ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number	**: E043R-007**
Applicant	**: Hanse Electronics Co., Ltd.**
Address	**: 33B 4L, NamDong-Industrial Zone, 613-3, Namchon-Dong, Namdong-Gu, Inchon, 405-846, Korea**
Manufacturer	**: Hanse Electronics Co., Ltd.**
Address	**: 33B 4L, NamDong-Industrial Zone, 613-3, Namchon-Dong, Namdong-Gu, Inchon, 405-846, Korea**
Type of Equipment	**: Micro Scope USB (Class B Computing Device Peripheral)**
FCC ID	**: RVJCM500PCAE**
Model Name	**: HVS-CM500PC**
Multiple Model Name	**: N/A**
Serial number	**: HD720072SPL**
Total page of Report	**: 11 pages (including this page)**
Date of Incoming	**: January 02, 2004**
Date of Issuing	**: March 02, 2004**

SUMMARY

The equipment complies with the requirements of **FCC CFR 47 PART 15 SUBPART B, Class B.**
This test report contains only the results 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.

Prepared by:
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EMC Div.
ONETECH Corp.

Reviewed by:
Gea-Won, Lee / Chief Engineer
EMC Div.
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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : Hanse Electronics Co., Ltd.
-. ADDRESS : 33B 4L, NamDong-Industrial Zone, 613-3, Namchon-Dong, Namdong-Gu, Inchon, 405-846, Korea
-. CONTACT PERSON : Mr. Yong-Yee, Kim / Q.A. Manager
-. TELEPHONE NO : +82-32-816-8700
-. FCC ID : RVJCM500PCAE
-. MODEL NO/NAME : HVS-CM500PC
-. SERIAL NUMBER : N/A
-. DATE : March 02, 2004

DEVICE TYPE	Peripheral Device for Class B Computing Device - Unintentional Radiator
E.U.T. DESCRIPTION	Micro Scope USB
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2001
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

-. This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 affected by the 15.37(j) transition provisions.

-. 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.

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2. GENERAL INFORMATION

2.1 Product Description

The Hanse Electronics Co., Ltd., Model HVS-CM500PC (referred to as the EUT in this report) is a Micro Scope USB that is a personal computer peripheral with USB standard port. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Non-Metal
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	12 MHz
NUMBER OF LAYERS	2 Layers (Main B'D, Switch B'D), 1 Layer (LED B'D)
EXTERNAL CONNECTOR	USB

2.2 Model Differences:

-. The difference(s) compared to the EUT is as follows: none

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Test System Details

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
HVS-CM500PC	Hanse Electronics Co., Ltd.	RVJCM500PCAE	EUT	NOTEBOOK PC
S690	Samsung Elect.	DOC	NOTEBOOK PC	-
AD-6019(V)	Samsung Elect.	N/A	AC/DC ADAPTER	NOTEBOOK PC
X06-08477	Microsoft Corp.	DOC	MOUSE	NOTEBOOK PC
2225C	HP	DSI6XU2225	PRINTER	NOTEBOOK PC

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 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 18, 2002. (Registration Number: 92819)

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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	Hanse Electronics Co., Ltd.	HVS-CM500PC	N/A
LED BOARD	Hanse Electronics Co., Ltd.	Microscope 500 LED	N/A
SWITCH BOARD	Hanse Electronics Co., Ltd.	HVS-CM500PC R2	N/A

3.2 EUT exercise

-. After connecting the EUT to USB port of a notebook PC, the enlarged image by the EUT was continuously displayed on the screen of notebook PC.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
Micro Scope USB (EUT)	N/A	Y	1.5 (D)
NOTEBOOK PC	N	-	1.5 (P)
AC/DC ADAPTER (for Notebook PC)	N	N	1.2(P), 1.0(D)
MOUSE	N/A	N	1.2(D)
PRINTER	N	Y	1.5(P), 1.5(D)

* The marked “(P)” means the Power Cable and “D” means the I/O Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Micro Scope USB (EUT)	Y	EUT END	Y	Notebook PC END
NOTEBOOK PC	-	-	-	-
AC/DC ADAPTER (for Notebook PC)	Y	Notebook PC END	Y	Notebook PC END
MOUSE	N	N/A	Y	Notebook PC END
PRINTER	N	N/A	Y	BOTH END

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3.5 Equipment Modifications

To achieve compliance to CLASS B levels, the following change(s) was made by ONETECH Corp. during compliance testing:

"There were no Modified items during EMI test"

3.6 Configuration of Test System

Line Conducted Test : The EUT was connected to PC and the power line of PC was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2001 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: 2001 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 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
The enlarged image was displayed.	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)
The enlarged image was displayed.	X

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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 : 50 % Temperature: 19 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)

Type of Test : CLASS B

Result : PASSED BY –12.97 dB at 0.19 MHz (Peak detector mode)

EUT : Micro Scope USB Date: January 01, 2004

Operating Condition : The enlarged image was displayed.

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.15	N	48.81	66.00	-17.19
0.19	N	50.85	63.82	-12.97
0.46	H	39.80	56.69	-16.89
0.59	N	39.32	56.00	-16.68
0.85	N	38.02	56.00	-17.98
3.21	N	37.43	56.00	-18.57
Frequency (MHz)	**Line**	**Average (dBuV)**		**Margin (dB)**
		Emission level	**Limits**	
-				
-				

Line Conducted Emissions Tabulated Data

Remark : "H": Hot Line, "N": Neutral line, "P": Peak detect

Average data was not recorded, because Peak values were under the Average limit.

See Appendix I for an overview sweep performed with peak and average detector.

Tested by: Dong-Yub, Lee / Test Engineer

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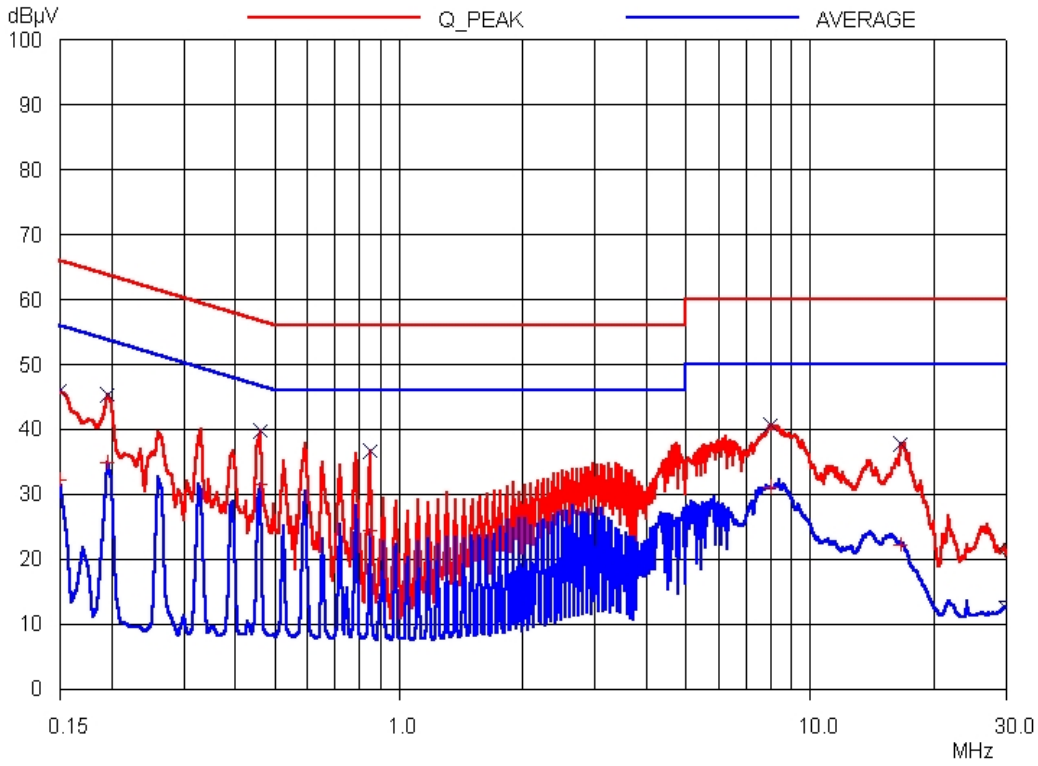
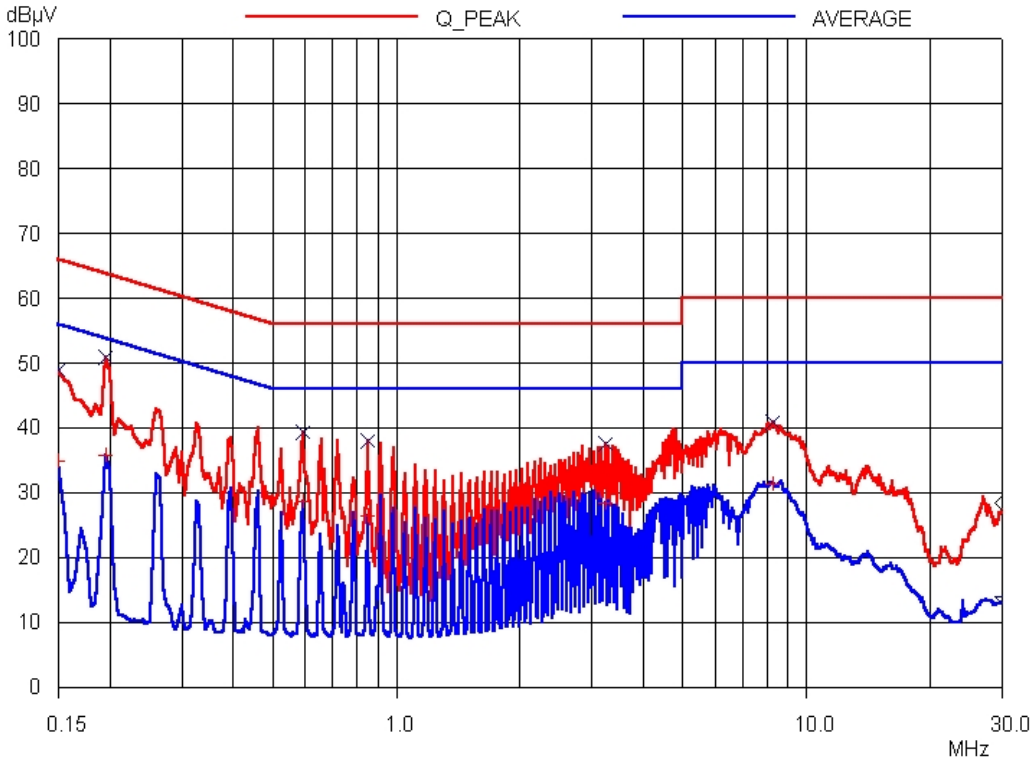


HOT LINE



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 : 48 % Temperature: 17 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)

Type of Test : CLASS B

Result : PASSED BY –6.60dB at 376.91 MHz

EUT : Micro Scope USB Date: January 05, 2004

Operating Condition : The enlarged image was displayed.

Frequency range : 30MHz ~ 1000MHz

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Distance : 3 Meter

Radiated Emissions		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
95.89	19.40	H	10.87	1.13	31.40	43.50	-12.10
120.12	16.08	H	13.49	1.23	30.80	43.50	-12.70
162.75	12.05	V	15.35	1.40	28.80	43.50	-14.70
216.05	16.39	H	10.96	1.65	29.00	46.00	-17.00
228.65	19.58	H	11.10	1.72	32.40	46.00	-13.60
240.00	17.50	H	11.62	1.78	30.90	46.00	-15.10
336.21	21.30	V	14.29	2.21	37.80	46.00	-8.20
355.59	21.41	V	14.49	2.30	38.20	46.00	-7.80
376.91	22.36	V	14.65	2.39	39.40	46.00	-6.60
488.35	15.59	H	17.47	2.64	35.70	46.00	-10.30
554.24	13.56	H	18.25	2.79	34.60	46.00	-11.40
584.28	13.97	H	18.65	2.88	35.50	46.00	-10.50

Radiated Emissions Tabulated Data

Tested by: Dong-Yub, Lee / Test Engineer

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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)
=	Corrected Reading	(dBuV/meter)
-	Specification Limit	(dBuV/meter)
=	dB Relative to Spec	(+/- dB)

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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	NOV/03	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR /03	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	MAY/03	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	MAY/03	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	MAY/03	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	MAY/03	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/04	12MONTH	
8.	Biconical antenna	EMCO	3104C	9109-4443	MAY/03	12MONTH	
				9109-4444	JUL/03	12MONTH	■
		Schwarzbeck	VHA9103	91031852	JAN/04	12MONTH	
9.	Log Periodic antenna	EMCO	3146	9109-3214	JUL/03	12MONTH	■
				9109-3217	MAY/03	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	JAN/04	12MONTH	
10.	LISN	EMCO	3825/2	9109-1867	AUG/03	12MONTH	■
				9109-1869	OCT/03	12MONTH	■
11.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
12.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
13.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

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