

FCC TEST REPORT (PART 15)

REPORT NO.: RF950109L04G

MODEL NO.: HERM100

RECEIVED: Sep. 01, 2006

TESTED: Sep. 02 ~ Sep. 07, 2006

ISSUED: Sep. 07, 2006

APPLICANT: High Tech Computer Corp.

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ISSUED BY: Advance Data Technology Corporation

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1 CERTIFICATION

PRODUCT: Pocket PC Phone

MODEL NO.: HERM100


TEST SAMPLE: ENGINEERING SAMPLE

TESTED: Sep. 02 ~ Sep. 07, 2006

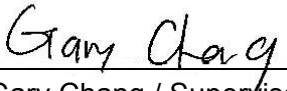
APPLICANT: High Tech Computer Corp.

STANDARDS: FCC Part 15, Subpart C (Section 15.247),
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 :  , **DATE:** Sep. 07, 2006
Stephanie Hung

TECHNICAL ACCEPTANCE :  , **DATE:** Sep. 07, 2006
Responsible for RF Long Chen

APPROVED BY :  , **DATE:** Sep. 07, 2006
Gary Chang / Supervisor

NOTE: This report is issued for the designation of 1. EUT with Video telephone & without CCD;
2. EUT without Video telephone & with CCD.

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

FOR WIRELESS LAN FUNCTION:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -2.99dB at 2390.00MHz.

FOR BLUETOOTH FUNCTION:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.247(d)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -11.58 dB at 45.55MHz.

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	3.73 dB
	200MHz ~ 1000MHz	3.74 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Pocket PC Phone
MODEL NO.	HERM100
FCC ID	NM8HERM100
POWER SUPPLY	3.7Vdc from rechargeable lithium battery 5.0Vdc from power adapter 5.0Vdc from host equipment
MODULATION TYPE	Wireless LAN: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM Bluetooth: GFSK for FHSS
MODULATION TECHNOLOGY	DSSS, OFDM, FHSS
TRANSFER RATE	Wireless LAN: 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps Bluetooth: 723Kbps
FREQUENCY RANGE	Wireless LAN: 2.412 ~ 2.462GHz Bluetooth: 2.402 ~ 2.480GHz
NUMBER OF CHANNEL	Wireless LAN: 11 Bluetooth: 79
OUTPUT POWER	Wireless LAN: 39.902mW for 802.11b 50.466mW for 802.11g Bluetooth: 1.000mW
ANTENNA TYPE	PIFA antenna with -1.0dBi gain
DATA CABLE	1.2m USB shielded cable without core 1.7m non-shielded cable for earphone
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. This report is issued as a supplementary report of RF950109L04. This report shall be combined together with its original report.
2. RF output power is the same as the original test report.

3. This report is prepared for FCC class II permissive change. Difference compared with the original report is listed as below, therefore radiated emission measurements has been re-tested.

ITEM	ORIGINAL DESCRIPTION	ITEM	CLASS II CHANGE DESCRIPTION
1	with Video telephone, with CCD camera	1	with Video telephone, without CCD camera
2	without Video telephone, without CCD camera	2	without Video telephone, with CCD camera

4. The EUT is a GSM850/PCS1900/ WCDMA850/WCDMA1900 Pocket PC Phone with wireless LAN and bluetooth functions. This report is only covered the functions of wireless LAN and bluetooth. The mobile phone function is covered in another two test reports, which standards used are FCC Part 24 and FCC Part 22.

5. The communicated functions of EUT listed as below:

		GSM 850MHz	PCS 1900MHz	WCDMA 850MHz	WCDMA 1900MHz	With 802.11b/g & bluetooth
2G	GPRS	√	√			
	Edge	√	√			
3G	HSDPA			√	√	

6. The EUT was operated with following power adapters:

ADAPTER 1:	
BRAND:	TPT
MODEL:	JHA050100UU05
INPUT:	100-240Vac ~ 50-60Hz, 0.3A,
OUTPUT:	5.0Vdc, 1A
POWER LINE:	DC 1.8m non-shielded cable without core

ADAPTER 2:	
BRAND:	PHIHONG
MODEL:	PSAA05A-050
INPUT:	100~240Vac, 0.2A, 50-60Hz
OUTPUT:	5.0Vdc, 1A
POWER LINE:	DC 1.8m non-shielded cable without core

ADAPTER 3:	
BRAND:	Delta
MODEL:	ADP-5FH B
INPUT:	100-240Vdc ~ 0.2A, 50-60Hz
OUTPUT:	5.0Vdc, 1A
POWER LINE:	DC 1.8m non-shielded cable without core

7. The EUT have lithium battery listed as below:

STANDARD BATTERY:	
MODEL:	PA16A
RATING:	3.7Vdc, 1350mAh

8. IMEI code: 35771900*****.

9. Software version: 0.90.00.

10. The EUT operates in the 2.4GHz frequency spectrum and complies with 802.11b & 802.11g techniques.

11. 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

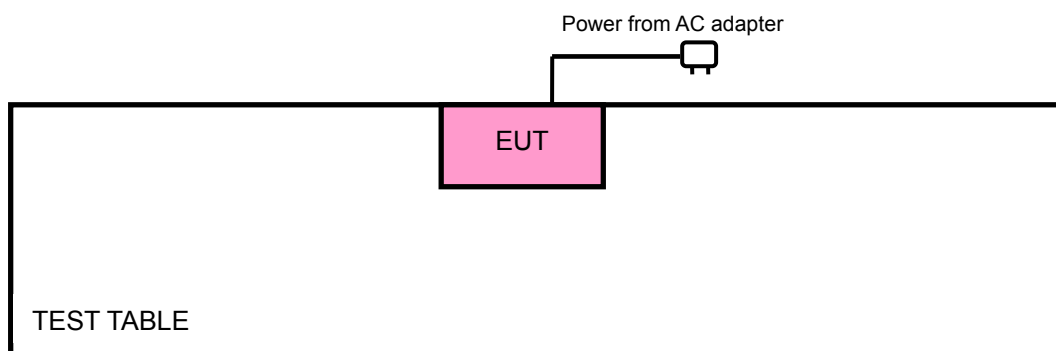
79 channels are provided to this EUT for bluetooth function:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2431	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

11 channels are provided to the EUT for wireless LAN function:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

The tested channel of each test item is selected from the worst case of original report.

FOR WIRELESS LAN FUNCTION:

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE<1G	RE≥1G	
A	√	√	The EUT without video telephone, with CCD
B	√	√	The EUT with video telephone, without CCD

Where **RE<1G**: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A / 802.11b	1 to 11	11	DSSS	DBPSK	1	Z
A / 802.11g	1 to 11	11	OFDM	BPSK	6	Z
B / 802.11g	1 to 11	11	OFDM	BPSK	6	Z

RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, xyz axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A / 802.11b	1 to 11	1	DSSS	DBPSK	1	Z
A / 802.11g	1 to 11	1	OFDM	BPSK	6	Z
B / 802.11g	1 to 11	1	OFDM	BPSK	6	Z

FOR BLUETOOTH FUNCTION:

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	RE<1G	RE≥1G	
-	√	√	The EUT without video telephone, with CCD

Where **RE<1G**: Radiated Emission below 1GHz **RE≥1G**: Radiated Emission above 1GHz

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, antenna ports (if EUT with antenna diversity architecture), xyz axis, and packet type.
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
0 to 78	78	FHSS	GFSK	DH5	Y

RADIATED EMISSION TEST (BELOW 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, antenna ports (if EUT with antenna diversity architecture), xyz axis, and packet type.
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	PACKET TYPE	AXIS
0 to 78	78	FHSS	GFSK	DH5	Y

3.2.3 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. (15.247)

ANSI C63.4- 2003

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.2.4 DESCRIPTION OF SUPPORT UNITS

NA

4 TEST TYPES AND RESULTS (FOR WIRELESS LAN FUNCTION)

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Dec. 20, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 27, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Jan. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
Preamplifier Agilent	8449B	3008A01961	Oct. 23, 2006
Preamplifier Agilent	8447D	2944A10629	Oct. 27, 2006
RF signal cable HUBER+SUHNER	SUCOFLEX 104	214380/4	Jan. 16, 2007
RF signal cable HUBER+SUHNER	SUCOFLEX 104	219266/4	Jan. 16, 2007
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA
Turn Table ADT.	TT100.	TT93021702	NA
Controller ADT.	SC100.	SC93021702	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 Chamber 2.
 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 IC4924-2.

4.1.3 TEST PROCEDURES

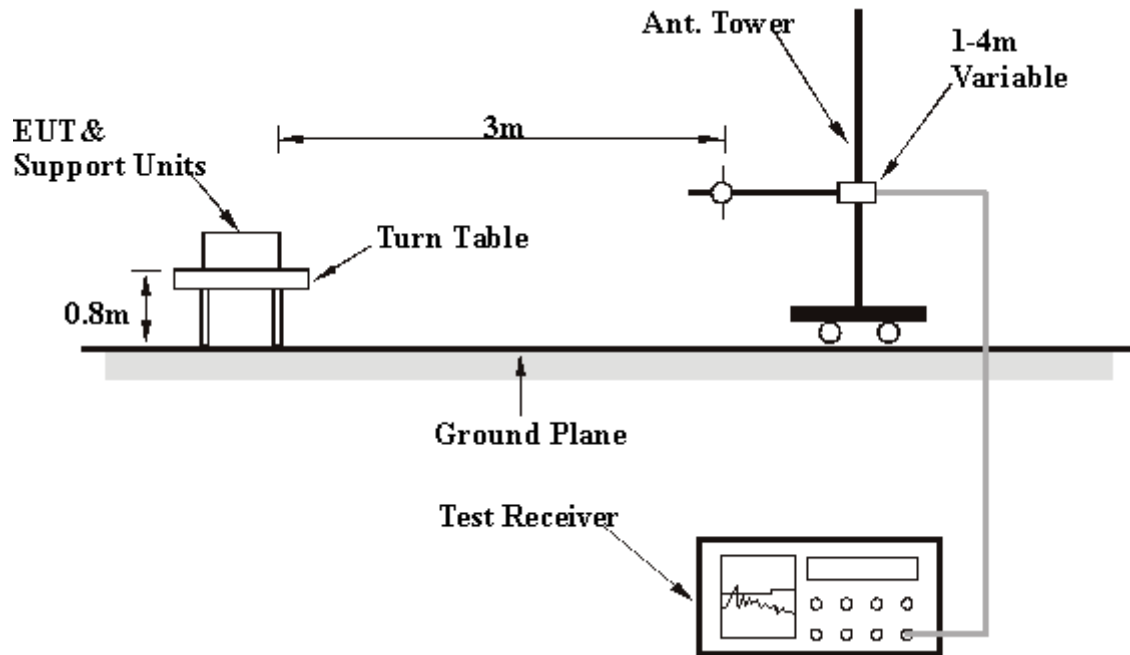
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on 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 the peak, quasi-peak or average method as specified and then reported in a 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.
 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

The EUT placed on the testing table and set it under transmission condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

RADIATED WORST CASE DATA:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	DBPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	1Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa	TEST MODE	A
TESTED BY	Match Tsui		

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	150.52	23.00 QP	43.50	-20.50	1.00 H	169	9.58	13.42
2	764.79	26.07 QP	46.00	-19.93	2.00 H	82	0.22	25.84
3	788.12	25.55 QP	46.00	-20.45	2.00 H	64	-0.40	25.94
4	830.88	25.62 QP	46.00	-20.38	1.50 H	307	-0.80	26.42
5	852.26	26.40 QP	46.00	-19.60	1.50 H	211	-0.30	26.69
6	906.69	26.50 QP	46.00	-19.50	1.50 H	211	-0.89	27.39
7	931.96	27.55 QP	46.00	-18.45	1.00 H	223	-1.02	28.57

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	55.27	26.34 QP	40.00	-13.66	1.00 V	340	12.41	13.93
2	66.93	19.83 QP	40.00	-20.17	1.50 V	25	7.49	12.34
3	768.68	25.33 QP	46.00	-20.67	1.00 V	187	-0.53	25.86
4	803.67	25.01 QP	46.00	-20.99	1.00 V	106	-1.03	26.05
5	834.77	25.53 QP	46.00	-20.47	1.00 V	106	-0.93	26.47
6	865.87	25.99 QP	46.00	-20.01	1.00 V	106	-0.81	26.80
7	889.20	26.27 QP	46.00	-19.73	1.00 V	46	-0.72	26.99
8	935.85	27.75 QP	46.00	-18.25	1.00 V	340	-1.00	28.76

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa	TEST MODE	A
TESTED BY	Match Tsui		

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	782.28	25.06 QP	46.00	-20.94	1.00 H	25	-0.86	25.92
2	788.12	25.53 QP	46.00	-20.47	1.00 H	322	-0.42	25.94
3	840.60	25.75 QP	46.00	-20.25	1.50 H	241	-0.80	26.55
4	875.59	26.04 QP	46.00	-19.96	1.00 H	25	-0.84	26.88
5	896.97	26.30 QP	46.00	-19.70	2.00 H	235	-0.76	27.06
6	935.85	28.76 QP	46.00	-17.24	1.50 H	244	0.00	28.76

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	45.55	28.14 QP	40.00	-11.86	2.00 V	112	13.14	15.00
2	74.71	20.95 QP	40.00	-19.05	2.00 V	223	9.74	11.21
3	780.34	25.49 QP	46.00	-20.51	1.50 V	208	-0.42	25.91
4	793.95	25.50 QP	46.00	-20.50	2.00 V	241	-0.47	25.97
5	832.83	25.84 QP	46.00	-20.16	2.00 V	88	-0.60	26.44
6	863.93	26.21 QP	46.00	-19.79	2.00 V	88	-0.58	26.79
7	906.69	26.39 QP	46.00	-19.61	1.00 V	160	-1.00	27.39
8	935.85	27.62 QP	46.00	-18.38	1.50 V	208	-1.13	28.76
9	945.57	29.99 QP	46.00	-16.01	2.00 V	358	0.78	29.21

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa	TEST MODE	B
TESTED BY	Match Tsui		

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	45.55	20.13 QP	40.00	-19.87	2.00 H	247	5.13	15.00
2	152.46	24.39 QP	43.50	-19.11	1.50 H	223	10.97	13.42
3	774.51	25.16 QP	46.00	-20.84	1.50 H	253	-0.73	25.89
4	811.44	25.13 QP	46.00	-20.87	1.00 H	286	-1.03	26.15
5	844.49	25.39 QP	46.00	-20.61	2.00 H	232	-1.21	26.60
6	860.04	26.43 QP	46.00	-19.57	1.50 H	247	-0.33	26.76
7	883.37	25.95 QP	46.00	-20.05	1.00 H	34	-0.99	26.95
8	933.91	28.06 QP	46.00	-17.94	2.00 H	199	-0.61	28.66
9	945.57	28.73 QP	46.00	-17.27	1.00 H	34	-0.48	29.21

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	45.55	30.21 QP	40.00	-9.79	1.00 V	145	15.21	15.00
2	64.99	23.27 QP	40.00	-16.73	1.50 V	64	10.59	12.68
3	121.36	23.46 QP	43.50	-20.04	1.50 V	190	12.47	10.99
4	743.41	25.27 QP	46.00	-20.73	1.00 V	193	-0.30	25.56
5	770.62	25.18 QP	46.00	-20.82	1.00 V	82	-0.69	25.87
6	803.67	25.23 QP	46.00	-20.77	1.00 V	163	-0.82	26.05
7	832.83	25.26 QP	46.00	-20.74	1.00 V	82	-1.19	26.44
8	867.82	26.40 QP	46.00	-19.60	1.00 V	193	-0.42	26.82
9	904.75	26.82 QP	46.00	-19.18	1.50 V	262	-0.48	27.30
10	935.85	27.70 QP	46.00	-18.30	1.50 V	262	-1.05	28.76
11	951.40	28.92 QP	46.00	-17.08	1.00 V	160	-0.47	29.39

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHZ
MODULATION TYPE	DBPSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TRANSFER RATE	1Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TEST MODE	A
TESTED BY	Morgan Chen		

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	2390.00	55.46 PK	74.00	-18.54	1.47 H	206	23.97	31.49
1	2390.00	40.75 AV	54.00	-13.25	1.47 H	206	9.26	31.49
2	4824.00	50.01 PK	74.00	-23.99	1.00 H	0	12.48	37.53
2	4824.00	38.62 AV	54.00	-15.38	1.00 H	0	1.09	37.53

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	2390.00	57.02 PK	74.00	-16.98	1.08 V	100	25.53	31.49
1	2390.00	45.06 AV	54.00	-8.94	1.08 V	100	13.57	31.49
2	4824.00	51.90 PK	74.00	-22.10	1.39 V	360	14.37	37.53
2	4824.00	38.63 AV	54.00	-15.37	1.39 V	360	1.10	37.53

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHZ
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TEST MODE	A
TESTED BY	Morgan Chen		

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	2390.00	65.51 PK	74.00	-8.49	1.20 H	106	34.02	31.49
1	2390.00	48.47 AV	54.00	-5.53	1.20 H	106	16.98	31.49
2	4824.00	43.12 PK	74.00	-30.88	1.00 H	360	5.59	37.53
2	4824.00	30.57 AV	54.00	-23.43	1.00 H	360	-6.96	37.53

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	2390.00	67.40 PK	74.00	-6.60	1.11 V	345	35.91	31.49
1	2390.00	51.01 AV	54.00	-2.99	1.11 V	345	19.52	31.49
2	4824.00	47.95 PK	74.00	-26.05	1.00 V	0	10.42	37.53
2	4824.00	37.66 AV	54.00	-16.34	1.00 V	0	0.13	37.53

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TEST MODE	B
TESTED BY	Morgan Chen		

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	2390.00	64.10 PK	74.00	-9.90	1.15 H	165	32.61	31.49
1	2390.00	47.24 AV	54.00	-6.76	1.15 H	165	15.75	31.49
2	4824.00	43.52 PK	74.00	-30.48	1.00 H	1	5.99	37.53
2	4824.00	30.52 AV	54.00	-23.48	1.00 H	1	-7.01	37.53

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	2390.00	67.54 PK	74.00	-6.46	1.18 V	12	36.05	31.49
1	2390.00	50.98 AV	54.00	-3.02	1.18 V	12	19.49	31.49
2	4824.00	47.58 PK	74.00	-26.42	1.00 V	360	10.05	37.53
2	4824.00	35.56 AV	54.00	-18.44	1.00 V	360	-1.97	37.53

- 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 TEST TYPES AND RESULTS (FOR BLUETOOTH FUNCTION)

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 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.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100188	Dec. 20, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 27, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Jan. 15, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
Preamplifier Agilent	8449B	3008A01961	Oct. 23, 2006
Preamplifier Agilent	8447D	2944A10629	Oct. 27, 2006
RF signal cable HUBER+SUHNER	SUCOFLEX 104	214380/4	Jan. 16, 2007
RF signal cable HUBER+SUHNER	SUCOFLEX 104	219266/4	Jan. 16, 2007
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower ADT.	AT100	AT93021702	NA
Turn Table ADT.	TT100.	TT93021702	NA
Controller ADT.	SC100.	SC93021702	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 Chamber 2.
 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 IC4924-2.

5.1.3 TEST PROCEDURES

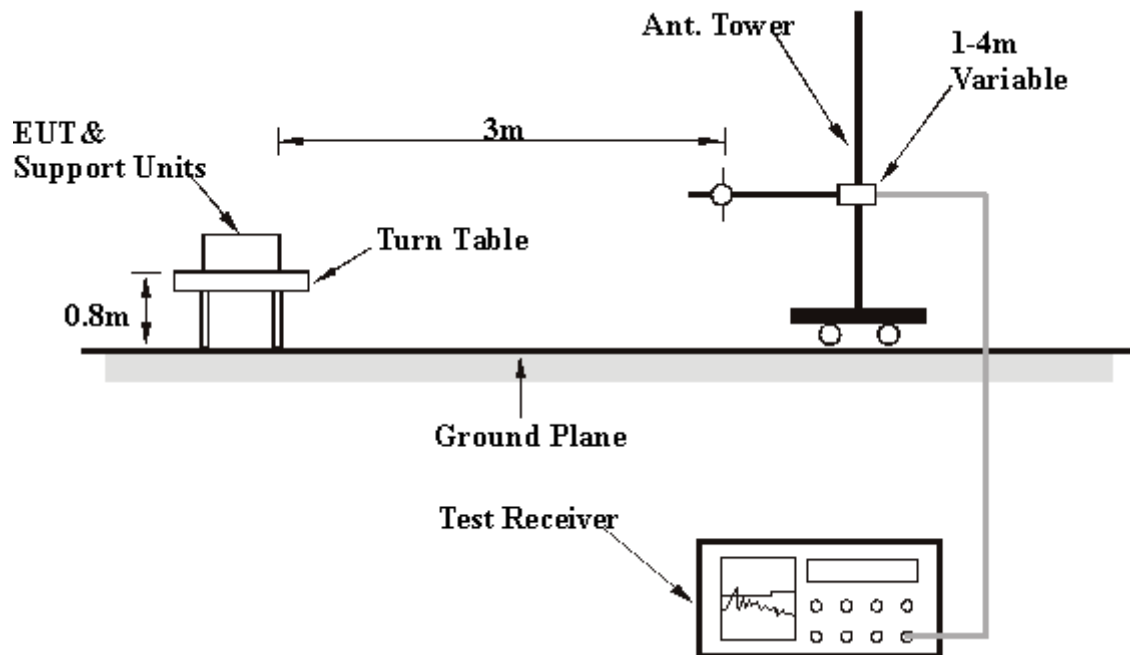
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on 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 the peak, quasi-peak or average method as specified and then reported in a 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.
 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 TEST SETUP



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

5.1.6 EUT OPERATING CONDITIONS

The EUT placed on the testing table and set it under transmission condition continuously at specific channel frequency.

5.1.7 TEST RESULTS

RADIATED WORST CASE DATA:

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Match Tsui		

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	801.72	25.72 QP	46.00	-20.28	2.00 H	262	-0.30	26.02
2	836.71	25.37 QP	46.00	-20.63	1.00 H	298	-1.12	26.50
3	858.10	26.52 QP	46.00	-19.48	1.50 H	295	-0.22	26.74
4	906.69	26.40 QP	46.00	-19.60	1.00 H	265	-0.99	27.39
5	930.02	28.22 QP	46.00	-17.78	1.00 H	298	-0.26	28.48
6	945.57	28.79 QP	46.00	-17.21	1.00 H	313	-0.42	29.21

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	45.55	28.42 QP	40.00	-11.58	1.00 V	118	13.41	15.00
2	72.77	21.96 QP	40.00	-18.04	1.50 V	121	10.50	11.46
3	119.42	23.12 QP	43.50	-20.38	1.00 V	4	12.37	10.76
4	784.23	25.46 QP	46.00	-20.54	1.00 V	289	-0.47	25.93
5	844.49	26.63 QP	46.00	-19.37	1.00 V	343	0.03	26.60
6	860.04	26.21 QP	46.00	-19.79	1.00 V	124	-0.55	26.76
7	893.09	26.92 QP	46.00	-19.08	1.00 V	118	-0.10	27.02
8	916.41	28.24 QP	46.00	-17.76	1.00 V	238	0.39	27.85
9	949.46	29.79 QP	46.00	-16.21	1.50 V	121	0.40	29.39

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~ 25GHZ
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 68%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

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	2483.50	44.20 PK	74.00	-29.80	1.16 H	182	12.29	31.91
1	2483.50	35.70 AV	54.00	-18.30	1.16 H	182	3.79	31.91
2	4960.00	47.47 PK	74.00	-26.53	1.16 H	0	9.64	37.83
2	4960.00	17.47 AV	54.00	-36.53	1.16 H	0	-20.36	37.83

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	2483.50	40.17 PK	74.00	-33.83	1.00 V	154	8.26	31.91
1	2483.50	32.67 AV	54.00	-21.33	1.00 V	154	0.76	31.91
2	4960.00	43.49 PK	74.00	-30.51	1.00 V	360	5.66	37.83
2	4960.00	13.49 AV	54.00	-40.51	1.00 V	360	-24.34	37.83

- 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.

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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Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

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Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

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