

FCC TEST REPORT

REPORT NO.: FC961220A25

MODEL NO.: HiPKI SafGuard 1000

RECEIVED: Dec. 21, 2007

TESTED: May 16, 2008

ISSUED: May 30, 2008

APPLICANT: Chunghwa Telecom Research Institute

ADDRESS: 12, Lane 551, Min-Tsu Road Sec. 5Yang-Mei,
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ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou
Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

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1 CERTIFICATION

PRODUCT: Hardware Secure Module
BRAND NAME: Chunghwa Telecom
MODEL NO: HiPKI SafGuard 1000
TEST ITEM: ENGINEERING SAMPLE
APPLICANT: Chunghwa Telecom Research Institute
TESTED: May 16, 2008
STANDARDS: FCC Part 15: 2007, Subpart B, Class B
CISPR 22: 1997, Class B
ICES-003: 2004, Class B
ANSI C63.4-2003

The above equipment have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Celia Chen, **DATE:** May 30, 2008
(Celia Chen / Specialist)

TECHNICAL
ACCEPTANCE : Arthur Lin, **DATE:** May 30, 2008
Responsible for EMI (Arthur Lin / Senior Engineer)

APPROVED BY : Kenny Meng, **DATE:** May 30, 2008
(Kenny Meng / Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
FCC Part 15: 2007 Subpart B, Class B	Conducted Test	PASS	Meets Class B Limit Minimum passing margin is -16.34 dB at 0.192 MHz
CISPR 22: 1997, Class B	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is -2.66 dB at 300.01 MHz
ICES-003: 2004, Class B			

Note: The limit for radiated test was performed according to CISPR 22: 1997, which was specified in FCC PART 15 Subpart B 15.109(g). Also the limits of ICES-003: 2004 and CISPR 22: 1997 are same.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz ~ 30MHz	2.46 dB
Radiated emissions	30MHz ~ 1GHz	3.63 dB
	1GHz ~ 40GHz	2.89 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Hardware Secure Module
MODEL NO.	HiPKI SafGuard 1000
FCC ID	RPX712S1000
POWER SUPPLY	Switching power adapter Brand Name: ADAPTER TECH. Model No.: STD-05025U AC I/P: 100-240V, 47-63Hz, 0.48A MAX DC O/P: 5V, 2.5A, 12.5W MAX Power cord, AC 2-pin Non-shielded DC (1.8m)
DATA CABLE SUPPLIED	Shielded USB cable (1.8m)

NOTE:

1. The EUT is a Hardware Secure Module with USB interface.
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF SUPPORT UNITS

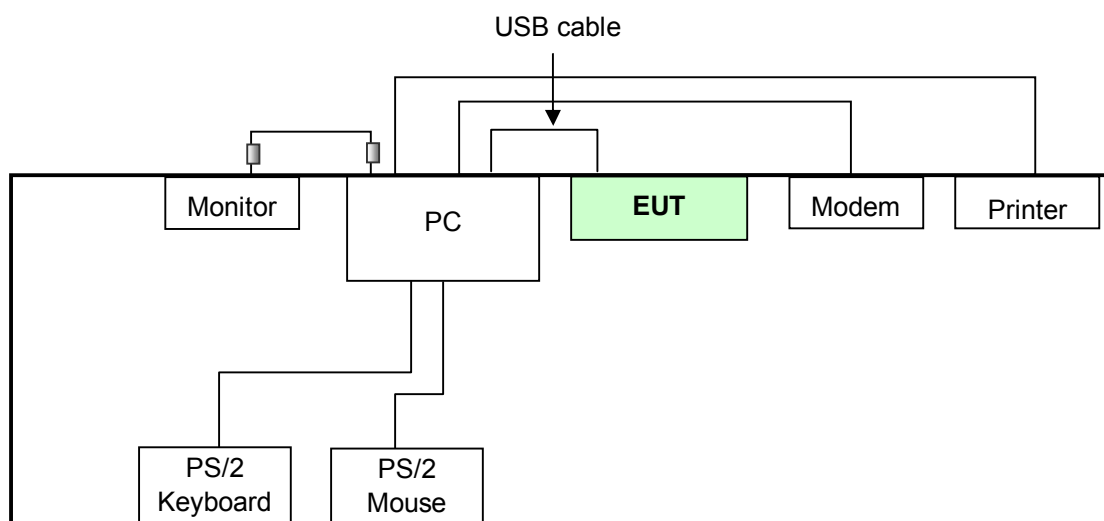
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PERSONAL COMPUTER	LEO	Persica 8620G	K13111398	FCC DoC Approved
2	MONITOR	ADI	CM100	240058T00100082	FCC DoC Approved
3	PRINTER	EPSON	LQ-300+	DCGY017081	FCC DoC Approved
4	MODEM	ACEEX	1414	980020538	IFAXDM1414
5	PS/2 KEYBOARD	HP	KB-0316	BC3520BGAUJ0US	FCC DoC Approved
6	PS/2 MOUSE	BTC	M851	N/A	E5XMSM860

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, with two cores
3	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.8 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
6	1.5 m Non shielded wire, terminated with PS/2 connector via drain wire, w/o core.

NOTE: All power cords of the above support units are non-shielded (1.8m).

Test Configuration



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD:

FCC Part 15: 2007, Subpart B (Section: 15.107)

CISPR 22: 1997 (section 5)

ICES-003: 2004 (Class A: section 5.2)

(Class B: section 5.3)

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	ESCS30	847793/022	Mar. 24, 2009
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	828075/003	Jun. 20, 2008
LISN With Adapter (for EUT)	AD10	C05Ada-001	Jun. 20, 2008
ROHDE & SCHWARZ 200-A Four-line V-Network	ENV4200	830326/018	Sep. 10, 2008
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 18, 2008
Software	ADT_Cond_V7.3.5	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	Feb. 13, 2009
LYNICS Terminator (For R & S LISN)	0900510	E1-01-305	Feb. 13, 2009

- 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. The test was performed in ADT Shielded Room No. 5.
 3. The VCCI Site Registration No. C-1093.
 4. The Industry Canada Reference No. IC 3789-5.

4.1.3 TEST PROCEDURE

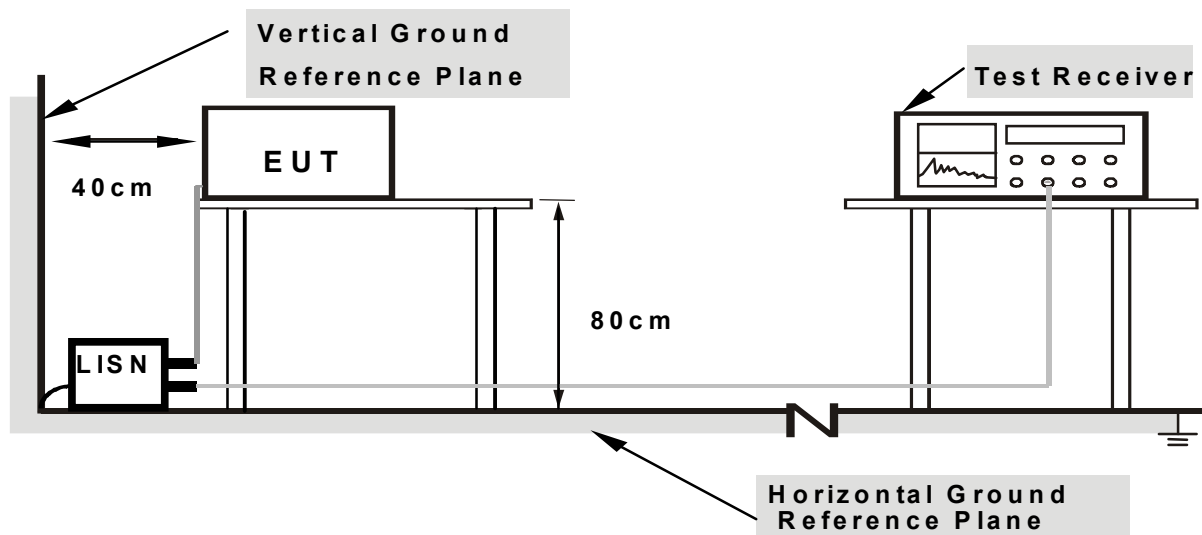
The basic test procedure was in accordance with ANSI C63.4-2003 (section 7), CISPR 22 (section 9) and ICES-003: 2004 (section 4).

- 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) were not recorded.

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

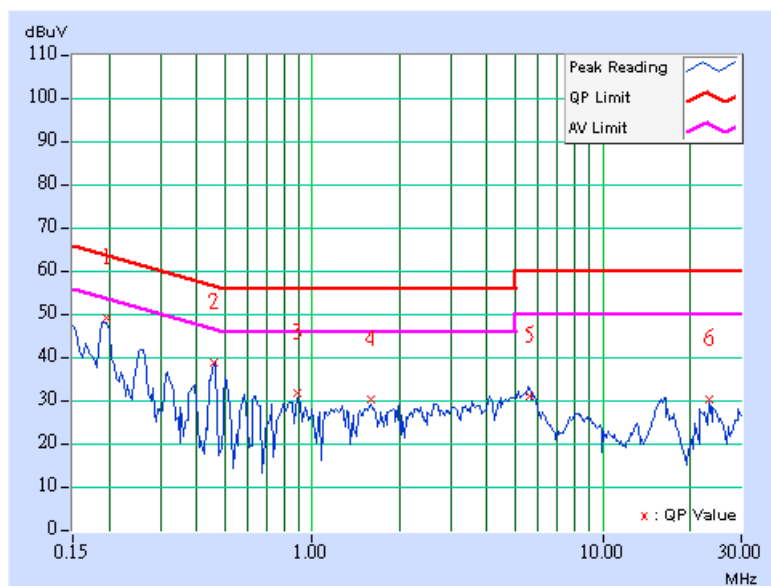
- a. Turned on the power of all equipment.
- b. PC ran a test program (provided by client) to enable all functions.
- c. PC read and wrote messages from HDD and EUT.
- d. PC sent "H" messages to monitor and monitor displayed "H" patterns on screen.
- e. PC sent messages to printer and printed them out.
- f. PC sent messages to modem.
- g. Repeated steps c-g.

4.1.7 TEST RESULTS

TEST MODE	R/W data	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	27 deg. C, 56% RH, 999hPa	TESTED BY: John Liao	

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	0.197	0.30	46.77	-	47.07	-	63.74	53.74	-16.67	-
2	0.458	0.32	36.38	-	36.70	-	56.73	46.73	-20.03	-
3	0.884	0.46	29.31	-	29.77	-	56.00	46.00	-26.23	-
4	1.592	0.50	28.05	-	28.55	-	56.00	46.00	-27.45	-
5	5.573	0.68	28.49	-	29.17	-	60.00	50.00	-30.83	-
6	23.129	2.44	28.00	-	30.44	-	60.00	50.00	-29.56	-

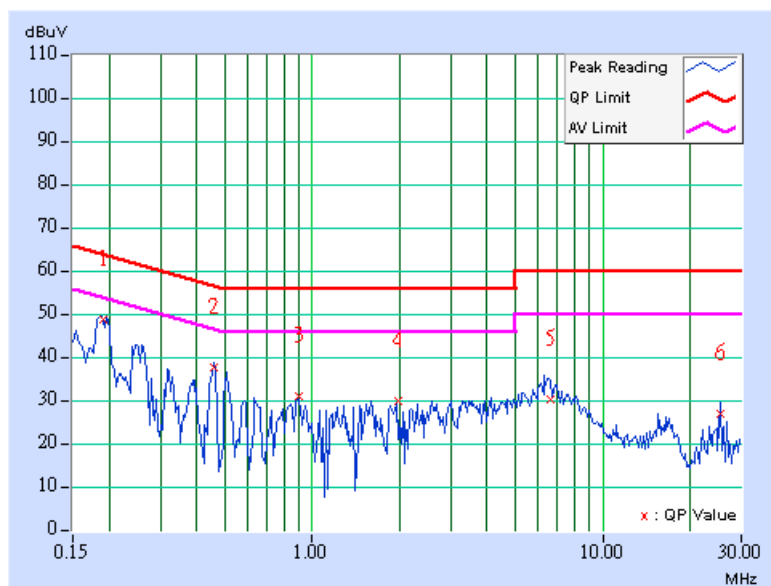
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



TEST MODE	R/W data	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	27 deg. C, 56% RH, 999hPa	TESTED BY: John Liao	

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.192	0.40	47.23	-	47.63	-	63.97	53.97	-16.34	-
2	0.460	0.41	36.12	-	36.53	-	56.69	46.69	-20.16	-
3	0.896	0.48	29.30	-	29.78	-	56.00	46.00	-26.22	-
4	1.979	0.50	28.10	-	28.60	-	56.00	46.00	-27.40	-
5	6.604	0.73	28.45	-	29.18	-	60.00	50.00	-30.82	-
6	25.386	1.82	25.16	-	26.98	-	60.00	50.00	-33.02	-

- 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

TEST STANDARD:

FCC Part 15: 2007, Subpart B (Section: 15.109)

CISPR 22: 1997 (section 6)

ICES-003: 2004 (Class A: Section 5.4)

(Class B: Section 5.5)

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

Note: The limit for radiated test was performed according to CISPR 22: 1997, which was specified in FCC PART 15B 15.109(g). Also the limits of ICES-003: 2004 and CISPR 22: 1997 are same.

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.

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

4.2.2 TEST INSTRUMENTS

<Frequency Range 30MHz-1GHz>

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
R&S Receiver	ESCS 30	100290	Nov. 14, 2008
CHASE BILOG Antenna	CBL6112B	2640	Apr. 24, 2009
ADT Turn Table	TT100	0204	NA
ADT Tower	AT100	0204	NA
Software	ADT_Radiated_V 7.6.15	NA	NA
ADT RF Switches BOX	EM-H-01-1	1005	Jul. 09, 2008
WOKEN RF cable	8D	CABLE-ST1-01	Jul. 09, 2008

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. The test was performed in ADT Open Site No. 1.
 3. The VCCI Site Registration No. R-236.

<Frequency Range 1GHz-40GHz>

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Agilent Spectrum	8564EC	4208A00659	Jun. 04, 2008
Agilent Preamplifier	8449B	3008A01201	Oct. 01, 2008
Agilent Preamplifier	8449B	3008A01292	Aug. 05, 2008
MITEQ Preamplifier	AMF-6F-260400- 33-8P	892164	May 14, 2009
Schwarzbeck Horn Antenna	BBHA-9170	BBHA9170190	May 14, 2009
Schwarzbeck Horn Antenna	BBHA-9120	D130	May 22, 2009
ADT Turn Table	TT100	0204	NA
ADT Tower	AT100	0204	NA
Software	ADT_Radiated_V 7.6.15	NA	NA
SUHNER RF cable	SF106-18	PHACAB-1G-40 GHz	Dec. 11, 2008

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. The test was performed in ADT Open Site No. 1.
 3. The VCCI Site Registration No. R-236.

4.2.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4-2003 (section 8), CISPR 22 (section 10) and ICES-003: 2004 (section 4).

- 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.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

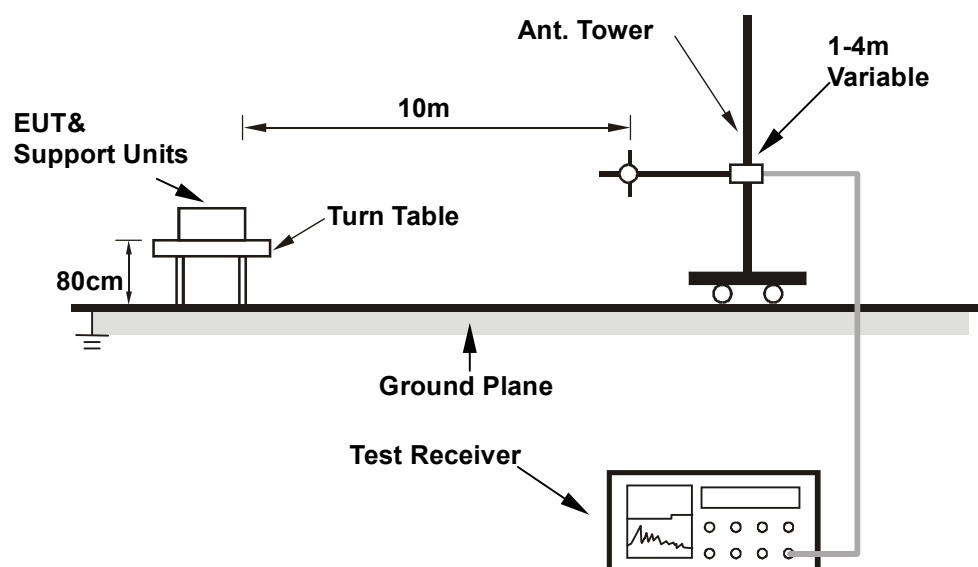
NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the interference-receiving antenna.

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

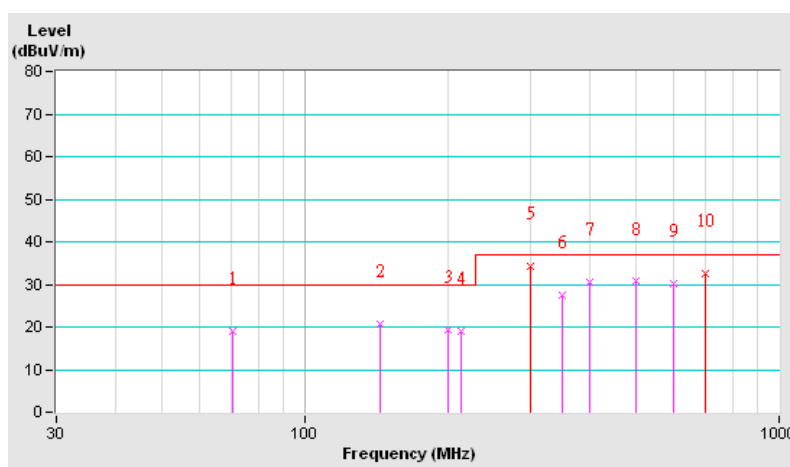
4.2.7 TEST RESULTS

TEST MODE	R/W data	FREQUENCY RANGE	30-1000 MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	26 deg. C, 73% RH, 999 hPa	TESTED BY: Fox Chang	

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	70.81	19.12 QP	30.00	-10.88	4.00 H	243	11.22	7.90
2	143.93	20.68 QP	30.00	-9.32	4.00 H	327	7.99	12.69
3	200.03	19.42 QP	30.00	-10.58	4.00 H	115	7.54	11.88
4	213.60	18.99 QP	30.00	-11.01	4.00 H	82	6.20	12.79
5	300.01	34.34 QP	37.00	-2.66	2.63 H	42	18.30	16.04
6	350.01	27.46 QP	37.00	-9.54	2.51 H	78	9.48	17.98
7	400.03	30.64 QP	37.00	-6.36	1.71 H	131	10.76	19.88
8	500.01	30.73 QP	37.00	-6.27	2.10 H	191	8.70	22.03
9	599.98	30.12 QP	37.00	-6.88	3.10 H	162	6.56	23.56
10	700.04	32.58 QP	37.00	-4.42	1.34 H	239	8.16	24.42

- 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.

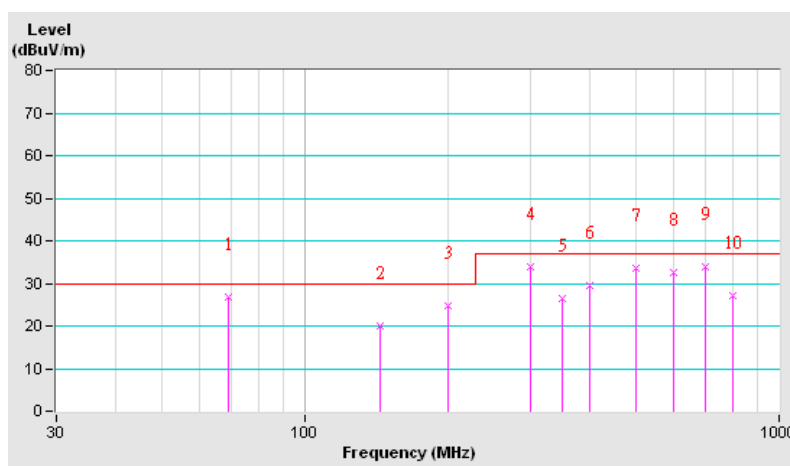


TEST MODE	R/W data	FREQUENCY RANGE	30-1000 MHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	26 deg. C, 73% RH, 999 hPa	TESTED BY: Fox Chang	

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	69.28	26.75 QP	30.00	-3.25	1.96 V	327	18.98	7.77
2	144.04	20.02 QP	30.00	-9.98	1.00 V	237	7.34	12.68
3	200.02	24.69 QP	30.00	-5.31	1.00 V	234	12.81	11.88
4	300.00	33.89 QP	37.00	-3.11	1.26 V	344	17.85	16.04
5	349.95	26.46 QP	37.00	-10.54	2.25 V	255	8.49	17.97
6	400.16	29.43 QP	37.00	-7.57	1.06 V	345	9.55	19.88
7	500.04	33.62 QP	37.00	-3.38	3.42 V	115	11.59	22.03
8	600.02	32.58 QP	37.00	-4.42	2.58 V	149	9.02	23.56
9	700.01	33.94 QP	37.00	-3.06	3.16 V	269	9.52	24.42
10	800.09	27.22 QP	37.00	-9.78	1.94 V	39	1.34	25.88

- 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

Please refer to the attached file (Test Setup Photo).

6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

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

USA	FCC, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA, CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	GOST-ASIA (MOU)
Russia	CERTIS (MOU)

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:

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Hsin Chu EMC/RF Lab:

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Hwa Ya EMC/RF/Safety/Telecom Lab:

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Email: service@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.

7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.