FCC ID: E5XRX5213URF2

FCC TEST REPORT

REPORT NO.: RF940907A01B
MODEL NO.: 5213URF2
RECEIVED: Sep. 7, 2005
TESTED: Sep. 14, 2005
ISSUED: Sep. 21, 2005

APPLICANT: BEHAVIOR TECH COMPUTER CORP.

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

ISSUED BY: Advance Data Technology Corporation

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

ACCREDITED
No. 2177-01

CNLA
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1 CERTIFICATION

PRODUCT:	Wireless Transceiver
BRAND NAME:	BTC
MODEL NO:	5213URF2
APPLICANT:	BEHAVIOR TECH COMPUTER CORP.
TEST SAMPLE:	ENGINEERING SAMPLE
TESTED:	Sep. 14, 2005
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 : Jessica Cheng , **DATE:** Sep. 21, 2005
(Jessica Cheng)

TECHNICAL ACCEPTANCE : Ken Liu , **DATE:** Sep. 21, 2005
Responsible for RF
(Ken Liu)

APPROVED BY : , **DATE:** Sep. 21, 2005
(Cody Chang / Deputy Manager)

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 –13.86dB at 0.173MHz
15.227 15.209	Radiated Emission Test	PASS	Minimum passing margin is –4.11dB at 48.32MHz

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	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz (Horizontal)	3.47 dB
	30MHz ~ 200MHz (Vertical)	3.62 dB
	200MHz ~1000MHz (Horizontal)	3.64 dB
	200MHz ~1000MHz (Vertical)	3.62 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Transceiver
MODEL NO.	5213URF2
POWER SUPPLY	5.0Vdc from host equipment
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	26.995MHz, 27.045MHz, 27.095MHz, 27.145MHz, 27.195MHz.
NUMBER OF CHANNEL	5
ANTENNA TYPE	Loop antenna
DATA CABLE	1.5m USB shielded cable
I/O PORTS	USB
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

Five channels were provided to this EUT

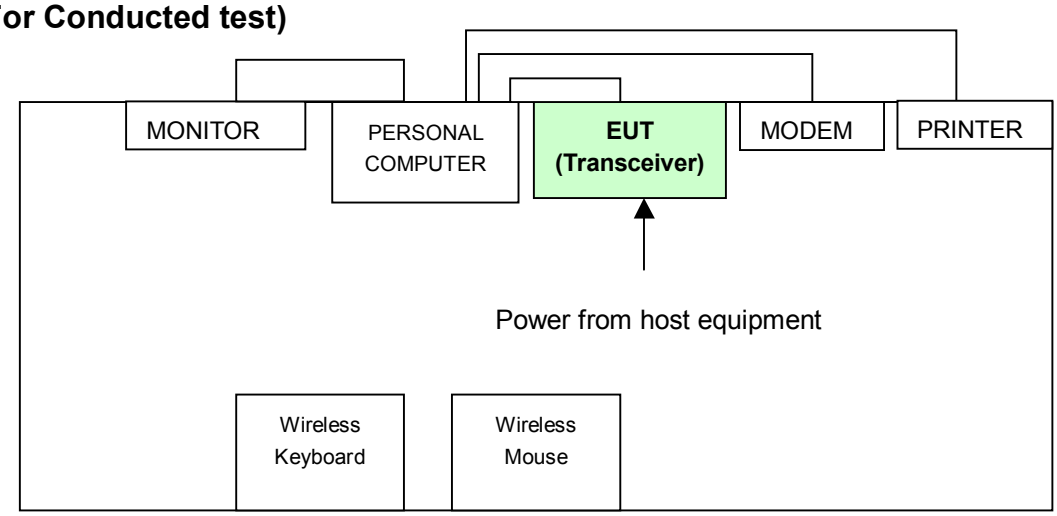
Channel	Frequency (MHz)
1	26.995MHz
2	27.045MHz
3	27.095MHz
4	27.145MHz
5	27.195MHz

Note: Channel 4 (27.145MHz) was the worst case and chosen for final test.

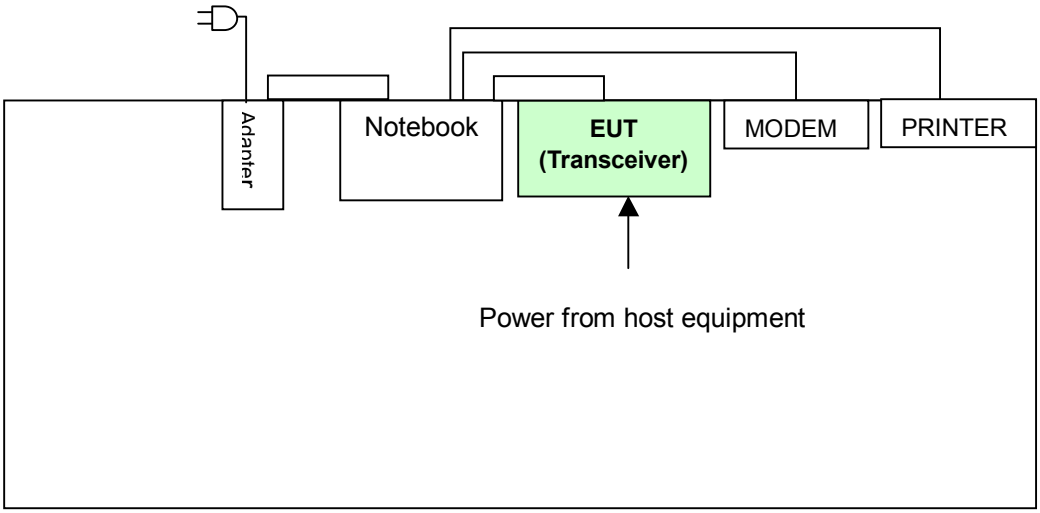
3.1.1 CONFIGURATION OF SYSTEM UNDER TEST

Test Configuration

(For Conducted test)



(For Radiated test)



3.1.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

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

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz

Note: No need to concern of Conducted Emission due to the EUT is powered by battery.

Power Line Conducted Emission Test:

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

EUT	Available Channel	Tested Channel	Modulation Type
Wireless Transceiver	1 ~ 5	4	FSK

Radiated Emission Test (Below 1 GHz):

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

EUT	Available Channel	Tested Channel	Modulation Type
Wireless Transceiver	1 ~ 5	4	FSK

3.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless Transceiver. 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

(For Conducted test)

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PERSONAL COMPUTER	LEO	Persica 8620G	1A36I98A000203	FCC DoC Approved
2	MONITOR	ADI	CM100	020058T10200180	FCC DoC Approved
3	PRINTER	EPSON	LQ-300+	DCGY017064	FCC DoC Approved
4	MODEM	ACEEX	1414	980020512	IFAXDM1414
5	Wireless Mouse	BTC	5213URF2	N/A	E5XMS5213URF2
6	Wireless Keyboard	BTC	5213URF2	N/A	E5XKB5213URF2

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	N/A
6	N/A

NOTE: (1) All power cords of the above support units are non-shielded (1.8m).
(2) Support units 4, 5 were provided by client. (For conducted test).

(For Radiated test)

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PRINTER	EPSON	LQ-300+	DCGY017054	FCC DoC Approved
2	MODEM	ACEEX	1414	980020520	IFAXDM1414
3	DELL Notebook	DELL	D600	CN-0G5152-48643-487-0213	E2K24CLNS

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

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 (dBμV)	
	Quasi-peak	Average
0.15-0.5 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
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Dec. 5, 2005
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 1, 2005
LISN With Adapter (for EUT)	AD10	C10Ada-001	Dec. 1, 2005
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 1, 2005
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 1, 2005
Software	ADT_Cond_V7.3.2	NA	NA
Software	ADT_ISN_V7.3.2	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Apr. 05, 2006
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Mar. 04, 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 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.

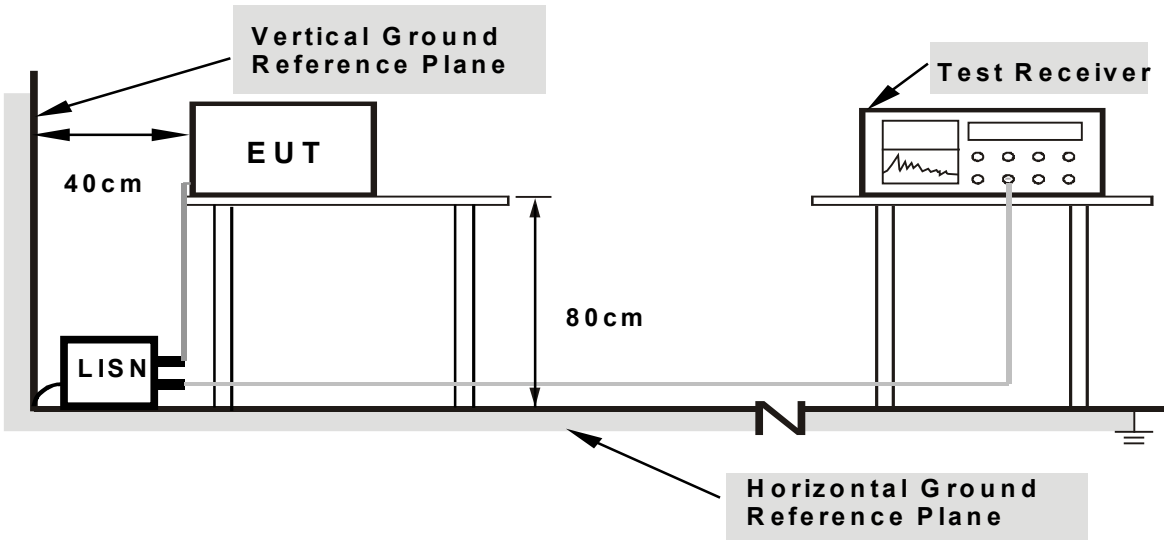
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

a. Connected the EUT with a Notebook / PC on the testing table.
b. Checked if the transceiver part (EUT) and the transmitter part wireless keyboard & wireless mouse were set at the same channel.
c. Set the EUT for under transmitting / receiving condition at specific channel.
d. PC sent “H” messages to Monitor, then Monitor displayed “H” patterns on its screen. (for Conducted test)
e. The Notebook sent "H" messages LCD panel and displayed "H" patterns on its screen. (for Radiated test).
f. The Notebook / PC sent “H” messages to modem.
g. The Notebook / PC sent "H" messages to printer and the printer prints them out.
h. Repeated d ~ h.

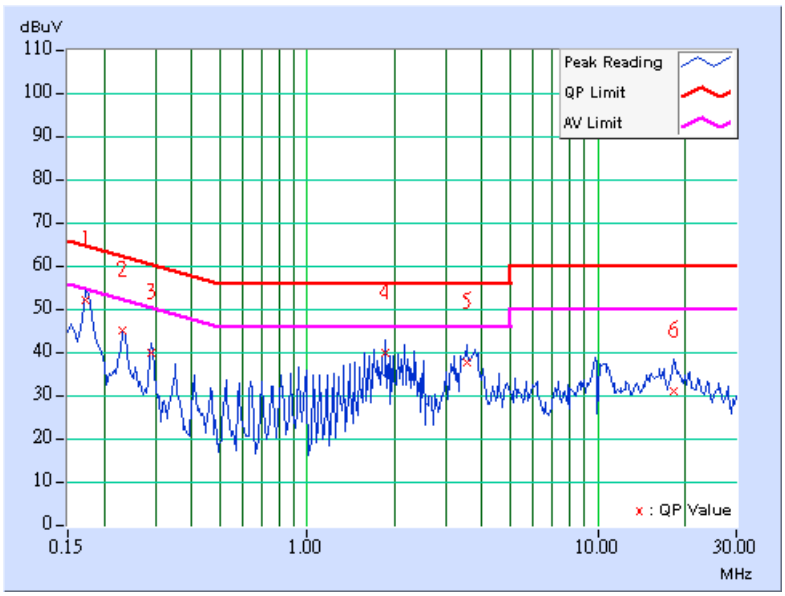
4.1.7 TEST RESULTS

Conducted Worst-Case Data

EUT	Wireless Transceiver	MEASUREMENT DETAIL	
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	MODEL	5213URF2
ENVIRONMENTAL CONDITIONS	28deg. C, 64% RH, 1005hPa	6dB BANDWIDTH	9kHz
TESTED BY	Jamison Chan	PHASE	Line (L)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.173**	**0.20**	**50.73**	**-**	**50.93**	**-**	**64.79**	**54.79**	**-13.86**	**-**
2	0.232	0.20	43.74	-	43.94	-	62.38	52.38	-18.44	-
3	0.291	0.20	38.58	-	38.78	-	60.51	50.51	-21.73	-
4	1.863	0.29	38.69	-	38.98	-	56.00	46.00	-17.02	-
5	3.551	0.38	36.54	-	36.92	-	56.00	46.00	-19.08	-
6	18.367	1.37	29.71	-	31.08	-	60.00	50.00	-28.92	-

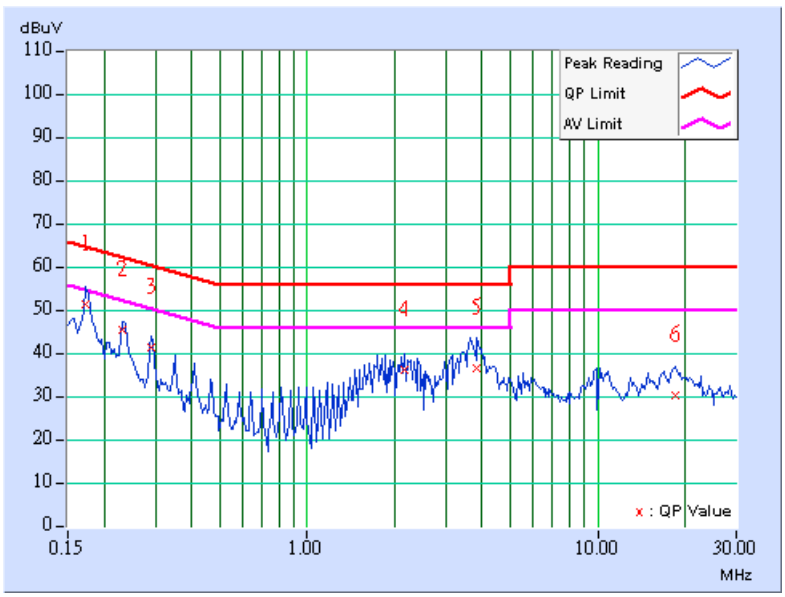
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	Wireless Transceiver	MEASUREMENT DETAIL	
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	MODEL	5213URF2
ENVIRONMENTAL CONDITIONS	28deg. C, 64% RH, 1005hPa	6dB BANDWIDTH	9kHz
TESTED BY	Jamison Chan	PHASE	Neutral (N)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.20	50.59	-	50.79	-	64.79	54.79	-14.00	-
2	0.232	0.20	44.75	-	44.95	-	62.38	52.38	-17.43	-
3	0.291	0.20	40.54	-	40.74	-	60.51	50.51	-19.77	-
4	2.156	0.32	35.43	-	35.75	-	56.00	46.00	-20.25	-
5	3.852	0.49	35.86	-	36.35	-	56.00	46.00	-19.65	-
6	18.477	0.97	29.40	-	30.37	-	60.00	50.00	-29.63	-

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)	
26.96-27.28	Peak	Average
	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(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 ROHDE & SCHWARZ	ESMI	839013/007 839379/002	Feb. 03, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSEK30	100049	Aug. 14, 2006
BILOG Antenna SCHWARZBECK	VULB9163	121	Jun. 01, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-407	Jan. 06, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10638	Dec. 21, 2005
Preamplifier Agilent	8449B	3008A01959	Dec. 21, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218188/218189 /231134	Apr. 19, 2006
RF signal cable Worken	8D-FB	Cable-HYCH5-02	Apr. 21, 2006
Software ADT.	ADT_Radiated_ V7.6.01	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Antenna Tower Controller EMCO	2090	NA	NA
Turn Table EMCO	2087-2.03	NA	NA
Turn Table Controller EMCO	2090	NA	NA
Loop Antenna	HFH2-Z2	100070	Nov. 14, 2005

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 4.
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.

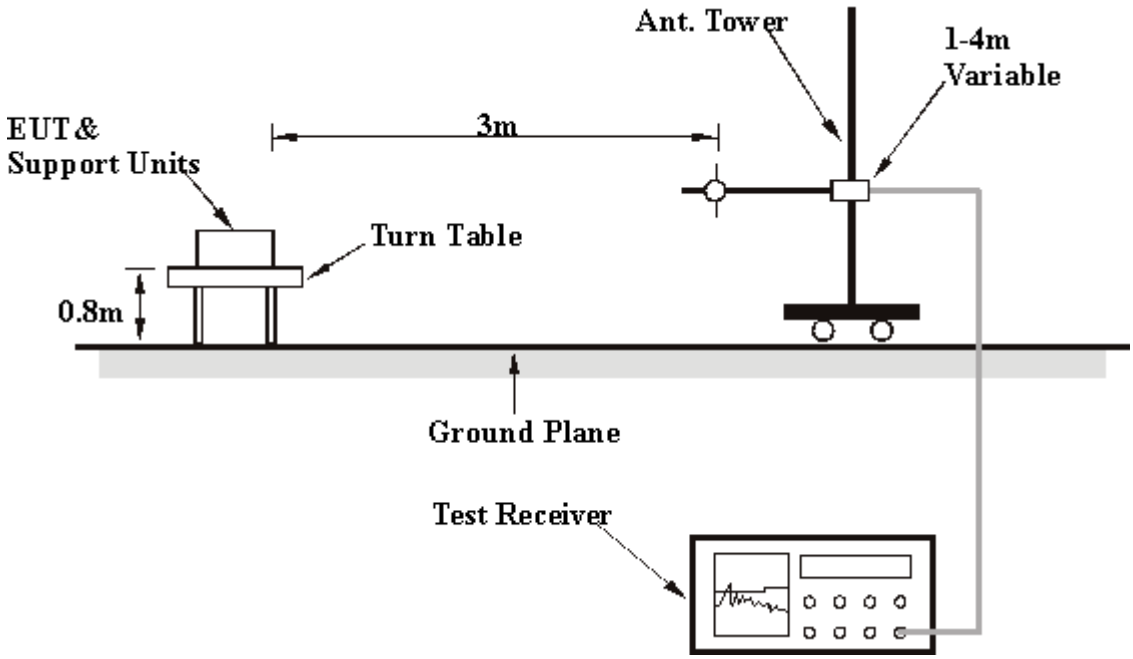
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 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

Same as item 4.1.6.

4.2.6 TEST RESULT

EUT	Wireless Transceiver	MEASUREMENT DETAIL	
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	MODEL	5213URF2
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH, 1005hPa	FREQUENCY RANGE	Below 1000MHz
TESTED BY	Jamison Chan	DETECTOR FUNCTION	Peak / Average

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	*27.145	69.14 PK	100.00	-30.86	3.70	230	58.49	10.65
2	*27.145	49.08 AV	80.00	-30.92	3.70	230	38.43	10.65

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.

EUT	Wireless Transceiver	MEASUREMENT DETAIL	
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	MODEL	5213URF2
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH, 1005hPa	FREQUENCY RANGE	Below 1000MHz
TESTED BY	Jamison Chan	DETECTOR FUNCTION	Quasi-Peak

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	64.49	22.14 QP	40.00	-17.86	2.00 H	10	11.82	10.32
2	191.67	22.17 QP	43.50	-21.33	1.00 H	70	12.06	10.11
3	252.02	28.66 QP	46.00	-17.34	1.00 H	82	16.34	12.32
4	326.39	24.00 QP	46.00	-22.00	1.00 H	10	8.97	15.03
5	428.78	34.96 QP	46.00	-11.04	1.00 H	358	18.06	16.90
6	652.96	24.27 QP	46.00	-21.73	1.50 H	10	2.89	21.37

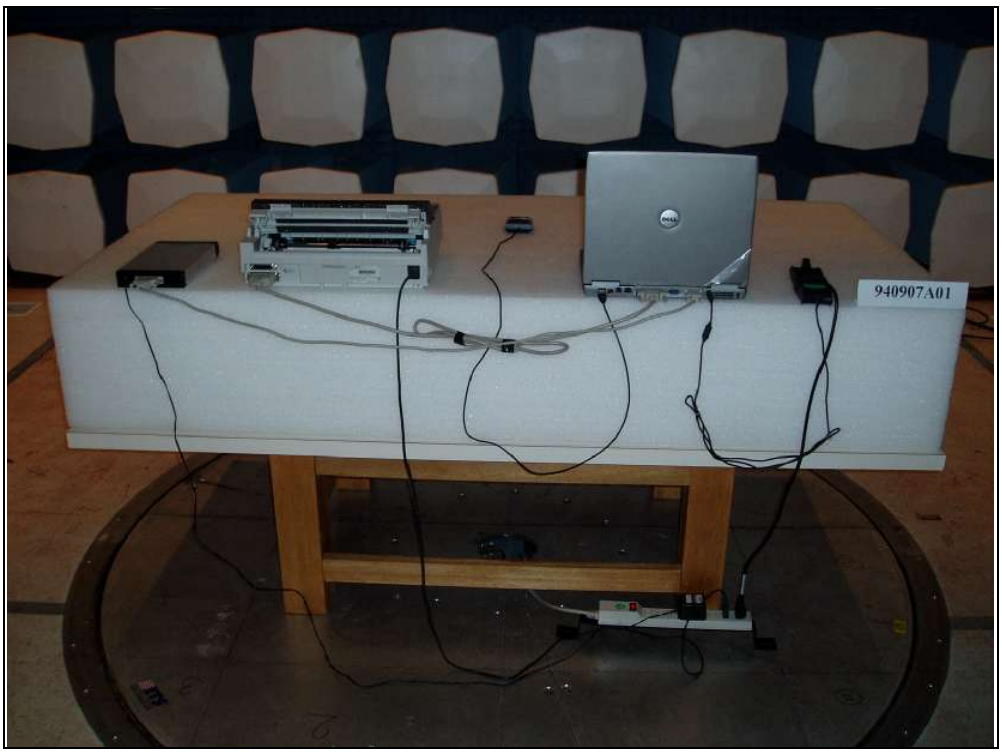
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**48.32**	**35.89 QP**	**40.00**	**-4.11**	**1.00 V**	**358**	**22.49**	**13.40**
2	81.73	24.47 QP	40.00	-15.53	1.00 V	4	15.24	9.24
3	115.14	24.07 QP	43.50	-19.43	1.00 V	118	14.37	9.70
4	252.02	27.47 QP	46.00	-18.53	1.50 V	10	15.15	12.32
5	451.41	31.11 QP	46.00	-14.89	1.00 V	346	14.09	17.02
6	957.97	22.97 QP	46.00	-23.03	1.00 V	328	-2.45	25.41

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, NVLAP, 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:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

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.