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<http://www.ltalab.com>Dates of Tests: July 2~9, 2010
Test Report S/N: LR500191007A
Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

VULCADENACIO

APPLICANT

Bioinsec Co., Ltd.

FCC Classification	:	Part 15 Low Power Communication Device Transmitter
Manufacturing Description	:	Fingerprinter Access Controller
Manufacturer	:	Bioinsec Co., Ltd.
Model name	:	Cadenacio
Variant Model name	:	BKS-5000
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.225 Subpart C; ANSI C-63.4-2003
Frequency Range	:	13.56MHz
RF power	:	71.75dBuV/m @ 3m
Data of issue	:	July 9, 2010

This test report is issued under the authority of:

The test was supervised by:

Kyung-Taek LEE, Technical Manager

Hyun-Chae You, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

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1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
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Web site : <http://www.ltalab.com>
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2010-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-09-01	EMC accredited Lab.
FCC	U.S.A	610755	2011-04-22	FCC filing
VCCI	JAPAN	R2133, C2307	2011-06-21	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Client& Manufacturer

Company name : Bioinsec Co., Ltd.
 Address : 902, 197-17, Ace Techno Tower1, Guro3-dong, Guro-gu, Seoul, Korea
 Tel / Fax : +82-2-2109-1140/ +82-2-2109-1143

2-2 Equipment Under Test (EUT)

Trade name : Fingerprinter Access Controller
 Model name : Cadenacio
 Variant Modelname : BKS-5000
 Serial number : Identical prototype
 Date of receipt : July 1, 2010
 EUT condition : Pre-production, not damaged
 Antenna type : Loop Antenna
 Frequency Range : 13.56 MHz
 RF output power : 71.75dBuV/m @ 3m
 Power Source : DC 12V

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	-	13.56	-

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP Compaq dx7400 Microtower	CNG8330J95	HP
Monitor 17"	HPL1710	CNC816QH92	HP
Keyboard	SK-8115	641-OEWW	DELL
Mouse	MO56UOA	F0J00NOL	DELL
PRINTER	STYLUS C65	N/A	EPSON
Micro SD Card	N/A	N/A	SANDISK

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Test Condition	Status (note 1)
15.225(a)	Electric Field Strength - Fundamental Emission	Radiated	C
15.225(b) (c)	Electric Field Strength - Outside the Band		C
15.225(d) / 15.209	Electric Field Strength - Spurious Emission		C
15.225(e)	Frequency Tolerance		C
15.207 /15.107	AC Conducted Emissions	Line Conducted	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 15.225; ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 Electric Field Strength

Procedure: About the Fundamental Emission, Outside the Band and Spurious Emission

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m.

→ From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for each antenna angle 0deg., 45deg. and 90deg.

→ From 30MHz to 1000MHz at distance 3m

The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Bandwidth settings per frequency range;

	From 9kHz to 150kHz	From 150kHz to 30MHz	From 30MHz to 1000MHz
IF Bandwidth	200Hz	9kHz	120kHz

Part 15 Section 15.31 (f)(2) (9kHz ~ 30MHz)

9kHz ~ 490kHz [Limit at 3m] = [Limit at 300m]-20log(3[m]/300[m])

490kHz ~ 30MHz [Limit at 3m] = [Limit at 30m]-20log(3[m]/30[m])

3.2.1.1 Electric Field Strength - Fundamental Emission

Test method : Part 15.225(a)
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement data:

Freq (MHz)	Pol.	Reading (dBμV/m)	T.F (dB)	Field Strength @3m (dBμV/m)	Limit @3m (dBμV/m)	Margin (dB)
13.56	H	83.25	-11.5	71.75	104	32.25
13.56	V	82.14	-11.5	70.64	104	33.36

-- Note 1--

Field strength of 13.553MHz to 13.567MHz Limit@3m = 84dBμV/m + 20log30m/3m
 = 104dBμV/m

-- Note 2--

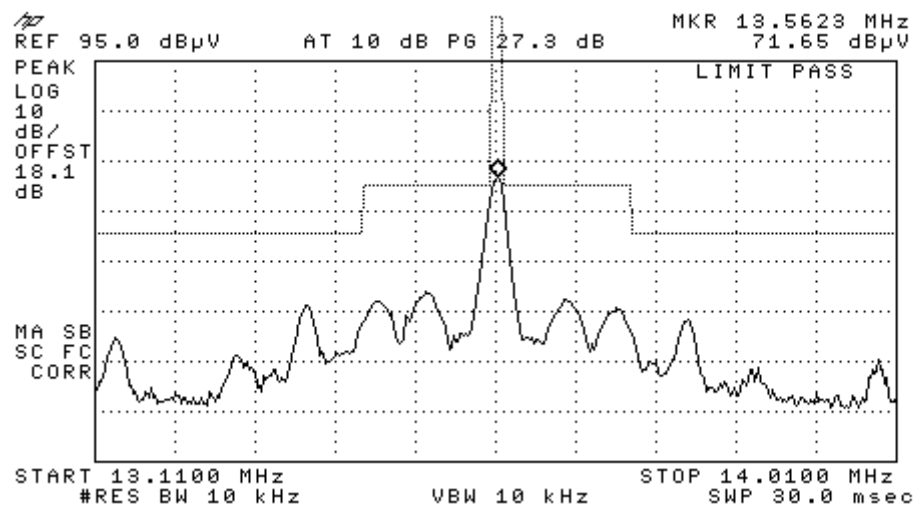
T.F(Total Factor) = Antenna Factor + Cable Loss –Amp Gain

Field Strength @3m = Reading + T.F

3.2.1.2 Electric Field Strength - Outside the Allocated Band

Test method : Part 15.225(b) (c)
Tx Frequency : 13.56 MHz
Result : **Complies**

Measurement Data:



3.2.1.3 Electric Field Strength – Spurious Emission

Test method : Part 15.225(d) / Part 15.209
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement Data:

Freq (MHz)	Pol.	Reading (dBμV/m)	T.F (dB)	Field Strength @3m (dBμV/m)	Limit @3m (dBμV/m)	Margin (dB)
30.00	V	51.61	-14.17	37.44	40.00	2.56
67.80	V	52.10	-14.74	37.36	40.00	2.64
81.36	V	50.80	-16.34	34.46	40.00	5.54
85.00	H	48.50	-17.44	31.06	40.00	8.94
89.90	V	52.30	-16.79	35.51	43.50	7.99
119.02	V	50.12	-14.06	36.06	43.50	7.44
122.04	V	51.50	-13.72	37.78	43.50	5.72
189.84	H	55.30	-14.28	41.02	43.50	2.48
203.40	H	54.80	-13.41	41.39	43.50	2.11
212.90	H	54.30	-15.15	39.15	43.50	4.35
216.96	V	54.20	-12.80	41.40	46.00	4.60
220.62	H	55.60	-16.20	39.40	46.00	6.60
230.52	V	52.40	-12.68	39.72	46.00	6.28
230.52	H	57.70	-16.16	41.54	46.00	4.46
233.59	H	52.60	-16.14	36.46	46.00	9.54
266.40	H	55.70	-12.99	42.71	46.00	3.29
383.85	H	50.30	-9.98	40.32	46.00	5.68
573.80	V	45.20	-3.69	41.51	46.00	4.49

-- Note 1--

T.F(Total Factor) = Antenna Factor + Cable Loss –Amp Gain

Field Strength @3m = Reading + T.F

-- Note 2--

No other emissions were detected at a level greater than 20dB below limit.

3.2.2 Frequency Tolerance

Procedure:

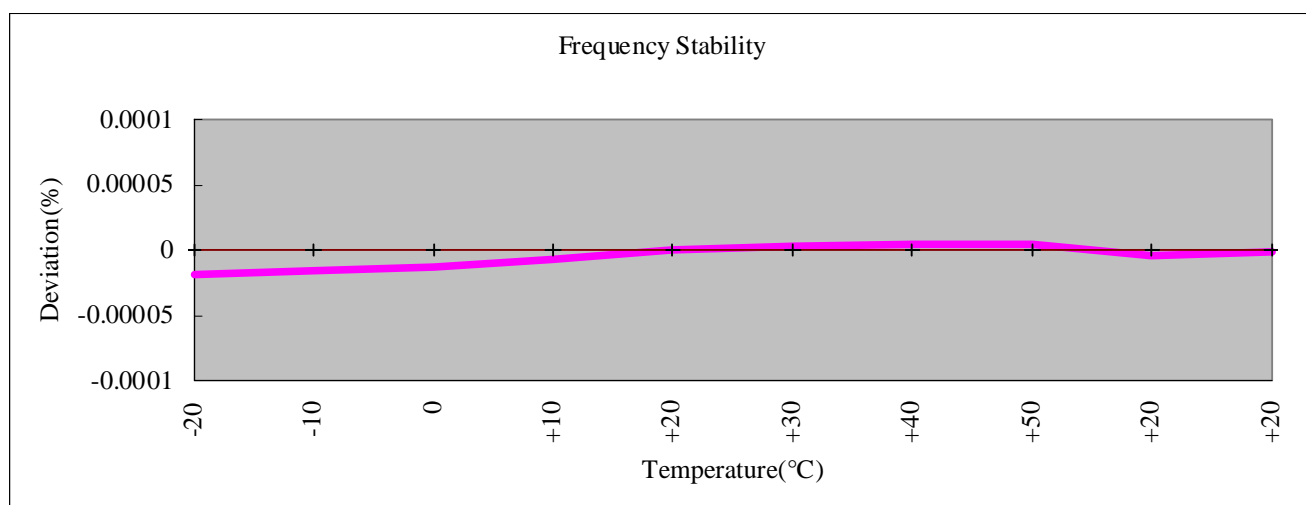
The temperature test was started after the temperature stabilization time of 30 minutes.

Test method : Part 15.225(e)
 Tx Frequency : 13.56 MHz
 Result : **Complies**

Measurement Data:

OPERATING FREQUENCY: 13,562,305 Hz
 Freq. Tolerance Limit: ± 0.01 %

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ (Hz)	Deviation (%)
100	12.0	-20	13,562,487	-0.000019
100		-10	13,562,464	-0.000015
100		0	13,562,425	-0.000013
100		10	13,562,271	-0.000007
100		20	13,562,305	0.000000
100		30	13,562,263	0.000003
100		40	13,562,249	0.000004
100		50	13,562,257	0.000005
85	10.2	20	13,562,243	-0.000004
115	13.8	20	13,562,241	-0.000001



3.2.3 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 10dB below limit.

Minimum Standard: FCC Part 15.207(a)/EN 55022**Class A**

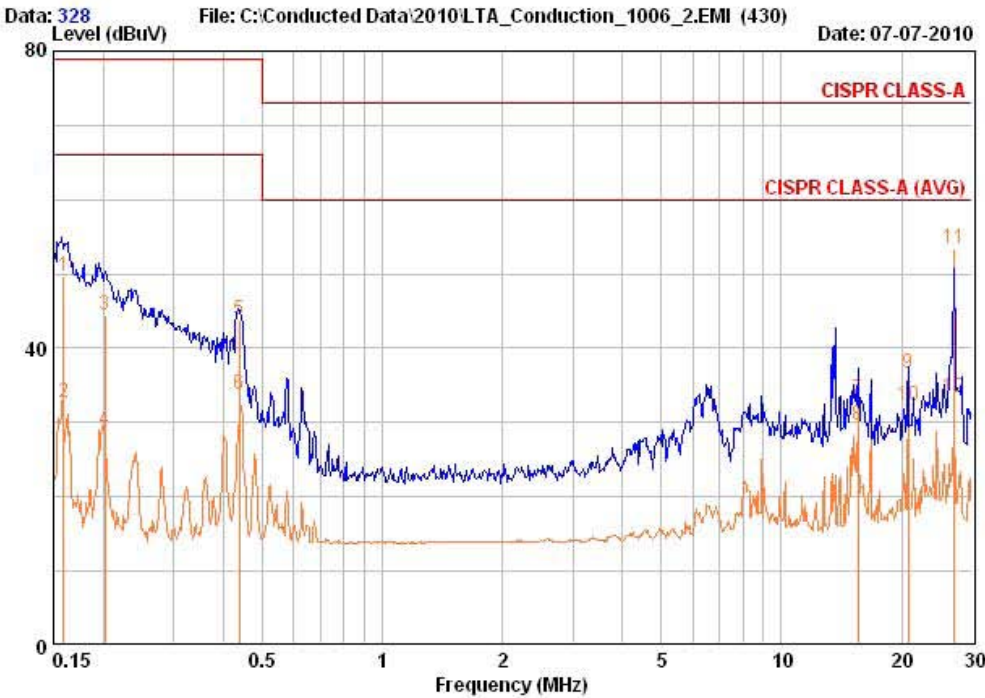
Frequency Range	quasi-peak	Average
0.15 ~ 0.5 MHz	79 dBuV	66 dBuV
0.5 ~ 30 MHz	73 dBuV	60 dBuV

AC Conducted Emissions – Ping – Line



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EUT / Model No. : Cadenacio	Phase : LINE
Test Mode : PING mode	Test Power : 120 / 60
Temp./Humi. : 25 / 54	Test Engineer : KIM.K.I



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
0.159	40.15	22.95	9.65	49.80	32.60	79.00	66.00	29.20	33.40
0.202	34.86	19.26	9.65	44.51	28.91	79.00	66.00	34.49	37.09
0.439	34.05	24.15	9.67	43.72	33.82	79.00	66.00	35.28	32.18
15.554	22.81	19.21	10.43	33.24	29.64	73.00	60.00	39.76	30.36
20.807	25.94	21.74	10.61	36.54	32.34	73.00	60.00	36.46	27.66
26.985	42.78	22.58	10.72	53.50	33.30	73.00	60.00	19.50	26.70

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

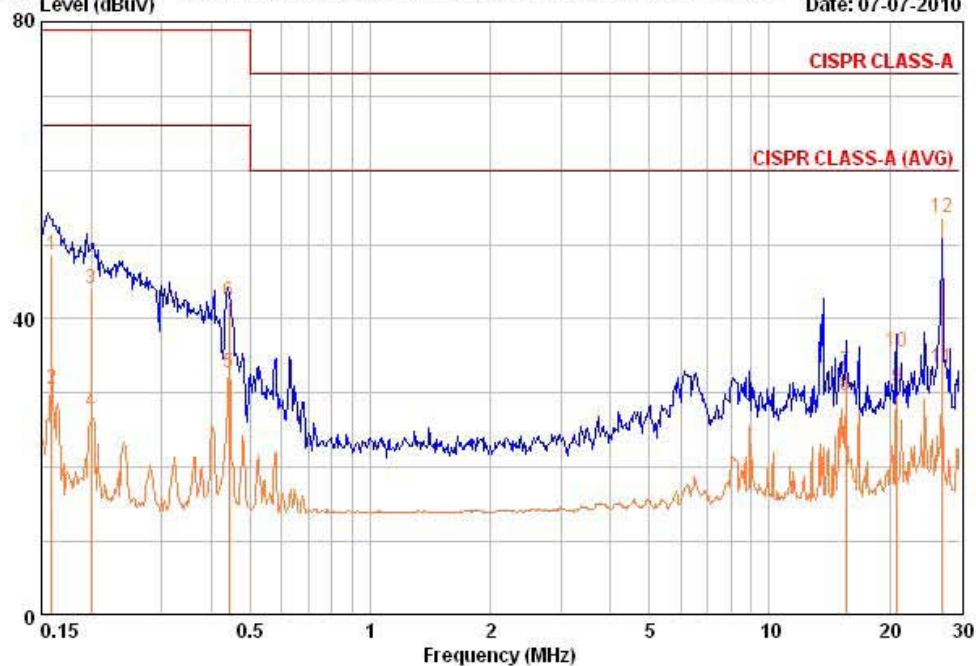
AC Conducted Emissions – Ping – Neutral



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EUT / Model No. : Cadenacio	Phase : NEUTRAL
Test Mode : PING mode	Test Power : 120 / 60
Temp./Humi. : 25 / 54	Test Engineer : KIM.K.I

Data: 330 Level (dBuV) File: C:\Conducted Data\2010\LTA_Conduction_1006_2.EMI (430) Date: 07-07-2010



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
QP	QP	AV		QP	AV	QP	AV	QP	AV
MHz	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.159	38.95	20.85	9.66	48.61	30.51	79.00	66.00	30.39	35.49
0.200	34.46	17.86	9.66	44.12	27.52	79.00	66.00	34.88	38.48
0.442	32.65	23.05	9.66	42.31	32.71	79.00	66.00	36.69	33.29
15.554	22.51	19.11	10.43	32.94	29.54	73.00	60.00	40.06	30.46
20.868	24.94	20.14	10.62	35.56	30.76	73.00	60.00	37.44	29.24
26.985	42.78	22.58	10.74	53.52	33.32	73.00	60.00	19.48	26.68

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	FSV-30	100757	R&S	Feb-11
2	Spectrum Analyzer	8563E	3425A02505	HP	Mar-11
3	Spectrum Analyzer	8594E	3710A04074	HP	Oct-10
4	Signal Generator	8648C	3623A02597	HP	Mar-11
5	Signal Generator	83711B	US34490456	HP	Mar-11
6	Attenuator (3dB)	8491A	37822	HP	Oct-10
7	Attenuator (10dB)	8491A	63196	HP	Oct-10
8	Attenuator (30dB)	8498A	1801A06689	HP	Oct-10
9	EMI Test Receiver	ESVD	843748/001	R&S	Mar-11
10	Horn Antenna(18 ~ 40GHz)	SAS-574	154	Schwarzbeck	Nov-10
11	Horn Antenna(18 ~ 40GHz)	SAS-574	155	Schwarzbeck	Nov-10
12	RF Amplifier	8447D	2949A02670	HP	Oct-10
13	RF Amplifier	8449B	3008A02126	HP	Mar-11
14	Test Receiver	ESHS10	828404/009	R&S	Mar-11
15	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Apr-11
16	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-11
17	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-11
18	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-11
19	Horn Antenna	BBHA 9120D	9120D122	SCHWARZBECK	Dec-11
20	Dipole Antenna	VHA9103	2116	SCHWARZBECK	Nov-10
21	Dipole Antenna	VHA9103	2117	SCHWARZBECK	Nov-10
22	Dipole Antenna	VHA9105	2261	SCHWARZBECK	Nov-10
23	Dipole Antenna	VHA9105	2262	SCHWARZBECK	Nov-10
24	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Mar-11
25	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
26	RF Switch	MP59B	6200414971	ANRITSU	-
27	Power Divider	11636A	6243	HP	Oct-10
28	DC Power Supply	6622A	3448A03079	HP	Oct-10
29	Frequency Counter	5342A	2826A12411	HP	Mar-11
30	Power Meter	EPM-441A	GB32481702	HP	Mar-11
31	Power Sensor	8481A	2702A64048	HP	Mar-11
32	Audio Analyzer	8903B	3729A18901	HP	Oct-10
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-10
34	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	Oct-10
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-11
36	Stop Watch	HS-3	601Q09R	CASIO	Mar-11
37	LISN	ENV216	100408	R&S	Oct-10
38	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	May-12