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**CERTIFICATE OF COMPLIANCE  
 FCC Part 15C Certification**

Dates of Tests: April 2 ~ 9, 2006  
 Test Report S/N:DR50110704F  
 Test Site : DIGITAL EMC CO., LTD.

FCC ID.

**CCEDRC500LCRF**

APPLICANT

**COMMAX Co., Ltd**

**FCC Classification** : Low Power Communication Device Transmitter  
**Device name** : Main Entrance Camera with 13.56MHz RFID  
**Manufacturer** : COMMAX Co. Ltd  
**Model name** : DRC-500LC/RF  
**Brand name** : COMMAX  
**Test Device Serial number** : Identical prototype  
**FCC Rule Part(s)** : FCC Part 15.225 Subpart C; ANSI C-63.4-2003  
**Frequency band** : 13.56 MHz  
**Data of issue** : April 10, 2007

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



NVLAP LAB CODE 200559-0

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**1. General information's**

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

<http://www.digitalemc.com> E-mail : demc@unitel.co.kr

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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".

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

**Test operator: engineer**

April 10, 2007

Won -Jong LEE

Data

Name

Signature

**Report Reviewed By: manager**

April 10, 2007

Harvey Sung

Data

Name

Signature

Ordering party:

Company name : COMMAX Co., Ltd  
 Address : 513-11, Sangdaewon-Dong, Jungwon-Gu, Sungnam-Si  
 Zip code : 462-120  
 City/town : Kyunggi-Do  
 Country : Korea  
 Date of order : March 9, 2007

## 2. Information's about test item

### CCEDRC500LCRF

#### 2.1 Equipment information

Equipment model name	DRC-500LC/RF
Type of equipment	Main Entrance Camera with 13.56MHz RFID
Frequency band	13.56 MHz
Type of Modulation	ASK
Physical channel	1 CH
Power	DC 15 V

#### 2.2 Tested environment

Temperature	:	15 ~ 35 (°C)
Relative humidity content	:	20 ~ 75 %
Air pressure	:	86 ~ 103 kPa
Details of power supply	:	DC 15 V

#### 2.3 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
-	-	-	-
-	-	-	-
-	-	-	-

#### 2.4 EMI Suppression Device(s)/Modifications

None

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Status (note 1)
<b>Transmitter requirements</b>		
15.225(a)	Radiated Emission - The field strength of any emission within the band 13.553 – 13.567 MHz.	C
15.225(b), (c), (d) / 15.209	Radiated Emission - Out of Band Emissions	C
15.225(e)	Frequency Tolerance	C
15.215	Additional provisions to the general radiated emission limitations.	C
15.207	Conducted Emissions Limits	NA
Note 1: C= Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable		

The sample was tested according to the following specification:  
 FCC Parts 15.225, 15.215, 15.205; ANSI C-63.4-2003

### 3.2 Transmitter requirements

#### 3.2.1 Radiated Emission

**Procedure:**

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in a OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Frequency Range = 9 KHz ~ 1GHz

RBW = 9KHz (9KHz ~ 30MHz)

= 120 kHz ( 30MHz ~ 1 GHz)

VBW ≥ RBW

Trace = max hold

Sweep = auto

Detector function = peak / Quasi-peak / average

**Measurement Data: Complies**

- Refer to the Next page

**Minimum Standard: FCC Part 15.225 / 15.209**

Rule Part	Frequency (MHz)	Limit
Part 15. 225	13.553 ~ 13.567	15848 uV/m@30m
	13.410 ~ 13.553 13.567 ~ 13.710	334 uV/m@30m
	13.110 ~ 13.410 13.710 ~ 14.010	106 uV/m@30m
	14.010 ~ 30.000	30 uV/m@30m
Part 15. 209	0.009 ~ 0.490	2400/F(KHz)uV/m@300
	0.490 ~1.705	24000/F(KHz)uV/m@30
	1.705 ~ 30	30 uV/m@30
	30 ~ 88	100 ** uV/m@3m
	88 ~ 216	150 ** uV/m@3m
	216 ~ 960	200 ** uV/m@3m
	Above 960	500 uV/m@3m

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

**- Measurement Data:**

▪ **The field strength of any emission within the band 13.553 ~ 13.567 MHz.**

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Distance Correction (dB)	Result Level (dBuV)	Limit (dBuV)	Margin (dB)
13.56	26.9	9.9	-19.08	17.72	84	66.28

▪ **The field strength of any emission within the band 13.410 ~ 13.553 MHz and 13.567 ~ 13.710MHz.**

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Distance Correction (dB)	Result Level (dBuV)	Limit (dBuV)	Margin (dB)
-	-	-	-	-	-	-

▪ **The field strength of any emission within the band 13.110 ~ 13.410 MHz and 13.710 ~ 14.010MHz.**

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Distance Correction (dB)	Result Level (dBuV)	Limit (dBuV)	Margin (dB)
-	-	-	-	-	-	-

▪ **The field strength of any emission within the band 14.010 ~ 30.000 MHz.**

Frequency (MHz)	Read Level (dBuV)	Factor (dB)	Distance Correction (dB)	Result Level (dBuV)	Limit (dBuV)	Margin (dB)
22.146	28.2	8.8	-19.08	17.92	30	12.08

▪ **The field strength of any emission within the band 0.009 ~ 1000 MHz.**

Frequency (MHz)	Ant (H/V)	Read Level (dBuV)	Factor (dB)	Result Level (dBuV)	Limit (dBuV)	Margin (dB)
88.414	H	51.2	-13.0	38.2	43.5	5.3
155.048	H	53.5	-12.1	41.4	43.5	2.1
199.183	H	54.1	-12.8	41.3	43.5	2.2
309.639	V	53.5	-8.6	44.9	46.0	1.1
311.866	V	53.2	-8.5	44.7	46.0	1.3
320.192	V	51.9	-8.2	43.7	46.0	2.3
325.801	H	52.3	-8.2	44.1	46.0	1.9
331.410	H	51.7	-8.0	43.7	46.0	2.3
338.987	H	52.0	-7.8	44.2	46.0	1.8
342.628	H	51.3	-7.8	43.5	46.0	2.5
376.282	V	50.7	-7.0	43.7	46.0	2.3
463.782	H	48.4	-5.3	43.1	46.0	2.9
88.414	H	51.2	-13.0	38.2	43.5	5.3

Remark :

1. Distance Correction Below 30MHz =  $40\log(10m/30m) = -19.08dB$   
Measurement Distance : 10m (Below 30MHz) , 3m (Above 30MHz)
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Result Level = Read Level + Factor
4. Margin = Limit – Result Level
5. No emissions were detected at a level greater than 10dB below limit.

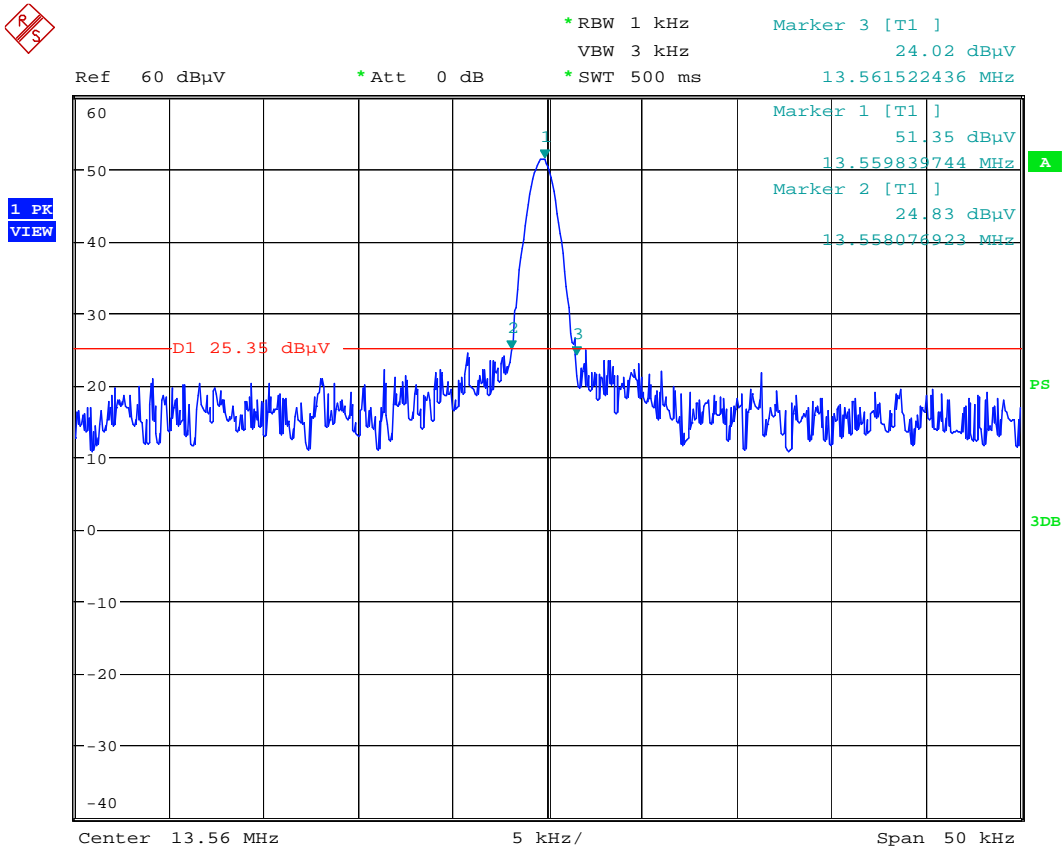
### 3.2.2 Additional provisions to the general radiated emission limitations.

**Procedure: Part 15.215**

The spectrum analyzer is set to:  
 Center Frequency = 13.56MHz  
 RBW = 1 kHz  
 Trace = max hold  
 Sweep = auto

SPAN = 50KHz  
 VBW ≥ RBW  
 Detector function = peak

**Measurement Result: Complies**





### 3.2.3 Frequency Tolerance

**Procedure: Part 15.225, ANSI 63.4**

If required, the operating or transmitting frequency of an intentional radiator should be measured in accordance with the following procedure to ensure that the device operates outside certain precluded frequency bands and within the frequency range. No modulation needs to be supplied to the intentional radiator during these tests, unless modulation is required to produce an output, e.g., single-sideband suppressed carrier transmitters.

The frequency stability of the transmitter is measured by:

- a) **Temperature:** The temperature is varied from -20°C to + 50°C using an environmental chamber.
- b) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the voltage normally at a temperature of 20 degrees C.

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

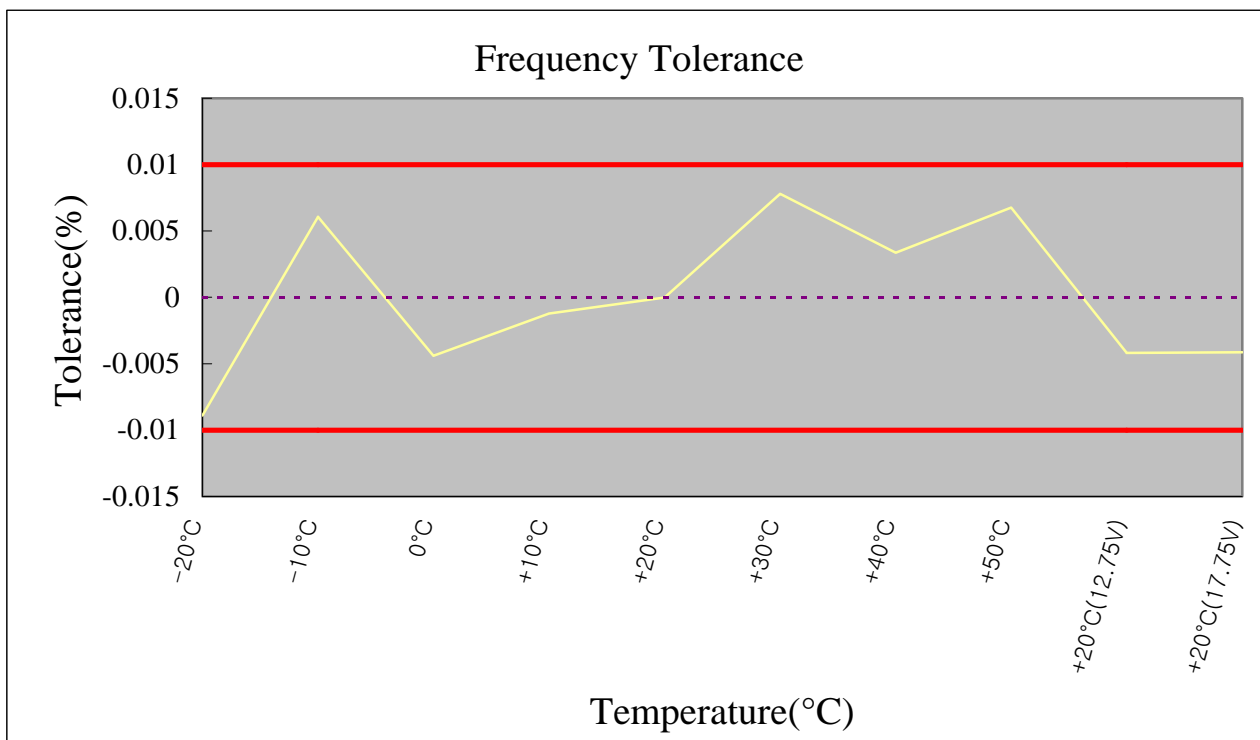
**Measurement Result: Complies**

- Refer to the Next page

### Frequency Tolerance

OPERATING FREQUENCY : 13,558,752 Hz  
 REFERENCE VOLTAGE : 15 VDC  
 DEVIATION LIMIT : ± 0.01 % or 100 ppm  
 :

VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	15	-20	13,557,545	-0.008903
100%		-10	13,559,575	+0.006070
100%		0	13,558,157	-0.004389
100%		+10	13,558,586	-0.001224
100%		+20	13,558,752	+0.000000
100%		+30	13,559,808	+0.007788
100%		+40	13,559,209	+0.003370
100%		+50	13,559,667	+0.006748
85%	12.75	+25	13,558,185	-0.004182
115%	17.75	+25	13,558,193	-0.004123



APPENDIX  
TEST EQUIPMENT USED FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4440A	05/10/07	MY45304199
02	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
03	Power Meter	H.P	EPM-442A	06/07/07	GB37170413
04	Power Sensor	H.P	8481A	14/07/07	3318A96332
05	Frequency Counter	H.P	5342A	15/09/07	2119A04450
06	Multifunction Synthesizer	H.P	8904A	12/10/07	3633A08404
07	Signal Generator	Rohde Schwarz	SMR20	21/03/08	101251
08	Signal Generator	H.P	E4421A	06/07/07	US37230529
09	Audio Analyzer	H.P	8903B	06/07/07	3011A0944B
10	Modulation Analyzer	H.P	8901B	10/07/07	3028A03029
11	Oscilloscope	Tektronix	TDS3052	01/10/07	B016821
12	8960 Series 10 Wireless Comms Test Set	Agilent	Z5515C	13/06/08	GB43461134
13	Universal Radio Communication Test	Rohde Schwarz	CMU200	21/03/08	107631
14	CDMA Mobile Station Test Set	H.P	8924C	15/09/07	US35360688
15	PCS Interface	HP	83236B	15/09/07	3711J03014
16	Multi system Ue Tester	Japan Radid Co., Ltd	NJZ-2000	20/11/07	ET00095
17	Power Splitter	WEINSCHL	1593	14/10/07	332
18	BAND Reject Filter	Microwave Circuits	N0308372	19/10/07	3125-01DC0312
19	BAND Reject Filter	Wainwright	WRCG1750	19/10/07	SN2
20	AC Power supply	DAEKWANG	5KVA	20/03/08	N/A
21	DC Power Supply	H.P	6622A	20/03/08	465487
22	HORN ANT	EMCO	3115	24/07/07	6419
23	HORN ANT	EMCO	3115	21/08/07	21097
24	HORN ANT	A.H.Systems	SAS-574	16/08/07	154
25	HORN ANT	A.H.Systems	SAS-574	16/08/07	155
26	Dipole Antenna	Schwarzbeck	VHA9103	18/11/07	2116
27	Dipole Antenna	Schwarzbeck	VHA9103	18/11/07	2117
28	Dipole Antenna	Schwarzbeck	UHA9105	18/11/07	2261
29	Dipole Antenna	Schwarzbeck	UHA9105	18/11/07	2262
30	Loop Antenna	ETS	6502	22/11/07	3471

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
31	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/07	021031
32	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	21/07/07	4N-161-4
33	EMI TEST RECEIVER	R&S	ESCI	28/04/07	100364
34	EMI TEST RECEIVER	R&S	ESU	25/01/08	100014
35	Frequency Converter	Kyorits	KCV-604C	21/07/07	4-230-3
36	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	26/09/07	1098
37	Biconical Antenna	Schwarzbeck	VHA9103	12/09/07	2233
38	Digital Multimeter	H.P	34401A	20/03/08	3146A13475
39	Attenuator (10dB)	WEINSCHL	23-10-34	17/10/07	BP4386
40	High-Pass Filter	ANRITSU	MP526	13/10/07	M27756
41	Attenuator (3dB)	Agilent	8491B	10/07/07	58177
42	Attenuator (10dB)	WEINSCHL	23-10-34	26/01/08	BP4387
43	Attenuator (30dB)	H.P	8498A	17/10/07	50101
44	Amplifier (25dB)	Agilent	8447D	12/04/07	2944A10144
45	Amplifier (30dB)	Agilent	8449B	13/10/07	3008A01590
46	Position Controller	TOKIN	5901T	N/A	14173
47	Driver	TOKIN	5902T2	N/A	14174
48	Spectrum Analyzer	Agilent	8594E	04/11/07	3649A05889
49	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	11/07/07	4N-170-3
50	LISN	Kyorits	KNW-407	19/08/07	8-317-8
51	LISN	Kyorits	KNW-242	09/10/07	8-654-15
52	CVCF	NF Electronic	4400	N/A	344536 4420064
53	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
54	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
	Software	AUDIX	e3	N/A	Ver 3.0
	Software	Agilent	Benchlink	N/A	A.01.09 021211