C, part 2.1049

5.2 Test procedure

The E.U.T was placed on a non-metallic table, 0.8 meters above the ground plane, on a remote-controlled turntable in the OATS. The test distance was 3 meters. The transmitter unit operated with normal modulation. The EMI receiver was set to 1 kHz resolution BW. The spectrum bandwidth of the transmitter unit was measured and recorded. The test was performed to measure the transmitter occupied bandwidth. The EUT was set up as shown in Figure 3, and its proper operation was checked. The transmitter occupied bandwidth was measured with the EMI receiver as frequency delta between reference points on modulation envelope. The E.U.T. was tested at 125 KHz.

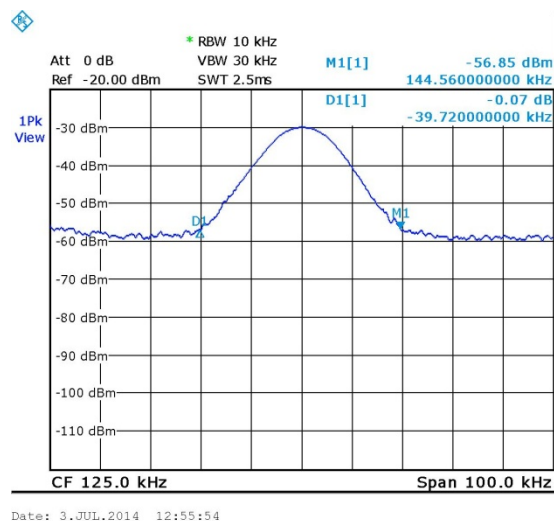


Figure 16. 125 kHz



5.3 Test Results

E.U.T Description: ALC LF BUS Beacon

Model: 5-ALC11121-0

Serial Number: Not Designated

Operation Frequency (MHz)	Bandwidth Reading (MHz)
125K	39.72K

Figure 17 Test Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____

Date: 06.01.15

Typed/Printed Name: M. Zohar



5.4 Test Equipment Used; 26 dB Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2014	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
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 18 Test Equipment Used

6. Field Strength of Fundamental

6.1 Test Specification

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

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

The details of the highest reading given in *Figure 20*.

TEST PERSONNEL:

Tester Signature:  Date: 06.01.15

Typed/Printed Name: M. Zohar

Antenna Type	Reading (dBμV/m)	Average Factor (dB)	AVG Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5ALC11121-0 (indoor) Integral Loop	90.46	-6.02	84.44	105.6	-21.16
5ALC11123-0 (outdoor)10m	82.06	-6.02	76.04	105.6	-29.56
5ALC11123-0 (outdoor) 80m	62.91	-6.02	56.89	105.6	-48.71

Figure 19 Test Results



Field Strength of Fundamental

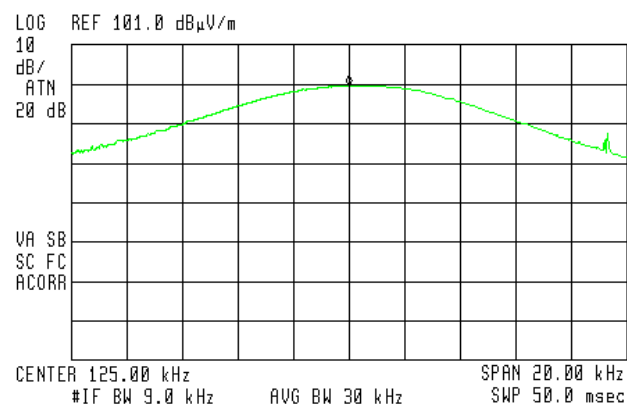
E.U.T Description ALC LF BUS Beacon

Type 5-ALC11121-0

Serial Number: Not Designated



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 125.00 kHz
90.46 dB μ V/m



**Figure 20. Field Strength of Fundamental.
Detector: Peak – 5-ALC11121-0**



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 125.40 kHz
82.06 dB μ V/m

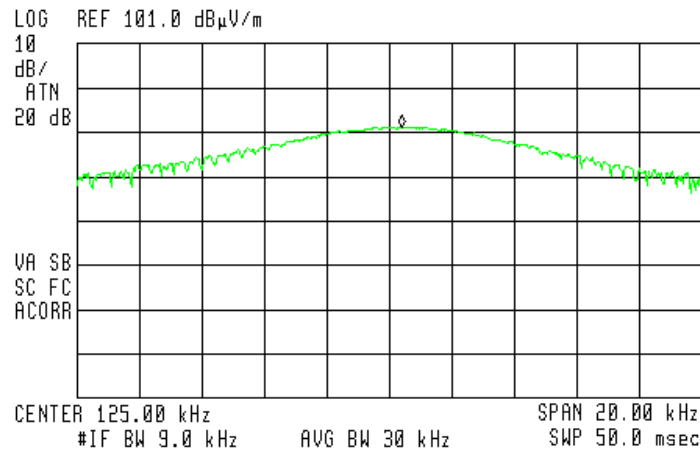


Figure 21. Field Strength of Fundamental.
Detector: Peak – 5-ALC11123-0 10m Antenna



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 125.040 kHz
62.91 dB μ V/m

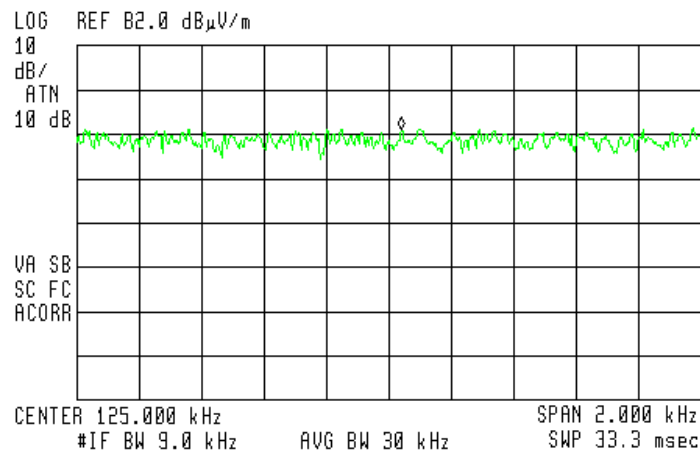
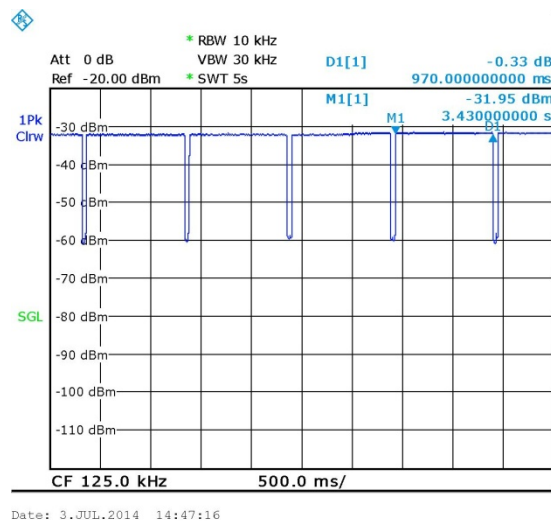


Figure 22. Field Strength of Fundamental.
Detector: Peak – 5-ALC11123-0 80m Antenna

Average Factor Calculation

1. Burst duration = 970 msec
2. Time between bursts >100msec
3. Assuming “MANCHESTER” code used the ratio between pulse duration to pulse period is 0.5
4. Average Factor = $20 \log \left[\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{burst duration}}{100\text{msec}} \times \text{Num of burst within 100msec} \right]$

$$\text{Average Factor} = 20 \log[0.5 \times 1 \times 1] = -6.02\text{dB}$$



Date: 3.JUL.2014 14:47:16

Figure 23. Burst Duration



6.4 Test Equipment Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2014	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
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 24. Test Equipment 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 3.1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying with 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 10 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

The EUT was tested and it met the requirements of the FCC Part 15, Subpart C, Section 209 specification.

For all tested configurations, results were not above the limit.

TEST PERSONNEL:

Tester Signature: _____

Date: 06.01.15

Typed/Printed Name: M. Zohar

7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2013	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

Figure 25. Test Equipment Used

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 μ v/m]
 RA: Receiver Amplitude [dB μ v]
 AF: Receiving Antenna Correction Factor [dB/m]
 CF: Cable Attenuation Factor [dB]

Example: FS = 30.7 dB μ V (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dB μ V

No external pre-amplifiers are used.

8. Spurious Radiated Emission

8.1 Test Specification

30 - 1000 MHz, F.C.C., Part 15, Subpart C

8.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3. See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

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 4*.

The signals from the list of the highest emissions were verified and the list was updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

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

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The emissions were measured at a distance of 3 meters.



8.3 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C specification.

TEST PERSONNEL:

Tester Signature: _____

Date: 06.01.15

Typed/Printed Name: M. Zohar

Frequency (MHz)	Peak (dBuV/m)	Q.Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)
43.2	40.1	33.9	40	-6.1
58.7	38.0	30.4	40	-9.6
65.5	35.8	30.9	40	-9.1

Figure 26. Spurious Radiated Emission Test – 5-ALC11121-0 Integral Loop Antenna

Frequency (MHz)	Peak (dBuV/m)	Q.Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)
43.2	34.1	26.7	40	-13.3
58.7	35.2	29.0	40	-11.0
65.5	31.0	21.6	40	-18.4

Figure 27. Spurious Radiated Emission Test – 5-ALC11123-0 10m Antenna

Frequency (MHz)	Peak (dBuV/m)	Q.Peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
43.2	35.0	24.2	40	-15.8	
58.7	35.5	29.0	40	-11.0	
65.5	31.8	24.7	40	-15.3	

Figure 28. Spurious Radiated Emission Test – 5-ALC11123-0 80m Antenna



8.4 Test Equipment Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	January 15, 2014	1 year
RF Section	HP	85420E	3705A00248	January 15, 2014	1 year
Active Loop Antenna	EMCO	6502	9506-2950	November 4, 2013	1 year
Antenna Biconical	EMCO	3104	2606	August 30, 2012	2 years
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
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

Figure 29. Test Equipment Used

9. APPENDIX A - CORRECTION FACTORS

9.1 Correction factors for CABLE from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	7.3
20.0	0.6	1400.0	7.8
30.0	0.8	1600.0	8.4
40.0	0.9	1800.0	9.1
50.0	1.1	2000.0	9.9
60.0	1.2	2300.0	11.2
70.0	1.3	2600.0	12.2
80.0	1.4	2900.0	13.0
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	4.3		
600.0	4.7		
700.0	5.3		
800.0	5.9		
900.0	6.3		
1000.0	6.7		

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 CABLE
from EMI receiver
to test antenna
at 3 meter range.

FREQUENCY	CORRECTION
(GHz)	FACTOR
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

- 1. The cable type is RG-8.*
- 2. The overall length of the cable is 10 meters.*



9.4 **Correction factors for** **ACTIVE LOOP ANTENNA**
Model 6502
S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2



10. APPENDIX B – Comparison of Industry Canada Requirements with FCC Requirements

IC: 1467G-5ALC01121-0

FCC ID: OX45-ALC01121-0

FCC Specification	FCC Standard	IC Standard
Spurious Emission	47CFR15.209	RSS-210, Issue 8 Section 2.5