Electromagnetic Emission

F C C M E A S U R E M E N T R E P O R T

CERTIFICATION OF COMPLIANCE

FCC Part 15 Certification Measurement

PRODUCT	:	EMS agent
MODEL/TYPE NO	:	EU-200BX
FCC ID	:	PQVEU-200BX
APPLICANT	:	Xeline Co., Ltd. 5F, Seowon Bldg., 1515-4 Seocho 3-dong Seocho-gu, Seoul, 137-871, South Korea Attn. :Il Soo Kim / Senior Manager
MANUFACTURER	:	Xeline Co., Ltd. 5F, Seowon Bldg., 1515-4 Seocho 3-dong Seocho-gu, Seoul, 137-871, South Korea
FCC CLASSIFICATION	:	Class B personal computers and peripherals
FCC RULE PART(S)	:	FCC Part 15 Subpart B
FCC PROCEDURE	:	Certification
TRADE NAME	:	N/A
TEST REPORT No.	:	ETLE051205.001
DATES OF TEST	:	December 05, 2005 - January 25, 2006
REPORT ISSUE DATE	:	February 2, 2006
TEST LABORATORY	:	ETL Inc. (FCC Registration Number : 95422)

This EMS agent, Model EU-200B has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 at the ETL/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part15 Subpart B:
I attest to the accuracy of data. All measurement herein was performed by me or was made under my supervision and is 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.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Hyung Seok, Lee / Chief Engineer

ETL Inc.
#584 Sangwhal-ri, Kanam-myon, Yoju-kun, Kyounggi-do, 469-885, Korea
Tel : (031) 885-0072 Fax : (031) 885-0074

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FCC MEASUREMENT REPORT

Scope – *Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

General Information

Applicant Name: Xeline Co., Ltd.

Address : 5F, Seowon Bldg., 1515-4 Seocho 3-dong, Seocho-gu, Seoul, 137-871, South Korea.

Attention : Il Soo Kim / Senior Manager

- **EUT Type :** EMS agent
- **Model Number :** EU-200BX
- **FCC ID :** PQVEU-200BX
- **S/N :** N/A
- **FCC Rule Part(s) :** FCC Part 15 Subpart B
- **Test Procedure :** ANSI C63.4-2003
- **FCC Classification :** Class B personal computers and peripherals
- **Dates of Tests :** December 05, 2005 - January 24, 2006
- **Place of Tests :** ETL Inc.
  EMC Testing Lab. (FCC Registration Number : 95422)
  584, Sangwhal-Ri, Kanam-Myun, Yoju-Kun,
  Kyounggi-Do, Korea
  Tel : (031) 885-0072 Fax : (031) 885-0074
- **Test Report No. :** ETLE051205.001

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1. INTRODUCTION

The measurement test for radiated and conducted emission test were conducted at the open area test site of E-RAE Testing Laboratory Inc. facility located at 584, Sangwhal-ri, Ganam-myun, Youju-kun, Kyoungki-do, Korea. The site is constructed in conformance with the requirements of the ANSI C63.4-2003 and CISPR Publication 16. The ETL has site descriptions on file with the FCC for 3 and 10 meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2003 and registered to the Federal Communications Commission (Registration Number : 95422).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C.63.4-2003) was used in determining radiated and conducted emissions from the Xeline Co., Ltd. Model : EU-200B

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2. PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test(EUT) is the Xeline Co., Ltd. EMS agent, EU-200BX.

2.2 General Specification

- Chassis Type : Metal
- List of Each OSC. Or X-Tal. Freq.(>=1MHz) : 25.00 MHz, 18.432 MHz

(1) Hardware Specifications

Category	Specifications
Main Processor	KS8695X
RAM	32MB SDRAM
Flash Memory	2MB X1 NOR FLASH 32MB X1 NAND FLASH
Serial Port	RS232 [1 port] - Console 2 Serial Port - Data (Optional)
Ethernet Link	10/100 Base Auto Negotiation Auto MDIX
Power	External Power : DC 5V, 2A
Dimensions	190 x 110 x 31mm (W x D x H)
Weight	664g

(2) Software Specifications

Category	Specifications
Operating Software	Embedded Linux (Kernel Version 2.4.x)
Supported Protocols	RFC 791 IP RFC 793 TCP RFC 1157 SNMP v1 RFC 1213 MIB II RFC 1901 SNMP v2
Supported Functions	Remote OS Upgrade Remote configuration PLC equipment control NMS using SNMP
Supported Services	Inetd, ftp, ssh, http, tftp, SNMP
Supported Commands	Busy box

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3. DESCRIPTION OF TESTS

3.1 Conducted Emission Measurement

Conducted emissions measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2003. The measurements were performed over the frequency range of 0.15MHz to 30MHz using a 50Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Test Receiver. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 9 kHz or for "quasi-peak" within a bandwidth of 9 kHz.

The line-conducted emission test is conducted inside a shielded anechoic chamber room with 1 m x 1.5 m x 0.8m wooden table which is placed 40 cm away from the vertical wall and 1.5 m away from the side wall of the chamber room. Two LISN are bonded to the shielded room. The EUT is powered from the LISN and the support equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the LISN. Non-inductive bundling to a 1m length shortened all interconnecting cables more than 1m. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the EMI Test Receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using to set Quasi-Peak mode by manual, after scanned by automatic Peak mode from 0.15 to 30 MHz. The bandwidth of the spectrum analyzer was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission.

Photographs of the worst-case emission can be seen in photographs of conducted emission test setup in Appendix B.

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3. DESCRIPTION OF TESTS

3.2 Radiated Emission Measurement

Radiated emission measurements were made in accordance with section 11, "Measurement of Information Technology Equipment" of ANSI C63.4-2003. The measurements were performed over the frequency range of 30 MHz to 1 GHz using antenna as the input transducer to a spectrum analyzer or a field intensity meter. The measurements were made with the detector set for "Quasi-peak" within a bandwidth of 120 kHz.

Preliminary measurements were made at 10 meter using broadband antennas, and spectrum analyzer to determined the frequency producing the maximum emission in shielded room. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000 MHz using Log-Bicon antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used. Final measurements were made open site at 10-meters. The test equipment was placed on a wooden turn-table. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR Quasi-peak mode and the bandwidth of the receiver was set to 120 kHz or 1MHz depending on the frequency of type of signal. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or support equipment and changing the polarity of the antenna, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in Photographs of the worst-case emission test setup can be seen in Appendix B.

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4. TEST CONDITION

4.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the following conditions and configurations were used.

4.2 EUT operation

Operating Mode	The worst operating condition
Stand-by Mode	X
Communication network monitoring mode	O

O : Worst case investigated during the Test

4.3 Support Equipment Used

Following peripheral devices and interface cables were connected during the measurement:

EUT – EMS agent

FCC ID	: PQVEU-200BX
Model Name	: EU-200BX
Serial No.	: N/A
Manufacturer	: Xeline Co., Ltd.
Power Supply Type	: External Adapter
Power Cord	: Non-Shielded, 1.5 m
Data Cable	: WAN:1, CONSOLE:1

Support Unit 1 – Personal computer

FCC ID	: DOC
Model Name	: DHM
Serial No.	: FNTGB1S
Manufacturer	: Dell Asia Pacific Sdn.
Power Supply Type	: Switching
Power Cord	: Non-Shielded: 1.5 m
Data Port	: RGB IN:1, Parallel:1, RS-232:1, PS/2: 2, USB: 2,
	: Audio in:1, Audio out:1, MIC IN:1

Support Unit 2 – Keyboard (Chicony Electronics)

FCC ID	: N/A (DoC)
Model Name	: KB-9963
Serial No.	: B26960GBUKO13F
Manufacturer	: Chicony Electronics
Power Supply Type	: N/A
Power Cord	: N/A
Data Cable	: Shielded, 1.5m

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Support Unit 3 – Mouse (LOGITECH)

FCC ID	: DZL211029
Model Name	: M-S34
Serial No.	: LNA10212779
Manufacturer	: LOGITECH
Power Supply Type	: N/A
Power Cord	: N/A
Data Cable	: None-Shielded, 1.2m

Support Unit 4 – USB Mouse (N/A)

FCC ID	: N/A
Model Name	: HL898W
Serial No.	: HL08011839
Manufacturer	: N/A
Power Supply Type	: N/A
Power Cord	: N/A
Data Cable	: None-Shielded, 1.2m

Support Unit 5 – LCD Monitor (E-RAE)

FCC ID	: N/A
Model Name	: ELM-150B
Serial No.	: N/A
Manufacturer	: E-RAE Electronics Industry Co., Ltd.
Power Supply Type	: AC 110V-220V
Power Cord	: Non-Shield, 1.5m
Data Cable	: Shielded, 1.5m

Support Unit 5 – EAR MIC (JETECH)

FCC ID	: N/A
Model Name	: JE101
Serial No.	: N/A
Manufacturer	: JETECH
Power Supply Type	: N/A
Data Cable	: Shielded, 1.5m

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5. TEST RESULTS

5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

Test Rule Parts	Measurement Required	Result
15.107	Conducted Emissions Measurement	**Passed by 9.80 dB**
15.109	Radiated Emissions Measurement	**Passed by 3.30 dB**

The data collected shows that the **Xeline Co., Ltd. EMS agent. EU-200BX** complies with technical requirements of above rules part 15.107 and 15.109 Class B Limits and CISPR Publication 22.

The equipment is not modified anything, mechanical or circuits to improve EMI status during a measurement. No EMI suppression device(s) was added and/or modified during testing.

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5. TEST RESULTS

5.2 Conducted Emissions Measurement

EUT	EMS agent / EU-200BX (SN :N/A)
Limit apply to	FCC Part 15. 107(CISPR Pub.22 Class B)
Test Date	January 17, 2006
Operating Condition	Communication network monitoring mode
Environment Condition	Humidity Level : 35 % R.H., Temperature : 15 ℃
Result	Passed by 9.80 dB

Conducted Emission Test Data

The following table shows the highest levels of conducted emissions on both polarizations of hot and neutral line.
Detector mode: CISPR Quasi-Peak mode (6dB Bandwidth : 9 kHz)

Frequency [MHz]	Result [dBμV]		Phase (*L/**N)	Limit [dBμV]		Margin [dB]	
	Quasi-peak	Average		Quasi-peak	Average	Q.Peak	Average
0.171	48.8	41.0	H	64.9	54.9	16.1	13.9
0.514	38.7	35.9	H	56.0	46.0	17.3	10.1
4.358	42.9	35.4	H			13.1	10.6
4.466	43.5	36.2	N			12.5	9.80
4.813	41.6	33.8	H			14.4	12.2
9.808	45.2	33.7	H	60.0	50.0	14.8	16.3

NOTES :

1. *** H : HOT Line , **N : Neutral Line**
2. **Margin value = Limit – Result**
3. **Measurement were performed at the AC Power Inlet in the frequency band of 150 kHz ~ 30 MHz according to the FCC Part 15 and CISPR 22 Class B**
4. **If the Reading Quasi-Peak value is below the Average Limit, Do not test Average Mode.**

Test Engineer: Kug-Kyoung, Yoon

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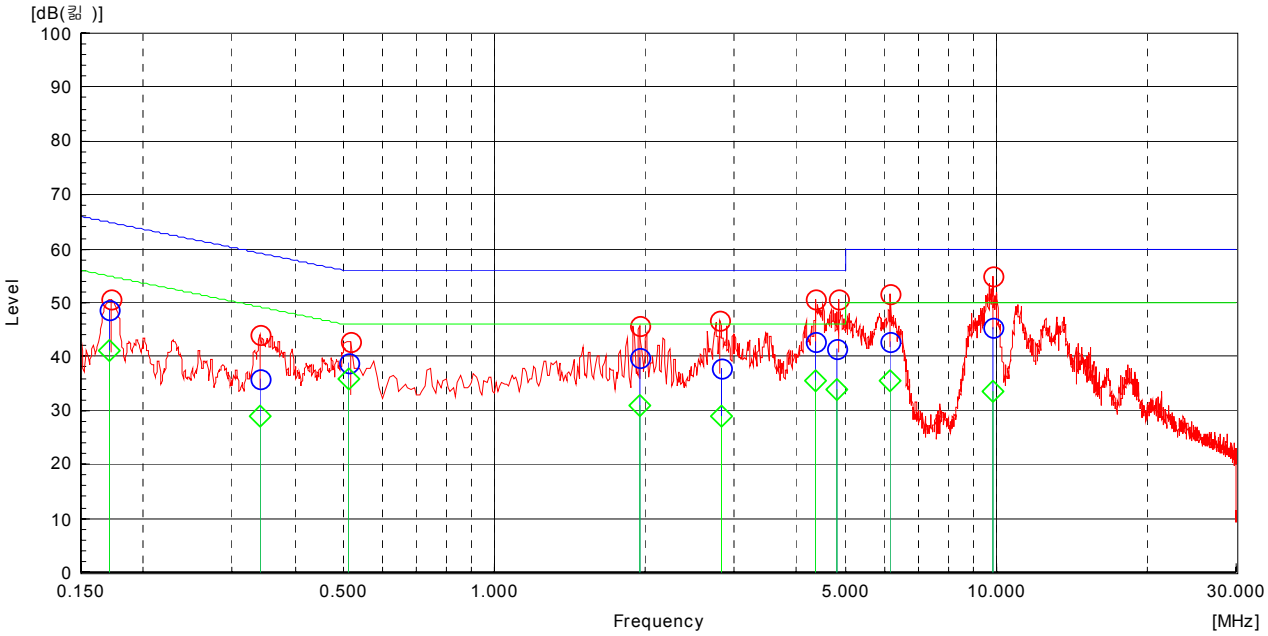
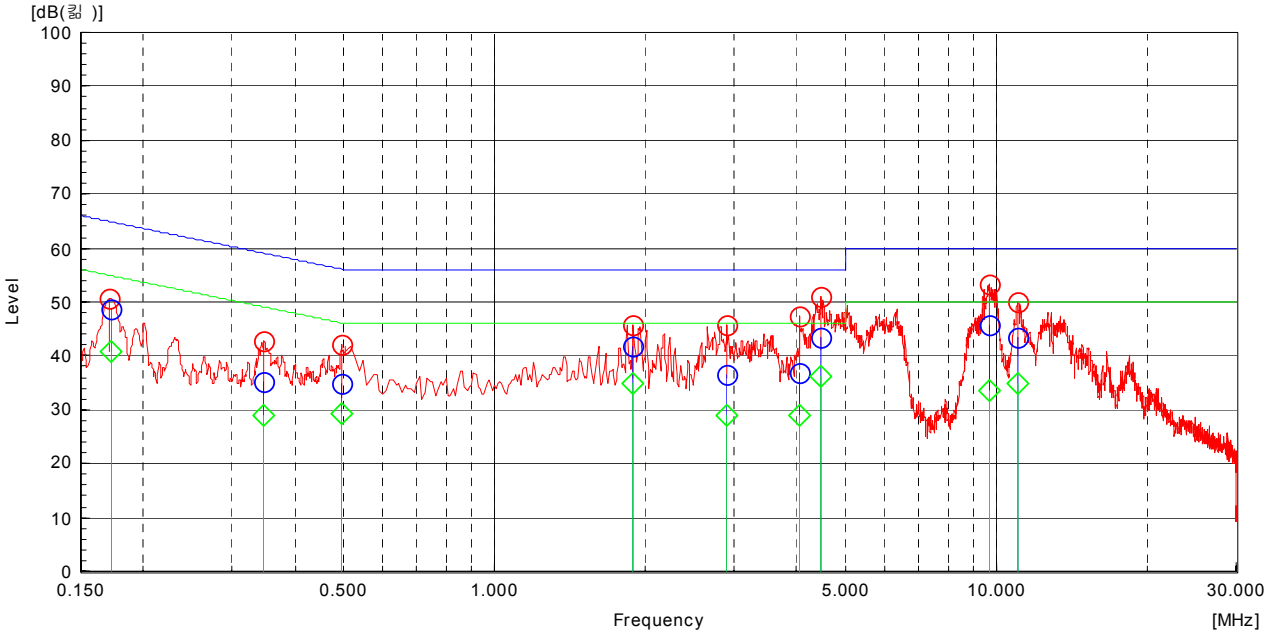
Line: HOT Line

Limit : Quasi-Peak
Average



Line: Neutral Line



Quasi-peak Average

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5. TEST RESULTS

5.3 Radiated Emissions Measurement

EUT	EMS agent / EU-200BX (SN :N/A)
Limit apply to	FCC Part 15. 109(CISPR Pub.22 Class B)
Test Date	January 17, 2006
Operating Condition	Communication network monitoring mode
Environment Condition	Humidity Level : 19 %R.H., Temperature : 6 ℃
Result	Passed by 3.30 dB

Radiated Emission Test Data

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.
Detector mode: CISPR Quasi-Peak mode (6dB Bandwidth: 120 kHz)

Frequency [MHz]	Reading [dBμV]	Polarization (*H/**V)	Ant. Factor [dB/m]	Cable Loss [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]
62.37	13.67	V	8.40	2.12	24.20	30.0	5.80
124.97	12.41	V	11.12	3.17	26.70	30.0	3.30
375.37	9.39	H	14.06	6.35	29.80	37.0	7.20
401.12	8.29	H	14.50	6.61	29.40	37.0	7.60
501.17	5.59	H	17.09	7.62	30.30	37.0	6.70
501.17	5.99	V	17.09	7.62	30.70	37.0	6.30
600.96	2.78	V	18.61	8.91	30.30	37.0	6.70

NOTES :

1. *** H : Horizontal polarization , ** V : Vertical polarization**
2. **Result = Reading + Antenna factor + Cable loss**
3. **Margin value = Limit - Result**
4. **The measurement was performed for the frequency range 30 MHz ~ 1000 MHz according to the CISPR 22 Class B**

Test Engineer: Kug-Kyoung, Yoon

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6. SAMPLE CALCULATION

Sample Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.
The basic equation with a sample calculation is as follows:

FS = RA + AF + CF

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor

$dB(\mu V) = 20 \log_{10} (\mu V)$: Equation 1
$dB\mu V$ = dBm + 107 : Equation 2

Example : @ 124.97 MHz

Class B Limit = 200 μV/m = 30 dB μV/m

Reading = 12.41 dB μV

Antenna Factor + Cable Loss = 11.12 + 3.17 = 14.29 dB μV/m

Total = 26.70 dB μV/m

Margin = 30 – 26.70 =3.30 dB

= 3.30 dB below Limit

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7. List of test equipments used for measurements

Test Equipment		Model	Mfg.	Serial No.	Cal. Due Date
☒	Spectrum Analyzer	E7402A	H.P	US39110107	06-10-17
☐	Spectrum Analyzer	R3261A	Advantest	21720033	06-10-17
☒	Receiver	ESVS 10	R & S	835165/001	06-04-07
☒	EMI TEST Receiver	ESPI	Rohde & Schwarz	100478	06-10-17
☐	Preamplifier	HP 8347A	HP	2834A00544	06-04-07
☒	LISN	3825/2	EMCO	9006-1669	06-04-06
☒	LISN	3825/2	EMCO	9208-1995	06-04-07
☐	TriLog Antenna	VULB9160	Schwarz Beck	3082	06-07-19
☒	LogBicon	VULB9165	Schwarz Beck	2023	06-07-05
☐	Dipole Antenna	VHAP	Schwarz Beck	964	06-06-24
☐	Dipole Antenna	VHAP	Schwarz Beck	965	06-07-05
☐	Dipole Antenna	UHAP	Schwarz Beck	949	06-06-24
☐	Dipole Antenna	UHAP	Schwarz Beck	950	06-07-05
☐	Broad-band Horn Antenna	BBHA 9120D	Schwarz Beck	227	06-04-04
☒	Turn-Table	DETT-03	Daeil EMC	-	N/A
☒	Antenna Master	DEAM-03	Daeil EMC	-	N/A
☐	Plotter	7440A	H.P	2725A 75722	N/A
☒	Chamber	DTEC01	DAETONG	-	N/A
☐	Thermo Hygrograph	3-3122	ISUZU	3312201	06-04-07
☐	BaroMeter	-	Regulus	-	06-03-15

End of Test Report

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