



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.

This test report consists of 21 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA, NVLAP or any government agencies. The test results in the report only apply to the tested sample. The test results in this report are traceable to the national or international standards.



0528
ILAC MRA



Lab Code: 200102-0



Table of Contents

1	CERTIFICATION.....	3
2	SUMMARY OF TEST RESULTS	4
3	GENERAL INFORMATION	5
3.1	GENERAL DESCRIPTION OF EUT	5
3.2	DESCRIPTION OF SUPPORT UNITS	6
4	EMISSION TEST	7
4.1	CONDUCTED EMISSION MEASUREMENT.....	7
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	7
4.1.2	TEST INSTRUMENTS.....	8
4.1.3	TEST PROCEDURE.....	9
4.1.4	DEVIATION FROM TEST STANDARD.....	9
4.1.5	TEST SETUP.....	9
4.1.6	EUT OPERATING CONDITIONS	10
4.1.7	TEST RESULTS	11
4.2	RADIATED EMISSION MEASUREMENT.....	13
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	13
4.2.2	TEST INSTRUMENTS.....	14
4.2.3	TEST PROCEDURE.....	15
4.2.4	DEVIATION FROM TEST STANDARD.....	15
4.2.5	TEST SETUP.....	16
4.2.6	EUT OPERATING CONDITIONS	16
4.2.7	TEST RESULTS	17
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	19
6	APPENDIX - INFORMATION ON THE TESTING LABORATORIES	21



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	Conducted Test	PASS	Meets Class B Limit Minimum passing margin is -16.15 dB at 22.159 MHz
CISPR22: 1997, Class B	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is -5.00 dB at 67.58 MHz
ANSI C63.4-1992			

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



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Hardware Secure Module
MODEL NO.	SAFGUARD200
POWER SUPPLY	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.
DATA CABLE	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.

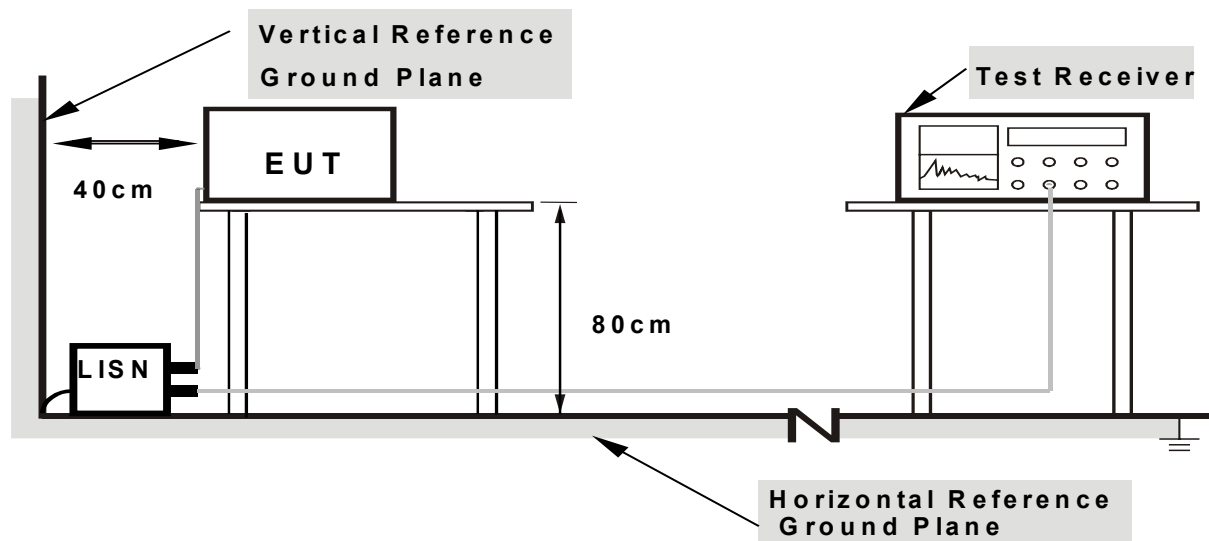
4.1.3 TEST PROCEDURE

- 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

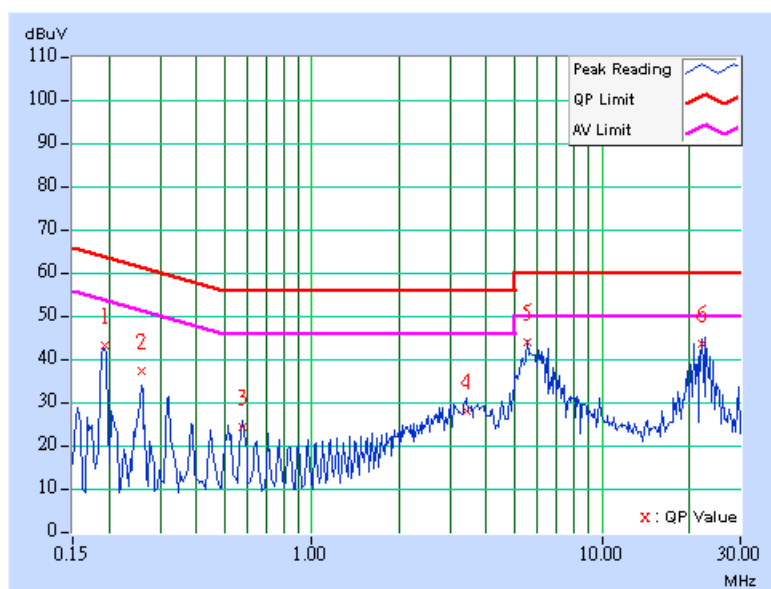
- a. Turn the power of all equipment.
- b. EUT sent/received messages to/from Notebook PC (kept in a remote area) via LAN transmission.

4.1.7 TEST RESULTS

EUT	Hardware Secure Module	MODEL	SAFGUARD200
		6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 80 % RH, 1005 hPa	TESTED BY: 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	-
6	22.159	1.09	42.76	-	43.85	-	60.00	50.00	-16.15	-

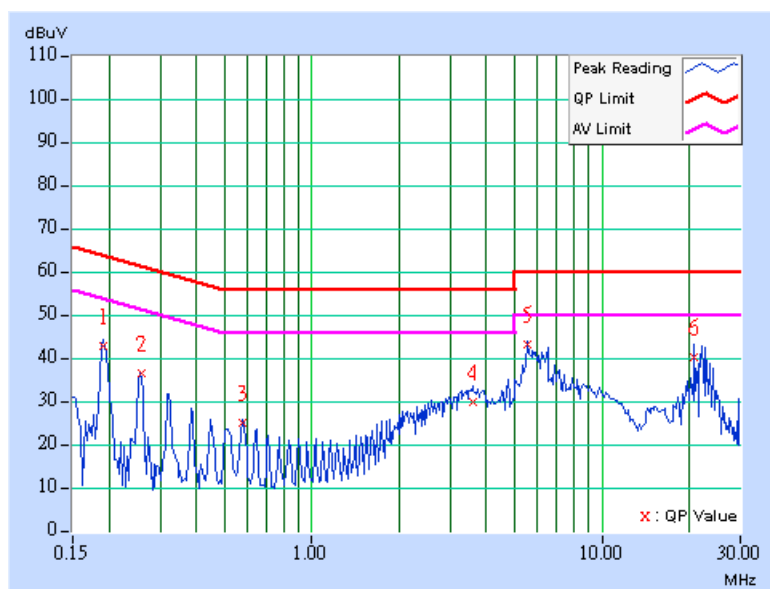
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



EUT	Hardware Secure Module	MODEL	SAFGUARD200
		6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 80 % RH, 1005 hPa	TESTED BY: 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	0.192	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.

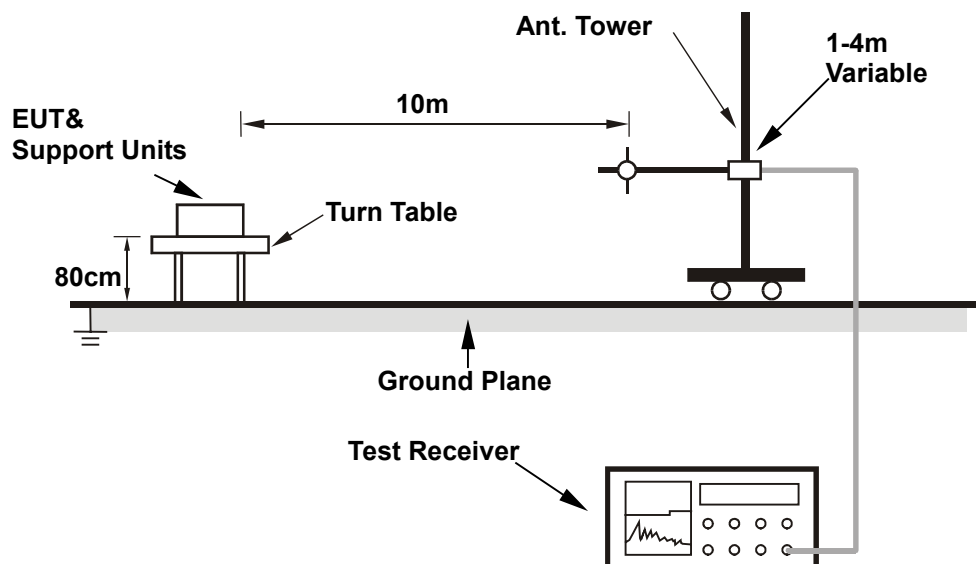
NOTE:

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

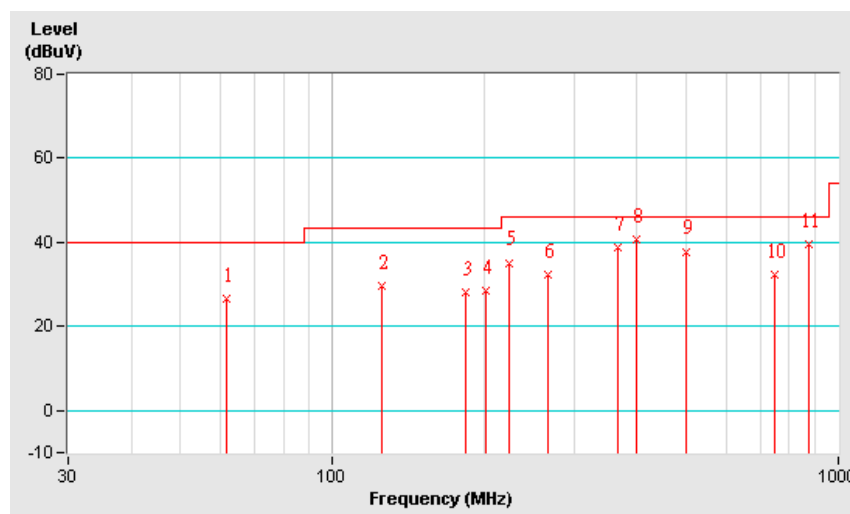
Same as item 4.1.6

4.2.7 TEST RESULTS

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

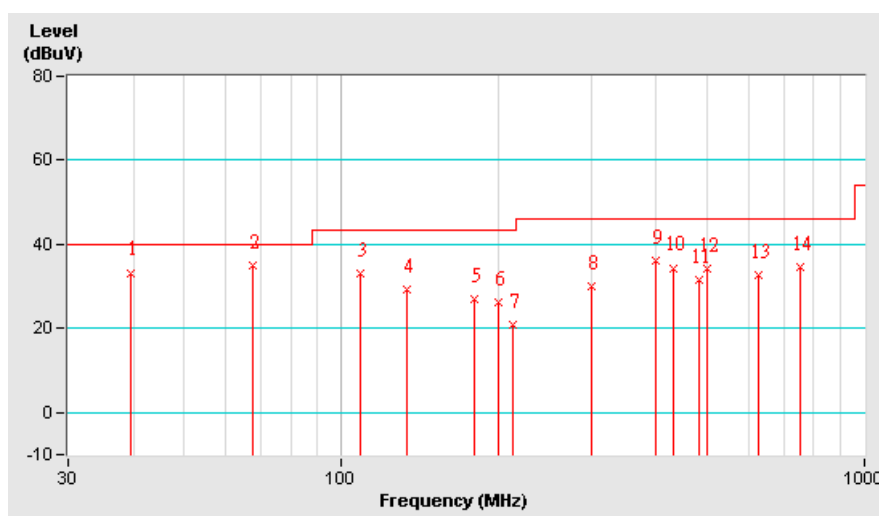
- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Hardware Secure Module	MODEL	SAFGUARD200
		FREQUENCY RANGE	30-1000 MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 75 % RH, 1005 hPa	TESTED BY: 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	67.58	35.00 QP	40.00	-5.00	1.13 V	173	28.32	6.68
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:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
Canada	INDUSTRY CANADA
R.O.C.	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. 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

Web Site: www.adt.com.tw

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