



CTK Co., Ltd.
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386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
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TEST REPORT For FCC

Test Report No. : 2007030086

Date of Issue : March 30, 2007

FCC ID : CCECDL100R

Model/Type No. : CDL-100R

Kind of Product : DIGITAL DOORLOCK

Applicant : COMMAX Co., Ltd.

Applicant Address : 513-11, Sangdaewon-dong, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea

Manufacturer : COMMAX Co., Ltd.

Manufacturer Address : 513-11, Sangdaewon-dong, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea

Contact Person : Ji-Soo KIM / Engineer

Telephone : +82-31-739-3682

Received Date : March 16, 2007

Test Date : March 30, 2007

Test Results : In Compliance Not in Compliance

The test results presented in this report relate only to the object tested.

CTK Co., Ltd. is accredited by Korea Laboratory Accreditation Scheme (KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the above test item(s) and test method(s).

Tested by

Young-Joon, Park
EMC Test Engineer
Date: March 30, 2007

Reviewed by

James Hong
EMC Technical Manager
Date: March 30, 2007



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REPORT REVISION HISTORY

Date	Revision	Page No
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1.0 General Product Description

1.0.1 Tested Equipment

- Unless otherwise indicated, all tests were conducted on Model CDL-100R.
- Tests performed on Model _____ were considered to be representative of Model(s) _____.

1.0.2 Equipment Size, Mobility and Identification

Dimensions: 75(W) by 300(L) by 38(H) mm inch
Mobility: Hand-held Table-top Built-in
 Traveling Floor-standing
Serial No.: Prototype

1.0.3 Electrical Ratings

Input: 6 Vdc (AA-type alkaline batteries, 1.5V, 4EA)
Output: -

1.0.4 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage: 6 Vdc (Battery)
Frequency: -

1.1 Model Differences

Not applicable

1.2 Device Modifications

Not applicable



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1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

Peripheral Devices

Device	Manufacturer	Model No.	Serial No.	FCC ID or DoC
DIGITAL DOORLOCK (EUT)	COMMAX Co., Ltd.	CDL-100R	Prototype	CCECDL100R

Cable Description

#	Description	Ferrite Core	Length (m)	Other Details

1.4 Test Software

- EMC Test V 1.0
- Display Test Patterns – V1.5
- Ping.exe
- Not applicable

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

- Standby
- Display circles pattern
- Practice operation : EUT transmitting at 13.56 MHz continuously
- Scrolling 'H'
- Read / Write

1.6 Configuration





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1.7 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.8 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.9 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested. Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)
Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Open Area Test Site. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-2003 7.2.3, 7.2.4, 8.3.1.1, 8.3.1.2








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1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements.	 93250
JAPAN	VCCI	10 meter Open Area Test Site and one conducted site.	 R-948, C-986
KOREA	MIC	EMI (10 meter Open Area Test Site and two conducted sites) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 No. 51, KR0025
International	KOLAS	EMC	
Europe	GLAS	EMC EN 55011, EN 55022, EN 61000-6-3, EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 50130-4, EN 55024, EN 61204-3, EN 60601-1-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	 No.13000796-02



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2.0 Emissions Test Regulations

The emissions tests were performed according to following regulations:

- EN 61000-6-3:2001 Class A Class B
- EN 61000-6-4:2001 Class A Class B
- EN 50083-2:2001
- EN 55011:1998 +A1:1999 +A2:2002 Group 1 Group 2
 Class A Class B
- EN 55013:2001 +A1:2003
- EN 55014-1:2000 +A1:2001 +A2:2002
- EN 55015:2000 +A1:2001 +A2:2002
- EN 61204-3:2000 Class A Class B
- EN 55022:1994 +A1:1995 +A2:1997 Class A Class B
- EN 55022:1998 Class A Class B
- EN 55022:1998 +A1:2000 Class A Class B
- EN 55022:1998 +A1:2000 +A2:2003 Class A Class B
- EN 61000-3-2:2000
- EN 61000-3-3:1995 +A1:2001
- VCCI V-3/2004.04 Class A Class B
- AS/NZS 3548:1995 +A1:1997 +A2:1997 Class A Class B
- FCC Part 15 Subpart C
- CISPR 22:1997 Class A Class B
- CISPR 22:1997 +A1:2000 Class A Class B

The unit was tested to CISPR 22 and complied with the alternate methods allowed by FCC under paragraphs 15.107 and 15.109.



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2.1 Radiated Electric Field Emissions - 15.225(a)

Reference Standard

FCC Part 15.225(a)

Test Date

March 27, 2007

Test Location

EMI-OATS: Testing was performed at a test distance of 3 m

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
<input checked="" type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2008-02-15
<input checked="" type="checkbox"/>	Loop Antenna	EMCO	6502	9107-2652	2007-10-17

Frequency Range of Measurement

13.553 MHz to 13.567 MHz

Instrument Settings

IF Band Width: 10 kHz

Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental uV/m	Field Strength of Fundamental dBuV/m (30 m)	Field Strength of Fundamental dBuV/m (3 m)
13.553-13.567	15,848	84	104

Test Results

The requirements are:

- MET
 NOT MET
 NOT APPLICABLE

Remarks

See Appendix A for test data



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2.2 Radiated Electric Field Emissions - 15.225(b)(c)

Reference Standard

FCC Part 15.225(b)(c)

Test Date

March 27, 2007

Test Location

EMI-OATS: Testing was performed at a test distance of 3 m

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
<input checked="" type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2008-02-15
<input checked="" type="checkbox"/>	Loop Antenna	EMCO	6502	9107-2652	2007-10-17

Frequency Range of Measurement

13.410 MHz to 13.553 MHz, 13.567 MHz to 13.710 MHz
13.110 MHz to 13.410 MHz, 13.710 MHz to 14.010 MHz

Instrument Settings

IF Band Width: 10 kHz

Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental uV/m	Field Strength of Fundamental dBuV/m (30 m)	Field Strength of Fundamental dBuV/m (3 m)
13.410-13.553	334	50.4	70.4
13.567-13.710	334	50.4	70.4
13.110-13.410	106	40.5	60.5
13.710-14.010	106	40.5	60.5

Test Results

The requirements are:

- MET
 NOT MET
 NOT APPLICABLE

Remarks

Emissions 20dB's below the limit were not necessarily recorded.



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2.3 Radiated Electric Field Emissions - 15.225(d)

Reference Standard

FCC Part 15.225(d), 15.209

Test Date

March 27, 2007

Test Location

EMI-OATS: Testing was performed at a test distance of 3 m

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
<input checked="" type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESVS30	826638/008	2007-04-25
<input checked="" type="checkbox"/>	ULTRA Broadband Antenna	Rohde & Schwarz	HL562	361324/014	2008-06-12
<input checked="" type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2008-02-15
<input checked="" type="checkbox"/>	Loop Antenna	EMCO	6502	9107-2652	2007-10-17

Frequency Range of Measurement

9 kHz to 1000 MHz

Instrument Settings

IF Band Width: 10 kHz (9 kHz to 30 MHz)

IF Band Width: 120 kHz (30 MHz to 1000 MHz)

Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental $\mu\text{V}/\text{m}$	Field Strength of Fundamental $\text{dB}\mu\text{V}/\text{m}$ (3 m)
1.705-30.0	30	49.5
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	600	54

Test Results

The requirements are:

- MET
 NOT MET
 NOT APPLICABLE

Remarks

See Appendix A for test data



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2.4 Frequency Stability – 15.225(e)

Reference Standard

FCC Part 15.225(e)

Test Date

March 28, 2007

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
<input checked="" type="checkbox"/>	Spectrum Analyzer	HP	E4403B	US39440619	2007-09-01
<input checked="" type="checkbox"/>	Temp & Humi Chamber	Kunpoong Engineering	KP-1000	2002KP050041	2008-01-15

Test Results

The requirements are:

- MET
- NOT MET
- NOT APPLICABLE

Test Data

Timing	-20 °C	-10 °C	0 °C	10 °C	20 °C	30 °C	40 °C	50 °C
Start-up	13.56013	13.56010	13.56012	13.56012	13.56010	13.56010	13.56009	13.56011
10 min	13.56012	13.56010	13.56011	13.56011	13.56010	13.56011	13.56010	13.56013
30 min	13.56012	13.56011	13.56011	13.56010	13.56011	13.56012	13.56010	13.56012

Timing	Power 85%	Power 115%
Start-up	Not Applicable (Battery Power)	Not Applicable (Battery Power)
10 min	Not Applicable (Battery Power)	Not Applicable (Battery Power)
30 min	Not Applicable (Battery Power)	Not Applicable (Battery Power)



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2.5 Conducted Voltage Emissions – 15.207

Reference Standard

FCC Part 15.207

Test Date

Not Applicable (Battery Power)

Test Location

Shielded Room

Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
<input type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESHS30	828144/002	2008-02-15
<input type="checkbox"/>	LISN	EMCO	3825/2	9607-2574	2007-09-01
<input type="checkbox"/>	LISN	EMCO	3825/2	9409-2246	2007-09-01
<input type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESHS30	862024/001	2008-03-07
<input type="checkbox"/>	LISN	Rohde & Schwarz	ESH3-Z5	100207	2007-12-15
<input type="checkbox"/>	LISN	EMCO	3825/2	9206-1971	2007-12-15

Frequency Range of Measurement

150 kHz to 30 MHz

Conducted Emission limits

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

Test Results

The requirements are:

- MET
- NOT MET
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Remarks



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APPENDIX A – TEST DATA

Radiated Electric Field Emissions (Quasi-Peak reading)

1) Fundamental Frequency Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
13.56	54.6	H	1.0	9.7	0.8	104.0	65.1	38.9
13.56	55.9	V	1.0	9.7	0.8	104.0	66.4	37.6

2) Frequency Range from 9 kHz to 30 MHz Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
27.12	7.8	H	1.0	8.5	1.3	49.5	17.6	31.9
27.12	9.4	V	1.0	8.5	1.3	49.5	19.2	30.3

3) Frequency Range from 30 MHz to 1000 MHz Test Data

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
149.47	27.3	H	2.0	7.9	3.0	43.5	38.2	5.3
169.72	21.6	H	2.0	7.1	3.3	43.5	32.0	11.5
183.22	20.4	H	3.5	6.9	3.4	43.5	30.7	12.8
189.97	24.8	H	4.0	7.2	3.4	43.5	35.4	8.1
196.72	23.6	H	4.0	7.4	3.6	43.5	34.6	8.9
272.32	19.6	H	1.8	10.3	4.2	46.0	34.1	11.9



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Bandwidth of the Operating Frequency

