

FCC TEST REPORT

REPORT NO.: RF950424A04B

MODEL NO.: 9128URF II

RECEIVED: Apr. 24, 2006

TESTED: Apr. 27, 2006

ISSUED: May 3, 2006

APPLICANT: BEHAVIOR TECH COMPUTER CORP.

ADDRESS: 2F, 51, Tung Hsing Rd., Taipei, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

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1 CERTIFICATION

PRODUCT: Wireless Transceiver
BRAND NAME: BTC, EMPREX
MODEL NO: 9128URF II
APPLICANT: BEHAVIOR TECH COMPUTER CORP.
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Apr. 27, 2006
STANDARDS: FCC Part 15, Subpart C (Section 15.227),
ANSI C63.4 -2003

The above equipment 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 : Annie Chang , **DATE:** May 3, 2006
(Annie Chang)

TECHNICAL
ACCEPTANCE : Ken Liu , **DATE:** May 3, 2006
Responsible for RF (Ken Liu)

APPROVED BY : Gary Chang , **DATE:** May 3, 2006
(Gary Chang / Supervisor)

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	PASS	Minimum passing margin is -11.78dB at 0.154MHz
15.227 15.209	Radiated Emission Test	PASS	Minimum passing margin is -7.57dB at 113.59MHz

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:

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

Measurement	Uncertainty
Conducted emissions	2.44 dB
Radiated emissions	3.86 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Transceiver
MODEL NO.	9128URF II
FCC ID	E5XRX9128URF2
POWER SUPPLY	5.0Vdc from host equipment
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	26.995MHz, 27.045MHz, 27.145MHz, 27.195MHz
NUMBER OF CHANNEL	4
ANTENNA TYPE	Loop antenna
DATA CABLE	1.8m Shielded cable
I/O PORTS	USB port
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is a transceiver, which included transmitter part and receiver part.
2. 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.

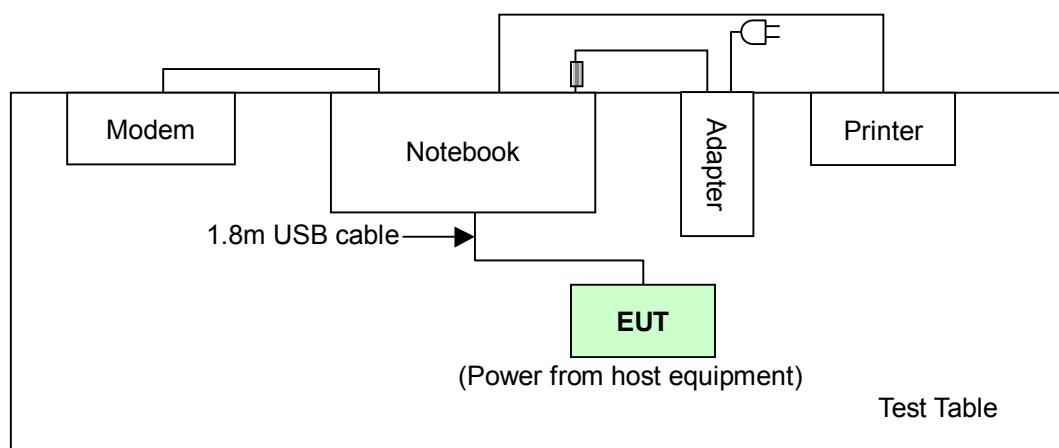
3.1 DESCRIPTION OF TEST MODES

Four channels were provided to this EUT

Channel	Frequency (MHz)
1	26.995MHz
2	27.045MHz
3	27.145MHz
4	27.195MHz

Note: Channel 1 (26.995MHz) was the worst case and chosen for final test.

3.1.1 CONFIGURATION OF SYSTEM UNDER TEST



3.1.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to		Description
	PLC	RE<1G	
-	√	√	NA

Where PLC: Power Line Conducted Emission

RE<1G RE: Radiated Emission below 1GHz

Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1 ~ 4	1	FSK

Radiated Emission Test (Below 1 GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1 ~ 4	1	FSK

3.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.227)
ANSI C63.4 -2003

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

3.3 DESCRIPTION OF SUPPORT UNITS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D600	CN-0G5152-48643-487-0213	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017054	FCC DoC Approved
3	MODEM	ACEEX	1414	980020520	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	1.8m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

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

4 TEST PROCEDURE AND RESULT

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	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
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Nov. 23, 2006
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Nov. 22, 2006
LISN With Adapter (for EUT)	AD10	C10Ada-001	Nov. 22, 2006
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Nov. 22, 2006
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Nov. 22, 2006
Software	ADT_Conc_V7.3.2	NA	NA
Software	ADT_ISN_V7.3.2	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Mar. 30, 2007
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 23, 2007

- 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. 10.
 3. The VCCI Site Registration No. C-1852.

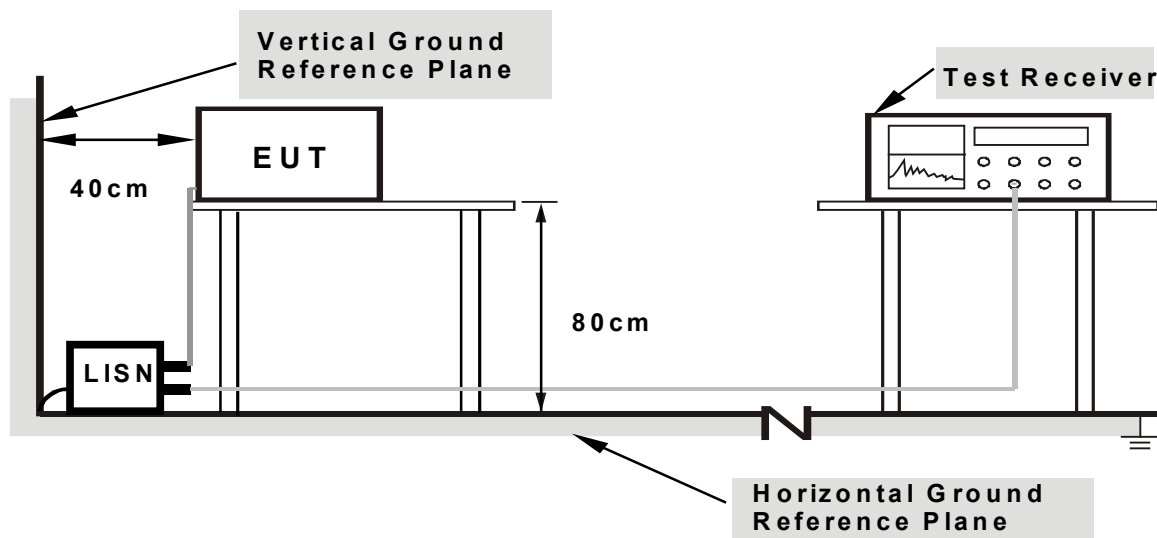
4.1.3 TEST PROCEDURES

- 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 150kHz to 30MHz 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) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

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

4.1.6 EUT OPERATING CONDITIONS

- Connected the EUT with a Notebook on the testing table.
- Set the EUT for under transmitting / receiving condition at specific channel.
- The Notebook sent "H" messages to LCD panel and displayed "H" patterns on its screen.
- The Notebook sent "H" messages to modem.
- The Notebook sent "H" messages to printer and the printer prints them out.
- Repeated d ~ e.

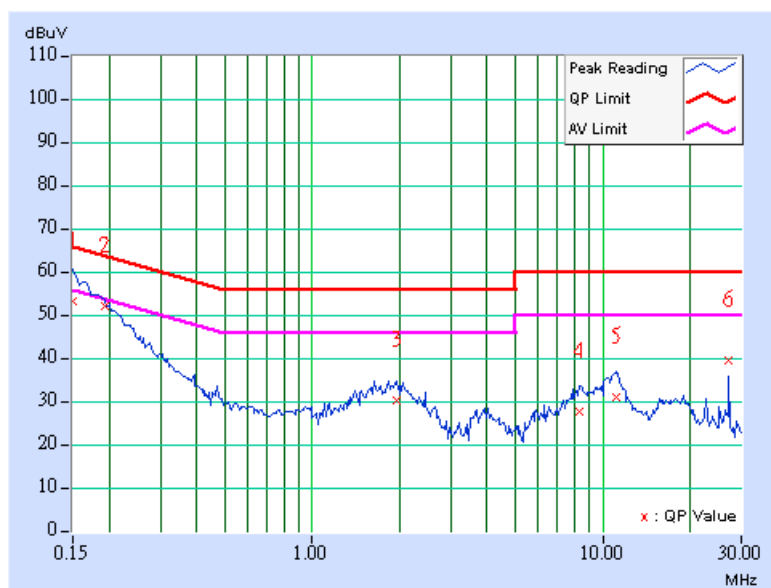
4.1.7 TEST RESULTS

CONDUCTED WORST CASE DATA

MODULATION TYPE	FSK	CHANNEL	1
INPUT POWER (SYSTEM)	120Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 78%RH, 1002hPa	PHASE	Line 1
TESTED BY	Jamison Chan		

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	0.150	0.20	51.95	-	52.15	-	66.00	56.00	-13.85	-
2	0.193	0.20	50.84	-	51.04	-	63.91	53.91	-12.87	-
3	1.953	0.30	28.89	-	29.19	-	56.00	46.00	-26.81	-
4	8.332	0.69	26.48	-	27.17	-	60.00	50.00	-32.83	-
5	11.191	0.82	29.67	-	30.49	-	60.00	50.00	-29.51	-
6	26.992	1.34	38.45	-	39.79	-	60.00	50.00	-20.21	-

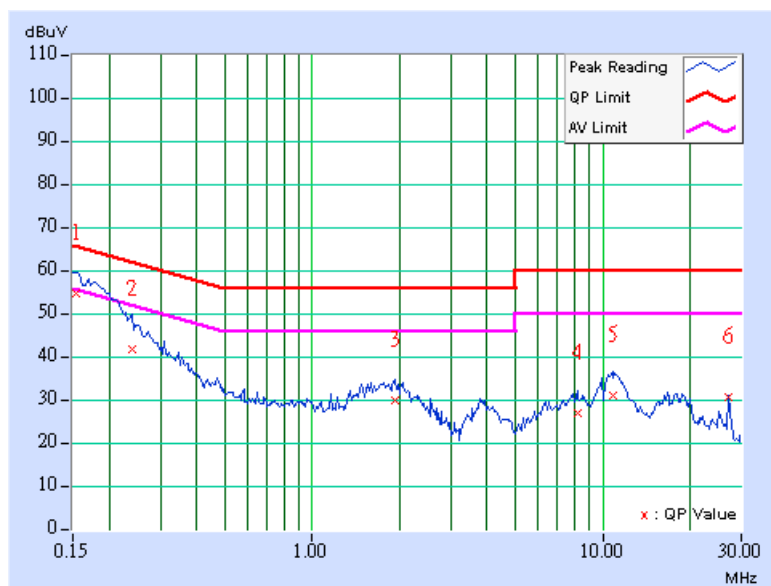
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



MODULATION TYPE	FSK	CHANNEL	1
INPUT POWER (SYSTEM)	120Vac, 60 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	22deg. C, 78%RH, 1002hPa	PHASE	Line 2
TESTED BY	Jamison Chan		

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	0.154	0.20	53.81	-	54.01	-	65.79	55.79	-11.78	-
2	0.240	0.20	40.92	-	41.12	-	62.10	52.10	-20.98	-
3	1.926	0.10	29.02	-	29.12	-	56.00	46.00	-26.88	-
4	8.176	0.41	26.08	-	26.49	-	60.00	50.00	-33.51	-
5	10.805	0.53	29.90	-	30.43	-	60.00	50.00	-29.57	-
6	26.992	1.10	29.65	-	30.75	-	60.00	50.00	-29.25	-

- 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

According to 15.227 the field strength of Emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
26.96-27.28	100	80

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	$2400/F(\text{kHz})$	300
0.490-1.705	$24000/F(\text{kHz})$	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
HP Preamplifier	8447D	2432A03504	May 22, 2006
HP Preamplifier	8449B	3008A01924	Sep. 06, 2006
HP Preamplifier	8449B	3008A01638	Sep. 21, 2006
ROHDE & SCHWARZ TEST RECEIVER	ESI7	836697/012	Nov. 01, 2006
Schwarzbeck Antenna	VULB 9168	137	Feb. 21, 2007
Schwarzbeck Antenna	VHBA 9123	480	Mar. 30, 2007
ADT. Turn Table	TT100	0306	NA
ADT. Tower	AT100	0306	NA
Software	ADT_Radiated_V 7.6.011	NA	NA
TIMES RF cable	LL142	CABLE-CH6-01	Dec. 19, 2006
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Mar. 16, 2007
Loop Antenna R & S	HFHZ-Z2	881058/15	Nov. 14, 2006

- 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 horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in ADT Chamber No. 6.
 4. The Industry Canada Reference No. IC 3789-6.

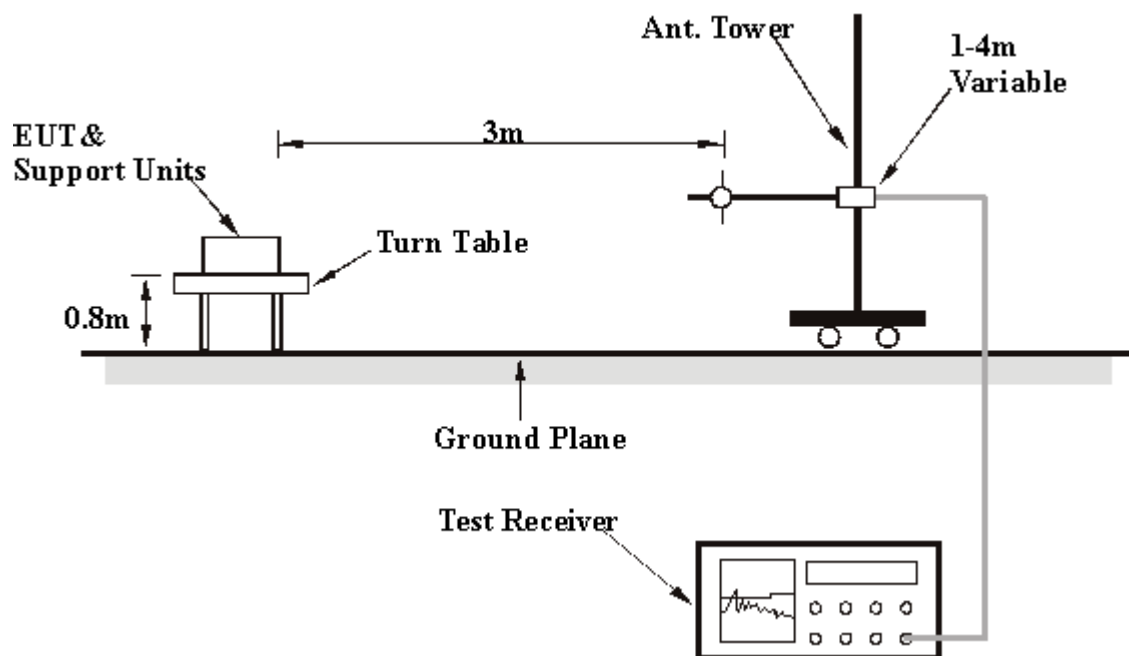
4.2.3 TEST PROCEDURE

- 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak method or average method as specified and then reported in data sheet.

NOTE:

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

4.2.4 TEST SETUP



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

4.2.5 EUT OPERATING CONDITION

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

4.2.6 TEST RESULT

MODULATION TYPE	FSK	CHANNEL	1
INPUT POWER	5.0Vdc	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	22deg. C, 88% RH, 1001hPa	DETECTOR FUNCTION	Peak / Average
OPERATING STATE	Operating	TESTED BY	Jamison Chan

TEST DISTANCE: 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	*26.995	44.05PK	100.00	-55.95	2.60	241	36.65	7.40
2	*26.995	43.45AV	80.00	-36.55	2.60	241	36.05	7.40

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 "*"= Fundamental frequency.
- 6 Loop antenna was used for all radiated emission below 30MHz.

MODULATION TYPE	FSK	CHANNEL	1
INPUT POWER	5.0Vdc	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	22deg. C, 88% RH, 1001hPa	DETECTOR FUNCTION	Quasi-Peak
OPERATING STATE	Operating	TESTED BY	Jamison Chan

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL 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	47.49	29.25 QP	40.00	-10.75	3.00 H	163	14.44	14.82
2	113.59	35.93 QP	43.50	-7.57	3.00 H	235	25.85	10.08
3	348.80	32.74 QP	46.00	-13.26	1.00 H	292	16.70	16.03
4	381.84	29.36 QP	46.00	-16.64	1.00 H	133	12.43	16.93
5	665.65	33.49 QP	46.00	-12.51	1.25 H	91	10.53	22.96
6	799.78	30.34 QP	46.00	-15.66	1.50 H	1	4.71	25.63

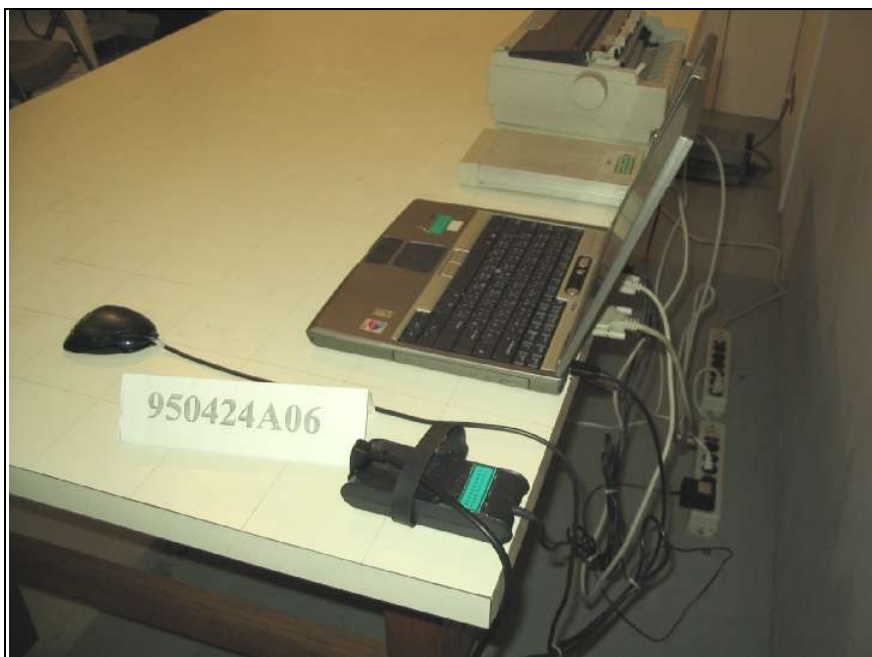
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

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	113.59	31.85 QP	43.50	-11.65	1.25 V	28	21.77	10.08
2	133.03	27.40 QP	43.50	-16.10	1.50 V	304	15.13	12.27
3	249.66	28.18 QP	46.00	-17.82	1.00 V	1	15.91	12.27
4	533.47	29.16 QP	46.00	-16.84	1.00 V	304	8.62	20.54
5	735.63	27.78 QP	46.00	-18.22	1.00 V	154	2.75	25.02
6	797.84	32.29 QP	46.00	-13.71	1.00 V	232	6.67	25.63

- 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 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.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , 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:

Linko EMC/RF Lab:

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Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Linko RF Lab.

Tel: 886-3-3270910

Fax: 886-3-3270892

Web Site: www.adt.com.tw

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

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.