ELECTROMAGNETIC EMISSION COMPLIANCE REPORT
FOR FCC CLASS B CERTIFICATION

Test report file number	**: E031R-017**
Applicant	**: HANA MICRON INC.**
Address	**: 6th Floor, Myeong-Seong B/D, Dogok-Dong, Kangnam-Gu, Seoul, 135-271, Korea**
Manufacturer	**: HANA MICRON INC.**
Address	**: 6th Floor, Myeong-Seong B/D, Dogok-Dong, Kangnam-Gu, Seoul, 135-271, Korea**
Type of Equipment	**: USB Flash Drive (Peripheral Device for Class B Computing Device)**
FCC ID	**: QH7HFDS-00A**
Model Name	**: HFDS-032**
Multiple Model Name	**: HFDS-064, HFDS-128, HFDS-256**
Serial number	**: N/A**
Total page of Report	**: 12 pages (including this page)**
Date of Incoming	**: December 24, 2002**
Date of Issuing	**: January 09, 2003**

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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ONETECH Corp.

Reviewed by:
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ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : HANA MICRON INC.
-. ADDRESS : 6th Floor, Myeong-Seong B/D, Dogok-Dong, Kangnam-Gu, Seoul, 135-271, Korea
-. CONTACT PERSON : Mr. Jung-Woo, Lee/ Technical Manager
-. TELEPHONE NO : +82-2-2057-4787
-. FCC ID : QH7HFDS-00A
-. MODEL NO/NAME : HFDS-032
-. SERIAL NUMBER : N/A
-. DATE : January 09, 2003

DEVICE TYPE	Peripheral Device for Class B Computing Device - Unintentional Radiator
E.U.T. DESCRIPTION	USB Flash Drive
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.

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2. GENERAL INFORMATION

2.1 Product Description

The HANA MICRON INC., Model HFDS-032 (referred to as the EUT in this report) is a USB Flash Drive that is interfaced to personal computer via USB port. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1MHz)	8 MHz
NUMBER OF LAYERS	4 Layers
EXTERNAL CONNECTOR	USB Plug (A type)

Model Differences:

The difference(s) compared to the EUT is as follows:

		Model Differences
Basic Model	HFDS-032	-
Multiple Model	HFDS-064, HFDS-128, HFDS-256	Only type designation by a memory size of the EUT.

2.2 Related Submittal(s) / Grant(s)

Original submittal only

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2.3 Test System Details

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

Model	Manufacturer	FCC ID	Description	Connected to
HFDS-032	HANA MICRON INC.	QH7HFDS-00A	USB Flash Drive (EUT)	PC
S690	SAMSUNG ELECTRONICS	DOC	NOTEBOOK PC	-
AD-6019(V)	SAMSUNG ELECTRONICS	N/A	ADAPTER	PC
X06-08477	MICROSOFT CORP.	DOC	MOUSE	PC
2225C	HP	DSI6XU2225	PRINTER	PC

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 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 B'D	HANA MICRON INC.	N/A	N/A

3.2 EUT exercise Software

After connecting the EUT to a personal computer, data were continuously read and written from the HDD of the personal computer to the EUT.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
USB Flash Drive (EUT)	N/A	N/A	-
NOTEBOOK PC	N	-	1.5 (P), -
ADAPTER	N	N (DC OUT)	1.3 (P), 1.0 (D)
MOUSE	N/A	N	1.3 (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
USB Flash Drive (EUT)	N	N/A	Y	PC END
NOTEBOOK PC	N	N/A	-	-
ADAPTER	Y	PC END	Y	PC END
MOUSE	N	N/A	Y	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 inserted to USB port of 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 C63.4/1992 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 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)
Data were continuously read and write via USB	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)
Data were continuously read and write via USB	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 : 53 % Temperature: 20 °C

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

Type of Test : CLASS B

Result : PASSED BY –14.79 dB at 0.59 MHz

EUT : USB Flash Drive Date: December 26, 2002

Operating Condition : Data were continuously read and written.

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

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.19	H	47.28	63.82	-16.54
0.43	H	42.18	57.25	-15.07
0.46	N	40.92	56.69	-15.77
0.59	H	41.21	56.00	-14.79
0.78	N	38.99	56.00	-17.01
4.59	H	39.35	56.00	-16.65
Frequency (MHz)	**Line**	**Average (dBuV)**		**Margin (dB)**
		Emission level	**Limits**	
-				
-				

Line Conducted Emission 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 next page for an overview sweep performed with peak detector.

Tested by: Young-Min Choi / Project Engineer

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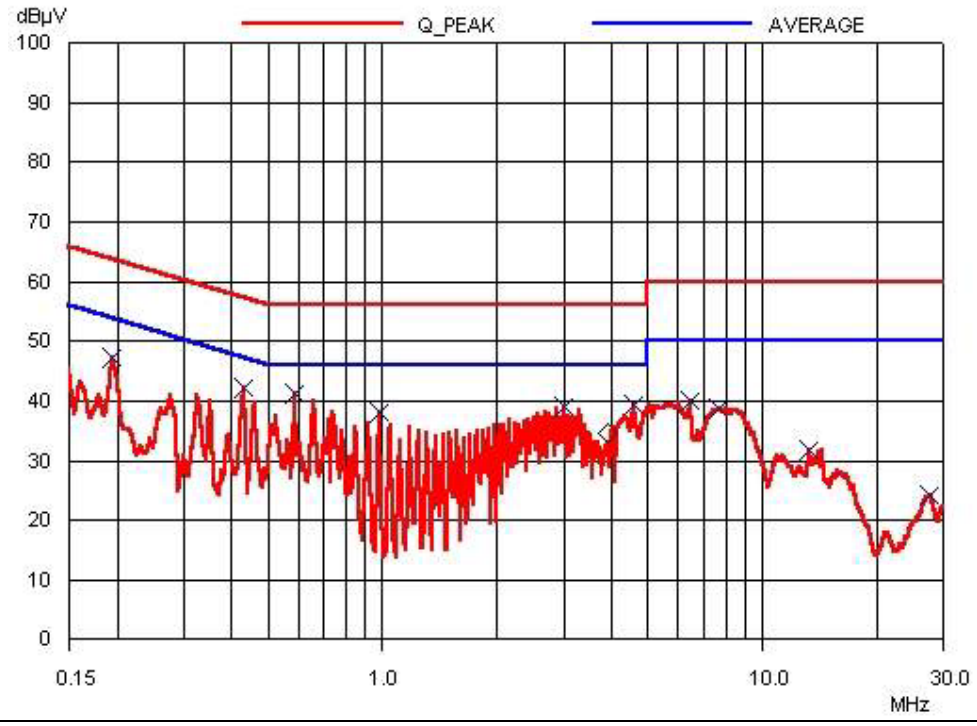
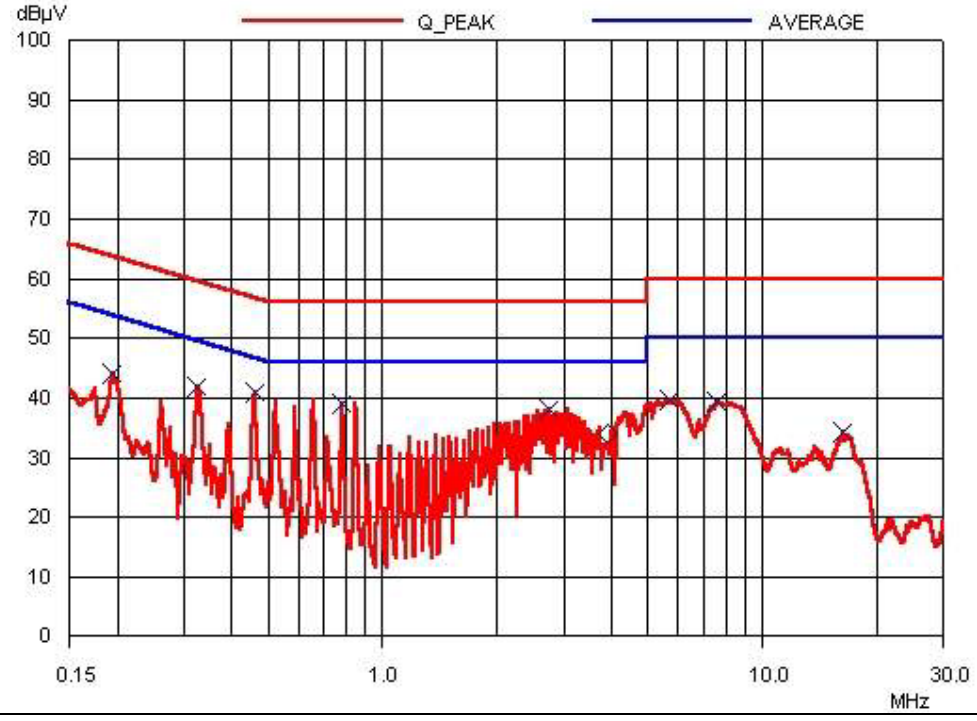


HOT LINE



NEUTRAL LINE

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5.3 Radiated Emission Test

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

Humidity Level : 49 % Temperature: 16 °C

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

Type of Test : CLASS B

Result : PASSED BY -3.39 dB at 455.80 MHz

EUT : USB Flash Drive Date: December 26, 2002

Operating Condition : Data were continuously read and written.

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)
36.00	20.40	V	11.21	0.80	32.41	40.00	-7.59
60.00	14.90	V	9.41	0.98	25.29	40.00	-14.71
72.00	13.70	V	7.39	1.00	22.09	40.00	-17.91
144.00	14.20	V	12.93	1.33	28.46	43.50	-15.04
168.00	11.20	V	15.75	1.42	28.37	43.50	-15.13
180.00	16.00	V	16.12	1.45	33.57	43.50	-9.93
215.20	15.70	V	10.93	1.65	28.28	43.50	-15.22
240.00	18.40	H	11.62	1.78	31.80	46.00	-14.20
336.40	16.50	H	14.30	2.21	33.01	46.00	-12.99
348.20	19.70	H	14.44	2.27	36.41	46.00	-9.59
360.00	12.20	H	14.52	2.32	29.04	46.00	-16.96
384.60	13.30	H	14.84	2.41	30.55	46.00	-15.45
431.60	18.10	V	15.88	2.50	36.48	46.00	-9.52
455.80	23.60	V	16.45	2.56	42.61	46.00	-3.39
36.00	20.40	V	11.21	0.80	32.41	40.00	-7.59

Radiated Emissions Tabulated Data

Tested by: Young-Min Choi / Project 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	OCT/02	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/02	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3109A05456	APR/02	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	APR/02	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/02	12MONTH	■
6.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/02	12MONTH	■
7.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	APR/02	12MONTH	■
8.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/02	12MONTH	■
9.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	■ ■
10.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
11.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
12.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

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