Global EMC Inc. Labs

EMC & RF Test Report

As per

RSS 210 Issue 8:2010

&

FCC Part 15 Subpart C:2011

Unlicensed Intentional Radiators

on the

Confidant RFID

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Testing produced for

KABA®

See Appendix A for full customer & EUT details.

Industry Canada
LAB REGISTRATION #6844A-2

CE

FCC REGISTRATION #612361

ACCREDITED
Testing Laboratory
Certificate #2555.01

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Report Scope

This report addresses the EMC verification testing and test results of the Confidant RFID door access controller from Kaba Ilco Inc. This unit is herein referred to as EUT (Equipment Under Test) performed at Global EMC Labs.

The EUT was tested for compliance against the following standards:

RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2011

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by A2LA or any other accreditation agency, any government, or Global EMC Inc.

Opinions/interpretations expressed in this report, if any, are outside the scope of Global EMC Inc accreditation. Any opinions expressed do not necessarily reflect the opinions of Global EMC Inc, unless otherwise stated.

Summary

The results contained in this report relate only to the item(s) tested.

EUT FCC Certification #, FCC ID:	Q8SCONFIDANT-RFID
EUT Industry Canada Certification #, IC:	4652A-CRFID
EUT Passed all tests performed.	Yes (see test results summary)
Tests conducted by	Raymond Lee Au

Client	Kaba Lodging Systems (Kaba Ilco Inc.)
Product	Confidant RFID
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2011

Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.203	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS 210 (Table 1)	Restricted Bands for intentional operation	QuasiPeak Average	Pass
FCC 15.207	Power line conducted emissions	QuasiPeak Average	N/A See Justification
FCC 15.209 RSS-210 (Table 2)	Spurious Radiated emissions	QuasiPeak Average	Pass
Overall Result			**PASS**

All tests were performed by Raymond Lee Au.

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '*'.

Justifications, Descriptions, or Deviations

The following justifications for tests not performed or deviations from the above listed specifications apply:

For the Antenna requirement specified in FCC 15.203 (RSS 210 section 5.5), this device incorporates an internal loop antenna, and there are no provisions for end user replacement.

For the Restricted Bands of operation, the EUT is designed to only operate at 13.56 MHz

The intentional emission does not fall within restricted bands as shown in FCC 15.205.

For the power line conducted emissions requirements, the EUT is DC powered using three standard 1.5V AA batteries only. It has no external cable connectors or cables. This test does not apply. There are no provisions for a charger.

Applicable Standards, Specifications and Methods

ANSI C63.4:2003	- Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2009	- American national standard for testing unlicensed wireless devices
CFR 47 FCC 15	- Code of Federal Regulations – Radio Frequency Devices
CISPR 22:1997	- Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
ICES-003:2004	- Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
ISO 17025:2005	- General Requirements for the competence of testing and calibration laboratories
RSS 210:2010	- Issue 8: Spectrum Management and Telecommunications Policy. Radio Standards Specification Low Power Licence-Exempt Radiocommunication Devices

Sample calculation(s)

Margin = limit – (received signal + antenna factor + cable loss – pre-amp gain)
Margin = 50.5dBuV/m – (50dBuV + 10dB + 2.5dB – 20dB)
Margin = 8.5 dB

Document Revision Status

Revision 1 - June 27, 2012

Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

AE – Auxiallary Equipment.

BW – Bandwidth. Unless otherwise stated, this is refers to the 6 dB bandwidth.

EMC – Electro-Magnetic Compatibility

EMI – Electro-Magnetic Immunity

EUT – Equipment Under Test

ITE – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

LISN – Line impedance stabilization network

NCR – No Calibration Required

RF – Radio Frequency

Testing Facility

Testing for EMC on the EUT was carried out at Global EMC labs in Toronto, Ontario, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

Calibrations and Accreditations

The measurement site used is registered with Federal Communications Commission (FCC) and Industry Canada (IC). This site is calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz”. The semi-anechoic chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

Testing Environmental Conditions and Dates

Following were the environmental conditions in the facility during time of testing –

Date	Test	Init.	Temperature (ºC)	Humidity (%)	Pressure (kPa)
April 13, 2012	All	RA	20-25ºC	30-45%	100 -103kPa

Detailed Test Results Section

Radiated Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

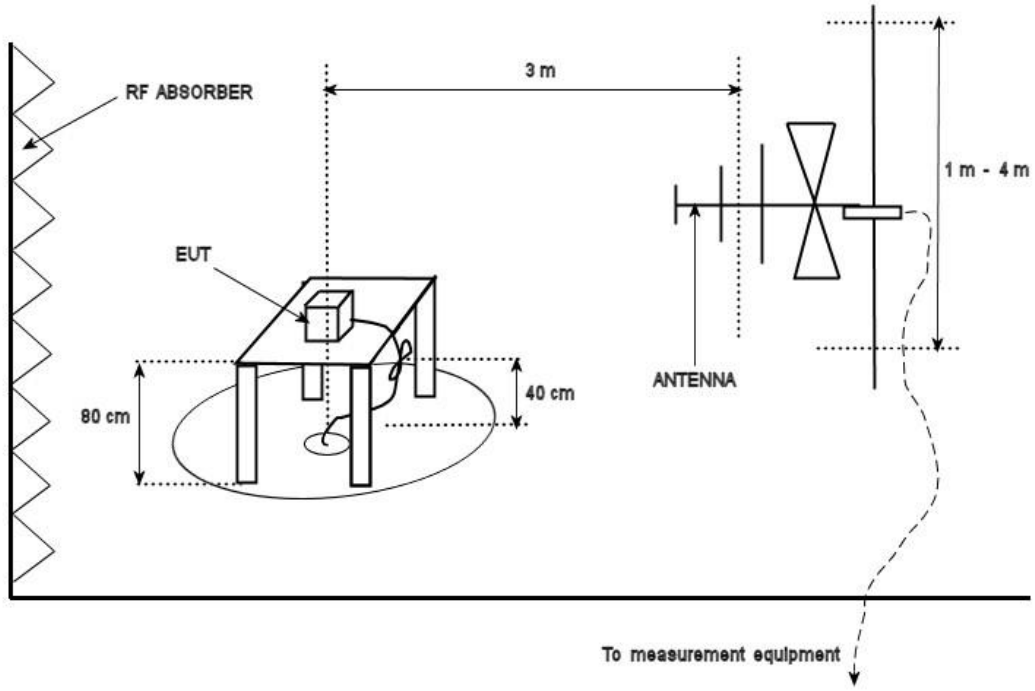
Limit(s) and Method

The method is as defined in ANSI C63.4:2003.
The limits are as defined in FCC Part 15, Section 15.209:

30 MHZ – 88 MHz, 100 uV/m (40.0 dBuV/m[1]) at 3 m
88 MHz – 216 MHz, 150 uV/m (43.5 dBuV/m[1]) at 3 m
216 MHz – 960 MHz, 200 uV/m (46.0 dBuV/m[1]) at 3 m
Above 960 MHz, 500 uV/m (54.0 dBuV/m[1]) at 3 m
Above 1000 MHz, 500 uV/m (54 dBuV/m[2]) at 3m

[1]Limit is with 120 kHz measurement bandwidth and a using a Quasi Peak detector.
[2]Limit is with 1 MHz measurement bandwidth and using an Average detector

Typical Radiated Emissions Setup



Measurement Uncertainty

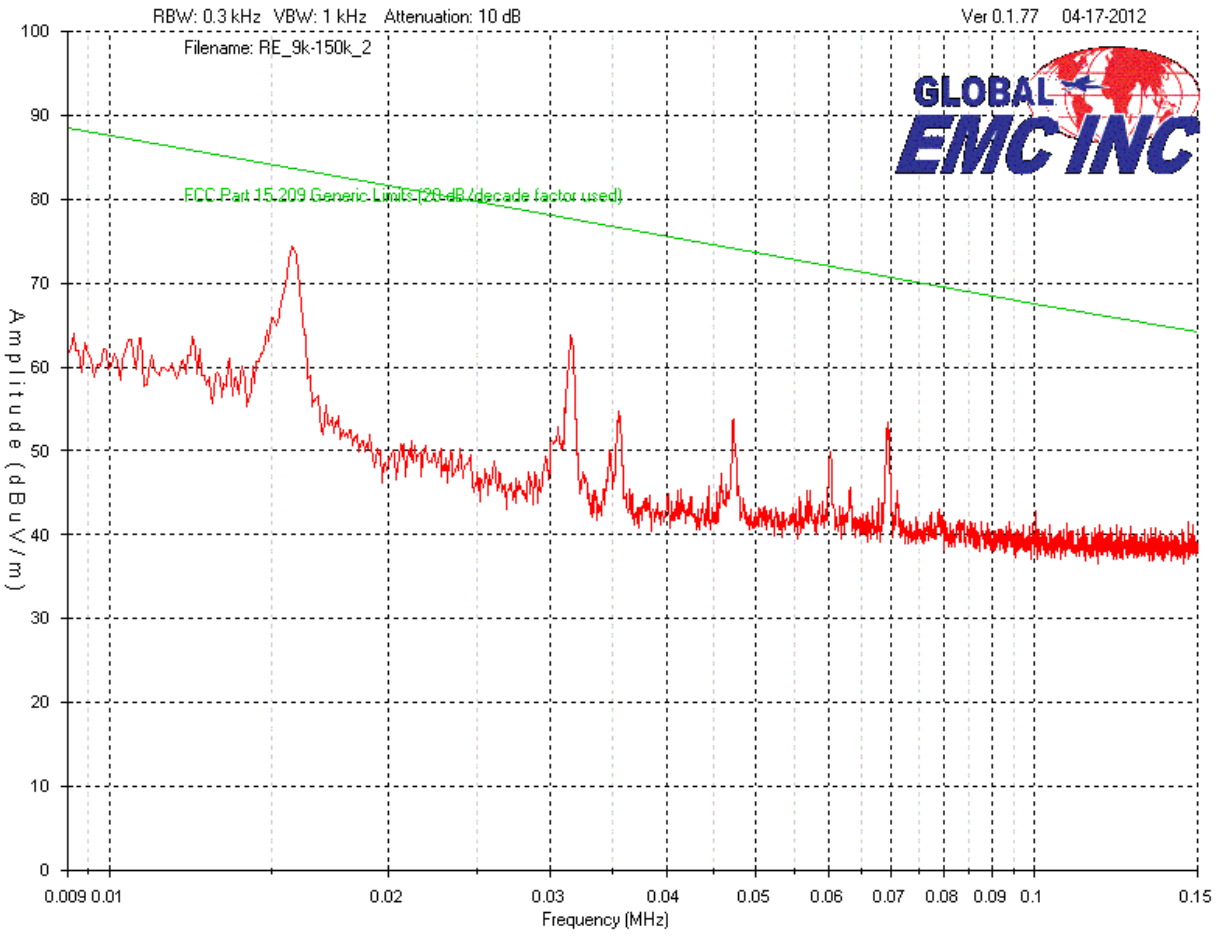
The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is +/-4.4 dB with a 'k=2' coverage factor and a 95% confidence level.

Preliminary Graphs

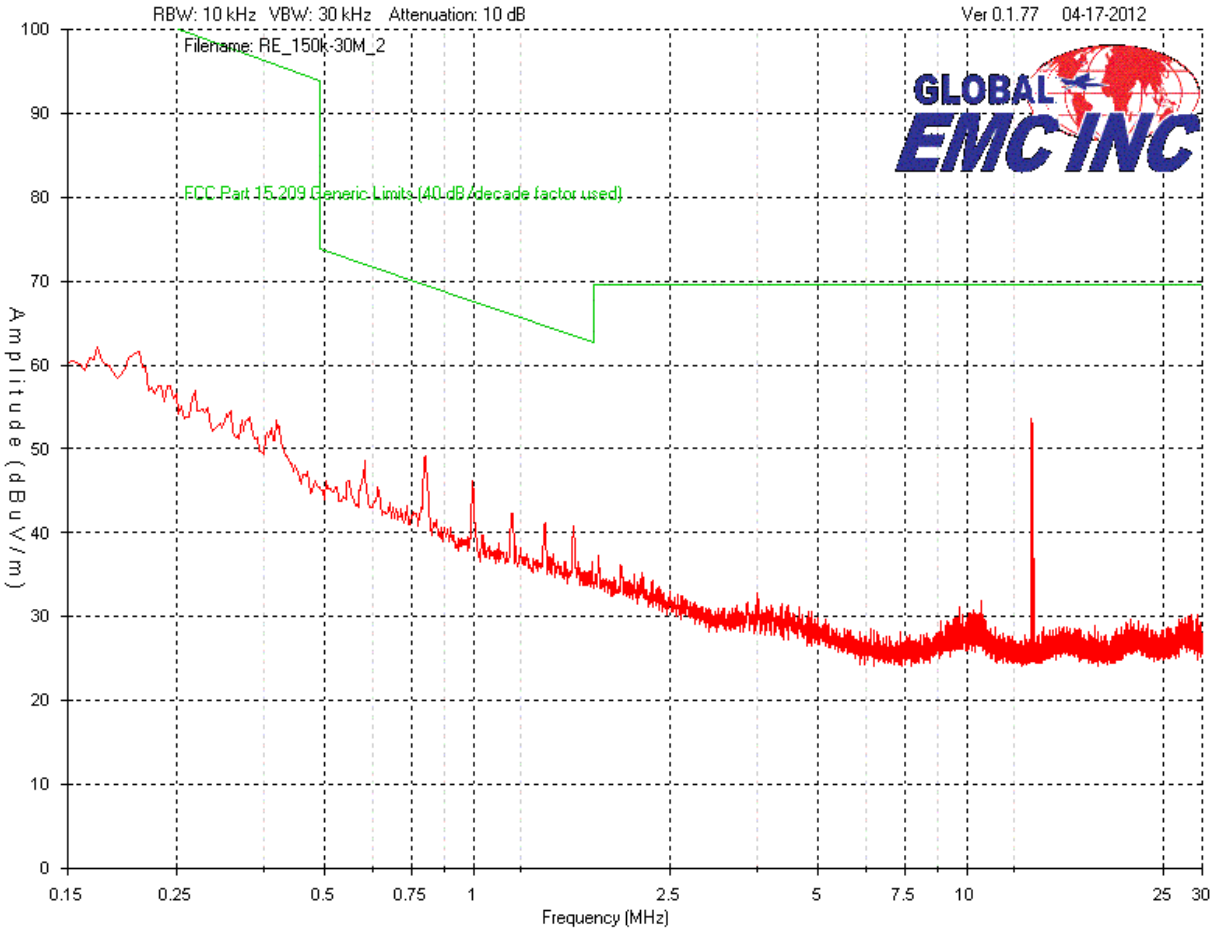
Note the graphs shown below are for graphical illustration only. For final measurements with the appropriate detector, please refer to the final measurement table where applicable. The graphs shown below are maximized peak measurement graphs, measured with a resolution bandwidth greater than the final required detector and over a full 0-360° rotation. This peaking process is done as a worst case measurement. This process enables the detection of frequencies of concern for final measurement, and provides considerable time savings.

In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10^{th} harmonic (a minimum of a 1 GHz).

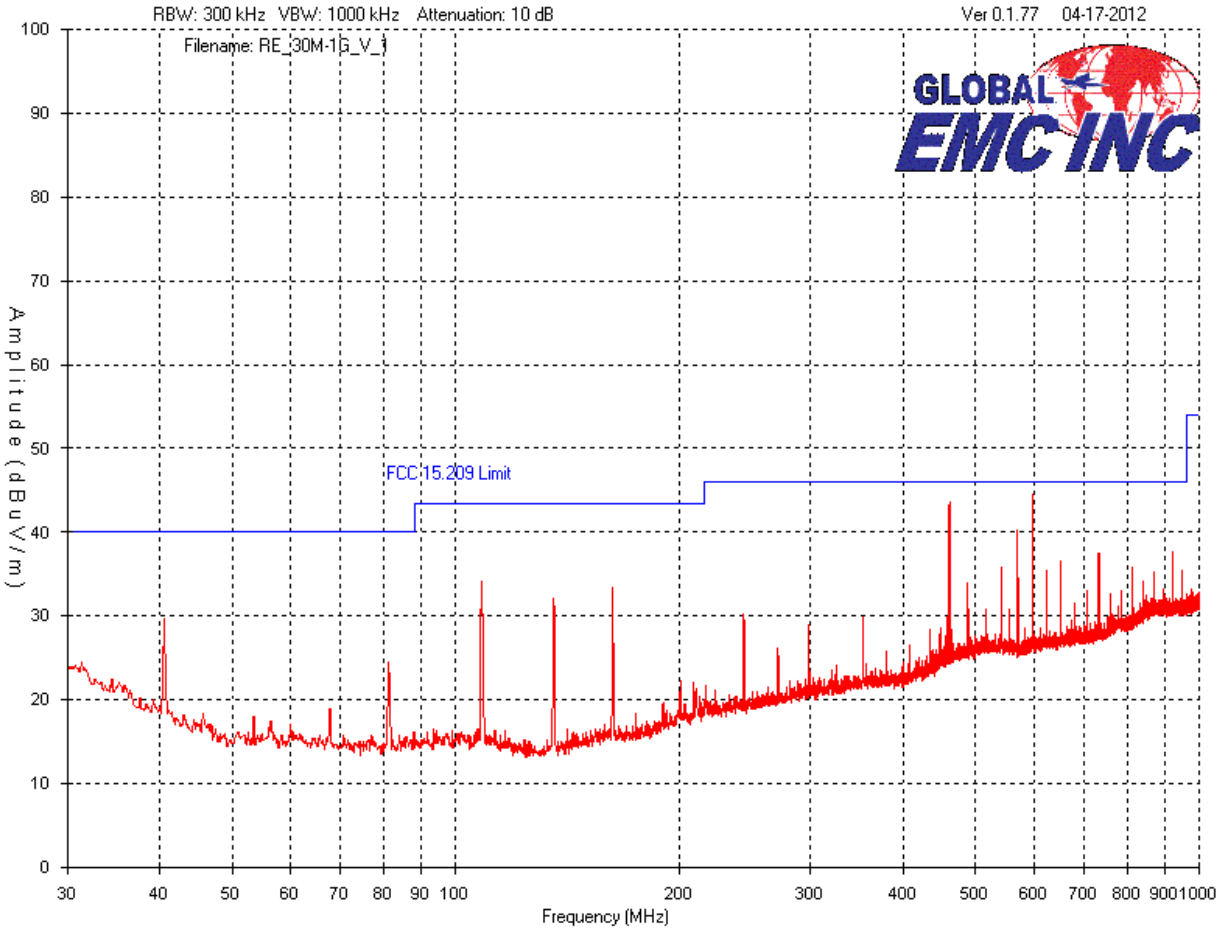
Peak Emissions Graph
9kHz – 150kHz



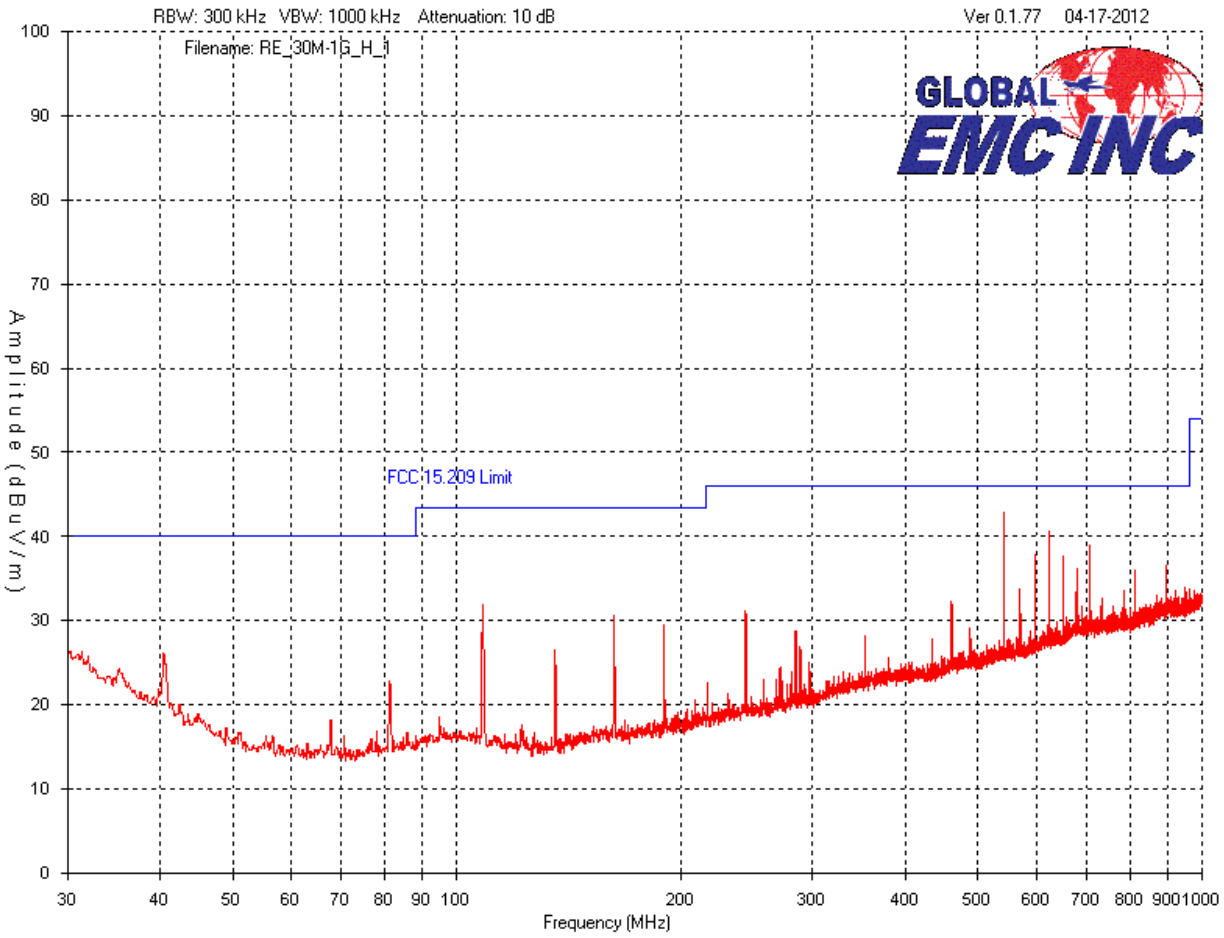
Peak Emissions Graph
150kHz – 30MHz



Peak Emissions Graph
30MHz – 30MHz, Vertical



Peak Emissions Graph
30MHz – 30MHz, Horizontal



Final Measurements

For information purposes, the fundamental was measured to be 53.9 dBuV/m at 3 meters.

Fundamental Emissions Table

Frequency (MHz)	Raw (dBuV)	Antenna (dB/m)	Cable Factor	Current to Voltage Factor	Preamp - Chase Factor	Level (dBuV/m)	Limit (dB)	Margin (dB)	Pass/Fail
13.56	48.4	-16	0.1	51.5	-30.1	53.9	69.5	15.6	Pass

Spurious Emissions Table

Frequency (MHz)	Polarity (Vertical / Horizontal)	Detector	Raw (dBuV)	Antenna factor (dB/m)	Cable RE Factor	Preamp (dB)	Level (dBuV/m)	Limit (dB)	Margin (dB)	Pass/Fail
596.8	Vertical	Quasi-peak	46.5	19	0.9	-30.2	36.2	46	9.8	Pass
461.2	Vertical	Quasi-peak	48.5	17.5	0.7	-30.3	36.4	46	9.6	Pass
569.6	Vertical	Peak	51.1	18.6	0.8	-30.2	40.3	46	5.7	Pass
921.9	Vertical	Peak	43.8	22.4	1.4	-29.9	37.7	46	8.3	Pass
732.2	Vertical	Peak	46.5	20.1	1.1	-30.1	37.6	46	8.4	Pass
108.3	Vertical	Peak	55.7	8.1	0.5	-30.2	34.1	43.5	9.4	Pass
542.5	Horizontal	Quasi-peak	40.8	18.7	0.8	-30.2	30.1	46	15.9	Pass
623.6	Horizontal	Peak	49.8	20.2	0.9	-30.2	40.7	46	5.3	Pass
705.2	Horizontal	Peak	46.6	21.4	1	-30.1	38.9	46	7.1	Pass
596.9	Horizontal	Peak	47.7	19.5	0.9	-30.2	37.9	46	8.1	Pass
651.1	Horizontal	Peak	46.6	20.3	0.9	-30.2	37.6	46	8.4	Pass
895.0	Horizontal	Peak	42.1	23	1.3	-29.9	36.5	46	9.5	Pass

No emissions were detected within the bands specified in 15.205.

Test Equipment List

Equipment	Model No.	Manufacturer	Last calibration date	Next calibration due date	Asset #
Spectrum Analyzer	ESL 6	Rohde & Schwarz	Oct-06, 2011	Oct-06, 2013	GEMC 160
BiLog Antenna	3142-C	ETS	Jan. 17, 2011	Jan. 17, 2013	GEMC 137
Loop Antenna	EM 6871	Electro-Metrics	Jan. 31, 2011	Jan. 31, 2013	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Jan. 31, 2011	Jan. 31, 2013	GEMC 71
Attenuator 3 dB	FP-50-3	Trilithic	NCR	NCR	GEMC 40
Chase Preamp 9kHz - 2 GHz	CPA9231A	Chase	Aug. 25, 2010	Aug. 25, 2012	GEMC 6403
Q-Par 1.5-18 GHz Horn	6878/24	Q-par	Aug 25, 2010	Aug 25, 2012	GEMC 6365
1-26G pre-amp	HP 8449B	HP	Aug 25, 2010	Aug 25, 2012	GEMC 6351
RF Cable 7m	LMR-400-7M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 28
RF Cable 1m	LMR-400-1M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 29
RF Cable 0.5M	LMR-400-0.5M-50OHM-MN-MN	LexTec	NCR	NCR	GEMC 31

This report module is based on GEMC template “FCC - 15.209 - Radiated Emissions_Rev1.doc”

Appendix A – EUT Summary

For further details for filing purposes, refer to filing package.

General EUT Description

Client / Manufacturer Details	
Organization / Address	Kaba Lodging Systems (Kaba Ilco Inc.) 7301 Decarie Blvd. Montreal QC, Canada H4P 2G7
Contact	Michael Mosca
Phone	514-735-5410
Email	michael.mosca@kaba.com
EUT (Equipment Under Test) Details	
EUT Name	Confidant RFID
FCC ID	Q8SCONFIDANT-RFID
IC #	4652A-CRFID
EUT revision	1
Equipment category	Residential
EUT is powered using	3x 1.5V AA batteries
Input voltage range(s) (V)	4.5Vdc
Rated input current (A)	0.040
Basic EUT functionality description	Electronic door lock
Modes of operation	Lock/ unlock
Frequency of all clocks present in EUT	24 MHz annd 27.12 MHz
Available connectors on EUT	None in normal use
Peripherals required to exercise EUT Ex. Signal generator	RFID card
Dimensions of product	L 30mm W 60mm H 280mm
Condition of EUT (Prototype, production, known damages, differences to production sample, etc)	Production representative

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see 'Appendix B – EUT & Test Setup Photographs'.

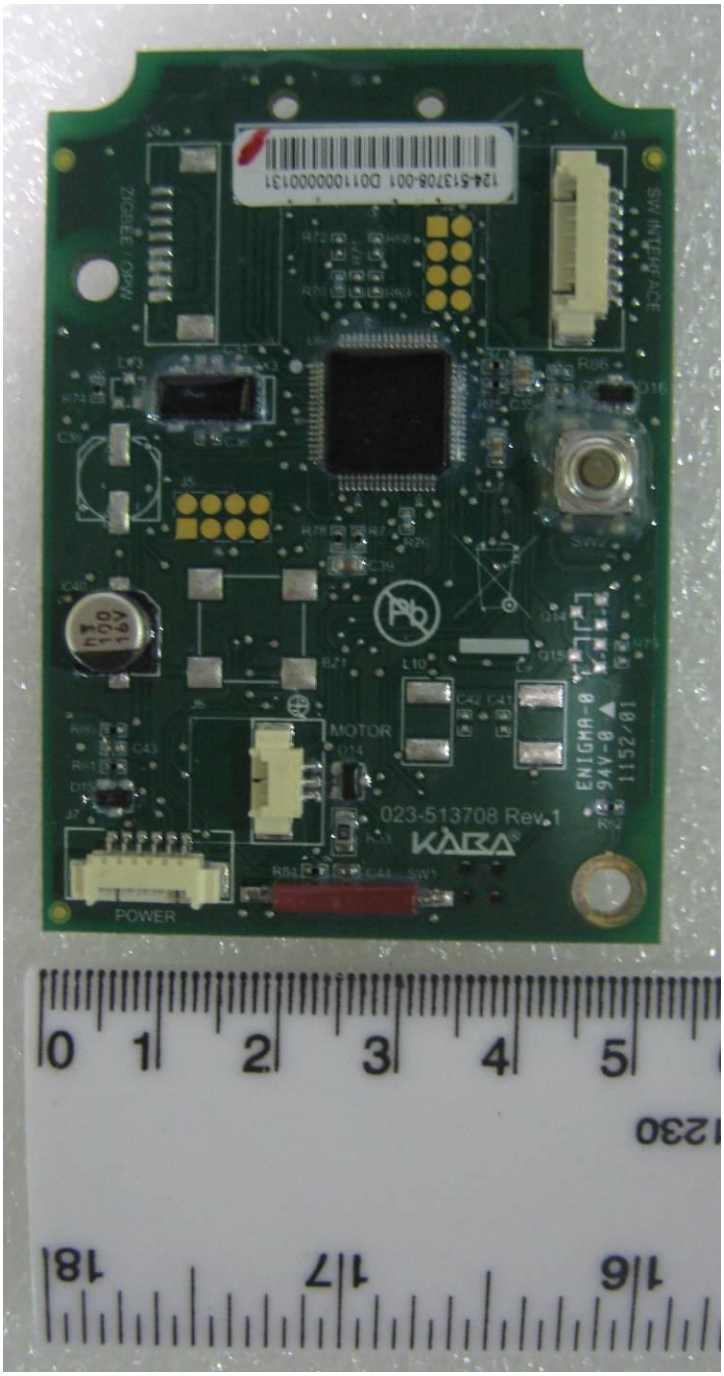
Appendix B – EUT and Test Setup Photographs

Note: These photos are for information purposes only.
Also refer to PDF files separate from this test report.

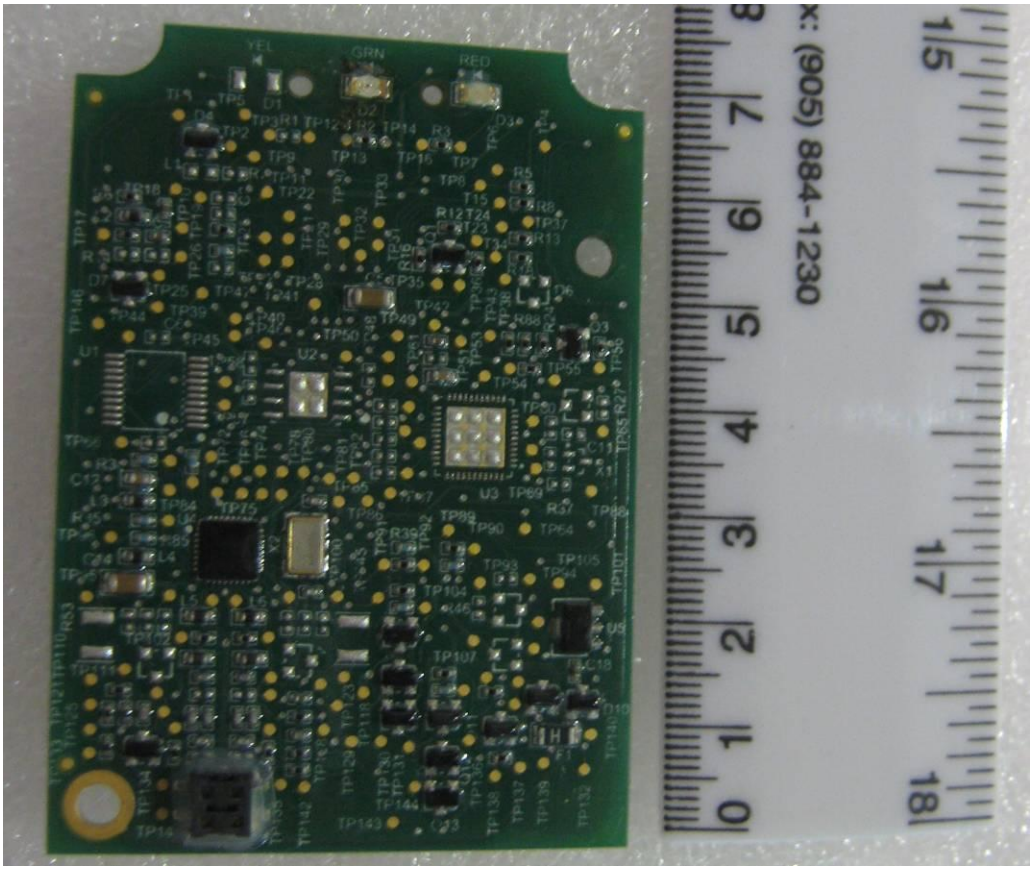
EUT – Exterior view

EUT – Interior view, circuit board installed within chassis

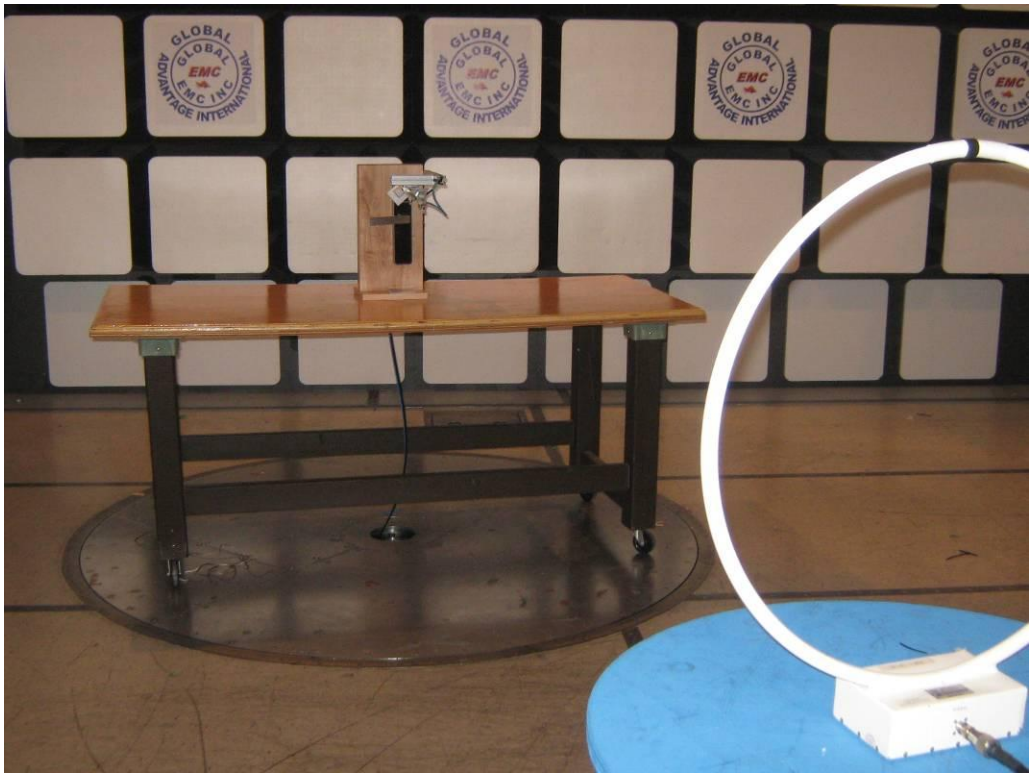
EUT – Interior view, circuit board side 1



EUT – Interior view, circuit board side 2



Radiated Emissions
9kHz – 30MHz



Radiated Emissions
30MHz – 1GHz