



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test report file number : E014R-019

Applicant : Hyundai MultiCAV Computer CO., LTD.  
Address : 333-1, Sangdaewon-1Dong, Jungwon-Ku, Sungnam-Si, Kyunggi-Do, 462-120, Korea  
Manufacturer : Hyundai MultiCAV Computer CO., LTD.  
Address : 333-1, Sangdaewon-1Dong, Jungwon-Ku, Sungnam-Si, Kyunggi-Do, 462-120, Korea  
Type of Equipment : PERSONAL COMPUTER  
FCC ID : PGGST-160  
Model / Type No. : ST-160  
Serial number : N/A  
Total page of Report : 22pages (including this page)  
Date of Incoming : April 02, 2001  
Date of issuing : April 12, 2001

## SUMMARY

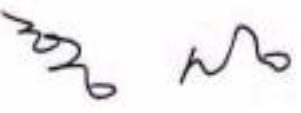
The equipment complies with the regulation; FCC PART 15 CFR 47 SUBPART B Section 15.101.

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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FCC-004 (Rev.0)

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## 1. VERIFICATION OF COMPLIANCE

APPLICANT : Hyundai MultiCAV Computer CO., LTD.  
ADDRESS : 333-1, Sangdaewon-1Dong, Jungwon-Ku, Sungnam-Si, Kyunggi-Do, 462-120, Korea  
CONTACT PERSON : Mr. Min-Soo, Park / Manager  
TELEPHONE NO : +82-31-735-8080  
FCC ID : PGGST-160  
MODEL NO/NAME : ST-160  
SERIAL NUMBER : N/A  
DATE : April 12, 2001

DEVICE TYPE	Class B Personal Computers - Unintentional Radiator
E.U.T. DESCRIPTION	PERSONAL COMPUTER
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The Hyundai MultiCAV Computer CO., LTD., Model ST-160 (referred to as the EUT in this report) is a internet settop PC. The EUT has function that can receive TV broadcast by the tuner and send video signal to CRT Monitor and TV. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
Used Mother Board	Model No: EP-MVP3H Manufacturer: EPOX COMPUTER
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	14.3MHz, 25MHz, 11.059MHz, 27MHz, 24.576MHz, 3.58MHz and 13.58MHz on the Main Board.
USED CPU SPECIFICATION	AMD KSIX-2: 450MHz
NUMBER OF LAYERS	Main Board: 6Layers, PCI Card: 4Layers, USB&Audio Board: 2Layers
POWER REQUIREMENTS	100-120/200-240Vac, 50/60Hz, 80W
Used SMPS	Model No: SPC-100 Manufacturer: POWERREX CO., LTD.
EXTERNAL CONNECTOR	Mouse port, Keyboard port, LAN port, COM1 port, VGA1 port, USB port, Parallel port, Joystick port, Speaker port, Audio port, S-Video port, AV In/Out port, MIC port, TV Antenna connector

### Model Differences:

None

### 2.2 Related Submittal(s) / Grant(s)

Original submittal only.



### 2.3 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
ST-160	Hyundai MultiCAV Computer CO., LTD.	PGGST-160	PERSONAL COMPUTER (EUT)	-
AV-5T	KDS	EVOKD-1510T	MONITOR	EUT
GHV-S9990	LG Elec.	DoC	VCR	EUT
DMS-700	DOOIN Elec.	N/A	SPEAKER	EUT
3500U	BTC	DoC	USB KEYBOARD	EUT
PCA-2302	PROCHIPS INC.	MY3PCA-2302	USB CAMERA	EUT
QS-124	QUICKSHOT	N/A	JOYSTICK	EUT
CTV-1010XK	Korea Electronics	N/A	TELEVISION	EUT
N/A	-	-	Antenna for TV	EUT
INTER LOCK	VIPSECURE CO., LTD.	DoC	USB SECURITY KEY	EUT
SMU100A	DIOGRAPHY INC.	DoC	USB SMART CARD READER	EUT
HM-700V	ROCKY	N/A	HEAD-MICROPHONE SET	EUT
ACK-260	SOLID YEAR CO., LTD	DoC	PS/2 KEYBOARD	EUT
020-0470	CARDINAL	GDE0196	EXTERNAL MODEM	EUT
GM-9601	N/A	FSUGMZE4	PS/2 MOUSE	EUT
2225C	HP	DSI6XU2225	PRINTER	EUT

### 2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

### 2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 12, 1999. (Registration Number: 92819)



### 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	EPOX COMPUTER	EP-MVP3H	N/A
USB&AUDIO BOARD	EPOX COMPUTER	EP-CARD3	N/A
PCI BOARD	EPOX COMPUTER	EP-CARD4	N/A
SMPS	POWERREX CO., LTD.	SPC-100	N/A
HDD	SAMSUNG ELECTRONICS	SV1021H	N/A
TV TUNER	PHILIPS	FI/236/F2	N/A

#### 3.2 EUT exercise Software

The windows program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. This program was included into HOST. Once loaded, this program sequentially exercises each system component in turn. The sequence used is: (1) series of H characters are printed on the monitor until the screen is completely full, (2) copy series of H characters to mass storage device (if one is used), (3) print series of H characters to printer. The complete cycle is repeated continuously.

The investigated video resolution was at 1024 X 768.

#### 3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
PERSONAL COMPUTER (EUT)	N	-	1.5(P)
MONITOR	N	Y	1.5(P), 1.2(D)
VCR	N	Y	1.5(D)
SPEAKER	N/A	N	1.8(D)
USB KEYBOARD	N/A	Y	1.5(D)
USB CAMERA	N/A	Y	1.5(D)
JOYSTICK	N/A	N	1.2(D)
TELEVISION	N	N	1.5(P), 1.2(D)
Antenna for TV	N/A	N	0.8(D)
USB SECURITY KEY	N/A	Y	1.5(D)
USB SMART CARD READER	N/A	Y	1.5(D)
HEAD-MICROPHONE SET	N/A	N	1.8(D)
KEYBOARD	N/A	N	1.8(D)
EXTERNAL MODEM	N	Y	1.5(P), 1.2(D)
MOUSE	N/A	N	1.2(D)
PRINTER	N	Y	1.5(P), 1.2 (D)

\* The marked "(P)" means the Power Cable, "(D)" means the Data Cable.



## 3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
PERSONAL COMPUTER (EUT)	-	-	-	-
MONITOR	Y	EUT END	Y	BOTH END
VCR	N	N/A	Y	BOTH END
SPEAKER	N	N/A	Y	BOTH END
USB KEYBOARD	N	N/A	Y	EUT END
TELEVISION	N	N/A	Y	BOTH END
Antenna for TV	N	N/A	Y	EUT END
USB CAMERA	N	N/A	Y	EUT END
JOYSTICK	N	N/A	Y	EUT END
USB SECURITY KEY	N	N/A	Y	EUT END
USB SMART CARD READER	N	N/A	Y	EUT END
HEAD-MICROPHONE SET	N	N/A	Y	EUT END
KEYBOARD	N	N/A	Y	EUT END
EXTERNAL MODEM	N	N/A	Y	BOTH END
MOUSE	N	N/A	Y	EUT END
PRINTER	N	N/A	Y	BOTH END

## 3.5 Equipment Modifications

None

## 3.6 Configuration of Test System

**Line Conducted Test:** The power line of EUT was connected to LISN, all supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

**Radiated Emission Test:** Preliminary radiated emission test was conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.



## 4. PRELIMINARY TEST

### 4.1 Conducted Emission Test

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Read and write of HDD and "H" pattern scrolling on T.V. at 640 X 480 resolution	
Read and write of HDD and "H" pattern scrolling on CRT Monitor at 1024 X 768 resolution	X

### 4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Read and write of HDD and "H" pattern scrolling on T.V. at 640 X 480 resolution	
Read and write of HDD and "H" pattern scrolling on CRT Monitor at 1024 X 768 resolution	X



## 5. FINAL RESULT OF MEASURMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

### 5.1 Conducted Emission Test

Humidity Level : 41 % Temperature : 20 •  
Limits apply to : FCC CFR 47, PART 15, SUBPART B  
Type of Test : CLASS B  
Result : PASSED BY -6.42 dB at 13.97 MHz

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EUT : PERSONAL COMPUTER Date: April 11, 2001  
Operating Condition : Read and write of HDD and "H" pattern scrolling on CRT Monitor  
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.53	34.71	HOT	48.00	-13.29
0.79	35.29	HOT	48.00	-12.71
2.09	40.82	NEUTRAL	48.00	-7.18
9.55	41.34	HOT	48.00	-6.66
13.97	41.58	NEUTRAL	48.00	-6.42
24.58	35.41	NEUTRAL	48.00	-12.59

Line Conducted Emission Tabulated Data

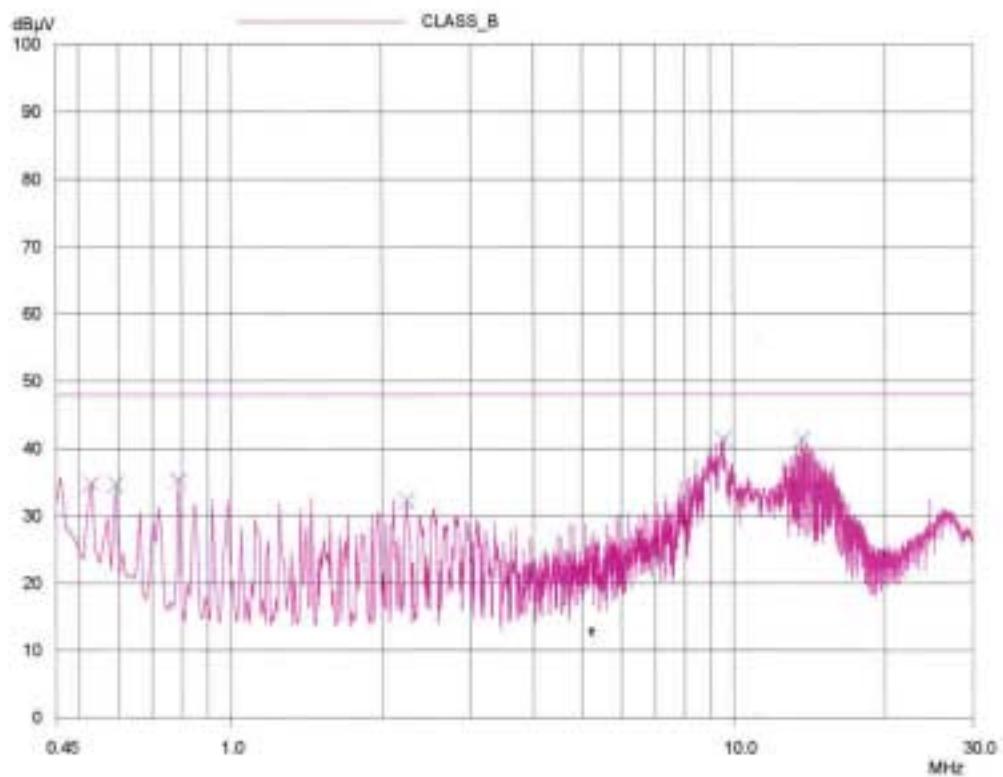
Measuring by: Young Min, Choi / Project Engineer



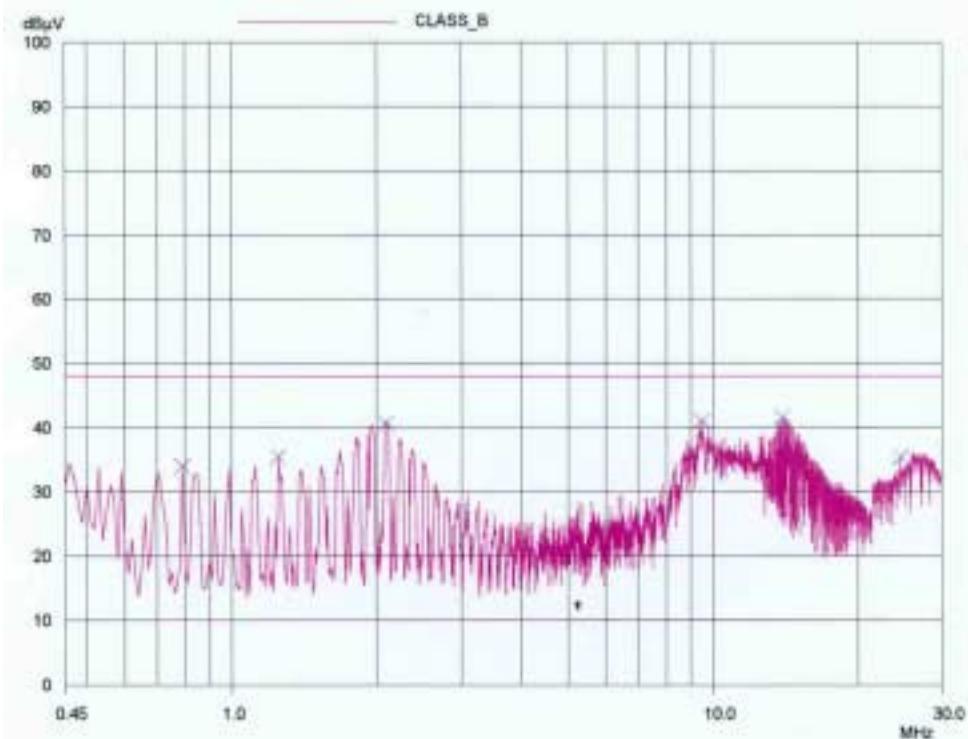
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Testing & Evaluation Lab.

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### HOT LINE



### NEUTRAL LINE

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## 5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

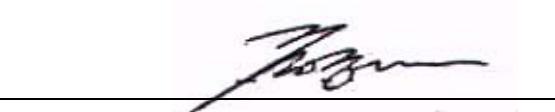
Humidity Level	: <u>41 %</u>	Temperature : <u>17•</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART B</u>	
Type of Test	: <u>CLASS B</u>	
Result	: <u>PASSED BY -3.22 dB at 902.80 MHz</u>	

EUT	: PERSONAL COMPUTER		Date: April 10, 2001
Operating Condition	: Read and write of HDD and "H" pattern scrolling on CRT Monitor		
Detector	: CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)		
Distance	: 3 Meter		

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)		Ant. (dBuV/m)	Cable (dB)		Amp. (dBuV/m)	Limit (dBuV/m)
61.44	22.00	V	9.33	0.99	32.32	40.00	-7.68
66.83	25.70	V	8.11	1.00	34.81	40.00	-5.19
75.18	25.80	V	6.30	1.00	33.10	40.00	-6.90
133.70	21.80	V	12.87	1.28	35.95	43.50	-7.55
189.00	22.00	V	16.35	1.50	39.85	43.50	-3.65
240.00	26.60	H	12.20	1.78	40.58	46.00	-5.42
295.00	21.70	H	15.00	1.98	38.68	46.00	-7.32
300.80	24.66	H	15.22	2.00	41.88	46.00	-4.12
501.14	21.02	H	18.30	2.68	42.00	46.00	-4.00
601.39	19.96	H	18.82	2.91	41.69	46.00	-4.31
701.60	17.00	H	20.99	3.32	41.31	46.00	-4.69
802.00	16.20	H	21.39	3.71	41.30	46.00	-4.70
902.80	16.33	H	22.50	3.95	42.78	46.00	-3.22
960~2000	*	-	-	-	-	54.00	-

Radiated Emission Tabulated Data

Remark: \* means equal or less than 5dB.



Measuring by: Young Min, Choi / Project Engineer



## 6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

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= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)



## 7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	SEP/00	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/00	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/00	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/00	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/00	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/01	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/01	12MONTH	■
9.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/01	12MONTH	■
10.	RF Amplifier	HP	8447F	3113A04554	JUN/00	N/A	
11.	Spectrum Analyzer	HP	8591A	3131A02312	APR/00	12MONTH	
12.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Horn Antenna	EMCO	3115	9509-4563	MAR/01	12MONTH	■
17.	Spectrum Analyzer	HP	8561E	3350A00546	SEP/00	12MONTH	■
18.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■