

FCC TEST REPORT

REPORT NO.: RF930922L02

MODEL NO.: ALT102

SERIES MODEL NO.: (Refer to note 2 on page 5)

RECEIVED: Sep. 22, 2004

TESTED: Oct. 05 ~ Nov. 25, 2004

ISSED: Nov. 25, 2004

APPLICANT: Asis Technologies Pte Ltd,

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Singapore, 408571

ISSUED BY: Advance Data Technology Corporation

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TEST LOCATION: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei

Shan Hsiang, Taoyuan Hsien 333, Taiwan,

R.O.C.

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NO. 2177-01

0528 ILAC MRA



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1 CERTIFICATION

PRODUCT NAME: Smart Card Terminal

BRAND NAME: ASIS

MODEL NO.: ALT102

SEREIS MODEL NO.: (Refer to note 2 on page 5)

APPLICANT: Asis Technologies Pte Ltd,

TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Oct. 05 ~ Nov. 25, 2004

STANDARDS: FCC Part 15, Subpart C(15.209)

ANSI C63.4-2003

The above equipment (Model: ALT102) has 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: Nov. 25, 2004

(Windy Chou)

TECHNICAL

ACCEPTANCE: , DATE: Nov. 25, 2004
Responsible for RF (Gary Chang)

APPROVED BY : ______, DATE: Nov. 25, 2004 (Cody Chang / Deputy Manager)

FCC ID: SPH-ALT102



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C					
STANDARD PARAGRAPH TEST TYPE RESULT REMARK					
15.207	Conducted Emission Test		Minimum passing margin is –11.36dB at 13.559MHz		
15.209	Radiated Emission Test	PASS	Minimum passing margin is –3.37dB at 68.88MHz		

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:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.65 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smart Card Terminal
MODEL NO.	ALT102
POWER SUPPLY	12.0Vdc from Adapter
MODULATION TYPE	ASK
CARRIER FREQUENCY OF EACH CHANNEL	13.56MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Loop antenna
DATA CABLE	RS485
I/O PORTS	NA
ASSOCIATED DDVCES	NA

NOTE:

1. The EUT was powered by the following adapter:

BRAND:	ILAN ELEC. LTD.		
MODEL:	F1560(N)		
INPUT:	100-240Vac, I.0A, 50-60Hz		
OUTPUT:	12Vdc, 2.83A, 34W MAX		

2. The following series models are provided to this EUT and identical to each other except for their model name due to marketing requirement. Please refer to the following table for the details.

Model	Remark			
	Same PCBA and casing, Application Firmware is different			
AMR255	1. Read Card ID			
	2. Access Control			
	Same PCBA and casing, Application Firmware is different			
AMR253	1. Read Card ID			
	2. Access Control no keypad scanning no LCD			
	Same PCBA and casing, Application Firmware is different			
ACU101	1. Read Card ID, Write antipass back, black list			
	2. Access Control no keypad scanning no LCD			
	Same PCBA and casing, Application Firmware is different			
ACU102	Read Card ID, Write antipass back, black list			
	2. Access Control			
	Same PCBA and casing, Application Firmware is different			
AXR251	1.Read and write of loyalty points			
AARZOT	2. Add and debit of loyalty points			
	3. Third party access protocol			



AKM102	Same PCBA and casing, Application Firmware is different 1.Read and write of access key 2. program Asis key to smart card
AMT350M	Same PCBA and casing, Application Firmware is different 1.Read and write of e-purse 2. Add and debit of e-purse
AMT350S	Same PCBA and casing, Application Firmware is different 1.Read of e-purse 2.balnce checking of e-purse
AXR102	Same PCBA and casing, Application Firmware is different 1.Read and write of loyalty points 2. Add and debit of loyalty points 3. Third party access protocol
AXR255	Same PCBA and casing, Application Firmware is different 1.Read and write of loyalty points 2. Add and debit of loyalty points 3. Third party access protocol
AKR102	Same PCBA and casing, Application Firmware is different 1.Read and write of access key 2. program Asis key to smart card
PT100	Same PCBA and casing, Application Firmware is different 1.Read and write of e-purse 2. Add and debit of e-purse
PT102	Same PCBA and casing, Application Firmware is different 1.Read and write of e-purse 2. Add and debit of e-purse

3. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

One channel was provided in this EUT.

CHANNEL	FREQUENCY
1	13.56 MHz

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the transmitter part of a Smart Card Terminal. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.209)

ANSI C63.4: 2003

All test items have been performed and recorded as per the above standards.



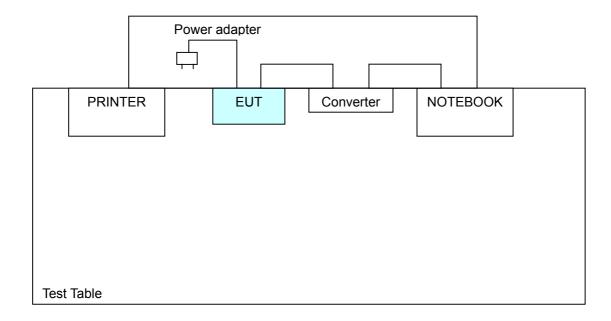
3.4 DESCRIPTION OF SUPPORT UNITS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	Dell	PP01L	TW-09C748- 12800-19O- B220	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
3	Converter				

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS		
1	NA		
2	1.2m Shielded cable without core.		
3	NA		

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST





4 TEST PROCEDURE AND RESULT

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
0.15-0.5	Quasi-peak	Average
0.13-0.3 0.5-5 5-30	66 to 56 56 60	56 to 46 46 50

NOTE:

- 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
Test Receiver	ESCS30	100291	Dec. 12, 2004
ROHDE & SCHWARZ	E3C330	100291	Dec. 12, 2004
RF signal cable	5D-FB	Cable-HYC01-01	Mor 02 2005
Woken	2D-LP	Cable-n (Cul-ul	Mar. 02, 2005
LISN	ESH3-Z5	847265/023	Oct 27 2005
ROHDE & SCHWARZ	ESH3-Z3	04/205/023	Oct. 27, 2005
LISN	E0112 75	100220	Dec 10 2004
ROHDE & SCHWARZ	ESH3-Z5	100220	Dec. 10, 2004
Software	ADT Cond 1/2	NIA	NIA
ADT	ADT_Cond_V3	NA	NA

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 HwaYa Shielded Room 1.
- 3. The VCCI Site Registration No. is C-2040. Hwa Ya Global Certification Office



4.1.3 TEST PROCEDURES

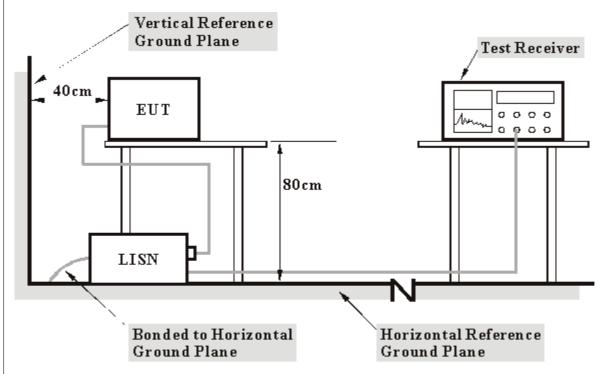
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling 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 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) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Connected the EUT with a notebook system via a converter on the testing table.
- b. Checked if the transmitter part and the receiver part were set at the same channel.
- c. Set the EUT for under transmitting / receiving condition at specific channel.
- d. The notebook system sent "H" messages to printer and the printer prints them on paper.
- e. Repeated d.



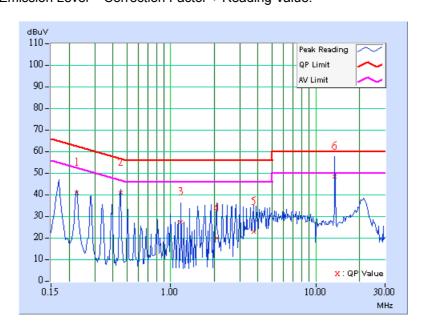
4.1.7 TEST RESULTS

EUT	Smart Card Terminal	MODEL	ALT102
INPUT POWER	120Vac, 60 Hz	6dB BANDWIDTH	9kHz
(SYSTEM)	120 vac, 60 HZ	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Rush Ka	ао

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin		
No		Factor	[dB ([dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.224	0.12	40.47	-	40.59	ı	62.66	52.66	-22.07	-	
2	0.451	0.13	40.63	-	40.76	-	56.86	46.86	-16.10	-	
3	1.180	0.15	26.79	-	26.94	ı	56.00	46.00	-29.06	-	
4	2.081	0.16	19.54	-	19.70	-	56.00	46.00	-36.30	-	
5	3.711	0.20	22.49	-	22.69	-	56.00	46.00	-33.31	-	
6	13.559	0.64	48.00	-	48.64	-	60.00	50.00	-11.36	-	

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.



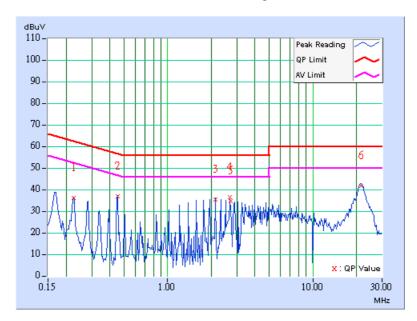


EUT	Smart Card Terminal	MODEL	ALT102	
INPUT POWER	120\/oo_60 Hz	6dB BANDWIDTH	9kHz	
(SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)	
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	TESTED BY: Rush Kao		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB ([dB (uV)] [dB		(uV)]	[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.224	0.11	35.63	ı	35.74	ı	62.66	52.66	-26.92	-
2	0.451	0.12	36.31	ı	36.43	ı	56.86	46.86	-20.43	-
3	2.146	0.16	34.68	-	34.84	-	56.00	46.00	-21.16	-
4	2.699	0.17	36.09	-	36.26	-	56.00	46.00	-19.74	-
5	2.708	0.17	34.21	-	34.38	-	56.00	46.00	-21.62	-
6	21.434	0.70	41.14	-	41.84	-	60.00	50.00	-18.16	-

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

Field strength limits are at the distance of 3 meters, Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any Emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL	
Test Receiver	ESI7	838496/016	Feb. 09, 2005	
ROHDE & SCHWARZ	LSIT	030490/010	1 60. 09, 2003	
Spectrum Analyzer	FSP40	100041	Dec. 15, 2004	
ROHDE & SCHWARZ	10140	100041	BC0. 10, 2004	
BILOG Antenna	VULB9168	9168-155	Feb. 03, 2005	
SCHWARZBECK	VOLDOTOO	3100-100	1 CD. 00, 2000	
HORN Antenna	BBHA 9120D	9120D-404	Feb. 03, 2005	
SCHWARZBECK	DDI IA 9 120D	91200-404	1 60. 03, 2003	
HORN Antenna	BBHA 9170	BBHA 9170242	Feb. 23, 2005	
SCHWARZBECK	DDIIA 9170	DDI IA 9170242	Feb. 23, 2005	
Preamplifier	8447D	2944A10631	Nov. 17, 2005	
Agilent	04470	2944A10031	NOV. 17, 2005	
Preamplifier	8449B	3008A01960	Nov. 14, 2005	
Agilent	04490	3000A01900	1407. 14, 2003	
RF signal cable	SUCOFLEX 104	219272/4	Mar. 04, 2005	
HUBER+SUHNNER	SUCUPLEX 104	219212/4		
RF signal cable	SUCOFLEX 104	219275/4	Mar. 04, 2005	
HUBER+SUHNNER	SUCUPLEX 104	219275/4	Mai. 04, 2005	
Software	ADT Dedicted VE 14	NA	NA	
ADT.	ADT_Radiated_V5.14	INA	INA	
Antenna Tower	MA 4000	040202	NA	
inn-co GmbH	MA 4000	010303	NA	
Antenna Tower Controller	000000	040202	NA	
inn-co GmbH	CO2000	019303	INA	
Turn Table	TT100	TT02024704	NA	
ADT.	TT100.	TT93021704	NA	
Turn Table Controller	00400	CC02024704	NA	
ADT.	SC100.	SC93021704	INA	

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 HwaYa Chamber 3.
- 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 4. The IC Site Registration No. is IC4924-4.



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 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the Emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the Emissions that did not have 10 dB margin would be retested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:

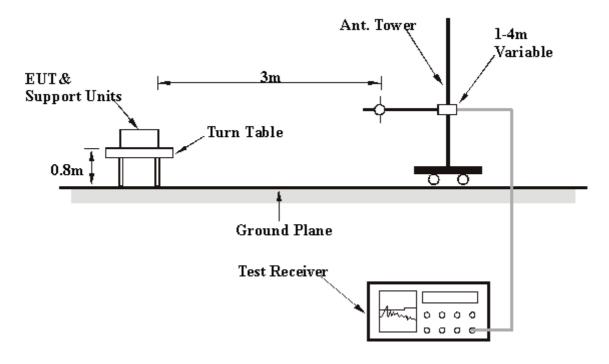
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVATION FROM TEST STANDARD

No deviation



4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITION

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.



4.2.7 TEST RESULTS

EUT	Smart Card Terminal	MODEL	ALT102
INPUT POWER	120Vac, 60Hz	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	DETECTOR FUNCTION	Peak / Quasi-Peak
TESTED BY	Rush Kao		

	ANTENNA POLARITY & TEST DISTANCE: AT 3 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	0.167	43.80 PK	103.15	-59.35	1.00	25.00	42.90	0.90				
2	0.226	41.70 PK	100.52	-58.52	1.00	42.00	40.60	1.10				
3	0.280	39.00 PK	98.66	-59.66	1.00	37.00	37.70	1.30				
4	13.56	46.50 QP	69.54	-23.04	1.00	185.00	44.80	1.70				

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. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance) Example:

13.56MHz = 30uV/m 30m

= 29.54dBuV/m 30m = $29.54+20log(30/3)^2$ 3m

= 69.54dBuV/m



EUT	Smart Card Terminal	MODEL	ALT102
INPUT POWER	120Vac, 60Hz	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa	DETECTOR FUNCTION	Quasi-Peak
TESTED BY	Rush Kao		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M											
	Freq.	Emission	Limit	Margin	Antenna	Table	Raw	Correction				
No.	(MHz)	Level	(dBuV/m)	(dB)	Height	Angle	Value	Factor				
	(IVIF1Z)	(dBuV/m)	(ubuv/iii)	(ub)	(m)	(Degree)	(dBuV)	(dB/m)				
1	53.33	30.68 QP	40.00	-9.32	2.50 H	25	16.41	14.27				
2	203.01	34.52 QP	43.50	-8.98	2.00 H	85	23.18	11.34				
3	216.61	36.75 QP	46.00	-9.25	2.00 H	85	25.11	11.64				
4	230.22	35.36 QP	46.00	-10.64	1.50 H	106	23.00	12.36				
5	243.83	34.25 QP	46.00	-11.75	1.50 H	106	21.23	13.02				
6	257.43	30.85 QP	46.00	-15.15	1.50 H	121	17.63	13.21				
7	284.65	34.24 QP	46.00	-11.76	1.00 H	181	20.07	14.17				
8	733.69	32.44 QP	46.00	-13.56	1.00 H	76	9.61	22.84				
9	758.96	34.53 QP	46.00	-11.47	1.75 H	133	11.26	23.28				
10	786.17	34.78 QP	46.00	-11.22	1.75 H	133	11.38	23.40				

	ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
	Erog	Emission	Limit	Margin	Antenna	Table	Raw	Correction			
No.	Freq. (MHz)	Level	(dBuV/m)	_	Height	Angle	Value	Factor			
	(IVIF1Z)	(dBuV/m)	(ubuv/iii)	(dB)	(m)	(Degree)	(dBuV)	(dB/m)			
1	68.88	36.63 QP	40.00	-3.37	4.00 V	40	24.02	12.61			
2	197.17	35.88 QP	43.50	-7.62	1.75 V	25	24.38	11.50			
3	203.40	25.03 QP	43.50	-18.47	1.00 V	37	13.68	11.35			
4	366.29	34.42 QP	46.00	-11.58	1.50 V	124	18.50	15.91			
5	475.15	39.70 QP	46.00	-6.30	1.00 V	301	21.42	18.29			
6	502.36	38.68 QP	46.00	-7.32	1.00 V	271	20.07	18.61			
7	556.79	36.40 QP	46.00	-9.60	1.00 V	286	16.76	19.65			
8	638.44	35.79 QP	46.00	-10.21	1.00 V	13	14.47	21.32			

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

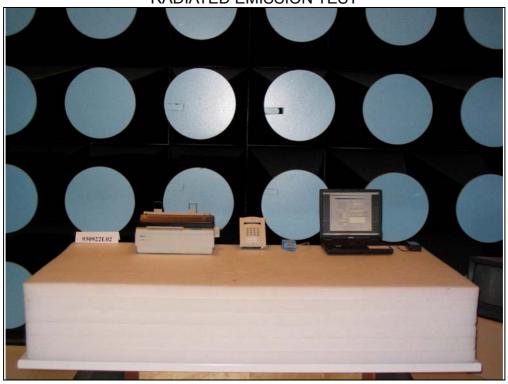


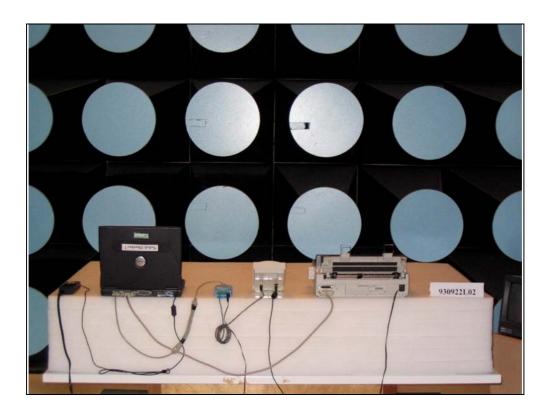














6 INFORMATION ON THE TESTING LABORATORIES

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, Guide 25 or EN 45001:

USA FCC, NVLAP, UL, A2LA

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

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