



# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E038R-007

**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** : QH7AXIS20  
**Model Name** : HMDZ-016C  
**Multiple Model Name** : HMDZ-032C, HMDZ-064C, HMDZ-128C, HMDZ-256C, HMDZ-512C, HMDZ-01GC  
**Serial Number** : N/A  
**Total page of Report** : 12 pages (including this page)  
**Date of Incoming** : July 10, 2003  
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## 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.

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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 : QH7AXIS20  
- MODEL NO/NAME : HMDZ-016C  
- SERIAL NUMBER : N/A  
- DATE : August 05, 2003

|                                                         |                                                                            |
|---------------------------------------------------------|----------------------------------------------------------------------------|
| DEVICE TYPE                                             | Peripheral Device for Class B Computing Device<br>- 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<br>AUTHORIZATION REQUESTED            | CERTIFICATION                                                              |
| EQUIPMENT WILL BE OPERATED<br>UNDER FCC RULES PART(S)   | FCC PART 15, SECTION 15.101                                                |
| MODIFICATIONS ON THE EQUIPMENT<br>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.



## 2. GENERAL INFORMATION

### 2.1 Product Description

The HANA MICRON INC., Model HMDZ-016C (referred to as the EUT in this report) is a USB Flash Drive that is USB portable storage device connected 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. $\geq$ 1MHz) | 12 MHz            |
| NUMBER OF LAYERS                                   | 4 Layers          |
| EXTERNAL CONNECTOR                                 | USB Plug (A type) |

### 2.2 Model Differences:

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

|                |                                                                     | Model Differences                                            |
|----------------|---------------------------------------------------------------------|--------------------------------------------------------------|
| Basic Model    | HMDZ-016C                                                           | -                                                            |
| Multiple Model | HMDZ-032C, HMDZ-064C, HMDZ-128C,<br>HMDZ-256C, HMDZ-512C, HMDZ-01GC | Only type designation by a memory size and color of the EUT. |

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

Original submittal only



## 2.4 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 |
|-----------|---------------------|------------|-----------------------|--------------|
| HMDZ-016C | HANA MICRON INC.    | QH7AXIS20  | USB Flash Drive (EUT) | PC           |
| GX240     | DELL COMPUTER CORP. | DoC        | PERSONAL COMPUTER     | -            |
| E551      | DELL COMPUTER CORP. | DoC        | MONITOR               | PC           |
| 2225C     | HP                  | DSI6XU2225 | PRINTER               | PC           |
| 020-0470  | CARDINAL            | GDE0196    | MODEM                 | PC           |
| X06-08477 | MICROSOFT CORP.     | DoC        | MOUSE                 | PC           |
| SK-8110   | SILITEK             | DoC        | KEYBOARD              | PC           |

## 2.5 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.

## 2.6 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)



### 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<br>Shielded (Y/N) | I/O cable Shielded<br>(Y/N) | Length (M)     |
|-----------------------|------------------------------|-----------------------------|----------------|
| USB Flash Drive (EUT) | N/A                          | N/A                         | -              |
| PERSONAL COMPUTER     | N                            | Y                           | 1.8(P), 1.2(D) |
| MONITOR               | N                            | Y                           | 1.5(P), 1.2(D) |
| PRINTER               | N                            | Y                           | 1.8(P), 1.2(D) |
| MODEM                 | N                            | Y                           | 1.8(P), 1.2(D) |
| MOUSE                 | N/A                          | Y                           | 1.2(D)         |
| KEYBOARD              | N/A                          | Y                           | 1.2(D)         |

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

#### 3.4 Noise Suppression Parts on Cable

|                       | Ferrite Bead<br>(Y/N) | Location | Metal Hood<br>(Y/N) | Location |
|-----------------------|-----------------------|----------|---------------------|----------|
| USB Flash Drive (EUT) | N                     | N/A      | Y                   | PC END   |
| PERSONAL COMPUTER     | N/A                   | N/A      | N/A                 | -        |
| MONITOR               | Y                     | PC END   | Y                   | PC END   |
| PRINTER               | N                     | N/A      | Y                   | BOTH END |
| MODEM                 | N                     | N/A      | Y                   | BOTH END |
| MOUSE                 | N                     | N/A      | Y                   | PC END   |
| KEYBOARD              | N                     | N/A      | Y                   | PC END   |



### 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                                                     |

**5. FINAL RESULT OF MEASUREMENT**

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 : 42 % Temperature: 26 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)  
 Type of Test : CLASS B  
 Result : PASSED BY -16.73 dB at 10.14 MHz

EUT : USB Flash Drive Date: July 14, 2003  
 Operating Condition : Data were continuously read and written.  
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

| Frequency<br>(MHz) | Line | Peak (dBuV)    |            | Margin<br>(dB) |
|--------------------|------|----------------|------------|----------------|
|                    |      | Emission level | Q.P Limits |                |
| 0.34               | H    | 34.04          | 59.08      | -25.04         |
| 0.83               | N    | 31.56          | 56.00      | -24.44         |
| 9.68               | N    | 43.12          | 60.00      | -16.88         |
| 10.14              | H    | 43.27          | 60.00      | -16.73         |
| 19.83              | H    | 39.19          | 60.00      | -20.81         |
| 21.22              | N    | 38.99          | 60.00      | -21.01         |
| Frequency<br>(MHz) | Line | Average (dBuV) |            | Margin<br>(dB) |
|                    |      | Emission level | Limits     |                |
| -                  |      |                |            |                |
| -                  |      |                |            |                |

Line Conducted Emission Tabulated Data

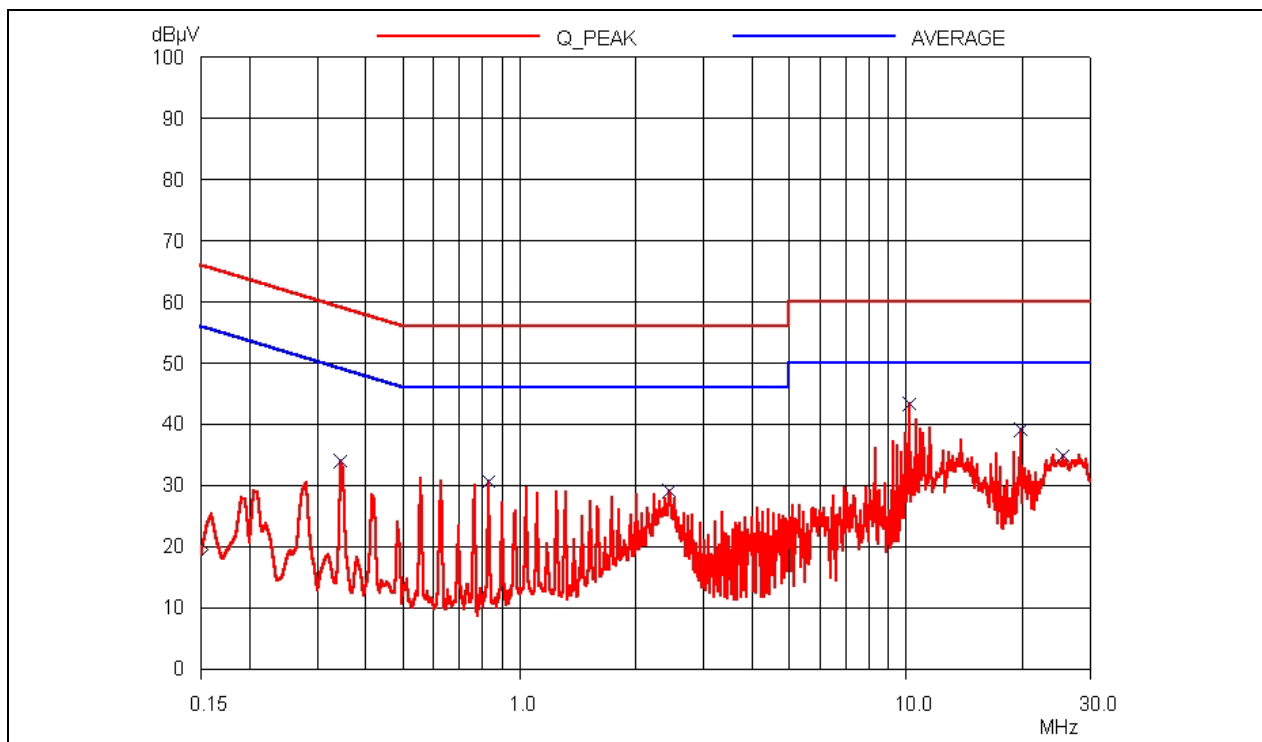
Remark : "H": Hot Line, "N": Neutral line

Average mode was not measured, because Peak values were under the Average limit.

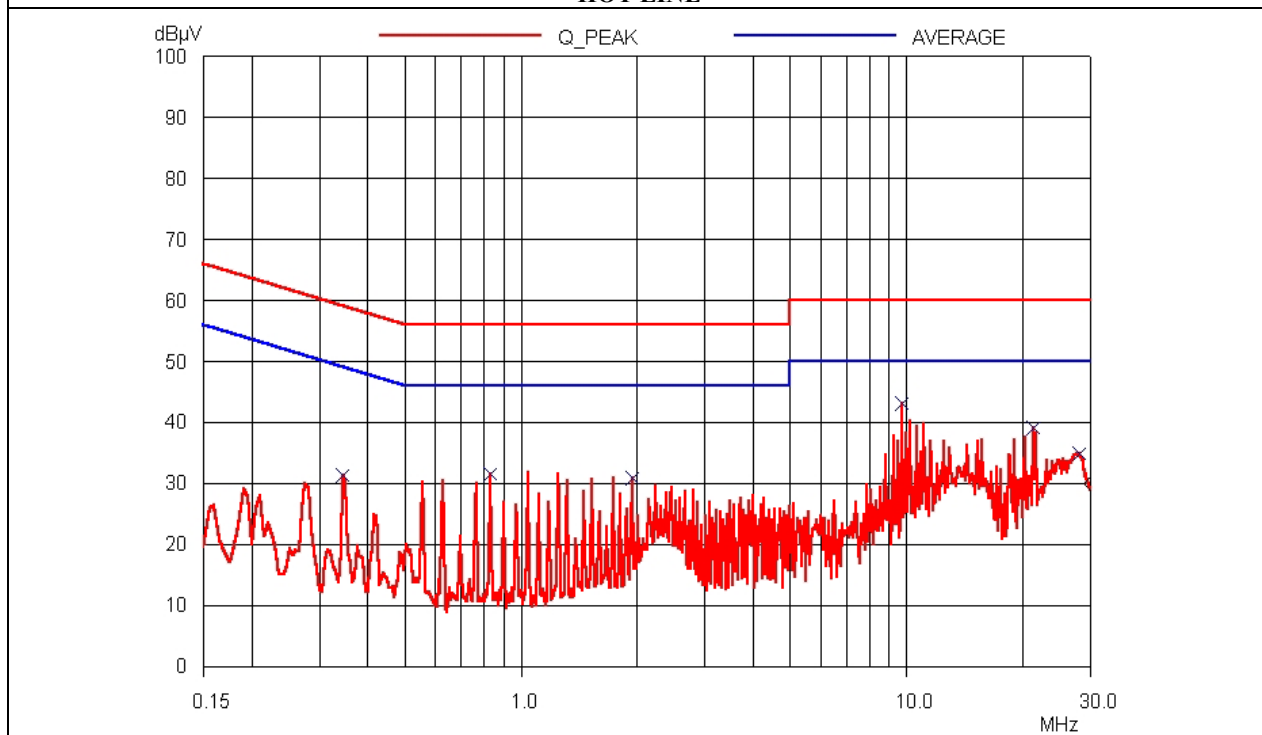
See next page for an overview sweep performed with peak detector.

Tested by: Young-Min Choi / Project Engineer





## HOT LINE



## NEUTRAL LINE

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FCC-003 (Rev.0)

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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 : 42 % Temperature: 26 °C  
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)  
 Type of Test : CLASS B  
 Result : PASSED BY -5.00 dB at 721.97 MHz

EUT : USB Flash Drive Date: July 14, 2003  
 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.<br>(MHz)     | Amp.<br>(dBuV) | Pol. | Ant.<br>(dBuV/m)   | Cable<br>(dB) | Amp.<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
| 132.60             | 19.00          | V    | 13.97              | 0.44          | 33.41            | 43.52             | -10.11         |
| 222.90             | 16.90          | V    | 17.01              | 0.77          | 34.68            | 46.02             | -11.34         |
| 443.00             | 15.90          | V    | 16.65              | 1.02          | 33.57            | 46.02             | -12.45         |
| 581.20             | 15.80          | V    | 18.63              | 0.99          | 35.42            | 46.02             | -10.60         |
| 721.97             | 19.20          | V    | 20.45              | 1.37          | 41.02            | 46.02             | -5.00          |
| 960.02             | 17.10          | V    | 22.21              | 1.33          | 40.64            | 53.97             | -13.33         |

Radiated Emissions Tabulated Data

  
 Tested 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)

---

= 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                                      | NOV/02                               | 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/03                               | 12MONTH |     |
| 8.  | Biconical antenna        | EMCO<br>Schwarzbeck | 3104C<br>VHA9103    | 9109-4443<br>9109-4444<br>91031852              | MAY/03<br>JUL/03<br>AUG/03           | 12MONTH | ■   |
| 9.  | Log Periodic antenna     | EMCO<br>Schwarzbeck | 3146<br>9108-A(494) | 9109-3213<br>9109-3214<br>9109-3217<br>62281001 | AUG/02<br>JUL/03<br>MAY/03<br>AUG/02 | 12MONTH | ■   |
| 10. | LISN                     | EMCO                | 3825/2              | 9109-1867<br>9109-1869                          | AUG/02<br>OCT/02                     | 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     | ■   |