



# FCC TEST REPORT

**REPORT NO.:** F921210A04

**MODEL NO.:** SAFGUARD200

**RECEIVED:** Dec. 10, 2003

**TESTED:** Dec. 10, 2003

**APPLICANT:** Chunghwa Telecom Research Institute

**ADDRESS:** No.12 Ln 551 Minzu 5th Rd. Yangmei  
Township, Taoyuan County, Taiwan, R.O.C.

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14th Lin, Chiapau Tsun, Linko, Taipei,  
Taiwan, R.O.C.

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0528  
ILAC MRA



Lab Code: 200102-0

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## 1 CERTIFICATION

**PRODUCT:** Hardware Secure Module  
**BRAND NAME:** Chunghwa Telecom  
**MODEL NO:** SAFGUARD200  
**TEST ITEM:** Mass Production  
**APPLICANT:** Chunghwa Telecom Research Institute  
**STANDARDS:** FCC Part 15, Subpart B, Class B  
CISPR22: 1997, Class B  
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on Dec. 10, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

**PREPARED BY:** Kay Chen, **DATE:** Jan. 8, 2004  
(Kay Chen)

**APPROVED BY:** Mike Su., **DATE:** Jan. 8, 2004  
( Mike Su, Manager )

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
FCC Part 15, Subpart B, Class B  CISPR22: 1997, Class B  ANSI C63.4-1992	Conducted Test	PASS	Meets Class B Limit  Minimum passing margin is -16.15 dB at 22.159 MHz
	Radiated Test	PASS	Meets Class B Limit  Minimum passing margin is -5.00 dB at 67.58 MHz

**Note:** The information of measurement uncertainty is available upon the customer's request.

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Hardware Secure Module
<b>MODEL NO.</b>	SAFGUARD200
<b>POWER SUPPLY</b>	Adapter CHI SAM Model No.: CH-1253TA AC Input: 100~120V, 50~60Hz DC Output: +12V/ 2.5A, 5.0V/1.0A, 3.3V/1.0A Power cable with one ferrite core.
<b>DATA CABLE</b>	N/A

**NOTE:** The EUT is a Hardware Security Module and Key management program transmit data each other via Internet using 100/10Mbps network interface.

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

### 3.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook PC	Compaq	EVO N610C	PP2040	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

**NOTE:**

1. All power cords of the above support units are non-shielded (1.8m).
2. Support unit 1 acted as a SERVER PC (kept in a remote area) and communicated with EUT via LAN cable (10m).

## 4 EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

**NOTES:**

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	June 24, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	June 17, 2004
FCC ISN	FCC-TLISN-T2-02	20117	Oct. 13, 2004
FCC ISN	FCC-TLISN-T4-02	20116	Oct. 13, 2004
FCC ISN	FCC-TLISN-T8-02	20096	Oct. 13, 2004
EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	June 17, 2004
Software	Cond-V3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C02.01	May 23, 2004
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 23, 2004
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 23, 2004

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. “\*”: These equipment are used for conducted telecom port test only (if tested).  
 3. The test was performed in ADT Shielded Room No. 2.  
 4. The VCCI Site Registration No. is C-240.

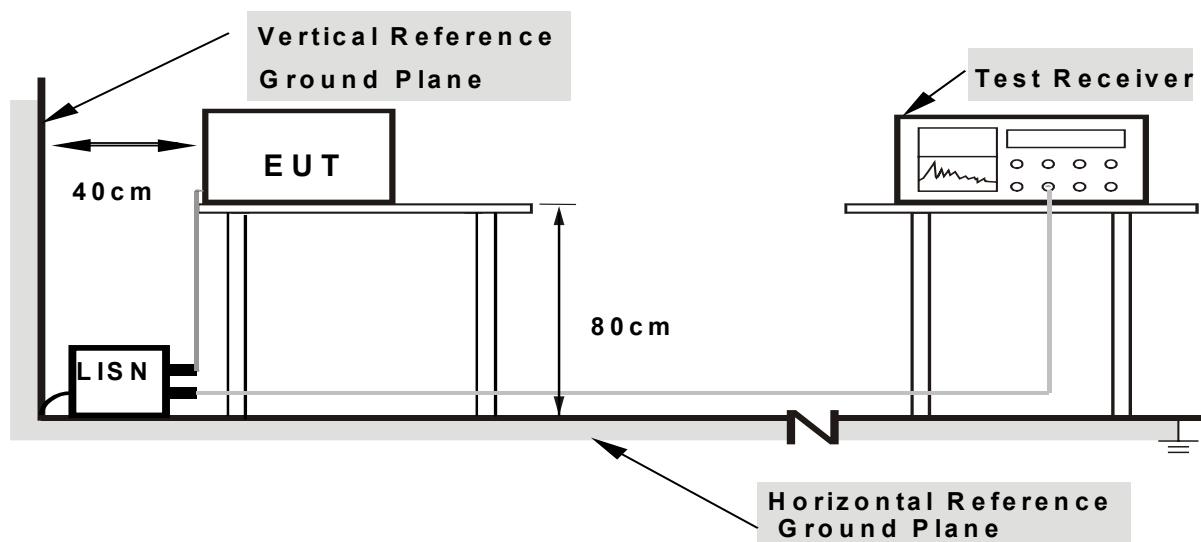
#### 4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) was not reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes**

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



#### 4.1.6 EUT OPERATING CONDITIONS

- a. Turn the power of all equipment.
- b. EUT sent/received messages to/from Notebook PC (kept in a remote area) via LAN transmission.

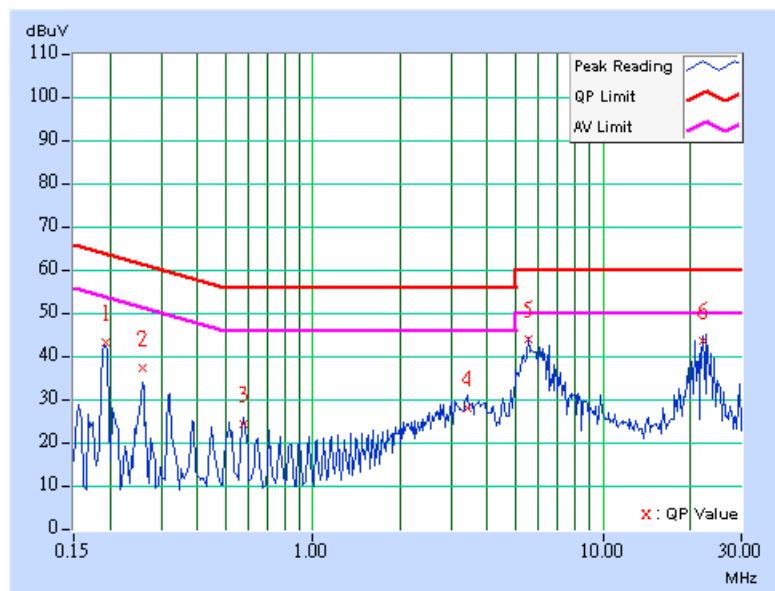
#### 4.1.7 TEST RESULTS

<b>EUT</b>	Hardware Secure Module	<b>MODEL</b>	SAFGUARD200
		<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 80 % RH, 1005 hPa	<b>TESTED BY:</b> Nick Chen	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.193	0.10	42.13	-	42.23	-	63.92	53.92	-21.69	-
2	0.258	0.10	36.17	-	36.27	-	61.48	51.48	-25.21	-
3	0.579	0.13	23.26	-	23.39	-	56.00	46.00	-32.61	-
4	3.409	0.34	27.05	-	27.39	-	56.00	46.00	-28.61	-
5	5.529	0.45	43.03	-	43.48	-	60.00	50.00	-16.52	-
<b>6</b>	<b>22.159</b>	<b>1.09</b>	<b>42.76</b>	-	<b>43.85</b>	-	<b>60.00</b>	<b>50.00</b>	<b>-16.15</b>	-

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

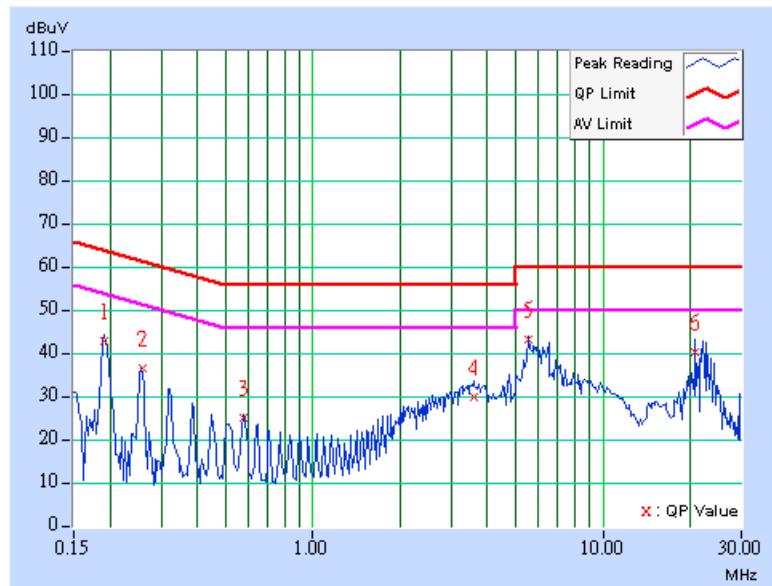


<b>EUT</b>	Hardware Secure Module	<b>MODEL</b>	SAFGUARD200
		<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 80 % RH, 1005 hPa	<b>TESTED BY:</b> Nick Chen	

No	Freq. Factor	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.192	0.10	42.14	-	42.24	-	63.95	53.95	-21.71	-
2	0.258	0.10	35.62	-	35.72	-	61.49	51.49	-25.77	-
3	0.578	0.13	24.16	-	24.29	-	56.00	46.00	-31.71	-
4	3.605	0.36	28.90	-	29.26	-	56.00	46.00	-26.74	-
5	5.530	0.43	42.36	-	42.79	-	60.00	50.00	-17.21	-
6	20.858	0.93	39.53	-	40.46	-	60.00	50.00	-19.54	-

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 - 1000	47	37

### LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

## 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
HP Spectrum Analyzer	8594A	3144A00308	Aug. 18, 2004
HP Preamplifier	8447D	2944A08119	July 01, 2004
* HP Preamplifier	8449B	3008A01924	Oct. 12, 2004
* HP Preamplifier	8449B	3008A01638	Oct. 17, 2004
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Oct. 22, 2004
SCHWARZBECK Tunable Dipole Antenna	VHA 9103	NA	Nov. 15, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
* CHASE Bilog Antenna	CBL6112B	2433	July 26, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	June 30, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23, 2004
* ADT. Turn Table	TT100	0302	NA
* ADT. Tower	AT100	0302	NA
* Software	ADT_Radiated_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Oct. 09, 2004
* TIMES RF cable	8D	CABLE-ST2-01	Oct. 09, 2004

**NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.  
 2. “\*” = These equipment are used for the final measurement.  
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.  
 4. The test was performed in ADT Open Site No. 2.  
 5. The VCCI Site Registration No. is R-237.

#### 4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

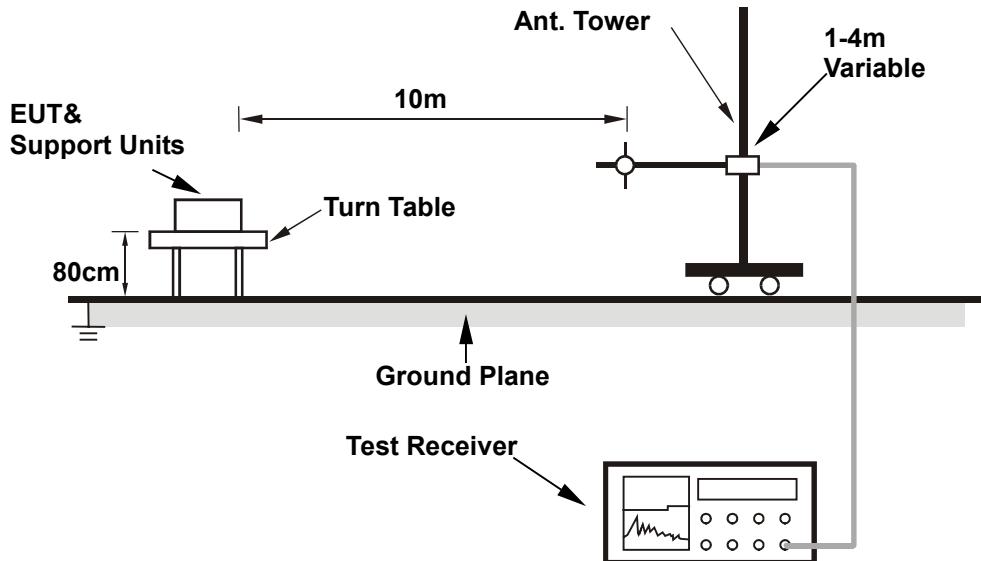
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6

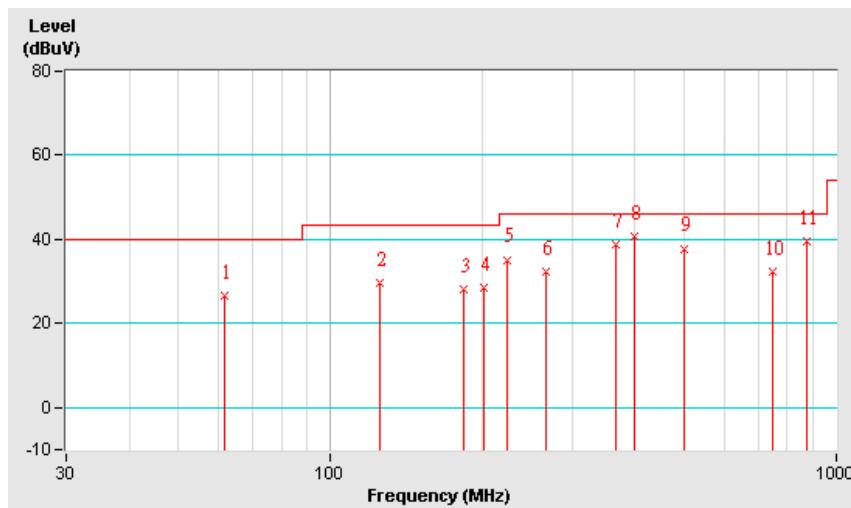
## 4.2.7 TEST RESULTS

<b>EUT</b>	Hardware Secure Module	<b>MODEL</b>	SAFGUARD200
		<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 75 % RH, 1005 hPa	<b>TESTED BY:</b> Nick Chen	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	61.63	26.51 QP	40.00	-13.49	1.51 H	202	19.81	6.70
2	125.38	29.72 QP	43.50	-13.78	1.91 H	351	16.43	13.29
3	182.75	28.15 QP	43.50	-15.35	1.41 H	198	17.41	10.74
4	200.38	28.47 QP	43.50	-15.03	1.00 H	342	17.36	11.11
5	223.75	35.18 QP	46.00	-10.82	1.67 H	341	22.58	12.60
6	265.70	32.36 QP	46.00	-13.64	1.25 H	279	16.81	15.55
7	365.90	38.71 QP	46.00	-7.29	1.44 H	103	20.69	18.02
8	398.15	40.57 QP	46.00	-5.43	1.00 H	91	21.32	19.25
9	501.20	37.82 QP	46.00	-8.18	1.55 H	6	15.79	22.03
10	751.00	32.36 QP	46.00	-13.64	1.83 H	277	7.36	25.00
11	875.05	39.43 QP	46.00	-6.57	1.34 H	222	13.59	25.84

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

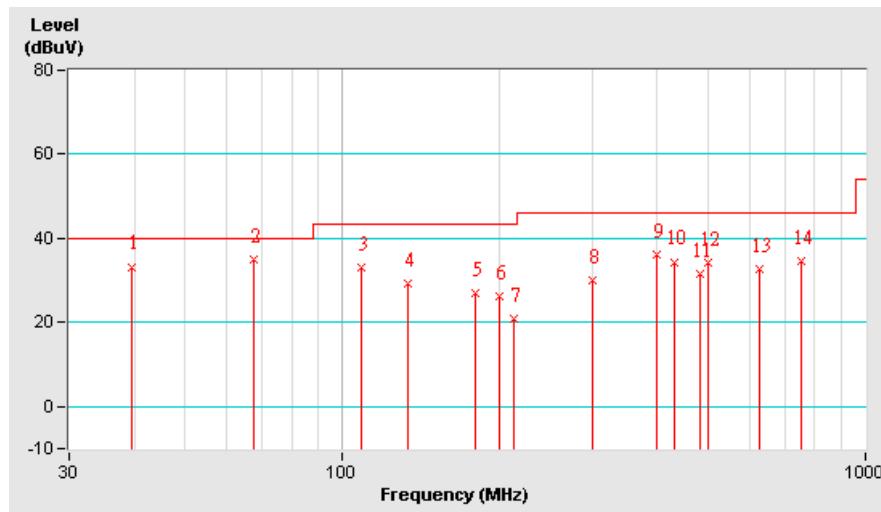


<b>EUT</b>		Hardware Secure Module		<b>MODEL</b>		SAFGUARD200	
<b>INPUT POWER</b>		120Vac, 60 Hz		<b>FREQUENCY RANGE</b>		30-1000 MHz	
<b>ENVIRONMENTAL CONDITIONS</b>		22 deg. C, 75 % RH, 1005 hPa		<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>		Quasi-Peak, 120kHz	
<b>TESTED BY:</b> Nick Chen							

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.62	33.25 QP	40.00	-6.75	1.41 V	145	19.78	13.47
2	<b>67.58</b>	<b>35.00 QP</b>	<b>40.00</b>	<b>-5.00</b>	<b>1.13 V</b>	<b>173</b>	<b>28.32</b>	<b>6.68</b>
3	108.90	33.02 QP	43.50	-10.48	1.42 V	193	20.32	12.70
4	133.00	29.32 QP	43.50	-14.18	1.14 V	347	16.34	12.98
5	179.95	27.13 QP	43.50	-16.37	1.06 V	193	16.44	10.69
6	200.15	26.05 QP	43.50	-17.45	1.41 V	135	14.95	11.10
7	212.60	20.78 QP	43.50	-22.72	1.18 V	102	8.89	11.89
8	299.70	29.86 QP	46.00	-16.14	1.98 V	198	13.49	16.37
9	399.40	35.97 QP	46.00	-10.03	1.61 V	300	16.67	19.30
10	431.32	34.39 QP	46.00	-11.61	1.28 V	16	14.53	19.86
11	481.50	31.71 QP	46.00	-14.29	1.20 V	239	10.38	21.33
12	501.20	34.37 QP	46.00	-11.63	1.08 V	152	12.34	22.03
13	626.50	32.79 QP	46.00	-13.21	1.33 V	20	8.92	23.87
14	751.80	34.70 QP	46.00	-11.30	1.89 V	247	9.70	25.00

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST



## 6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

<b>USA</b>	FCC, NVLAP, UL
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>New Zealand</b>	MoC
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA
<b>R.O.C.</b>	CNLA, BSMI

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC Lab:**  
Tel: 886-2-26052180  
Fax: 886-2-26052943

**Hsin Chu EMC Lab:**  
Tel: 886-35-935343  
Fax: 886-35-935342

**Lin Kou Safety Lab:**  
Tel: 886-2-26093195  
Fax: 886-2-26093184

**Lin Kou RF & Telecom Lab.**  
Tel: 886-3-3270910  
Fax: 886-3-3270892

**Email:** [service@mail.adt.com.tw](mailto:service@mail.adt.com.tw)  
**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.