Nemko Test Report: 6L0173RUS1

Applicant:
Allflex-Boulder
2820 Wilderness Place, Suite A
Boulder, CO 80301
USA

Equipment Under Test:

P/N	S/N
940030-001 B	206194001
940031-001 B	206194002
940032-001 B	206194003
940033-001 B	206194004
940018-001 A1	206064611
940014-001 A2	206064602

In Accordance With: **FCC Part 15, Subpart C, Paragraph 15.209**
General Limits For Low Power Transmitters

Tested By:
Nemko USA Inc.
802 N. Kealy
Lewisville, TX 75057
USA

Authorized By:
David Light, Senior Wireless Engineer

Date: 27 June 2006

Table Of Contents

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

Section 1. Summary Of Test Results

Manufacturer: Allflex

P/N	S/N
940030-001 B	206194001
940031-001 B	206194002
940032-001 B	206194003
940033-001 B	206194004
940018-001 A1	206064611
940014-001 A2	206064602

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart C for low power devices. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated Emissions were made on an open area test site.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207	Complies
Radiated Emissions	15.209	Complies
Occupied Bandwidth	Not Specified	NA

Section 2. General Equipment Specification

Frequency Range:	134.2 Fixed
Operating Frequency(ies) of Sample:	134.2 kHz
20 dB Bandwidth	3.84 kHz

	Yes	No
Integral Antenna	☒	☐

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

EQUIPMENT CONFIGURATION LIST (HARDWARE/PERIPHERALS):

Place an "*" next to EUT and any item that is part of the EUT.

Item	*	Generic Description	Manufacturer	Model No.	Serial #	Rev.	FCC ID Status[1]
(A)	*	Small Antenna	Allflex	940030-001 B	206194001		
(B)		Medium Antenna	Allflex	940031-001 B	206194002		
(C)		Intermediate Antenna	Allflex	940032-001 B	206194003		
(D)		Large Antenna	Allflex	940033-001 B	206194004		
(E)		12vdc power supply	Allflex	940018-001 A1	206064611		
(F)		6vdc power supply	Allflex	940018-001 A2	206064602		
(G)							
(H)							
(I)							
(J)							
(K)							
(L)							

[1] FCC ID STATUS
1. FCC DOC
2. FCC A/B Verification
3. None - (If performing FCC testing, contact lab manager)
4. Certification (include FCC ID in parenthesis)

INTER-CONNECTION CABLES:

Place an "*" next to EUT and any item that is part of the EUT.

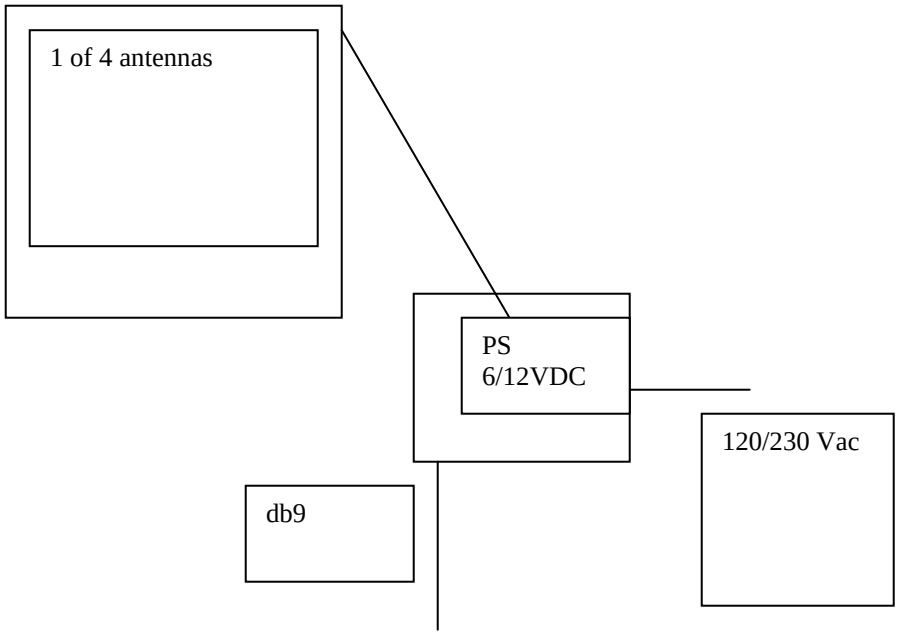
Item	*	Cable Type	Manufacturer	Ln (m)	Term[2]	Shield	Qty.
(1)							
(2)							
(3)							
(4)							
(5)							
(6)							
(7)							
(8)							
(9)							
(10)							
(11)							
(12)							
(13)							

[2] TERMINATION
1. Peripheral
2. Loopback
3. EUT
4. Resistive
5. Remote Equipment
6. Other _____

Description of DUT

Livestock ID reader

System Diagram



Section 3. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: Kevin Rose	DATE: 9-13 June 2006

Test Results: Complies. The worst-case emission level is 62.8 dBµV at 0.150 MHz on the hot side of the line. This is 3.2 dB below the quasi-peak specification limit of 66 dBµV.

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Conducted Emission (MHz)	Limit (dBmV) Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Measurement Data: See attached graph(s).

Method of Measurement: (Procedure ANSI C63.4-2003)

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak Detector. Any emissions that are close to the limit are measured using a test receiver with 9 kHz bandwidth, CISPR Quasi-Peak Detector.

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

Test #: CEPV-01

Tested By: Kevin Rose

Date of Tests: 6/9/2006

Test Conditions:

Test Voltage: 120Vac

Temperature: 23˚C

Humidity: 49%

Test Results:

The E.U.T. complies.

The worst-case emission is 41.2dBµV at 15.31 MHz on the Neutral side of the line.
This is 8.8 dB below the average specification limit of 50.0dBµV.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
545	LISN	Schwarz Beck	8120	8120350	02/02/06	02/02/07
1555	Filter high pass 5KHz	Solar Electronics	7930-5.0	933125	04/20/06	04/20/07
2076	Cable	Nemko USA, Inc.	None	None	08/10/05	08/10/06
1080	CABLE, 3m	Nemko USA, Inc.	RG223	N/A	03/09/06	03/09/07
1284	Spectrum analyzer display	Hewlett Packard	8566B	1811A00223	02/16/06	02/16/07
1663	Spectrum Analyzer	Rhode & Schwarz	FSP	973351	05/18/06	05/18/07

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

Test Data – Powerline Conducted Emissions

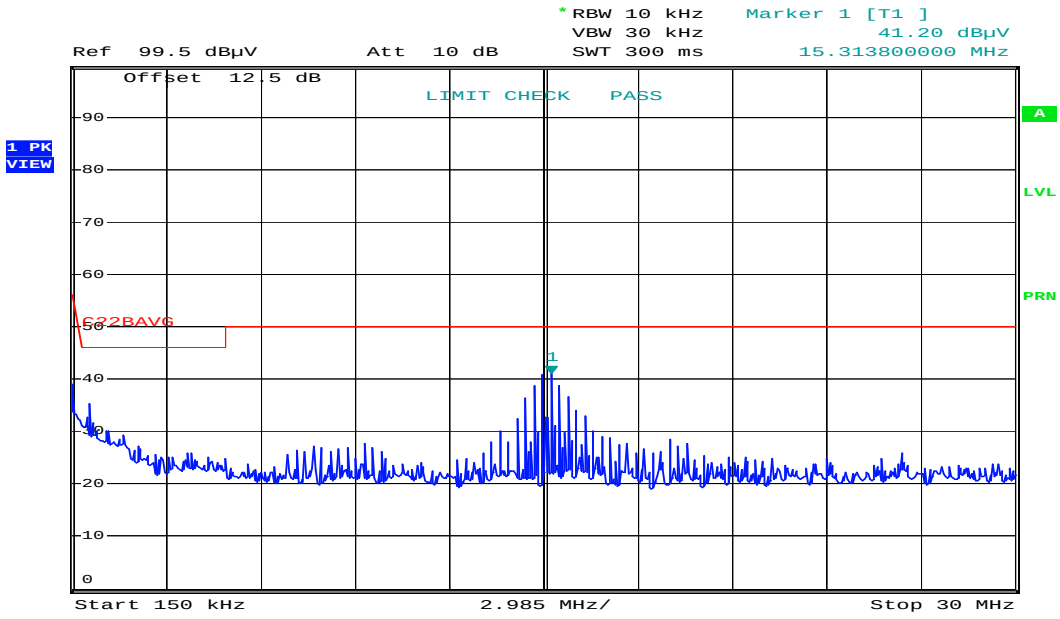
6VOLT UNIT

Conducted Emissions

Powerline Voltage Measurement

Complete	X			Job # :	6L0173E CEPV-01
Preliminary				Page	1 2
Client Name :	Allflex				
EUT Name :	ALLFLEX ISO RFID Panel Readers				
EUT Model # :	940033-001 B Antenna, 940014-001 A2 PS				
EUT Part # :	940033-001 B Antenna, 940014-001 A2 PS				
EUT Serial # :	206194 004, 2060 64602				
EUT Config. :	Largest antenna 6vdc on standby				
	6volt unit				
Specification :	CFR 47 Part 15, Subpart B			Reference :	
Transducer # :	545	Temp. (deg. C) :	23	Date :	6/9/2006
HP Filter # :	1555	Humidity (%) :	49	Time :	14:00
Cable 1 # :	2076	EUT Voltage :	120 Vac	Staff :	Kevin
Cable 2 # :	1080	EUT Frequency :	60 Hz	Location :	SE
Detector 1 # :	1284	Peak Bandwidth:	10kHz	Photo ID:	
Detector 2 # :	1663	QP Bandwidth	9kHz		
Limiter # :		Avg. Bandwidth	9kHz		

Meas. Freq. (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff. (dB)	Comment
15.31	h	p	a	41.2	0	0	41.2	60	50	-8.8	



Comment: Quasi Peak
Date: 9.JUN.2006 11:22:17

Test Data – Powerline Conducted Emissions

Conducted Emissions

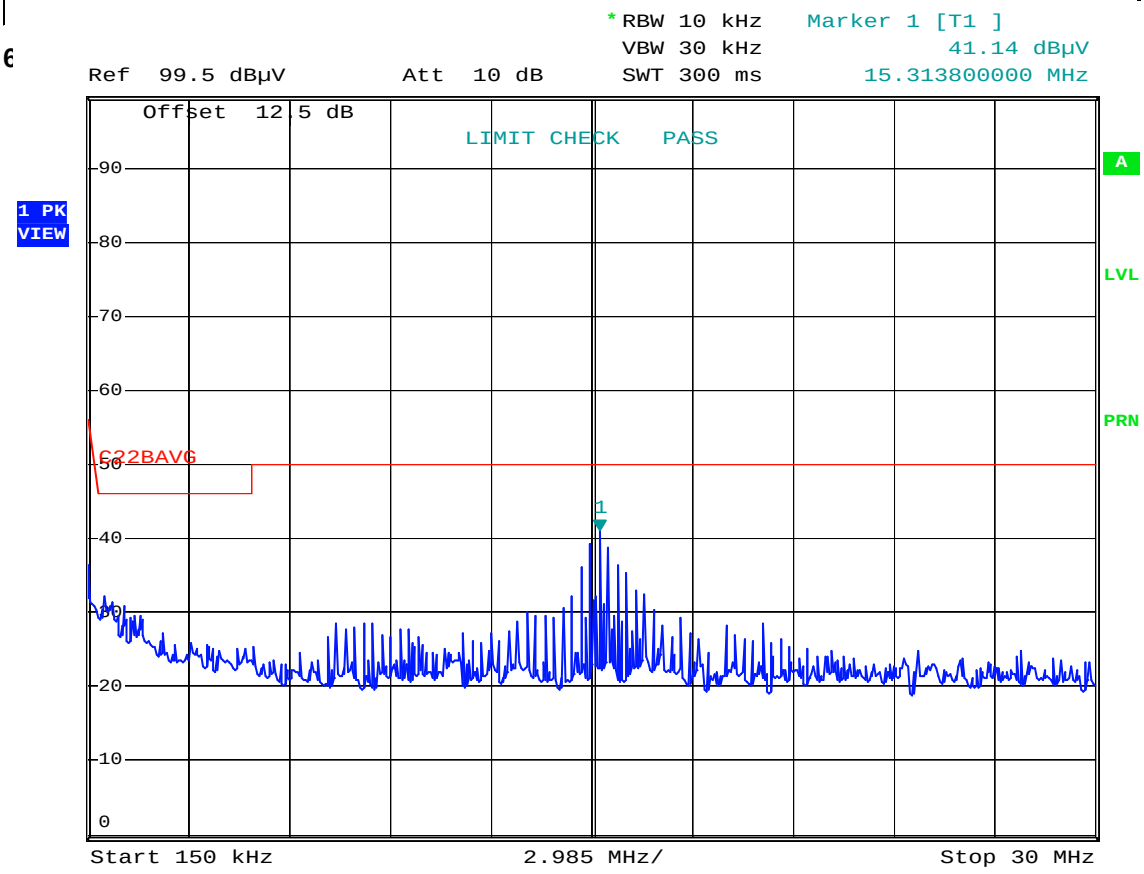
Powerline Voltage Measurement

Complete X — Job # : 6L0173E — Test # : CEPV-01
Preliminary — Page 2 of 2

Client Name : Allflex
EUT Name : ALLFLEX ISO RFID Panel Readers
EUT Model # : 940033-001 B Antenna, 940014-001 A2 PS
EUT Part # : 940033-001 B Antenna, 940014-001 A2 PS
EUT Serial # : 206194 004, 2060 64602
EUT Config. : Largest antenna 6vdc on standby
6volt unit
Specification : CFR 47 Part 15, Subpart B — Reference :

Meas. Freq. (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
15.31	n	p	a	41.1	0	0	41.1	60	50	-8.9	Pass	

6



Comment: Quasi Peak
Date: 9.JUN.2006 11:21:03

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

Test #: CEPV-02

Tested By: Kevin Rose

Date of Tests: 6/13/2006

Test Conditions:

Test Voltage: 120Vac

Temperature: 23˚C

Humidity: 49%

Test Results:

The E.U.T. complies.

The worst-case emission is 41.2dBµV at 15.31 MHz on the Neutral side of the line.
This is 8.8 dB below the average specification limit of 50.0dBµV.

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
545	LISN	Schwarz Beck	8120	8120350	02/02/06	02/02/07
1555	Filter high pass 5KHz	Solar Electronics	7930-5.0	933125	04/20/06	04/20/07
2076	Cable	Nemko USA, Inc.	None	None	08/10/05	08/10/06
1080	CABLE, 3m	Nemko USA, Inc.	RG223	N/A	03/09/06	03/09/07
1284	Spectrum analyzer display	Hewlett Packard	8566B	1811A00223	02/16/06	02/16/07
1663	Spectrum Analyzer	Rhode & Schwarz	FSP	973351	05/18/06	05/18/07

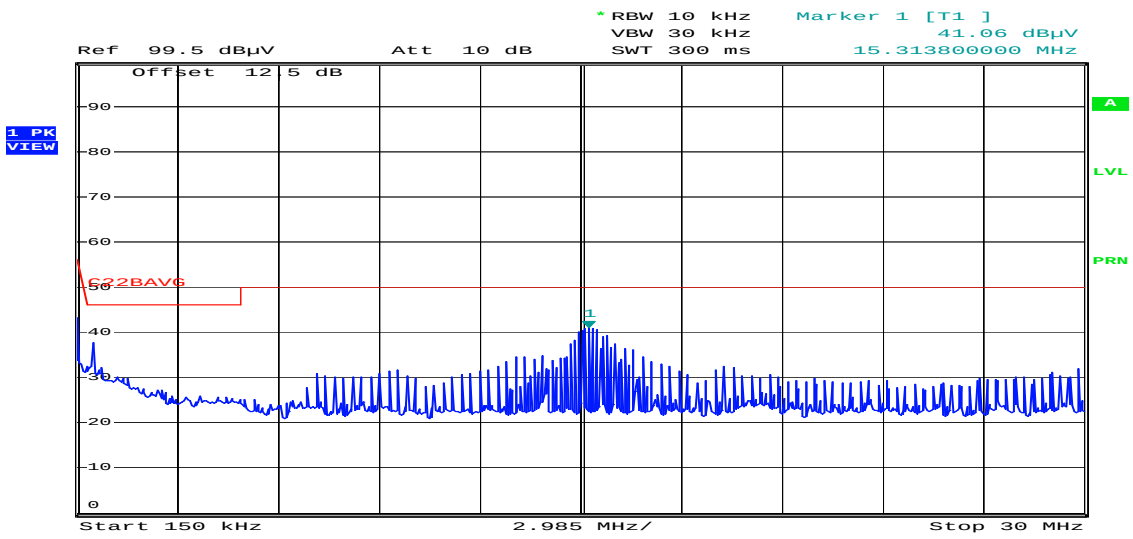
Test Data – Powerline Conducted Emissions

12 volt unit

Conducted Emissions
Powerline Voltage Measurement

Complete	X			Job # : 6L0173E	CEPV-01
Preliminary				Page 1	2
Client Name :	Allflex				
EUT Name :	ALLFLEX ISO RFID Panel Readers				
EUT Model # :	940033-001 B antenna, 940018-001 A1 PS				
EUT Part # :	940033-001 B antenna, 940018-001 A1 PS				
EUT Serial # :	2061 94004, 2060 64611				
EUT Config. :	Largest antenna 12vdc on standby				
	12volt unit				
Specification :	CFR 47 Part 15, Subpart B			Reference :	
Transducer # :	545	Temp. (deg. C) :	23	Date :	6/9/2006
HP Filter # :	1555	Humidity (%) :	49	Time :	14:00
Cable 1 # :	2076	EUT Voltage :	120 Vac	Staff :	Kevin
Cable 2 # :	1080	EUT Frequency :	60 Hz	Location :	SE
Detector 1 # :	1284	Peak Bandwidth:	10kHz	Photo ID:	
Detector 2 # :	1663	QP Bandwidth	9kHz		
Limiter # :		Avg. Bandwidth	9kHz		

Meas. Freq. (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff. (dB)	Comment
15.31	h	p	a	41.1	0	0	41.1	60	50	-8.9	



Comment: Quasi Peak
Date: 13.JUN.2006 09:12:26

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

Test Data – Powerline Conducted Emissions

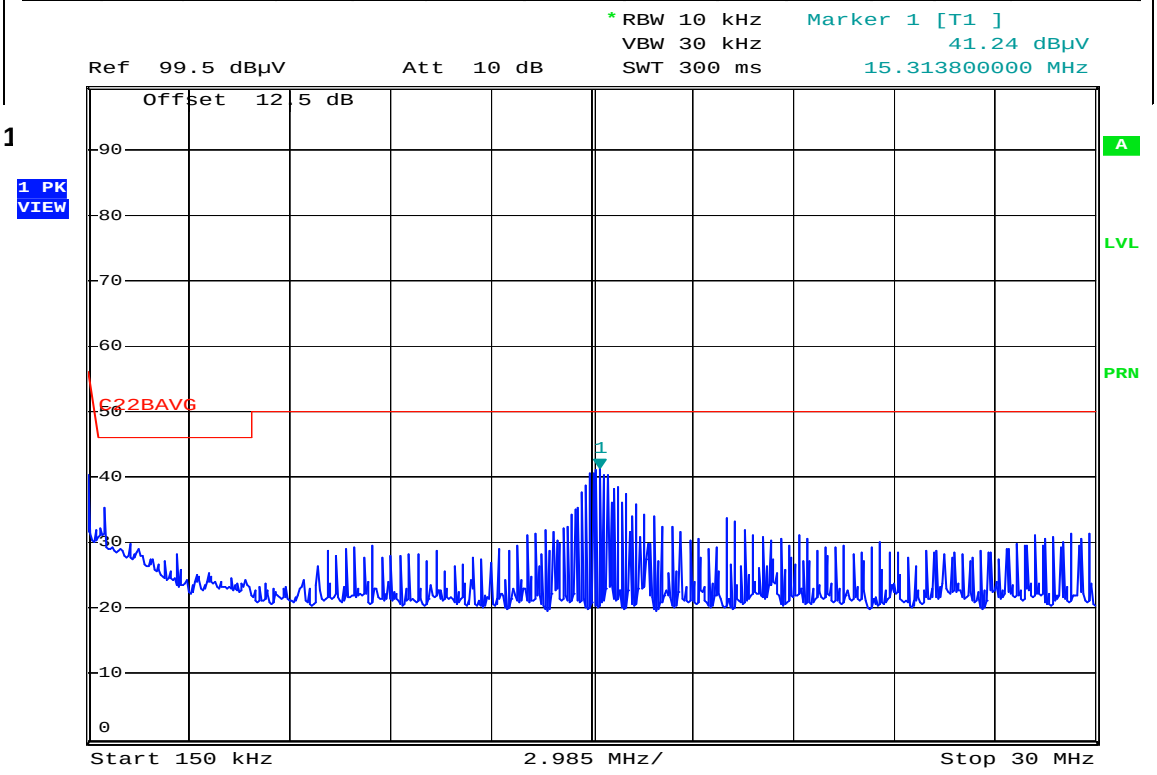
Conducted Emissions
Powerline Voltage Measurement

Complete X
Preliminary

Job # : 6L0173E Test # : CEPV-01
Page 2 of 2

Client Name : Allflex
EUT Name : ALLFLEX ISO RFID Panel Readers
EUT Model # : 940033-001 B antenna, 940018-001 A1 PS
EUT Part # : 940033-001 B antenna, 940018-001 A1 PS
EUT Serial # : 2061 94004, 2060 64611
EUT Config. : Largest antenna 12vdc on standby
12volt unit
Specification : CFR 47 Part 15, Subpart B Reference :

Meas. Freq. (MHz)	EUT Test Point	Detector Type (P,QP, A)	Limit Type (QP, A)	Meter Reading (dBuV)	Path Loss (dB)	Transducer Factor (dB)	Corrected Reading (dBuV)	Spec.limit (dBuV) Q.P.	Spec.limit (dBuV) Avg.	CR/SL Diff. (dB)	Pass Fail Unc.	Comment



Comment: Quasi Peak
Date: 13.JUN.2006 09:13:10

Test Photographs - Test # CEPV-01

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.209
TESTED BY: Kevin Rose	DATE: 18 May 2006

Minimum Standard: The field strength of emissions from the device shall not exceed the following limits.

Fundamental (MHz)	Field Strength (μV/m)	Field Strength (dBμV)
0.009 - 0.490	2400/F(kHz) @ 300m	—
0.490 - 1.705	24000/F(kHz) @ 30m	—
1.705 - 30	30 @ 30m	—
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results: Complies.

Measurement Data: **(Procedure ANSI C63.4-2003)**

Maximizing Emission Levels:
For hand held equipment or equipment that may be mounted in a variety of positions, the E.U.T. was tested on three orthogonal axis to determine orientation of worst-case emission levels. Below 30 MHz an active loop antenna is used at a fixed height of 1 meter. The loop is rotated about it's vertical axis to obtain worst-case results.

Spectrum Searched:
The spectrum was searched from the lowest frequency generated in the E.U.T. up to 1000 MHz, or the 10^{th} harmonic of the fundamental emission.

Near-Field Measurement:
Emissions below 30 MHz are measured in the near-field and an extrapolation factor of 40 dB per decade is used to determine the 10m limit.

Example: Measurement Distance = 10m
Specification Distance = 300m

10m Limit: Specified limit (at 300m) - (40 Log $\frac{10}{300}$)

Thus for measurement at 10m the specified limit is increased by 59 dB.

EQUIPMENT: 940030-001 B 940031-001 B 940032-001 B 940033-001 B 940018-001 A1 940014-001 A2

Test Data - Radiated Emissions

Specification :	15.209			Reference :	
Loop Ant. #:	1140	Temp. (deg. C) :	26	Date :	06/10/06
Bicon Ant.#:		Humidity (%) :	45	Time :	13:40
Log Ant.#:				Staff :	Kevin Rose
Bilog Ant.#:				Photo ID:	NA
Dipole Ant.#:				Peak Bandwidth:	10 kHz
Cable#:	2075			Video Bandwidth	10 kHz
Preamp#:		Distance:	3 m		
Limiter#:	na				
Atten #:	na				
Detector#:	1036				

Meas. Freq. (kHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	QP readings Comment
134.2	Loop	0	61.3	3.6	1.0	0.0	65.9	84.1	-18.2	Pass	large antenna 6VDC
402.6	Loop	0	26.3	-4.2	1.0	0.0	23.1	74.5	-51.4	Pass	large antenna 6VDC
134.2	Loop	0	67.2	3.6	1.0	0.0	71.8	84.1	-12.3	Pass	large antenna 12VDC
402.6	Loop	0	29.8	-4.2	1.0	0.0	26.6	74.5	-47.9	Pass	large antenna 12VDC
134.2	Loop	0	45.3	3.6	1.0	0.0	49.9	84.1	-34.2	Pass	small antenna 6VDC
402.6	Loop	0	26.5	-4.2	1.0	0.0	23.3	74.5	-51.2	Pass	small antenna 6VDC
134.2	Loop	0	50.3	3.6	1.0	0.0	54.9	84.1	-29.2	Pass	small antenna 12VDC
402.6	Loop	0	25.4	-4.2	1.0	0.0	22.2	74.5	-52.3	Pass	small antenna 12VDC

Searched spectrum 9 kHz to 1.5 MHz (10th Harmonic) - All emissions are reported

The input power was varied +/- 15% with no effect on output power.

.

Radiated Photographs (Worst Case Configuration)

Large antenna

Small Antenna

Section 5. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: N/A
TESTED BY: Kevin Rose	DATE: 10 June 2006

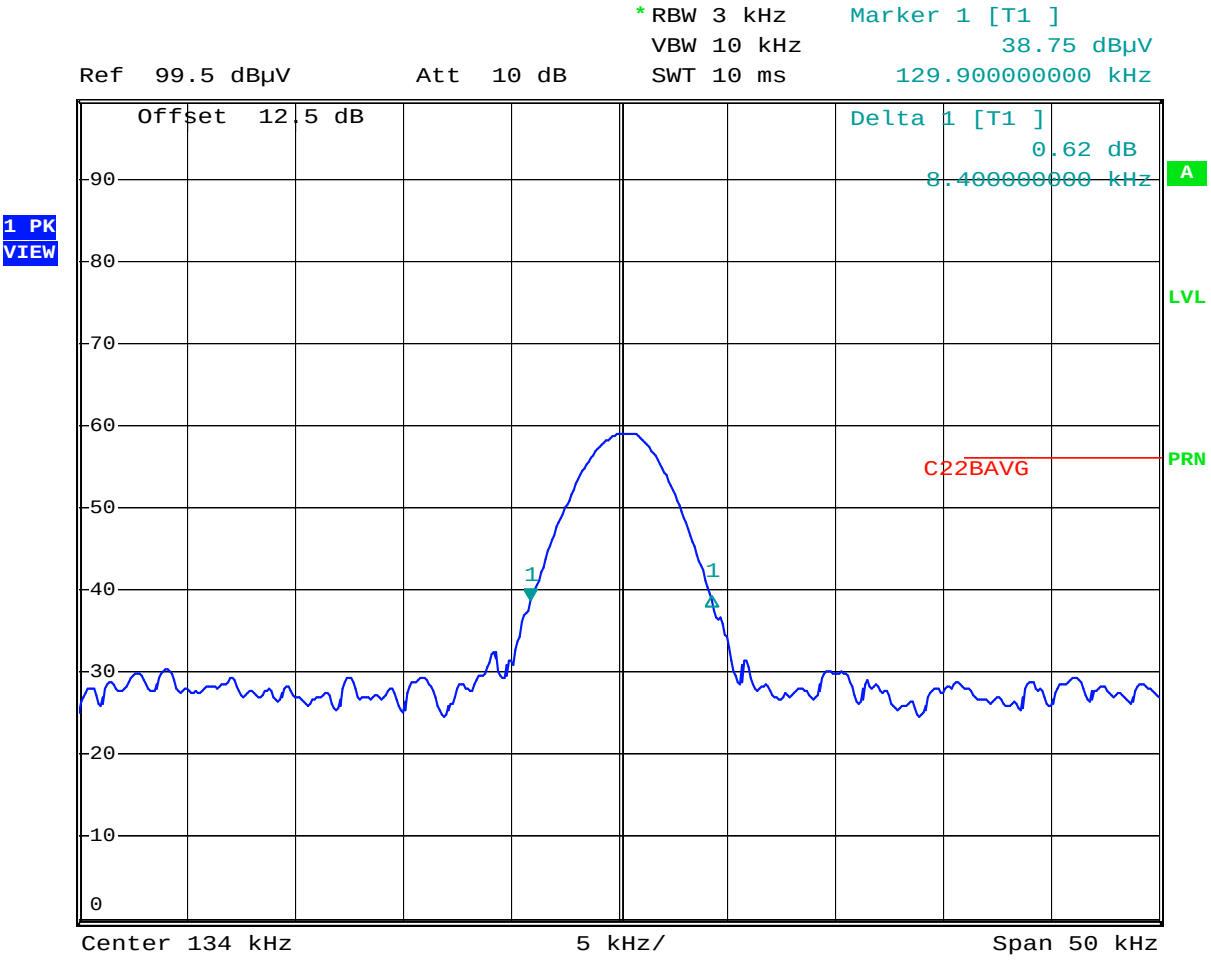
Minimum Standard: Not specified.

Test Results: The 99% power occupied bandwidth is 8.4 kHz.

Measurement Data: See attached graph(s).

Method of Measurement:

A spectrum analyzer was used to measure the 99% power occupied bandwidth of the fundamental emission. This value is used as the bandwidth for the emission designator.



Comment: Quasi Peak
Date: 9.JUN.2006 13:25:09

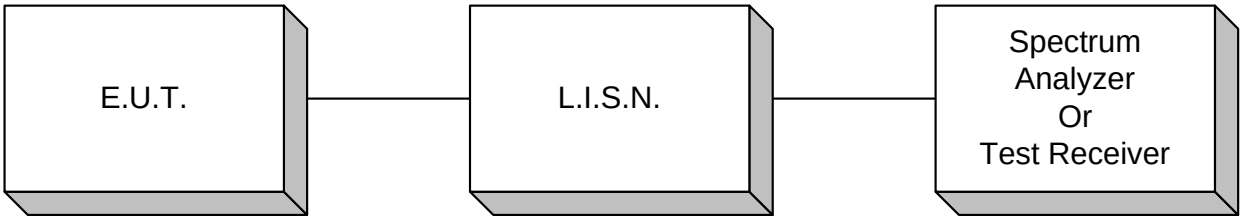
Section 6. Test Equipment List

Nemko ID	Description	Manufacturer / Model Number	Serial Number	Calibration Date	Calibration Due
1659	Spectrum Analyzer	Rhode & Schwarz / FSP	973353	01/10/06	01/10/07
1140	ACTIVE LOOP ANTENNA	A.H. SYSTEMS / SAS-200/562B	213	03/09/06	03/09/08
2075	Cable	Nemko USA, Inc. / None	None	CBU	NA
545	LISN	Schwarz Beck / 8120	8120350	02/02/06	02/02/07
1555	Filter high pass 5KHz	Solar Electronics / 7930-5.0	933125	04/20/06	04/20/07
2076	Cable	Nemko USA, Inc. / None	None	08/10/05	08/10/06
1284	Spectrum analyzer display	Hewlett Packard / 8566B	1811A00223	02/16/06	02/16/07
1663	Spectrum Analyzer	Rhode & Schwarz / FSP	973351	05/18/06	05/18/07

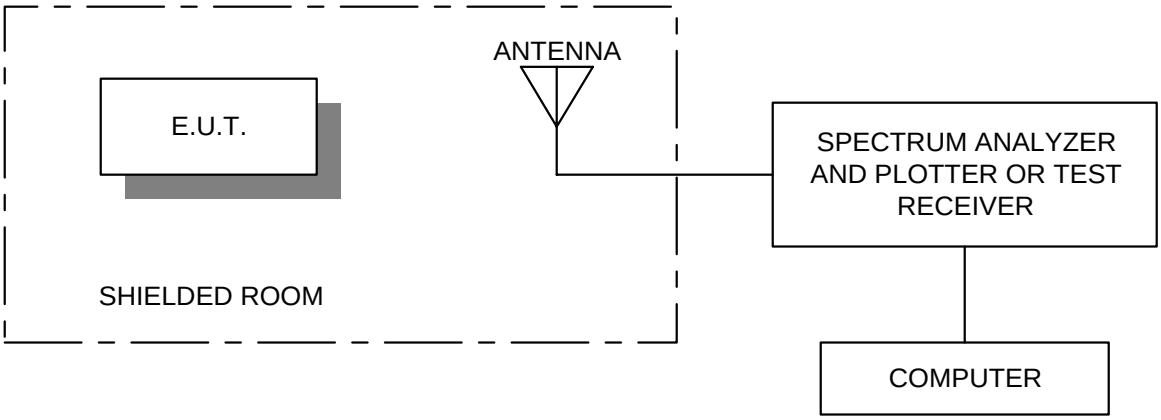
ANNEX A

TEST DIAGRAMS

Conducted Emissions



Radiated Prescan



Test Site For Radiated Emissions