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## CTK Co., Ltd.

386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea

Tel: +82-31-339-9970 Fax: +82-31-339-9855

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# TEST REPORT For FCC

Test Report No. : 2007090003  
Date of Issue : September 16, 2007  
Model/Type No. : KRF-WXYZ  
Kind of Product : RF Card Reader  
Applicant : KDE Inc.  
Applicant Address : Young B/D, 350-1, Gil-Dong, Gangdong-Gu, Seoul, Korea  
Manufacturer : KDE Inc.  
Manufacturer Address : Young B/D, 350-1, Gil-Dong, Gangdong-Gu, Seoul, Korea  
Contact Person : In-Gyu Lee  
Telephone : +82-2-2225-9392  
Received Date : August 16, 2007  
Test period : Start : August 16, 2007 End : September 13, 2007  
Test Results : ☒ In Compliance ☐ Not in Compliance

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

Tested by

Eun-Won, Lee  
EMC Test Engineer  
Date: September 16, 2007

Reviewed by

James Hong  
EMC Technical Manager  
Date: September 16, 2007



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### REPORT REVISION HISTORY

Date	Revision	Page No
September 16, 2007	Issued (2007090003)	All

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### TABLE OF CONTENTS

REPORT REVISION HISTORY .....	2
1.0 General Product Description .....	4
1.1 Model Differences .....	5
1.2 Device Modifications .....	5
1.3 EUT Configuration(s) .....	6
1.4 Test Software .....	6
1.5 EUT Operating Mode(s) .....	6
1.6 Configuration .....	7
1.7 Calibration Details of Equipment Used for Measurement .....	8
1.8 Test Facility .....	8
1.9 Measurement Procedure .....	8
1.10 Laboratory Accreditations and Listings .....	9
2.0 Emissions Test Regulations .....	10
2.1 Radiated Electric Field Emissions - 15.225(a) .....	11
2.2 Radiated Electric Field Emissions - 15.225(b)(c) .....	12
2.3 Radiated Electric Field Emissions - 15.225(d) .....	13
2.4 Frequency Stability - 15.225(e) .....	14
2.5 Conducted Voltage Emissions - 15.207 .....	15
APPENDIX A – TEST DATA .....	16
Radiated Electric Field Emissions (Quasi-Peak reading) .....	16
Conducted Voltage Emissions .....	19
Bandwidth of the Operating Frequency .....	23
APPENDIX B - Test Setup Photos and Configuration .....	24
Conducted Voltage Emissions .....	24
Radiated Electric Field Emissions (9 kHz ~ 30 MHz) .....	26
Radiated Electric Field Emissions (30 MHz ~ 1000 MHz) .....	28
Frequency Stability .....	30
APPENDIX C – EUT Photographs .....	31
EUT External Photographs .....	32
AC Adaptor .....	34
EUT Internal Photographs .....	35
PCB .....	36
Label and Location .....	40



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## 1.0 General Product Description

### 1.0.1 Tested Equipment

- ☒ Unless otherwise indicated, all tests were conducted on Model KRF-WXYZ.
- ☐ Tests performed on Model \_\_\_\_\_ were considered to be representative of Model(s) \_\_\_\_\_.

### 1.0.2 Equipment Size, Mobility and Identification

Dimensions: 80(W) by 134(L) by 17.9(H) ☒ mm ☐ inch  
Mobility: ☐ Hand-held ☐ Table-top ☐ Built-in  
☐ Traveling ☒ Fixed-type  
Serial No.: Prototype

### 1.0.3 Electrical Ratings

AC Adaptor	Input:	100-240 Vac, 50/60 Hz, 0.15 A
	Output:	9.0 Vdc, 0.5 A
EUT	Input:	9.0 Vdc
	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: 120 Vac  
Frequency: 60 Hz

### 1.0.5 Clock & Other Frequencies Utilized

7.3728 MHz, 13.56 MHz, 25 MHz

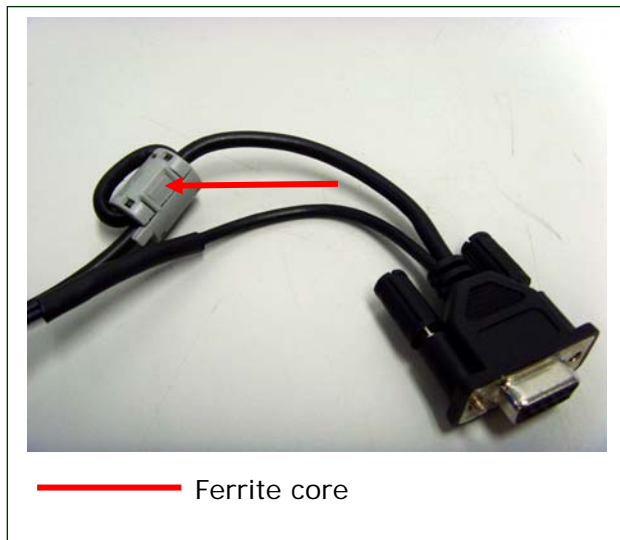
## 1.1 Model Differences

Related information of KRF-WXYZ model is as below.

- \* W (Type)
  - 2 : Terminal – Desktop Type (Ethernet Type)
  - 3 : Terminal – Wall Mount Type (RS-232C Type)
- \* X
  - 1: RS-232C 3: Ethernet 9. Customized
- \* Y (RF Card Type)
- \* Z
  - 2 : Free Voltage (100~240 Vac, 50/60 Hz)

## 1.2 Device Modifications

The following modifications were necessary for compliance:



Location	Manufacture	Part No.	Turn(s)
RS232C	TDK	ZCAT1518-0730	1

### 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
AC Adaptor (for EUT)	Ktec	KSAA0900050W1EU	-	-
Personal Computer	SAMSUNG	DM-V65	017W96BP400023J	DoC
LCD Monitor	SAMSUNG	PG17HS	P013H1DN301661	DoC
Adaptor (for LCD Monitor)	Anam Instruments (Shen Zhen) Co., Ltd.	AP04214-UV	0312103885AC	-
Keyboard (PS/2 type)	SAMSUNG	SEM-DT35	33008110	DoC
Mouse (PS/2 type)	Microsoft Corporation	Wheel Mouse 3.0 PS/2 Compatible	4917597-0	DoC
Mouse (USB type)	MICROSOFT CORPORATION	Optical Mouse USB/PS2 Compatible	69657-492-4974533-40420	DoC

☒ Cable Description

#	Description	Ferrite Core	Length (m)	Other Details
1	LAN Cable, Unshielded	No	3.0	Between the EUT and a PC
	RS-232C Cable, Shielded	Yes	1.2	Between the EUT and a PC
2	DC Input Cable, Unshielded	No	1.8	Between the EUT and an AC Adaptor
3	Mouse Cable, Shielded	No	1.5	PS/2 type
4	Mouse Cable, Shielded	Yes	1.5	USB type
5	Keyboard Cable, Shielded	No	1.5	PS/2 type
6	Monitor Cable, Shielded	Yes	1.5	Between a PC and a LCD Monitor
7	DC In Cable, Unshielded	Yes	1.5	Between a LCD Monitor and an Adaptor
8	AC Power Cable, Unshielded	No	1.8	Connect to AC power
9	AC Power Cable, Unshielded	No	1.8	Connect to AC power

### 1.4 Test Software

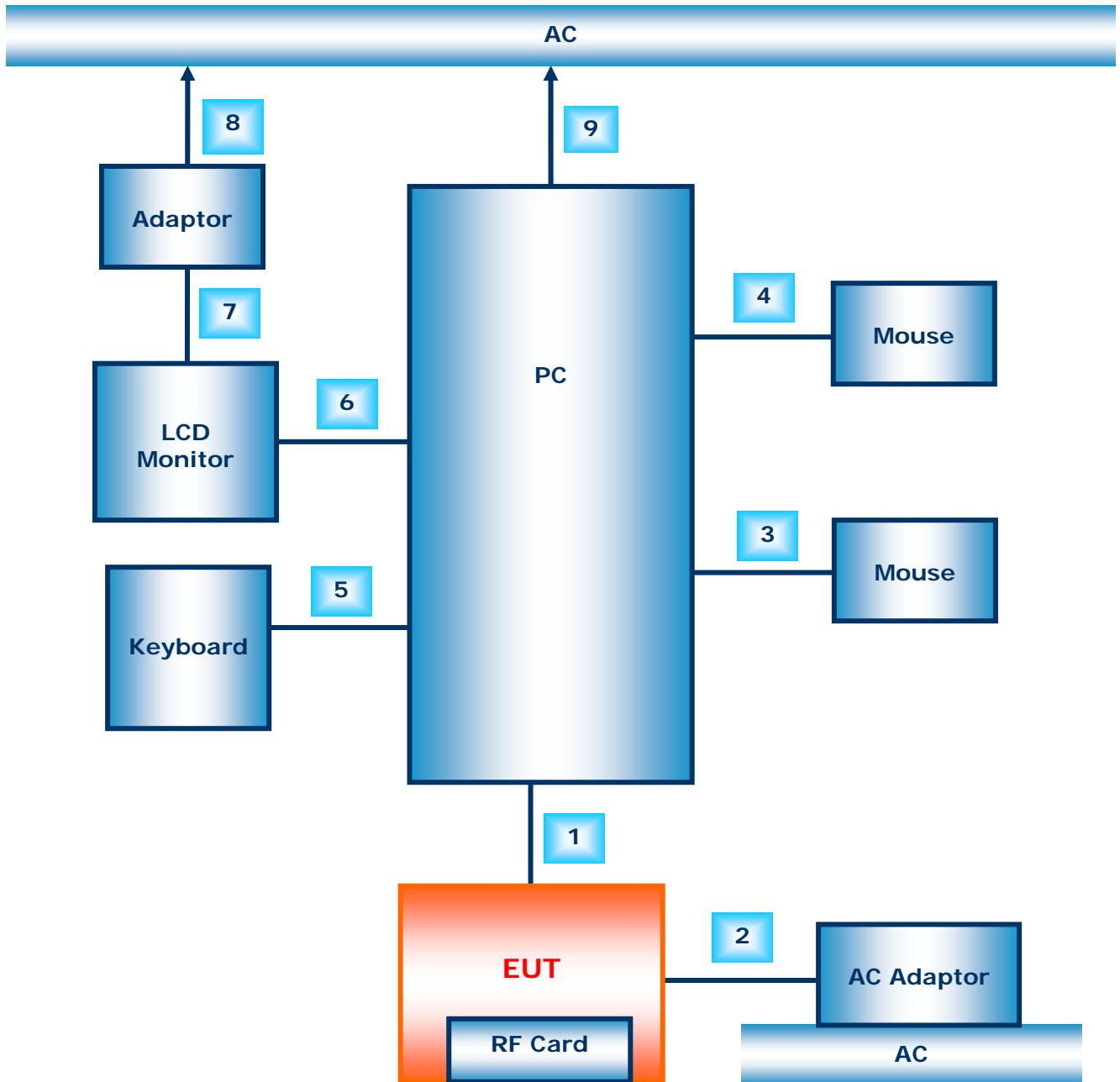
- ☐ EMC Test V 1.0  
☐ Display Test Patterns – V1.5  
☐ Ping.exe  
☒ SRT300\_RS232  
☒ VingCard\_LAN

### 1.5 EUT Operating Mode(s)

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

- ☐ Standby ☐ Scrolling 'H'  
☐ Display circles pattern ☐ Read / Write  
☒ Practice operation : transmitting mode at 13.56 MHz continuously  
 1) During testing, the EUT was connected to a PC via a LAN port.  
 2) During testing, the EUT was connected to a PC via a RS-232C port.

## 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
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:

- |  |                                  |                                  |
|--|----------------------------------|----------------------------------|
| <input type="checkbox"/> EN 61000-6-3:2001 +A11:2004       |                                  |                                  |
| <input type="checkbox"/> EN 61000-6-3:2007                 |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 61000-6-4:2001                 |                                  |                                  |
| <input type="checkbox"/> EN 61000-6-4:2007                 |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 50083-2:2001                   |                                  |                                  |
| <input type="checkbox"/> EN 50083-2:2001 +A1:2005          |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 55011:1998 +A1:1999 +A2:2002   | <input type="checkbox"/> Group 1 | <input type="checkbox"/> Group 2 |
|  | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55013:2001 +A1:2003            |                                  |                                  |
| <input type="checkbox"/> EN 55013:2001 +A1:2003 +A2:2006   |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 55014-1:2000 +A1:2001 +A2:2002 |                                  |                                  |
| <input type="checkbox"/> EN 55014-1:2006                   |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 55015:2000 +A1:2001 +A2:2002   |                                  |                                  |
| <input type="checkbox"/> EN 55015:2006                     |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 61204-3:2000                   | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 61131-2:2003                   |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 55022:1998 +A1:2000 +A2:2003   | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> EN 55022:2006                     | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 61000-3-2:2000                 |                                  |                                  |
| <input type="checkbox"/> EN 61000-3-2:2000 +A2:2005        |                                  |                                  |
| <input type="checkbox"/> EN 61000-3-2:2006                 |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> EN 61000-3-3:1995 +A1:2001        |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> VCCI V-3/2007.04                  | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <br>   |                                  |                                  |
| <input type="checkbox"/> AS/NZS CISPR22:2004               | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> AS/NZS CISPR22:2006               | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <br>   |                                  |                                  |
| <input type="checkbox"/> FCC Part 15 Subpart B             | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <br>   |                                  |                                  |
| <input checked="" type="checkbox"/> FCC Part 15 Subpart C  |                                  |                                  |
| <br>   |                                  |                                  |
| <input type="checkbox"/> CISPR 22:1997 +A1:2000 +A2:2002   | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> CISPR 22:2005 (Modified)          | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |



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## 2.1 Radiated Electric Field Emissions - 15.225(a)

### Reference Standard

FCC Part 15.225(a)

### Test Date

September 13, 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 (30m)	Field Strength of Fundamental dBuV/m (3m)
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

September 13, 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 (30m)	Field Strength of Fundamental dBuV/m (3m)
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

August 21, 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	829673/015	2008-01-12
<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 30.0 MHz)

IF Band Width: 120 KHz (30.0 MHz to 1000 Mz)

### Radiated emission limits

Frequency (MHz)	Field Strength of Fundamental uV/m	Field Strength of Fundamental dBuV/m (3m)
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

September 13, 2007

### Test Equipment

	Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
<input checked="" type="checkbox"/>	MICROWAVE FREQUENCY COUNTER	HP	5343A	2742A02615	2007-11-03
<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

#### [LAN]

Timing	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Start-up	13.56007	13.56004	13.56003	13.55997	13.55990	13.55990	13.55987	13.55986
10Min	13.56007	13.56004	13.56003	13.55997	13.55990	13.55990	13.55987	13.55986
30Min	13.56007	13.56004	13.56003	13.55997	13.55990	13.55990	13.55987	13.55986

Timing	AC Power 85%	AC Power 115%
Start-up	13.55990	13.55990
10Min	13.55994	13.55994
30Min	13.55994	13.55994

#### [RS-232C]

Timing	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Start-up	13.56007	13.56004	13.56003	13.55997	13.55990	13.55990	13.55987	13.55986
10Min	13.56009	13.56004	13.56003	13.55997	13.55990	13.55990	13.55987	13.55986
30Min	13.56009	13.56005	13.56003	13.55997	13.55990	13.55990	13.55987	13.55986

Timing	AC Power 85%	AC Power 115%
Start-up	13.55990	13.55990
10Min	13.55994	13.55994
30Min	13.55994	13.55994



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## 2.5 Conducted Voltage Emissions – 15.207

### Reference Standard

FCC Part 15.207

### Test Date

August 16, 2007

### Test Location

Shielded Room

### 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"/>	LISN	EMCO	3825/2	9607-2575	2008-08-29
<input checked="" type="checkbox"/>	LISN	EMCO	3825/2	9409-2246	2008-08-29
<input type="checkbox"/>	Field Strength Meter	Rohde & Schwarz	ESHS30	862024/001	2008-03-05
<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  
☐ NOT APPLICABLE

### Remarks

See Appendix A for test data.



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### APPENDIX A – TEST DATA

#### Radiated Electric Field Emissions (Quasi-Peak reading)

##### 1) Fundamental Frequency Test Data

###### [LAN]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
13.56	41.06	H	1.1	9.7	0.8	104.00	51.56	52.44
13.56	41.01	V	1.0	9.7	0.8	104.00	51.51	52.49

###### [RS-232C]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
13.56	43.70	H	1.2	9.7	0.8	104.00	54.20	49.80
13.56	43.56	V	1.0	9.7	0.8	104.00	54.06	49.94





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### 2) Frequency Range from 9 KHz to 30MHz Test Data

#### [LAN]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
16.35	26.4	V	1.0	9.7	0.8	49.5	36.9	12.6
12.81	19.6	V	1.0	9.8	0.8	49.5	30.2	19.3

#### [RS-232C]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
16.20	26.1	V	1.0	9.7	0.8	49.5	36.6	12.9
12.75	19.2	V	1.0	9.8	0.8	49.5	29.8	19.7



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### 3) Frequency Range from 30 MHz to 1 GHz Test Data

#### [LAN]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
44.25	22.2	V	2.0	11.3	1.7	43.5	35.2	8.3
250.65	24.6	H	4.0	9.7	4.0	43.5	38.3	5.2
258.02	25.2	H	2.0	9.9	4.1	43.5	39.2	4.3
340.42	18.0	H	3.5	12.2	4.7	43.5	34.9	8.6
500.00	16.3	V	4.0	15.5	5.8	43.5	37.6	5.9
830.25	15.4	V	1.8	20.1	6.6	46.0	42.1	3.9

'H': Horizontal, 'V': Vertical

#### [RS-232C]

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor		Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
				Antenna	Cable			
41.09	19.8	V	2.0	14.4	1.6	43.5	35.8	7.7
92.09	23.1	V	4.0	9.2	2.5	43.5	34.8	8.7
122.37	19.6	H	1.8	10.1	2.8	46.0	32.5	13.5
204.69	23.3	V	4.0	7.7	3.6	43.5	34.6	8.9
764.89	10.4	H	2.0	19.5	6.6	43.5	36.5	7.0
849.20	6.8	H	3.5	20.4	6.8	43.5	34.0	9.5

'H': Horizontal, 'V': Vertical



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### Conducted Voltage Emissions

#### [LAN]

Frequency  [MHz]	Correction Factor		Line	Quasi-peak				Average			
				Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dB]
0.32	0.3	0.2	H	59.7	49.8	50.3	9.4	49.7	32.4	32.9	16.8
0.35	0.3	0.2	H	59.0	49.3	49.8	9.2	49.0	33.3	33.8	15.2
0.36	0.3	0.2	H	58.7	47.2	47.7	11.0	48.7	28.7	29.2	19.5
0.41	0.3	0.2	H	57.6	52.5	53.0	4.6	47.6	37.6	38.1	9.5
0.42	0.3	0.2	H	57.4	51.4	51.9	5.5	47.4	38.5	39.0	8.4
1.05	0.3	0.2	H	56.0	47.5	48.0	8.0	46.0	33.3	33.8	12.2

H : Hot, N : Neutral



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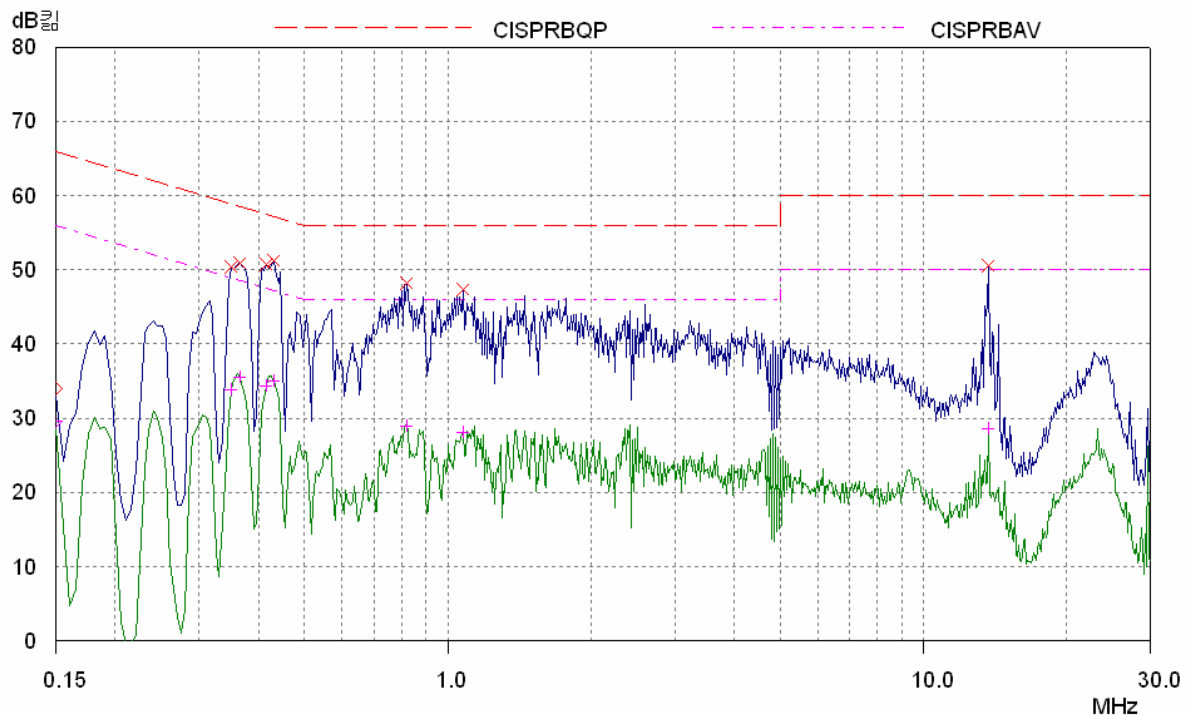
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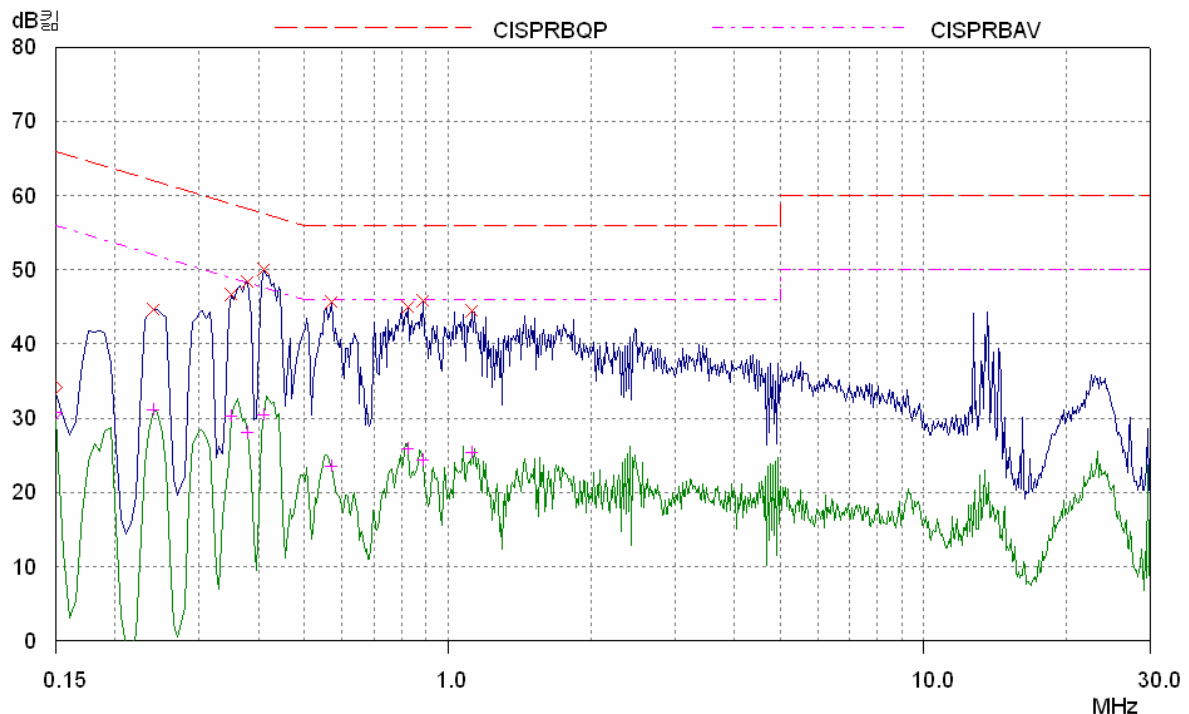
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### [HOT]



### [NEUTRAL]





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### [RS-232C]

Frequency  [MHz]	Correction Factor		Line	Quasi-peak				Average			
				Limit	Reading	Result	Margin	Limit	Reading	Result	Margin
	LISN	Cable		[dBuV]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dB]
0.36	0.3	0.2	H	58.7	52.9	53.4	5.3	48.7	37.4	37.9	10.8
0.37	0.3	0.2	H	58.5	52.0	52.5	6.0	48.5	36.1	36.6	11.9
0.38	0.3	0.2	H	58.3	51.8	52.3	6.0	48.3	32.4	32.9	15.4
0.41	0.3	0.2	H	57.6	51.5	52.0	5.6	47.6	34.9	35.4	12.2
0.74	0.3	0.2	H	56.0	48.3	48.8	7.2	46.0	27.6	28.1	17.9
1.08	0.3	0.2	H	56.0	47.1	47.6	8.4	46.0	29.5	30.0	16.0

H : Hot, N : Neutral



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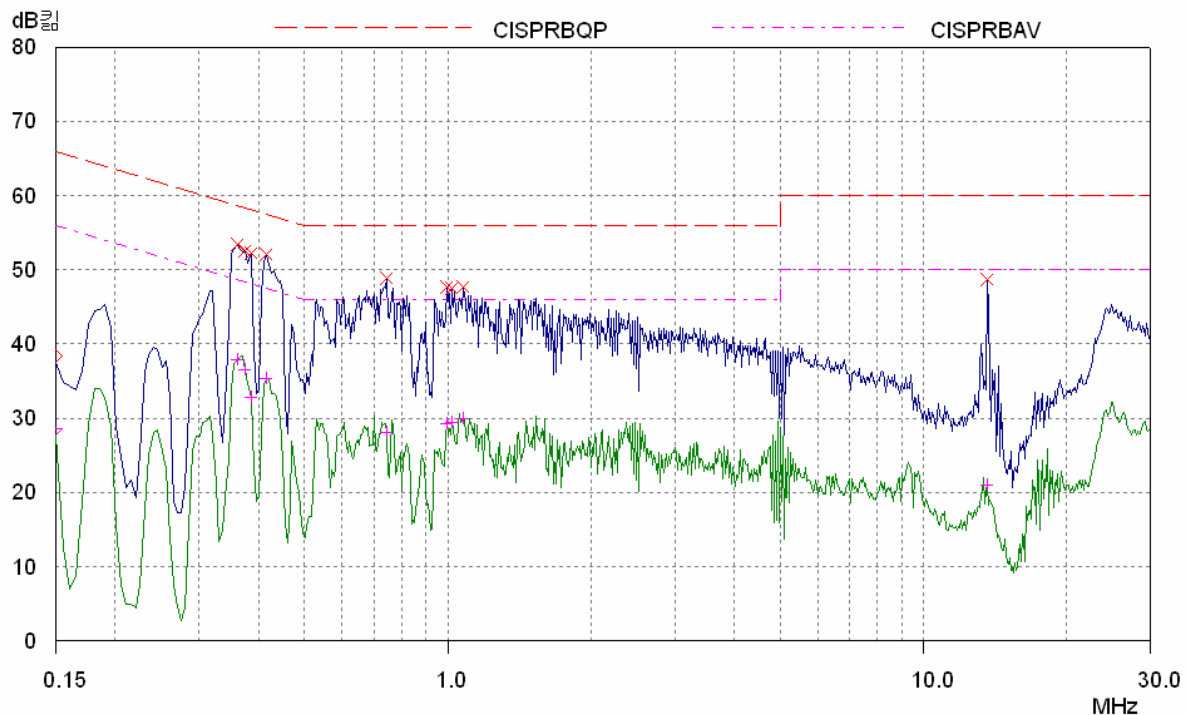
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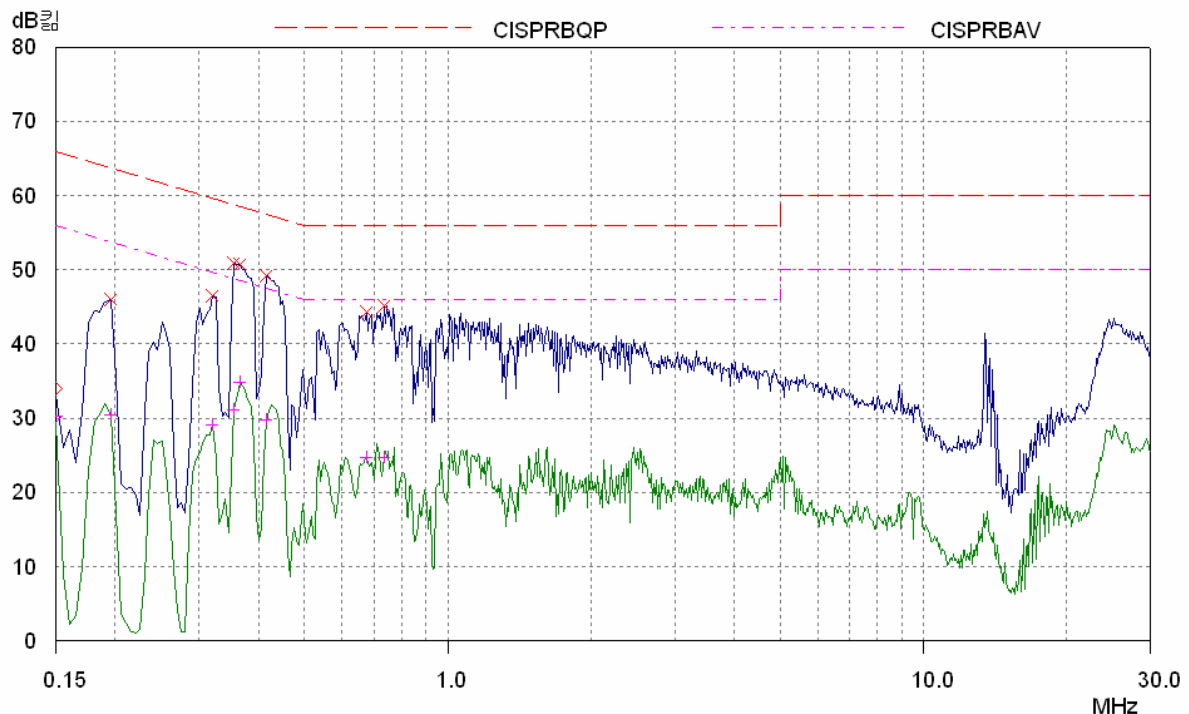
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### [HOT]



### [NEUTRAL]





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### Bandwidth of the Operating Frequency

