

FCC TEST REPORT (PART 22)

REPORT NO.: RF950109L04G

MODEL NO.: HERM100

RECEIVED: Sep. 01, 2006

TESTED: Sep. 02, 2006

ISSUED: Sep. 06, 2006

APPLICANT: High Tech Computer Corp.

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ISSUED BY: Advance Data Technology Corporation

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Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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1 CERTIFICATION

PRODUCT: Pocket PC Phone
MODEL NO.: HERM100
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Sep. 02, 2006
APPLICANT: High Tech Computer Corp.
STANDARDS: FCC Part 22, Subpart H
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 : Stephanie Hung , **DATE:** Sep. 06, 2006

TECHNICAL ACCEPTANCE : Long Chen , **DATE:** Sep. 06, 2006
Responsible for RF

APPROVED BY : Gary Chang , **DATE:** Sep. 06, 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 GSM FUNCTION:

APPLIED STANDARD: FCC Part 22 & Part 2 / IC RSS-132			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -42.21dB at 865.87MHz.

FOR WCDMA FUNCTION:

APPLIED STANDARD: FCC Part 22 & Part 2 / IC RSS-132			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -45.70dB at 861.98MHz.

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	GSM: GMSK / 8PSK WCDMA: QPSK / BPSK
FREQUENCY RANGE	Tx frequency: 824.2MHz ~ 848.8MHz Rx frequency: 869.2MHz ~ 893.8MHz
NUMBER OF CHANNEL	GSM: 124 WCDMA: 102
MAX. CONDUCTED PEAK OUTPUT POWER	32.63dBm (1.83231Watts)
MAX. ERP POWER	30.79dBm (1.19950Watts)
ANTENNA TYPE	Monopole antenna with -1dBi 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	Earphone
EUT EXTREME VOL. RANGE	3.7Vdc to 4.2Vdc

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 GSM850/WCDMA850. The wireless LAN and bluetooth functions are covered in another test report, which standard used is FCC Part 15. And the PCS1900/ WCDMA1900 mobile phone function is covered in another test report, which standard used is FCC Part 24.

5. The communicated functions of EUT listed as below:

		GSM850MHz	PCS1900MHz	WCDMA850MHz	WCDMA1900MHz	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 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

124 channels are provided to this EUT in the GSM850 band. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	128	824.2 MHz	GSM, GPRS, E-GPRS
MIDDLE	190	836.6 MHz	GSM, GPRS, E-GPRS
HIGH	251	848.8 MHz	GSM, GPRS, E-GPRS

- NOTE:** 1. Below 1 GHz, the channel 128, 190, and 251 were pre-tested in chamber. The channel 128 was chosen for final test.
2. The worst case for final test is chosen when the power control level set 5.
3. The channel space is 0.2MHz.
4. Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane. Therefore only the test data of this Y-plane was used for radiated emission measurement test.
5. For spurious emissions tests, GSM mode has been chosen for the worst case to do the final test and record.

102 channels are provided to this EUT in the WCDMA850 band. Therefore, the low, middle and high channels are chosen for testing.

	CHANNEL	FREQUENCY	TX MODE
LOW	4132	826.4 MHz	WCDMA, HSDPA
MIDDLE	4182	836.4 MHz	WCDMA, HSDPA
HIGH	4233	846.6 MHz	WCDMA, HSDPA

- NOTE:** 1. Below 1 GHz, the channel 4132, 4182 and 4233 were pre-tested in chamber. The channel 4132 was chosen for final test.
2. The worst case for final test is chosen when the power control level set maximum.
3. The channel space is 0.2MHz.
4. Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane. Therefore only the test data of this Y-plane was used for radiated emission measurement test.
5. For spurious emissions tests, WCDMA mode has been chosen for the worst case to do the final test and record.

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

FOR GSM FUNCTION:

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

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

Note: The EUT without video telephone, with CCD camera mode was found the worst case. Therefore only recorded the test data in the test report.

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	128	GSM	Y

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
128 to 251	251	GSM	Y

FOR WCDMA FUNCTION:

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

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

Note: The EUT without video telephone, with CCD camera mode was found the worst case. Therefore only recorded the test data in the test report.

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
4132 to 4233	4132	WCDMA	Y

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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	AXIS
4132 to 24233	4233	WCDMA	Y

3.2.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC 47 CFR Part 2

FCC 47 CFR Part 22

IC RSS-132

ANSI C63.4-2003

ANSI/TIA/EIA-603-A

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

3.2.3 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	CAL. DATE
1	Universal Radio Communication Tester	R&S	CMU200	104958	Apr. 11, 2007
2	NJZ-2000 (GSM+WCDMA simulator)	JRC	NJZ-2000	ET00054	Sep. 05, 2007

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

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

4 TEST TYPES AND RESULTS (FOR GSM FUNCTION)

4.1 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917, On any frequency outside a licensee's frequency block within GSM850 spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to -13 dBm. So the limit of emission is the same absolute specified line.

LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m) (NOTE)
-13	82.22

NOTE: The following formula is used to convert the equipment radiated power to field strength.

$$E = [1000000\sqrt{(30P)}] / 3 \text{ uV/m, where P is Watts.}$$

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
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 31, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 08, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 19, 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
Signal Generator Agilent	E8257C	MY43320668	Dec. 07, 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 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

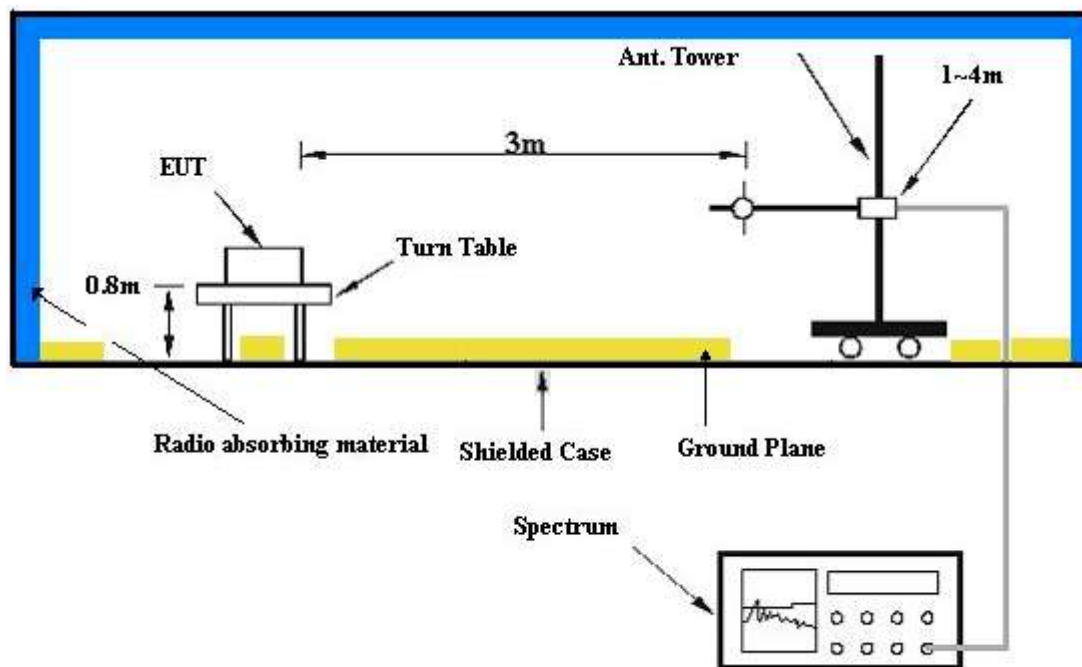
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. Repeat step a ~ c for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 1MHz.

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

- a. The EUT makes a phone call to the communication simulator.
- b. The communication simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.

4.1.7 TEST RESULTS

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

MODE	TX channel 128	DETECTOR FUNCTION	Quasi-Peak
FREQUENCY RANGE	Below 1000 MHz	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa	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	121.36	29.58 QP	82.22	-52.64	2.00 H	133	18.59	10.99
2	129.14	28.57 QP	82.22	-53.65	2.00 H	43	16.55	12.01
3	397.39	38.19 QP	82.22	-44.03	2.00 H	25	20.34	17.85
4	729.80	34.36 QP	82.22	-47.86	2.00 H	10	9.25	25.12
5	865.87	35.80 QP	82.22	-46.42	2.00 H	283	8.99	26.80
6	930.02	32.43 QP	82.22	-49.79	1.50 H	280	3.95	28.48

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	53.33	30.53 QP	82.22	-51.69	1.00 V	64	16.44	14.09
2	70.82	34.11 QP	82.22	-48.11	1.00 V	76	22.40	11.71
3	115.53	32.60 QP	82.22	-49.62	1.00 V	358	22.19	10.40
4	455.71	33.14 QP	82.22	-49.08	1.00 V	349	14.06	19.08
5	463.49	33.11 QP	82.22	-49.11	1.00 V	34	13.86	19.25
6	731.74	39.10 QP	82.22	-43.12	1.00 V	163	13.92	25.18
7	865.87	40.01 QP	82.22	-42.21	1.00 V	358	13.20	26.80
8	928.08	33.35 QP	82.22	-48.87	1.00 V	358	4.96	28.39

- 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.
 5. This is valid for all 3 channels.

4.2 EFFECTIVE RADIATED POWER MEASUREMENT (ABOVE 1GHz)

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917 (a), On any frequency outside a licensee's frequency block within GSM850 spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to -13dBm .

4.2.2 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
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 31, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 08, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 19, 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
Signal Generator Agilent	E8257C	MY43320668	Dec. 07, 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 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.

4.2.3 TEST PROCEDURES

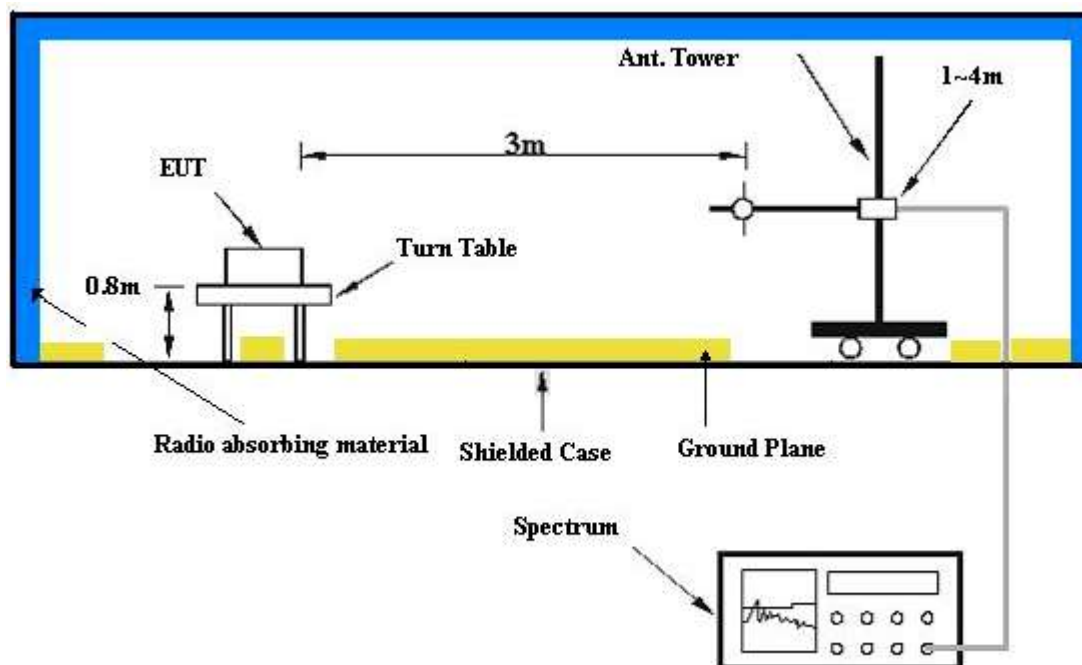
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. The EUT is replaced by a substituted antenna connected to a signal generator tuned to the frequency of emission.
- e. The signal generator level has to be adjusted to have the same emission nature.
- f. The radiated power can be calculated via the factor and antenna gain.
- g. Repeat step a ~ f for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 1MHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

- a. The EUT makes a phone call to the communication simulator.
- b. The communication simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.

4.2.7 TEST RESULTS

FOR GSM MODE (UP-LINK WITH 1 TIME SLOT)

MODE	TX channel 251	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	1698.00	65.57	-13.00	-39.83	10.17	-29.66
2	2546.00	51.63	-13.00	-55.09	11.49	-43.60
3	3395.00	57.67	-13.00	-50.12	12.56	-37.56
4	4244.00	50.69	-13.00	-58.24	13.70	-44.54
5	5093.00	52.46	-13.00	-56.68	13.91	-42.77
6	5941.00	52.61	-13.00	-57.01	14.39	-42.62
7	6790.00	55.67	-13.00	-52.86	13.30	-39.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	1698.00	65.42	-13.00	-39.98	10.17	-29.81
2	2546.00	53.20	-13.00	-53.52	11.49	-42.03
3	3395.00	53.57	-13.00	-54.22	12.56	-41.66
4	4244.00	49.53	-13.00	-59.40	13.70	-45.70
5	5093.00	50.64	-13.00	-58.50	13.91	-44.59
6	5941.00	53.60	-13.00	-56.02	14.39	-41.63
7	6790.00	57.60	-13.00	-50.93	13.30	-37.63

NOTE: Power Value (dBum) = S.G Power Value (dBm) + Correction Factor (dB).

5 TEST TYPES AND RESULTS (FOR WCDMA FUNCTION)

5.1 RADIATED EMISSION MEASUREMENT (BELOW 1GHz)

5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917, On any frequency outside a licensee's frequency block within GSM850 spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to -13 dBm. So the limit of emission is the same absolute specified line.

LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m) (NOTE)
-13	82.22

NOTE: The following formula is used to convert the equipment radiated power to field strength.

$$E = [1000000\sqrt{(30P)}] / 3 \text{ uV/m, where P is Watts.}$$

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
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 31, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 08, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 19, 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
Signal Generator Agilent	E8257C	MY43320668	Dec. 07, 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 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

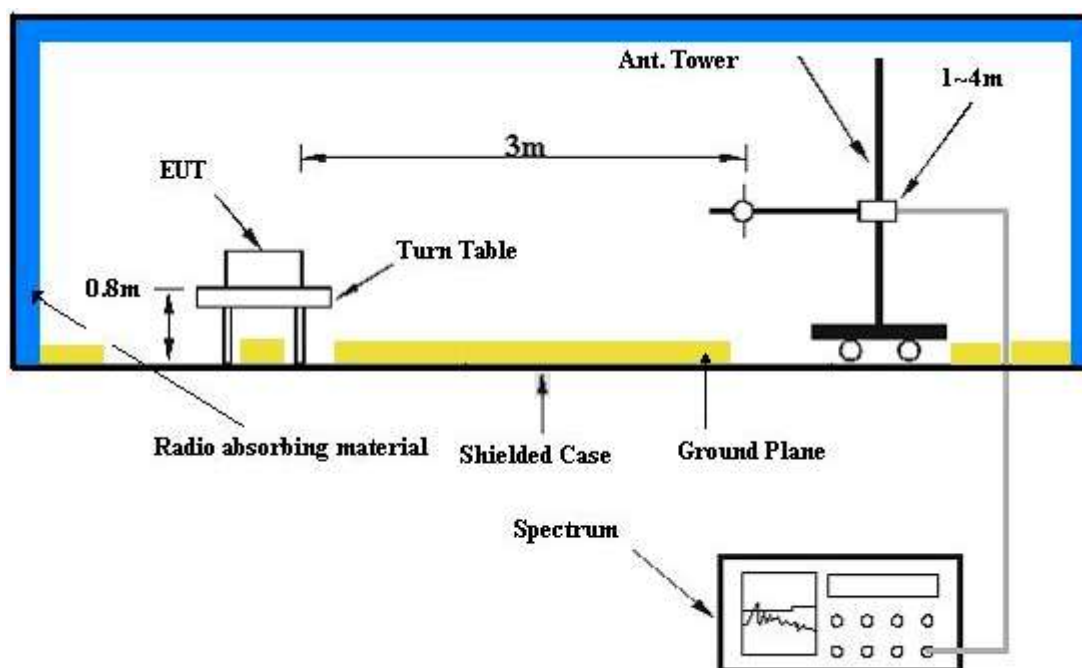
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. Repeat step a ~ c for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1MHz and the video bandwidth is 1MHz.

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

- a. The EUT makes a phone call to the communication simulator.
- b. The communication simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.

5.1.7 TEST RESULTS

MODE	TX channel 4132	DETECTOR FUNCTION	Quasi-Peak
FREQUENCY RANGE	Below 1000 MHz	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa	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	86.37	24.39 QP	82.22	-57.83	2.00 H	172	14.74	9.66
2	125.25	29.66 QP	82.22	-52.56	2.00 H	76	18.16	11.50
3	129.14	29.24 QP	82.22	-52.98	1.50 H	16	17.23	12.01
4	166.07	28.87 QP	82.22	-53.35	2.00 H	349	15.83	13.03
5	403.23	32.94 QP	82.22	-49.28	2.00 H	301	14.93	18.00
6	733.69	34.21 QP	82.22	-48.01	2.00 H	274	8.97	25.24
7	861.98	36.52 QP	82.22	-45.70	1.50 H	214	9.74	26.77
8	931.96	33.32 QP	82.22	-48.90	2.00 H	172	4.75	28.57
9	955.29	31.81 QP	82.22	-50.41	1.50 H	214	2.51	29.30

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	29.21 QP	82.22	-53.01	1.00 V	307	15.28	13.93
2	68.88	32.90 QP	82.22	-49.32	2.00 V	55	20.89	12.00
3	115.53	35.52 QP	82.22	-46.70	1.00 V	322	25.11	10.40
4	403.23	31.88 QP	82.22	-50.34	1.50 V	202	13.87	18.00
5	449.88	31.25 QP	82.22	-50.97	1.00 V	103	12.30	18.95
6	465.43	30.30 QP	82.22	-51.92	2.00 V	55	11.01	19.30
7	663.71	30.90 QP	82.22	-51.32	2.00 V	55	7.57	23.33
8	731.74	35.29 QP	82.22	-46.93	1.50 V	202	10.11	25.18
9	861.98	34.59 QP	82.22	-47.63	1.00 V	106	7.81	26.77
10	931.96	34.54 QP	82.22	-47.68	1.00 V	103	5.97	28.57
11	949.46	30.48 QP	82.22	-51.74	1.50 V	202	1.08	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.
 5. This is valid for all 3 channels.

5.2 EFFECTIVE RADIATED POWER MEASUREMENT (ABOVE 1GHz)

5.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

In the FCC 22.917 (a), On any frequency outside a licensee's frequency block within GSM850 spectrum, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The specified minimum attenuation becomes 43dB and the limit of emission equal to -13dBm .

5.2.2 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
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	May 31, 2007
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-407	Jan. 22, 2007
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 08, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 26, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 19, 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
Signal Generator Agilent	E8257C	MY43320668	Dec. 07, 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 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.

5.2.3 TEST PROCEDURES

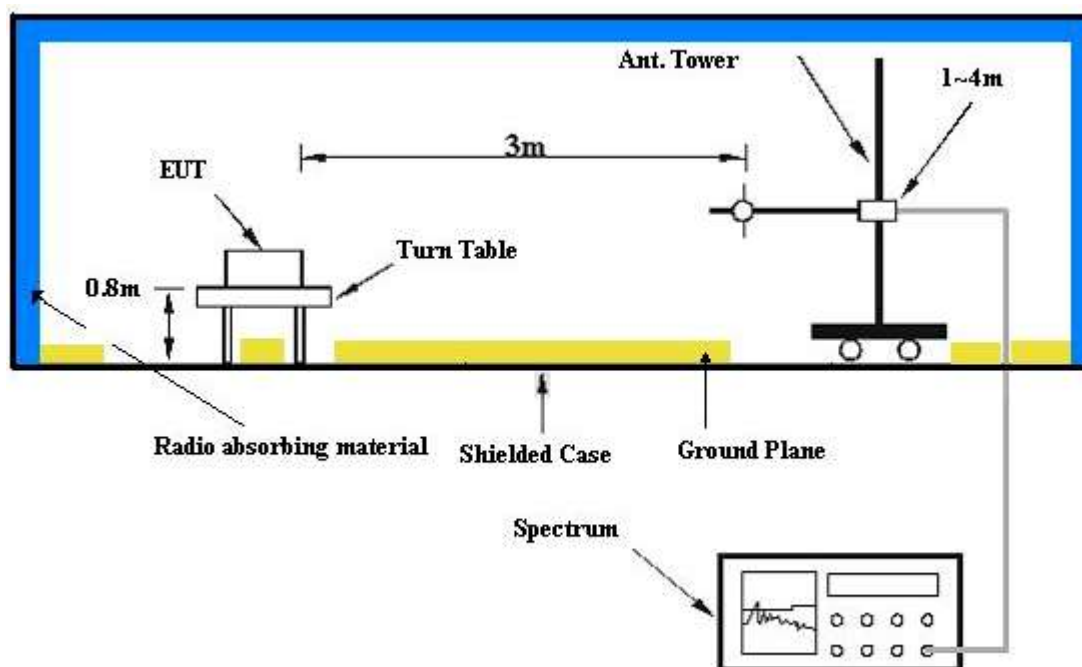
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
- c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
- d. The EUT is replaced by a substituted antenna connected to a signal generator tuned to the frequency of emission.
- e. The signal generator level has to be adjusted to have the same emission nature.
- f. The radiated power can be calculated via the factor and antenna gain.
- g. Repeat step a ~ f for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 1 MHz.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP



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

5.2.6 EUT OPERATING CONDITIONS

- a. The EUT makes a phone call to the communication simulator.
- b. The communication simulator station system controlled an EUT to export maximum output power under transmission mode and specific channel frequency.

5.2.7 TEST RESULTS

MODE	TX channel 4233	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	27deg. C, 66%RH, 991hPa
TESTED BY	Match Tsui		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	1693.20	69.54	-13.00	-35.86	10.17	-25.69
2	2539.80	48.33	-13.00	-58.39	11.49	-46.90
3	3386.40	46.58	-13.00	-61.21	12.56	-48.65

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	1693.20	71.17	-13.00	-34.23	10.17	-24.06
2	2539.80	50.28	-13.00	-56.44	11.49	-44.95
3	3386.40	50.24	-13.00	-57.55	12.56	-44.99

NOTE: Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

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:

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

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