

Ingersoll Rand

TEST REPORT FOR

Physical Access Control Reader, XF1100 Rev. C

Tested To The Following Standards:

**FCC Part 15 Subpart C Sections 15.207, 15.225
And
RSS-210 Issue 7**

Report No.: 91097-10

Date of issue: November 16, 2010



**TESTING
CERT #803.01, 803.02,
803.05, 803.06**

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

This report contains a total of 39 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc.

TABLE OF CONTENTS

Administrative Information	3
Test Report Information	3
Report Authorization	3
Test Facility Information	4
Site Registration & Accreditation Information	4
Summary of Results	5
Conditions During Testing	5
Equipment Under Test	6
Peripheral Devices	6
15.207 AC Conducted Emissions	7
15.209 Carrier	16
15.209 / RSS-210 Occupied Band Width	19
15.225 Carrier	22
15.225 / RSS-210 Occupied Band Width	25
15.225 Frequency Stability	28
15.209 Spurious Emissions	31
Supplemental Information	38
Measurement Uncertainty	38
Emissions Test Details	38

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Ingersoll Rand
500 Golden Ridge Road., Bldg. 1
Golden, CO 80401

REPRESENTATIVE: Chao Lor
Customer Reference Number: 306477

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Joyce Walker
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 91096

October 5, 2010

October 5 - 11, 2010

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink that reads "Steve Behm".

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Site Registration & Accreditation Information

Location	CB #	JAPAN	CANADA	FCC
Mariposa A	US0103	R-563, C-578, T-1492 & G-87	3082A-2	90477

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C & RSS-210 Issue 7

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
Carrier	FCC Part 15 Subpart C Section 15.209 / ANSI C63.4 (2003)	Pass
Occupied Band Width	FCC Part 15 Subpart C Section 15.209 / ANSI C63.4 (2003) and RSS-210 Issue 7	Pass
Carrier	FCC Part 15 Subpart C Section 15.225 / ANSI C63.4 (2003)	Pass
Occupied Band Width	FCC Part 15 Subpart C Section 15.225 / ANSI C63.4 (2003) and RSS-210 Issue 7	Pass
Frequency Stability	FCC Part 15 Subpart C Section 15.225 / ANSI C63.4 (2003)	Pass
Spurious Emissions	FCC Part 15 Subpart C Section 15.209 / ANSI C63.4 (2003)	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

The following model has been tested by CKC Laboratories: **XF1100C**

The manufacturer states that the following model name revision to the EUT does not effect it electrically and remains identical to the one which was tested, or any differences between them do not affect its EMC characteristics, and therefore meets the level of testing equivalent to the tested model: **XF1100 Rev. C**

EQUIPMENT UNDER TEST

Physical Access Control Reader

Manuf: Ingersoll Rand
Model: XF1100 Rev. C
Serial: 0100

Physical Access Control Reader*

Manuf: Ingersoll Rand
Model: XF2110 Rev. C
Serial: 0100

Physical Access Control Reader*

Manuf: Ingersoll Rand
Model: XF2100 Rev. C
Serial: 0100

*Models XF2110 Rev. C and XF2100 Rev. C were tested together with the EUT (XF1100 Rev. C) during some radiated emissions tests.

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

DC Power Supply

Manuf: Topward Electric Instruments
Model: TPS 4000
Serial: 918520

15.207 AC Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand (XceedID)**

Specification: **15.207 AC Mains - Average**

Work Order #: **91097**

Test Type: **Conducted Emissions**

Equipment: **Physical Access Control Reader**

Manufacturer: **Ingersoll Rand**

Model: **XF1100C**

S/N: **0100**

Date: 10/7/2010

Time: 14:58:20

Sequence#: 11

Tested By: **Chuck Kendall**

120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00374	50uH LISN-BLACK LEAD	8028-TS-50-BNC	4/22/2009	4/22/2011
T2	AN01183	Spectrum Analyzer Display	85662A	3/10/2009	3/10/2011
T3	AN01184	Spectrum Analyzer	8568B	3/10/2009	3/10/2011
T4	AN00069	Quasi Peak Adapter	85650A	3/10/2009	3/10/2011
T5	AN02608	High Pass Filter	HE9615-150K-50-720B	2/11/2010	2/11/2012
T6	ANP02229	Attenuator	PE7010-10	5/20/2009	5/20/2011
T7	ANMACOND	Cable		5/10/2009	5/10/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Physical Access Control Reader*	Ingersoll Rand	XF1100C	0100

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments	TPS 4000	918520

Test Conditions / Notes:

FCC 15.207

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a plastic cart. It is displaying a red light until the tag activates it.

Transmitters are on.

Actual integral antenna is connected.

Emissions measurements at fundamental frequency taken with integral antenna for reference and taken with dummy load attached for final results.

From 150 kHz to 30 MHz - RBW=9kHz, VBW=30kHz

Temp = 65°F

Relative Humidity = 50 %

Press = 97.2 mb

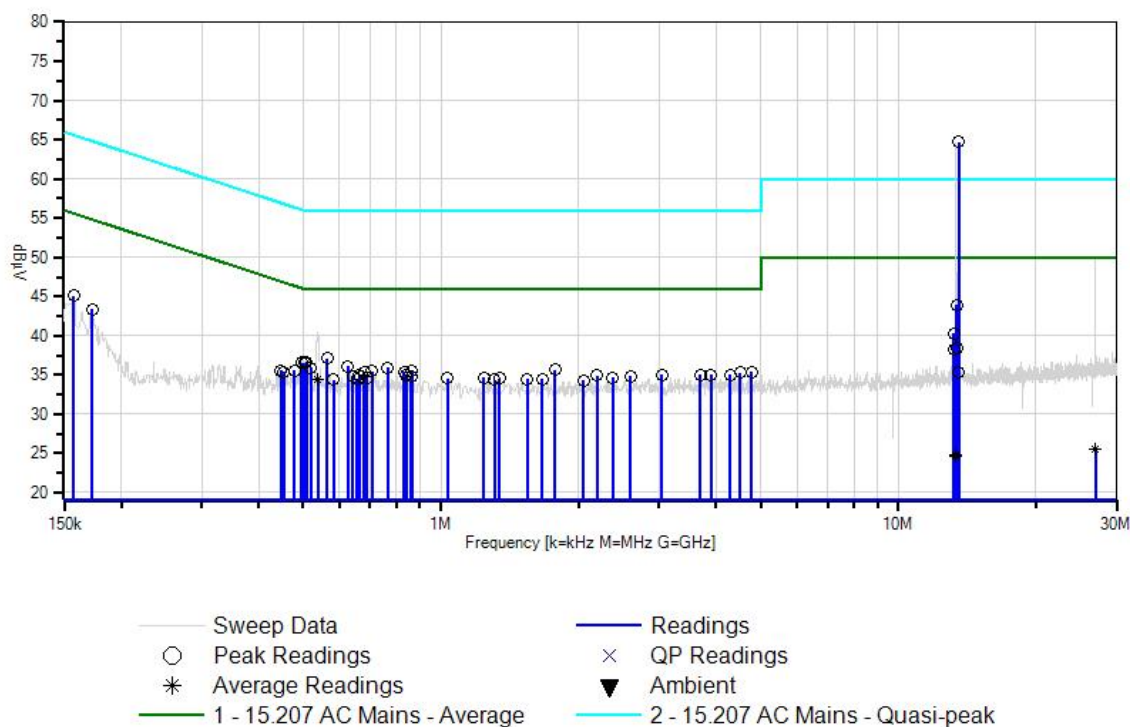
Ext Attn: 0 dB

<i>Measurement Data:</i>			Reading listed by margin.					Test Lead: Black			
#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	13.560M	52.9	+0.6 +0.2	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	64.7	50.0	+14.7	Black
Fundamental with integral antenna											
2	13.427M	32.2	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	43.9	50.0	-6.1	Black
3	563.777k	27.0	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	37.1	46.0	-8.9	Black
4	507.782k	26.5	+0.1 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	36.7	46.0	-9.3	Black
5	503.419k	26.4	+0.1 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	36.6	46.0	-9.4	Black
6	495.420k	26.4	+0.1 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	36.6	46.1	-9.5	Black
7	13.220M	28.6	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	40.3	50.0	-9.7	Black
8	626.316k	26.0	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	36.1	46.0	-9.9	Black
9	518.690k	25.7	+0.1 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.9	46.0	-10.1	Black
10	764.484k	25.5	+0.1 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.9	46.0	-10.1	Black
11	1.774M	25.3	+0.1 +0.0	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	35.7	46.0	-10.3	Black
12	157.272k	33.0	+0.1 +2.2	+0.0 +9.7	+0.0 +0.1	+0.0	+0.0	45.1	55.6	-10.5	Black
13	707.762k	25.1	+0.0 +0.2	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.5	46.0	-10.5	Black
14	864.110k	25.1	+0.1 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.5	46.0	-10.5	Black
15	678.674k	25.3	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.4	46.0	-10.6	Black
16	831.386k	25.0	+0.1 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.4	46.0	-10.6	Black
17	4.773M	24.7	+0.1 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.4	46.0	-10.6	Black
18	4.509M	24.6	+0.1 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.3	46.0	-10.7	Black
19	478.694k	25.3	+0.1 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.6	46.4	-10.8	Black
20	3.688M	24.3	+0.2 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.0	46.0	-11.0	Black
21	3.038M	24.4	+0.1 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.0	46.0	-11.0	Black
22	4.296M	24.2	+0.2 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.0	46.0	-11.0	Black

23	3.892M	24.2	+0.2 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.0	46.0	-11.0	Black
24	840.113k	24.6	+0.1 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.0	46.0	-11.0	Black
25	663.403k	24.8	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.9	46.0	-11.1	Black
26	2.195M	24.5	+0.1 +0.0	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	34.9	46.0	-11.1	Black
27	664.858k	24.7	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.8	46.0	-11.2	Black
28	641.587k	24.7	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.8	46.0	-11.2	Black
29	2.599M	24.2	+0.1 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	34.8	46.0	-11.2	Black
30	859.747k	24.4	+0.1 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	34.8	46.0	-11.2	Black
31	689.582k	24.5	+0.0 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.7	46.0	-11.3	Black
32	446.698k	25.3	+0.1 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.6	46.9	-11.3	Black
33	2.374M	24.2	+0.1 +0.0	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	34.7	46.0	-11.3	Black
34	1.243M	24.4	+0.0 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	34.7	46.0	-11.3	Black
35	453.970k	25.1	+0.1 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.4	46.8	-11.4	Black
36	172.543k	32.9	+0.1 +0.6	+0.0 +9.7	+0.0 +0.1	+0.0	+0.0	43.4	54.8	-11.4	Black
37	1.345M	24.2	+0.0 +0.1	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	34.6	46.0	-11.4	Black
38	1.034M	24.3	+0.0 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	34.6	46.0	-11.4	Black
39	1.545M	24.1	+0.1 +0.0	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	34.5	46.0	-11.5	Black
40	654.677k	24.4	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.5	46.0	-11.5	Black
41	13.472M	26.8	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	38.5	50.0	-11.5	Black
42	1.664M	24.1	+0.1 +0.0	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	34.5	46.0	-11.5	Black
43	538.325k	24.2	+0.1 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.4	46.0	-11.6	Black
^	538.325k	30.3	+0.1 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	40.5	46.0	-5.5	Black
45	582.684k	24.3	+0.0 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	34.4	46.0	-11.6	Black
46	1.311M	24.0	+0.0 +0.1	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	34.4	46.0	-11.6	Black
47	2.051M	23.9	+0.1 +0.0	+0.0 +9.9	+0.0 +0.4	+0.0	+0.0	34.3	46.0	-11.7	Black
48	13.256M	26.6	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	38.3	50.0	-11.7	Black

49	13.560M	23.5	+0.6 +0.2	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	35.3	50.0	-14.7	Black
Fundamental with dummy load at antenna port											
50	27.011M	12.9	+1.2 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	25.5	50.0	-24.5	Black
^	27.019M	37.2	+1.2 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	49.8	50.0	-0.2	Black
52	13.391M	13.1	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	24.8	50.0	-25.2	Black
^	13.391M	36.4	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	48.1	50.0	-1.9	Black
54	13.310M	12.9	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	24.6	50.0	-25.4	Black
^	13.310M	35.5	+0.6 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	47.2	50.0	-2.8	Black

CKC Laboratories, Inc. Date: 10/7/2010 Time: 14:58:20 Ingersoll Rand (XceedID) WO#: 91097
15.207 AC Mains - Average Test Lead: Black 120V 60Hz Sequence#: 11 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand (XceedID)**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **91097**
 Test Type: **Conducted Emissions**
 Equipment: **Physical Access Control Reader**
 Manufacturer: Ingersoll Rand
 Model: XF1100C
 S/N: 0100

Date: 10/7/2010
 Time: 15:14:36
 Sequence#: 12
 Tested By: Chuck Kendall
 120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00374	50uH LISN-WHITE LEAD	8028-TS-50-BNC	4/22/2009	4/22/2011
T2	AN01183	Spectrum Analyzer Display	85662A	3/10/2009	3/10/2011
T3	AN01184	Spectrum Analyzer	8568B	3/10/2009	3/10/2011
T4	AN00069	Quasi Peak Adapter	85650A	3/10/2009	3/10/2011
T5	AN02608	High Pass Filter	HE9615-150K-50-720B	2/11/2010	2/11/2012
T6	ANP02229	Attenuator	PE7010-10	5/20/2009	5/20/2011
T7	ANMACOND	Cable		5/10/2009	5/10/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Physical Access Control Reader*	Ingersoll Rand	XF1100C	0100

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments	TPS 4000	918520

Test Conditions / Notes:

FCC 15.207
 Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a plastic cart. It is displaying a red light until the tag activates it.
 Transmitters are on.
 Actual integral antenna is connected.
 Emissions measurements at fundamental frequency taken with integral antenna for reference and taken with dummy load attached for final results.
 From 150 kHz to 30 MHz - RBW=9kHz, VBW=30kHz
 Temp = 65 degrees F
 Relative Humidity = 50 %
 Press = 97.2 mb

Ext Attn: 0 dB

Measurement Data:

Reading listed by margin.

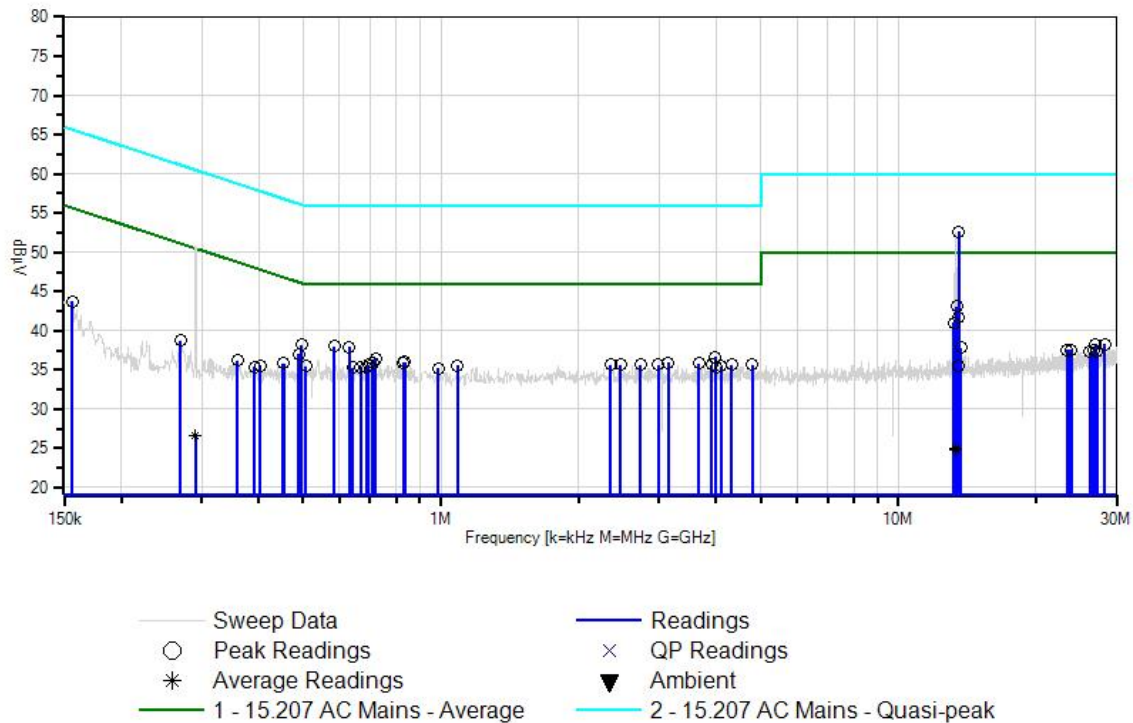
Test Lead: White

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 T7 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	13.560M	40.4	+1.0 +0.2	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	52.6	50.0 Fundamental with integral antenna	+2.6	White
2	13.427M	31.0	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	43.1	50.0	-6.9	White
3	495.420k	27.6	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	38.2	46.1	-7.9	White
4	584.866k	27.4	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	38.0	46.0	-8.0	White
5	631.406k	27.3	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	37.9	46.0	-8.1	White
6	13.508M	29.5	+1.0 +0.2	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	41.7	50.0	-8.3	White
7	13.211M	28.9	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	41.0	50.0	-9.0	White
8	488.875k	26.4	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	37.0	46.2	-9.2	White
9	3.977M	25.5	+0.6 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	36.7	46.0	-9.3	White
10	718.670k	25.6	+0.5 +0.2	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	36.5	46.0	-9.5	White
11	832.841k	25.1	+0.6 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	36.0	46.0	-10.0	White
12	709.217k	25.0	+0.5 +0.2	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.9	46.0	-10.1	White
13	829.205k	25.0	+0.6 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.9	46.0	-10.1	White
14	3.144M	24.8	+0.6 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.9	46.0	-10.1	White
15	3.667M	24.7	+0.6 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.8	46.0	-10.2	White
16	2.472M	24.6	+0.6 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.7	46.0	-10.3	White
17	2.731M	24.6	+0.6 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.7	46.0	-10.3	White
18	695.400k	25.0	+0.5 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.7	46.0	-10.3	White
19	2.349M	24.7	+0.6 +0.0	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.7	46.0	-10.3	White
20	4.318M	24.5	+0.6 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.7	46.0	-10.3	White
21	4.790M	24.4	+0.7 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.7	46.0	-10.3	White
22	2.991M	24.6	+0.6 +0.1	+0.0 +9.9	+0.0 +0.5	+0.0	+0.0	35.7	46.0	-10.3	White

23	3.909M	24.5	+0.6 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.7	46.0	-10.3	White
24	1.085M	24.8	+0.5 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.6	46.0	-10.4	White
25	4.092M	24.3	+0.6 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.5	46.0	-10.5	White
26	507.055k	24.9	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.5	46.0	-10.5	White
27	667.766k	24.8	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.4	46.0	-10.6	White
28	642.314k	24.7	+0.5 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.3	46.0	-10.7	White
29	688.128k	24.6	+0.5 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.3	46.0	-10.7	White
30	3.994M	24.1	+0.6 +0.1	+0.0 +9.9	+0.0 +0.6	+0.0	+0.0	35.3	46.0	-10.7	White
31	987.578k	24.4	+0.5 +0.1	+0.0 +9.9	+0.0 +0.3	+0.0	+0.0	35.2	46.0	-10.8	White
32	451.788k	25.1	+0.5 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.8	46.8	-11.0	White
33	453.970k	25.1	+0.5 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.8	46.8	-11.0	White
34	27.026M	25.0	+1.9 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	38.3	50.0	-11.7	White
35	28.266M	24.7	+2.0 +0.2	+0.0 +9.9	+0.0 +1.5	+0.0	+0.0	38.3	50.0	-11.7	White
36	156.545k	31.2	+0.4 +2.3	+0.0 +9.7	+0.0 +0.1	+0.0	+0.0	43.7	55.6	-11.9	White
37	403.066k	25.0	+0.4 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.6	47.8	-12.2	White
38	13.725M	25.6	+1.0 +0.2	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	37.8	50.0	-12.2	White
39	269.988k	28.2	+0.4 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	38.7	51.1	-12.4	White
40	23.360M	24.5	+1.6 +0.2	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	37.6	50.0	-12.4	White
41	23.785M	24.6	+1.6 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	37.6	50.0	-12.4	White
42	359.434k	25.7	+0.4 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	36.2	48.7	-12.5	White
43	23.888M	24.4	+1.7 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	37.5	50.0	-12.5	White
44	26.711M	24.2	+1.9 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	37.5	50.0	-12.5	White
45	391.430k	24.8	+0.4 +0.2	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	35.4	48.0	-12.6	White
46	26.252M	24.0	+1.8 +0.2	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	37.3	50.0	-12.7	White
47	27.136M	24.0	+1.9 +0.1	+0.0 +9.9	+0.0 +1.4	+0.0	+0.0	37.3	50.0	-12.7	White

48	13.560M	23.3	+1.0 +0.2	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	35.5	50.0	-14.5	White
Fundamental with dummy load at antenna port											
49	291.077k	16.1	+0.4 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	26.6	50.5	-23.9	White
^	291.077k	40.3	+0.4 +0.1	+0.0 +9.8	+0.0 +0.2	+0.0	+0.0	50.8	50.5	+0.3	White
51	13.355M	12.9	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	25.0	50.0	-25.0	White
52	13.391M	12.8	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	24.9	50.0	-25.1	White
^	13.391M	36.0	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	48.1	50.0	-1.9	White
54	13.301M	12.8	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	24.9	50.0	-25.1	White
^	13.301M	35.4	+1.0 +0.1	+0.0 +9.9	+0.0 +1.1	+0.0	+0.0	47.5	50.0	-2.5	White

CKC Laboratories, Inc. Date: 10/7/2010 Time: 15:14:36 Ingersoll Rand (XceedID) WO#: 91097
15.207 AC Mains - Average Test Lead: White 120V 60Hz Sequence#: 12 Ext ATTN: 0 dB



Test Setup Photos



15.209 Carrier

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand (XceedID)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91097**
 Test Type: **Maximized Emissions**
 Equipment: **Physical Access Control Reader**
 Manufacturer: Ingersoll Rand
 Model: XF1100C
 S/N: 0100

Date: 10/6/2010
 Time: 13:53:25
 Sequence#: 6
 Tested By: Chuck Kendall

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01992	Biconilog Antenna	CBL6111C	10/9/2009	10/9/2011
	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T1	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
	ANP05904	Cable	32022-2-29094K-144TC	6/9/2009	6/9/2011
	ANP01403	Cable	58758-23	6/10/2009	6/10/2011
T2	AN00226	Loop Antenna	6502	4/10/2009	4/10/2011
T3	ANMA10M	Cable		5/10/2009	5/10/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Physical Access Control Reader*	Ingersoll Rand	XF1100C	0100

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments	TPS 4000	918520

Test Conditions / Notes:

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it.
 Range of frequencies: 125 kHz
 From 9 kHz to 150 kHz -RBW=200Hz, VBW=1kHz
 No detectable change in field strength amplitude on voltage variations in accordance with 15.31(e).
 Temp = 60 degrees F
 Relative Humidity = 50 %
 Press = 97.2 mb
 All antennas are less than 0.05m²
 XF1100C ant dims are 1.25" x 5.25" or .0258 m x .13335 m or 0.00344 m²

Ext Attn: 0 dB

Measurement Data:		Reading listed by margin.					Test Distance: 3 Meters				
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	124.470k	76.9	+0.0	+9.7	+0.0		-80.0	6.6	25.7 XF1100C fundamental	-19.1	Vert
2	124.510k	72.8	+0.0	+9.7	+0.0		-80.0	2.5	25.7 XF1100C fundamental	-23.2	Horiz

Test Setup Photos



15.209 / RSS-210 Occupied Band Width

Engineer Name: Chuck Kendall

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02660	Spectrum Analyzer	E4446A	Agilent	6/30/2010	6/30/2012
AN00226	Loop Antenna	6502	EMCO	4/10/2009	4/10/2011
ANMA10M	Cable			5/10/2009	5/10/2011

Test Conditions

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it.

Range of frequencies: 125 kHz

From 9 kHz to 150 kHz -RBW=200Hz, VBW=1kHz

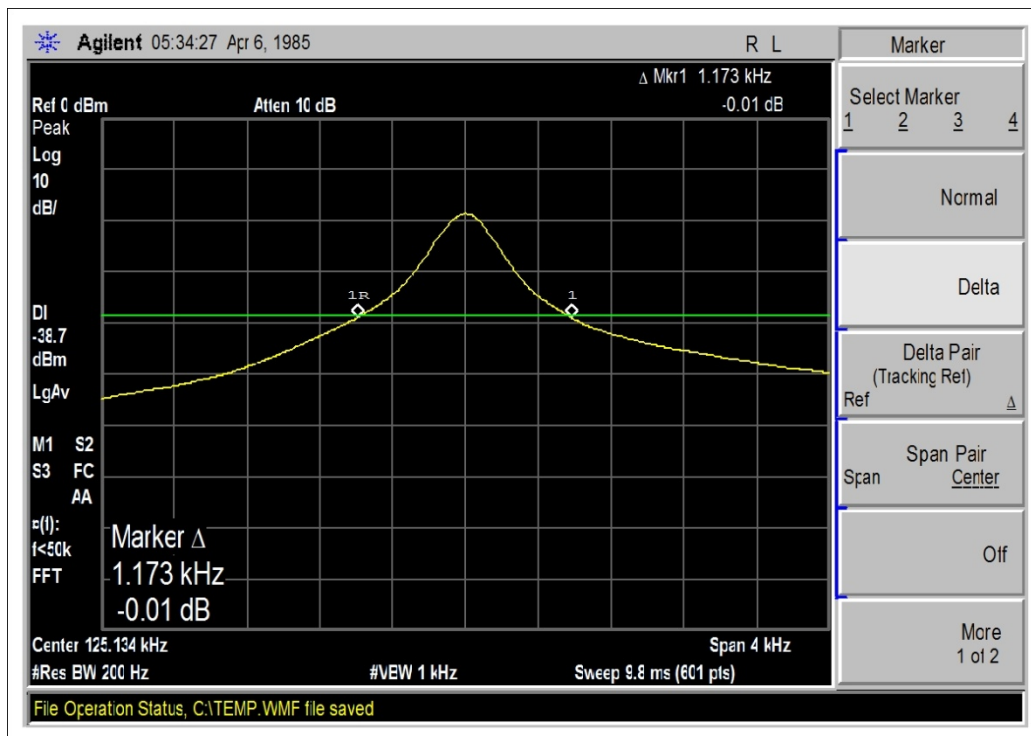
Temp = 60°F

Relative Humidity = 50 %

Press = 97.2 mb

Model	Occupied Bandwidth (kHz)
XF1100C	1.173

Test Plots



Test Setup Photos



15.225 Carrier

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand (XceedID)**
 Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
 Work Order #: **91097** Date: 10/6/2010
 Test Type: **Maximized Emissions** Time: 13:53:25
 Equipment: **Physical Access Control Reader** Sequence#: 5
 Manufacturer: Ingersoll Rand Tested By: Chuck Kendall
 Model: XF1100C
 S/N: 0100

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01992	Biconilog Antenna	CBL6111C	10/9/2009	10/9/2011
	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T1	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
	ANP05904	Cable	32022-2-29094K-144TC	6/9/2009	6/9/2011
	ANP01403	Cable	58758-23	6/10/2009	6/10/2011
T2	AN00226	Loop Antenna	6502	4/10/2009	4/10/2011
T3	ANMA10M	Cable		5/10/2009	5/10/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Physical Access Control Reader*	Ingersoll Rand	XF1100C	0100

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments	TPS 4000	918520

Test Conditions / Notes:

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it.
 Range of frequencies: 13.56 MHz
 From 150 kHz to 30 MHz - RBW=9kHz, VBW=30kHz
 Temp = 60 degrees F
 Relative Humidity = 50 %
 Press = 97.2 mb
 All antennas are less than 0.05m²
 XF1100C ant dims are 1.25" x 5.25" or .0258 m x .13335 m or 0.00344 m²

Ext Attn: 0 dB

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB		Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	13.562M	77.1	+0.0	+10.2	+0.8		-40.0	48.1	84.0 XF2100C fundamental	-35.9	Vert
2	13.562M	75.4	+0.0	+10.2	+0.8		-40.0	46.4	84.0 XF2110C fundamental	-37.6	Vert
3	13.562M	70.2	+0.0	+10.2	+0.8		-40.0	41.2	84.0 XF2110C fundamental	-42.8	Horiz
4	13.561M	70.1	+0.0	+10.2	+0.8		-40.0	41.1	84.0 XF2100C fundamental	-42.9	Horiz
5	13.561M	64.2	+0.0	+10.2	+0.8		-40.0	35.2	84.0 XF1100C fundamental	-48.8	Vert
6	13.561M	57.4	+0.0	+10.2	+0.8		-40.0	28.4	84.0 XF1100C fundamental	-55.6	Horiz

Test Setup Photos



15.225 / RSS-210 Occupied Band Width

Engineer Name: Chuck Kendall

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02660	Spectrum Analyzer	E4446A	Agilent	6/30/2010	6/30/2012
AN00226	Loop Antenna	6502	EMCO	4/10/2009	4/10/2011
ANMA10M	Cable			5/10/2009	5/10/2011

Test Conditions

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it.

Range of frequencies: 13.56 MHz

From 150 kHz to 30 MHz - RBW=9kHz, VBW=30kHz

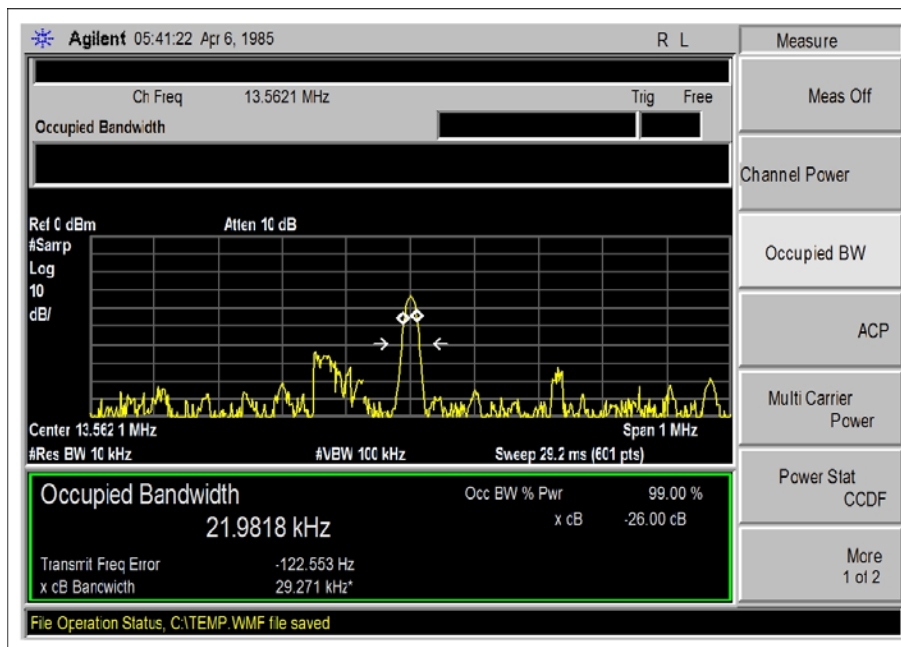
Temp = 60°F

Relative Humidity = 50 %

Press = 97.2 mb

Model	99% Bandwidth (kHz)	26dB Bandwidth (kHz)
XF1100C	21.982	29.271

Test Plots



Test Setup Photos



15.225 Frequency Stability

Engineer Name: Chuck Kendall

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02660	Spectrum Analyzer	E4446A	Agilent	6/30/2010	6/30/2012
AN00226	Loop Antenna	6502	EMCO	4/10/2009	4/10/2011
ANMA10M	Cable			5/10/2009	5/10/2011
AN01879	Temperature Chamber	S-1.2 Min.	Thermotron	12/16/2008	12/16/2010
AN02242	Thermometer	HH-26K	Omega	10/20/2009	10/20/2011

Test Conditions

Ambient conditions: Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it. For temperature testing, the equipment is placed inside a temperature chamber.

Range of frequencies: 13.56 MHz

Temp = 60°F

Relative Humidity = 50 %

Press = 97.2 mb

All antennas are less than 0.05m²

XF1100C ant dims are 1.25" x 5.25" or .0258 m x .13335 m or 0.00344 m²

Test Data Sheets

Frequency Stability

Customer: Ingersoll Rand
WO#: 91097
Date: 8-Oct-10
Test Engineer: Chuck Kendall
Test Specification: FCC 15.225
Device Model #: XF1100C
Operating Voltage: 12 VDC/VAC
Frequency Limit: 1.00 PPM/%

Temperature Variations

Channel Frequency:		Channel 1 (MHz)	Dev. (MHz)
		13.56135	
Temp (C)	Voltage		
-20	12	13.56187	0.00052
-10	12	13.56180	0.00045
0	12	13.56157	0.00022
10	12	13.56150	0.00015
20	12	13.56137	0.00002
30	12	13.56133	0.00002
40	12	13.56127	0.00008
50	12	13.56123	0.00012

Voltage Variations ($\pm 15\%$)

20	10.2	13.56137	0.00002
20	12	13.56137	0.00002
20	13.8	13.56137	0.00002

Max Deviation (MHz)	0.00052
Max Deviation (%)	0.00383
	PASS

Test Setup Photos



15.209 Spurious Emissions

Test Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand (XceedID)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91096**
 Test Type: **Maximized Emissions**
 Equipment: **Physical Access Control Reader**
 Manufacturer: Ingersoll Rand
 Model: XF1100C
 S/N: 0100

Date: 10/5/2010
 Time: 11:51:18
 Sequence#: 3
 Tested By: Chuck Kendall

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01992	Biconilog Antenna	CBL6111C	10/9/2009	10/9/2011
	AN00062	Preamp	8447D	6/23/2010	6/23/2012
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
	ANP05904	Cable	32022-2-29094K-144TC	6/9/2009	6/9/2011
	ANP01403	Cable	58758-23	6/10/2009	6/10/2011
T1	AN00226	Loop Antenna	6502	4/10/2009	4/10/2011
T2	ANMA10M	Cable		5/10/2009	5/10/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Physical Access Control Reader*	Ingersoll Rand	XF1100C	0100

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments	TPS 4000	918520

Test Conditions / Notes:

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it.
 Range of frequencies: 0.009 MHz to 30 MHz
 Range of frequencies: 0.009 MHz to 30 MHz
 From 9 kHz to 150 kHz -RBW=200Hz, VBW=1kHz
 From 150 kHz to 30 MHz - RBW=9kHz, VBW=30kHz
 Temp = 60 degrees F
 Relative Humidity = 50 %
 Press = 97.2 mb

Ext Attn: 0 dB

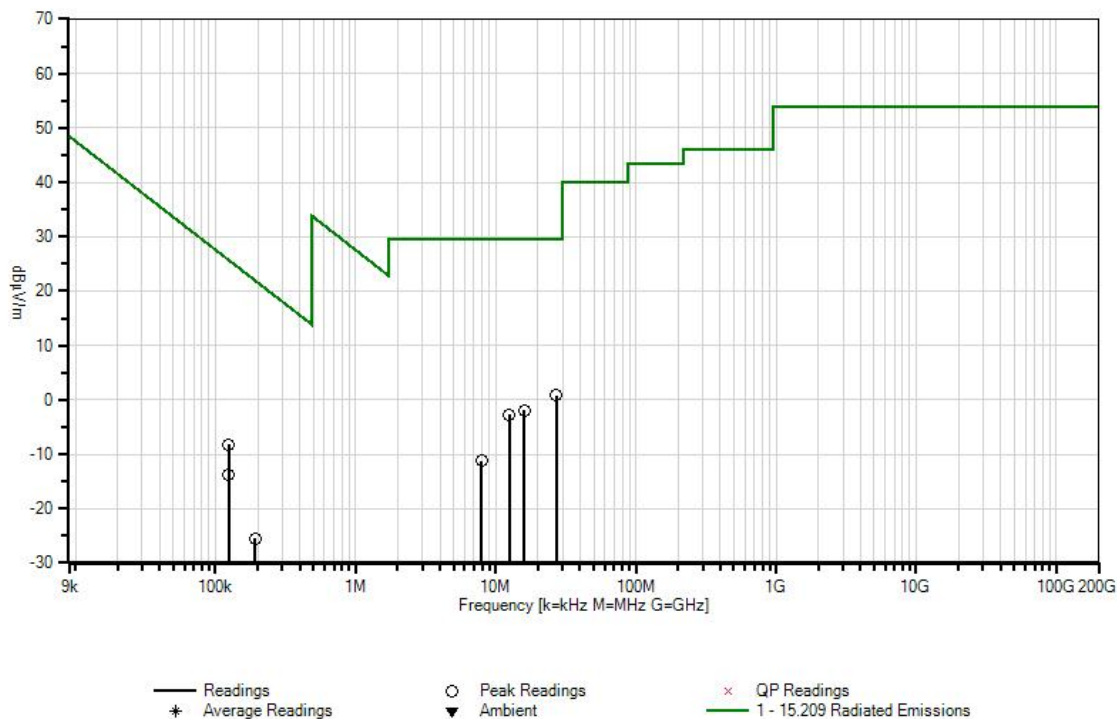
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB			Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	27.146M	33.5	+6.2	+1.2			-40.0	0.9	29.5	-28.6	Vert
2	15.984M	26.8	+10.3	+0.9			-40.0	-2.0	29.5	-31.5	Vert
3	12.517M	26.6	+9.9	+0.8			-40.0	-2.7	29.5	-32.2	Vert
4	124.392k	62.0	+9.7	+0.0			-80.0	-8.3	25.7	-34.0	Vert
5	124.916k	56.5	+9.7	+0.0			-80.0	-13.8	25.7	-39.5	Vert
6	7.942M	18.9	+9.3	+0.6			-40.0	-11.2	29.5	-40.7	Vert
7	192.830k	44.7	+9.8	+0.0			-80.0	-25.5	21.9	-47.4	Vert

CKC Laboratories, Inc. Date: 10/5/2010 Time: 11:51:18 Ingersoll Rand (XceedID) WO#: 91096
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 3 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • Mariposa, CA 95338 • (209) 966-5240

Customer: **Ingersoll Rand (XceedID)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91096** Date: 10/5/2010
 Test Type: **Maximized Emissions** Time: 10:33:03
 Equipment: **Physical Access Control Reader** Sequence#: 1
 Manufacturer: Ingersoll Rand Tested By: Chuck Kendall
 Model: XF1100C
 S/N: 0100

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01992	Biconilog Antenna	CBL6111C	10/9/2009	10/9/2011
T2	AN00062	Preamp	8447D	6/23/2010	6/23/2012
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
T3	ANP05904	Cable	32022-2-29094K-144TC	6/9/2009	6/9/2011
T4	ANP01403	Cable	58758-23	6/10/2009	6/10/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Physical Access Control Reader*	Ingersoll Rand	XF1100C	0100

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Topward Electric Instruments	TPS 4000	918520

Test Conditions / Notes:

Tag reader is setting upright (vertical) to the surface of the wooden support table 80cm atop a 40' diameter flush-mounted turntable. It is displaying a red light until the tag activates it.
 Range of frequencies: 30 MHz to 1000 MHz
 Temp = 60 degrees F
 Relative Humidity = 50 %
 Press = 97.2 mb

Ext Attn: 0 dB

Measurement Data:

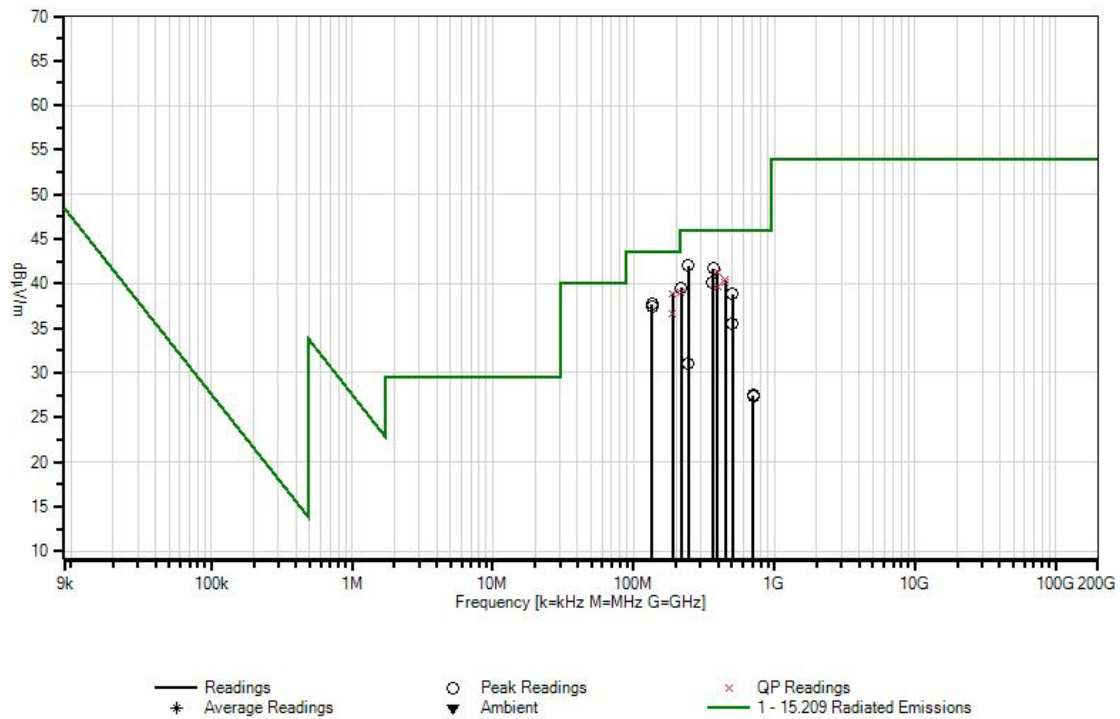
Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	244.102M	58.3	+12.2	-30.0	+0.8	+0.7	+0.0	42.0	46.0	-4.0	Horiz
2	366.165M	54.1	+15.8	-30.1	+1.0	+0.9	+0.0	41.7	46.0	-4.3	Vert
3	189.870M	58.7	+9.1	-30.2	+0.7	+0.6	+0.0	38.9	43.5	-4.6	Horiz
	QP										
^	189.864M	59.9	+9.1	-30.2	+0.7	+0.6	+0.0	40.1	43.5	-3.4	Horiz
5	393.298M	53.1	+16.5	-30.3	+1.0	+0.9	+0.0	41.2	46.0	-4.8	Vert
	QP										
^	393.298M	54.1	+16.5	-30.3	+1.0	+0.9	+0.0	42.2	46.0	-3.8	Vert

7	447.547M	51.4	+17.5	-30.5	+1.0	+1.0	+0.0	40.4	46.0	-5.6	Horiz
QP											
^	447.544M	52.5	+17.5	-30.5	+1.0	+1.0	+0.0	41.5	46.0	-4.5	Horiz
9	135.635M	55.4	+11.8	-30.6	+0.6	+0.5	+0.0	37.7	43.5	-5.8	Vert
10	447.541M	51.2	+17.5	-30.5	+1.0	+1.0	+0.0	40.2	46.0	-5.8	Vert
QP											
^	447.548M	53.6	+17.5	-30.5	+1.0	+1.0	+0.0	42.6	46.0	-3.4	Vert
12	366.161M	52.5	+15.8	-30.1	+1.0	+0.9	+0.0	40.1	46.0	-5.9	Horiz
13	135.630M	55.2	+11.8	-30.6	+0.6	+0.5	+0.0	37.5	43.5	-6.0	Horiz
14	393.289M	51.6	+16.5	-30.3	+1.0	+0.9	+0.0	39.7	46.0	-6.3	Horiz
QP											
^	393.293M	53.7	+16.5	-30.3	+1.0	+0.9	+0.0	41.8	46.0	-4.2	Horiz
16	216.990M	57.9	+10.4	-30.1	+0.7	+0.6	+0.0	39.5	46.0	-6.5	Vert
17	189.873M	56.5	+9.1	-30.2	+0.7	+0.6	+0.0	36.7	43.5	-6.8	Vert
QP											
^	189.870M	57.7	+9.1	-30.2	+0.7	+0.6	+0.0	37.9	43.5	-5.6	Vert
19	216.985M	57.4	+10.4	-30.1	+0.7	+0.6	+0.0	39.0	46.0	-7.0	Horiz
QP											
^	216.983M	59.9	+10.4	-30.1	+0.7	+0.6	+0.0	41.5	46.0	-4.5	Horiz
21	501.778M	49.0	+18.3	-30.5	+1.0	+1.0	+0.0	38.8	46.0	-7.2	Vert
22	501.795M	45.7	+18.3	-30.5	+1.0	+1.0	+0.0	35.5	46.0	-10.5	Horiz
23	244.110M	47.3	+12.2	-30.0	+0.8	+0.7	+0.0	31.0	46.0	-15.0	Vert
24	705.207M	34.2	+21.3	-30.5	+1.2	+1.3	+0.0	27.5	46.0	-18.5	Vert
25	705.204M	34.1	+21.3	-30.5	+1.2	+1.3	+0.0	27.4	46.0	-18.6	Horiz

CKC Laboratories, Inc. Date: 10/5/2010 Time: 10:33:03 Ingersoll Rand (XceedID) WO#: 91096
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



Test Setup Photos





SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBμV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.