



FCC DOC TEST REPORT

REPORT NO.: 940712L02

MODEL NO.: GHE225U

RECEIVED: Jul 8, 2005

TESTED: Jul 10, 2005 to Jul 12, 2005

ISSUED: Jul 12, 2005

APPLICANT: IOGEAR

ADDRESS: 23 Hubble Irvine, 92618 California, U.S.A.

ISSUED BY: Advance Data Technology Corporation

ADDRESS: 47 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang,
Taipei Hsien, Taiwan, R.O.C.

TEST LAB: ADT (Shanghai) Corporation

LAB LOCATION: 2F, Building C, No.1618, Yishan Rd., 201103,
Shanghai, China

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ADT (Shanghai) Corporation.

Advance Data Technology Corporation.





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1 CERTIFICATION

PRODUCT: USB 2.0 Portable Hard Drive
BRAND NAME: IOGEAR
MODEL NO.: GHE225U
APPLICANT: IOGEAR
TESTED: Jul 10, 2005 to Jul 12, 2005
TEST ITEM: ENGINEERING SAMPLE
STANDARDS: FCC Part 15

We, **Advance Data Technology Corp.**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified. This report contains data that were produced under subcontract by Laboratory ADT (Shanghai) Corporation.

TECHNICAL ACCEPTANCE : *Wailand Zhang* , **DATE:** JUL 12, 2005
Responsible for EMI (Wailand Zhang)

APPROVED BY :  , **DATE:** JUL 12, 2005
(Wallace Pan, Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD	TEST TYPE	RESULT	REMARKS
FCC Part 15	Conducted Test	PASS	Meets Class B Limit. Minimum passing AV margin is -10.74 dB at 0.23682MHz
	Radiated Test	PASS	Meets Class B Limit. Minimum passing margin is -6.02 dB at 352.6MHz

NOTE: This report contains data that were produced under subcontract by Laboratory ADT (Shanghai) Corporation.

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	Value
Conducted emissions	1.8dB
Radiated emissions	3.2dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	USB 2.0 Portable Hard Drive
MODEL NO.	GHE225U
DATA CABLE SUPPLIED	1.5m non-shielded power cable
EUT VOLTAGE	DC 5V

3.2 DESCRIPTION OF TEST MODES

For the Conducted test, the EUT was tested under the following modes:

MODE	DESCRIPTION
1	Line
2	Neutral

For the Radiated test, the EUT was tested under the following modes:

MODE	DESCRIPTION
1	Horizontal
2	Vertical

All modes were tested and recorded in this report.



3.3 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	FCC ID
1	PC	Dell	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
A	21x1.5m shielded AV cable with no core.
B	2x1m shielded S-VIDEO cable with no core.

4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD:

FCC Part 15

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- NOTES:**
- (1) The lower limit shall apply at the transition frequencies.
 - (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 - (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100295	Apr. 19, 2006
RF signal cable Woken	RG-58	E1CBL09	May. 30, 2006
LISN ROHDE & SCHWARZ	NSLK8127	8127-408	Feb. 12, 2006
LISN ROHDE & SCHWARZ	NSLK8126	8126-388	Jul. 04, 2006
Software ADT	ADT_Cond_V7 .3.0	NA	NA

NOTE: The calibration interval of the above test instruments is 12 months.

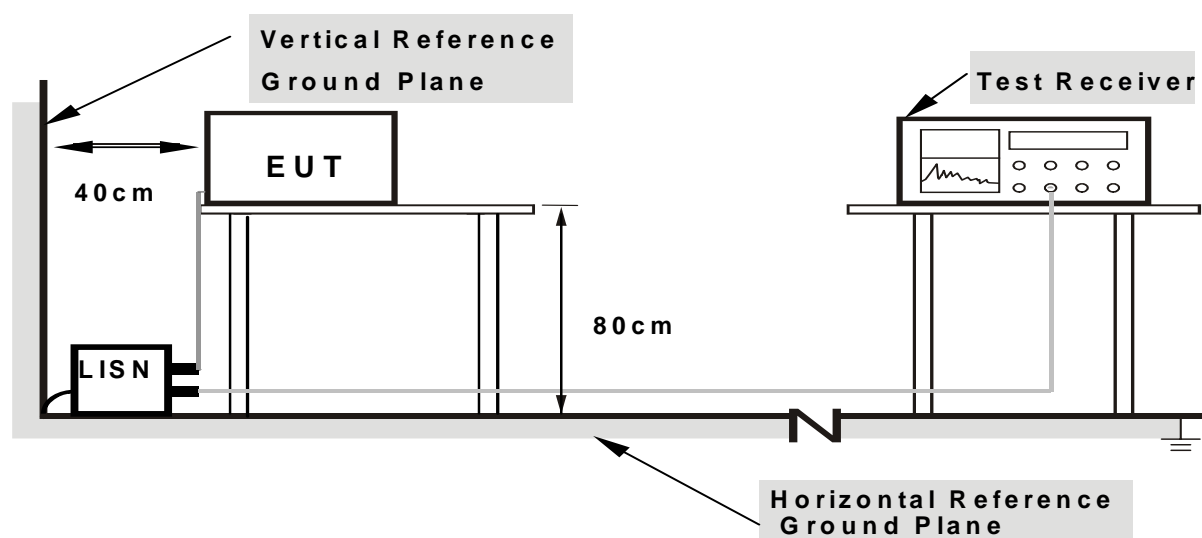
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were 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 80 cm from EUT and at least 80 cm from other units and other metal planes

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

4.1.6 EUT OPERATING CONDITIONS

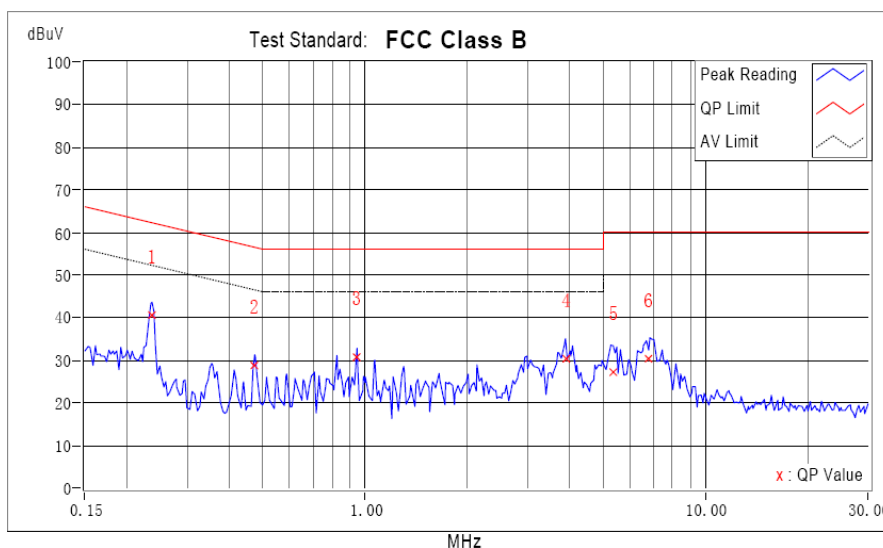
- a. Put the EUT on the test table and make it be connected to the computer.
- b. Let the computer ran the test-soft, and then send the data to the EUT.

4.1.7 TEST RESULTS

EUT	USB 2.0 Portable Hard Drive	MODEL NO.	GHE225U
INPUT POWER	DC 5V	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	26 deg. C, 60 % RH, 980 hPa	PHASE	Line (L)
		TESTED BY: YANG	

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	0.23657	0.5	40.18	39.72	40.68	40.22	62.22	52.22	-21.54	-12
2	0.47359	0.5	28.14	23.81	28.64	24.31	56.45	46.45	-27.81	-22.14
3	0.94478	0.5	30.22	25.58	30.72	26.08	56	46	-25.28	-19.92
4	3.88516	0.5	29.85	18.03	30.35	18.53	56	46	-25.65	-27.47
5	5.36161	0.5	26.48	17.09	26.98	17.59	60	50	-33.02	-32.41
6	6.80335	0.5	29.79	21.34	30.29	21.84	60	50	-29.71	-28.16

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

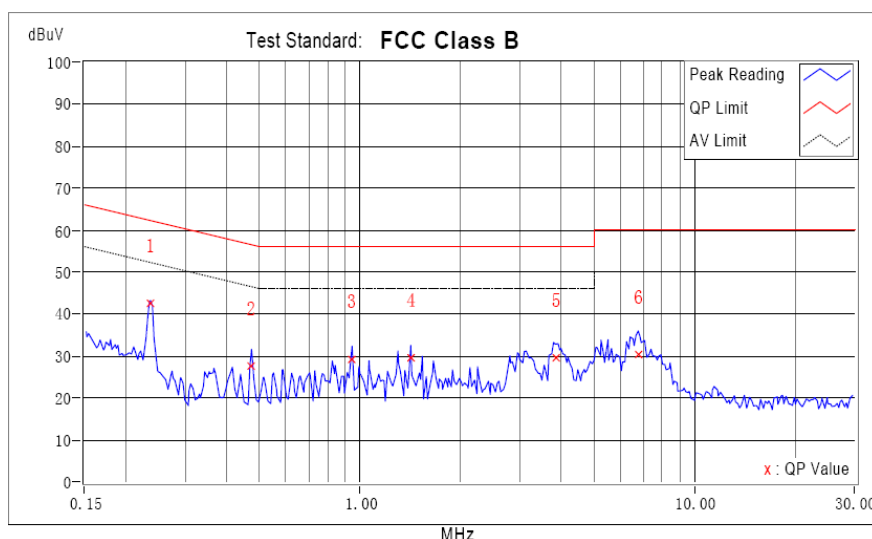




EUT	USB 2.0 Portable Hard Drive	MODEL NO.	GHE225U
INPUT POWER	DC 5V	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	26 deg. C, 60 % RH, 980 hPa	PHASE	Neutral (N)
		TESTED BY: YANG	

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	0.23682	0.5	41.9	40.97	42.4	41.47	62.21	52.21	-19.81	-10.74
2	0.47384	0.5	27.01	21.89	27.51	22.39	56.45	46.45	-28.94	-24.06
3	0.94478	0.5	28.49	24.17	28.99	24.67	56	46	-27.01	-21.33
4	1.41375	0.5	28.84	22.19	29.34	22.69	56	46	-26.66	-23.31
5	3.84056	0.5	29.04	23.59	29.54	24.09	56	46	-26.46	-21.91
6	6.77281	0.5	29.95	21.73	30.45	22.23	60	50	-29.55	-27.77

- 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

TEST STANDARD:

FCC Part 15

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
30 – 88	90	39.1	100	40.0
88 – 216	150	43.5	150	43.5
216 – 960	210	46.4	200	46.0
960 – 1000	300	49.5	500	54.0

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	80.0	60.0	74.0	54.0

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



**FREQUENCY RANGE OF RADIATED MEASUREMENT
(For unintentional radiators)**

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100296	Apr. 19, 2006
BILOG Antenna SCHWARZBECK	VULB9168	9168-159	Sep. 26, 2006
Preamplifier Agilent	8447D	2944A10643	Jan. 27, 2006
Double Ridged Broadband Horn Antenna Schwarzbeck	BBHA 9120D	9120D-398	Feb.15, 2006
Signal Analyzer ROHDE & SCHWARZ	FSP	100019	May.15,2006
RF signal cable Woken	RG-402	E1CBH01	May. 30, 2006
RF signal cable Woken	RG-412	E1CBL02	May. 30, 2006
RF signal cable Woken	RG-412	E1CBL03	May. 30, 2006
RF signal cable Woken	RG-412	E1CBL04	May. 30, 2006
Spectrum Agilent	E4403B	MY41440678	Jan. 13, 2006
Software ADT	ADT_Radiated_V7. 5	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months.

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 meters semi-anechoic room. 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

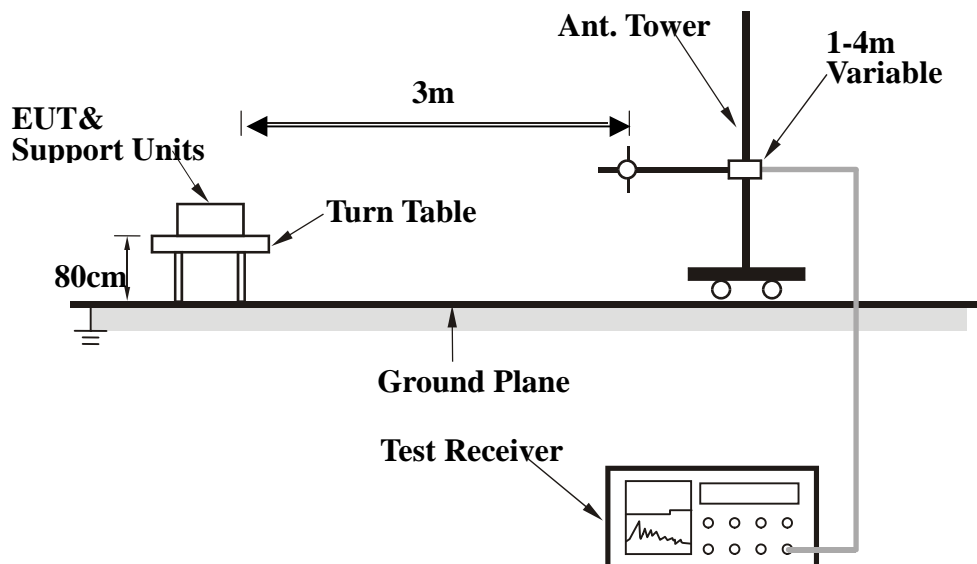
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the interference antenna.

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

Same as 4.1.6.

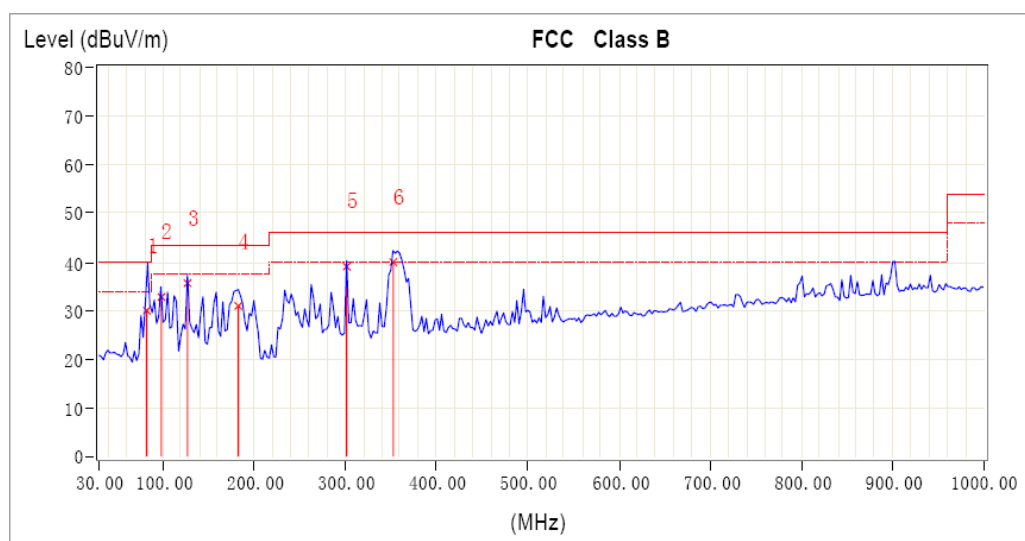
4.2.7 TEST RESULTS

EUT	USB 2.0 Portable Hard Drive	MODEL NO.	GHE225U
MODE	Horizontal	FREQUENCY RANGE	30 ~ 1000 MHz
INPUT POWER	DC 5V	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21 deg. C, 56 % RH, 980 hPa	TESTED BY: BEYONDIZ ZHANG	

ANTENNA POLARITY & test distance: HORIZONTAL at 3m

No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	82.42	11.61	18.4	30.01	40	-9.99	200	328
2	98.5	12.44	20.36	32.8	43.5	-10.7	188	289
3	127.06	15.19	20.46	35.65	43.5	-7.85	198	302
4	182.78	14.31	16.67	30.98	43.5	-12.52	200	198
5	301.56	16.58	22.47	39.05	46	-6.95	220	330
6	352.6	17.54	22.44	39.98	46	-6.02	197	322

- 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.

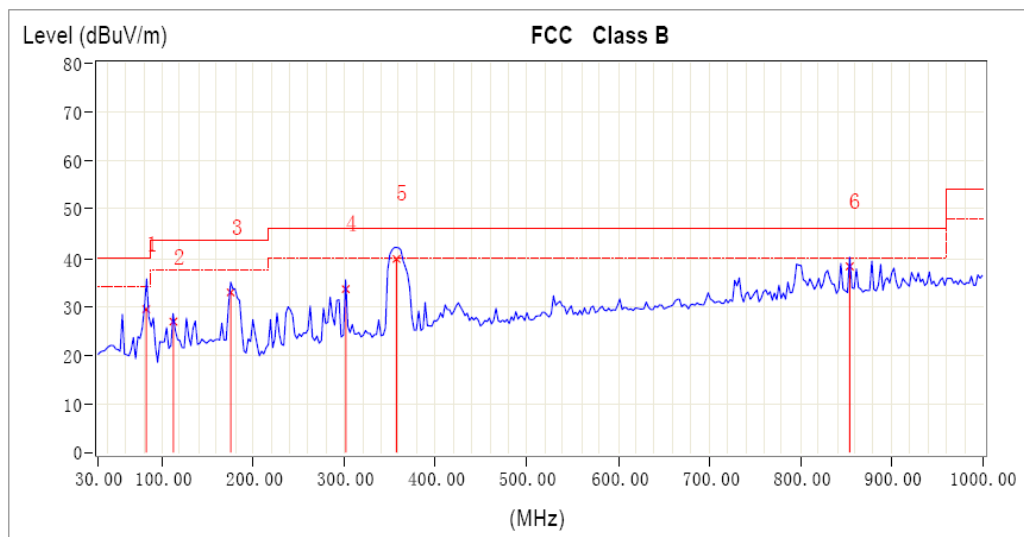


EUT	USB 2.0 Portable Hard Drive	MODEL NO.	GHE225U
MODE	Vertical	FREQUENCY RANGE	30 ~ 1000 MHz
INPUT POWER	DC 5V	DETECTOR FUNCTION & BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21 deg. C, 56 % RH, 980 hPa	TESTED BY: BEYONDIZ ZHANG	

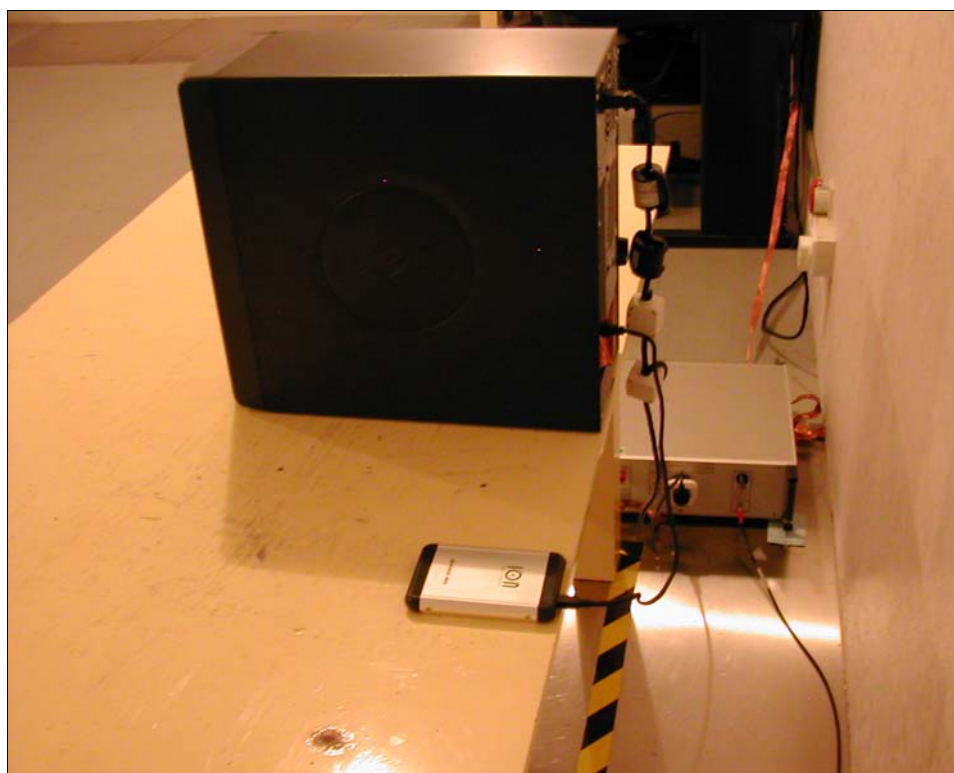
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Factor (dB/M)	Reading (dBuV/M)	Emission (dBuV/M)	Limit (dBuV/M)	Margin (dB)	Ant. Height (cm)	Table Angle (Deg.)
1	82.85	11.62	17.82	29.44	40	-10.56	103	0
2	112.65	13.88	12.99	26.87	43.5	-16.63	116	65
3	175.5	15.3	17.57	32.87	43.5	-10.63	100	54
4	301.68	16.58	16.96	33.54	46	-12.46	108	70
5	357.38	17.68	22.1	39.78	46	-6.22	110	102
6	854.45	26.2	12.02	38.22	46	-7.78	100	150

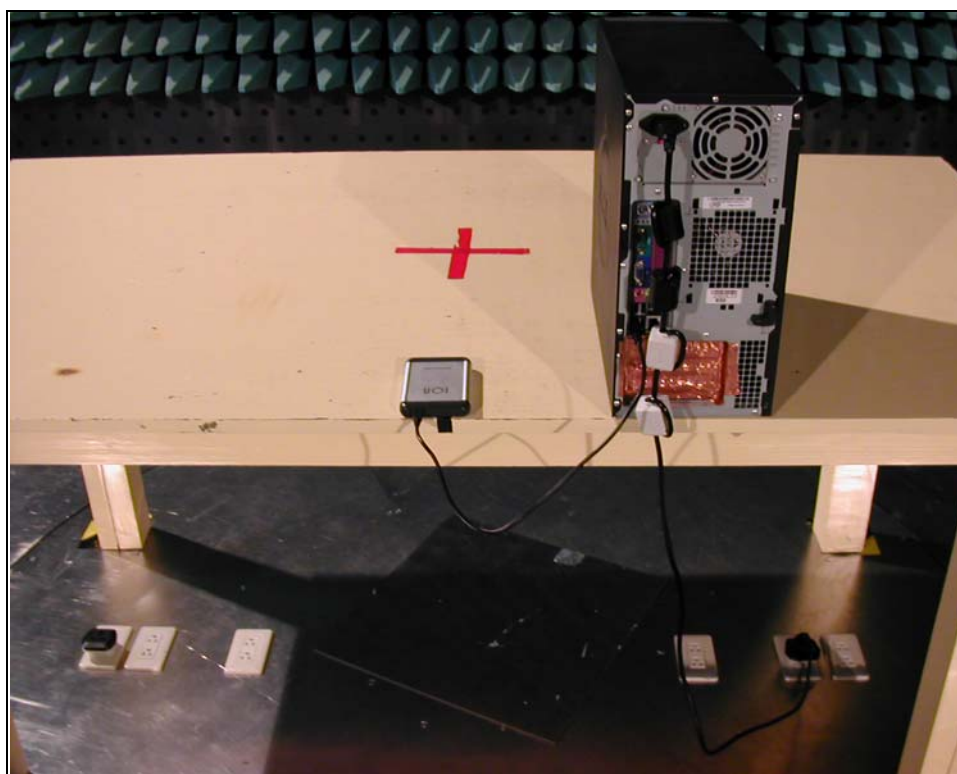
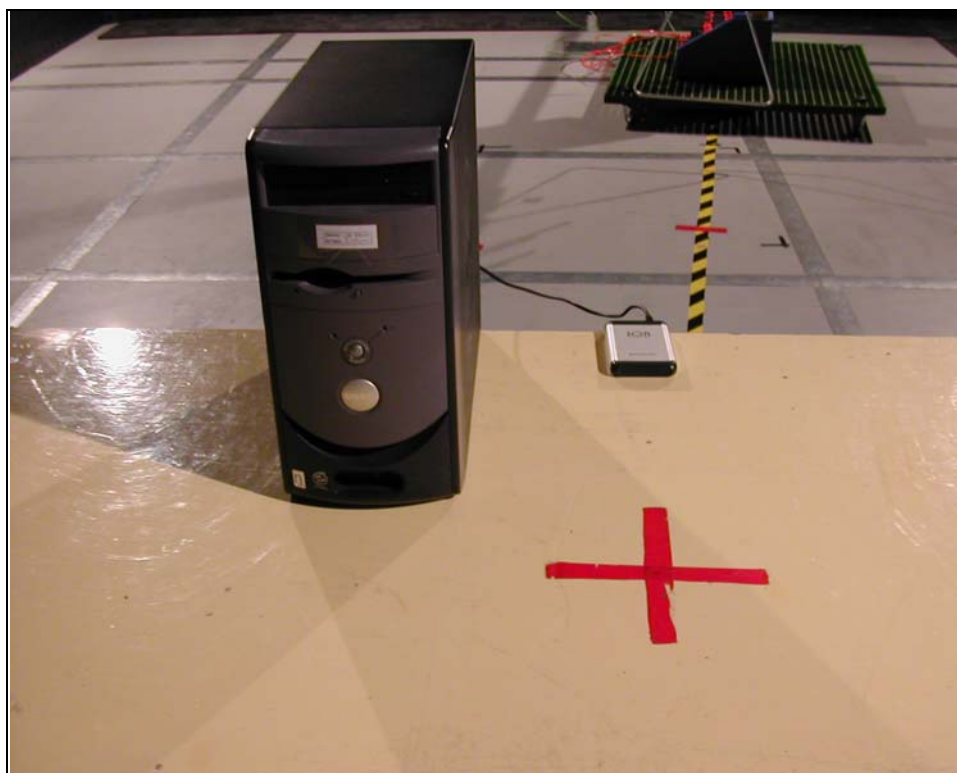
- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



5 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



6 PHOTOGRAPHS OF THE EUT





7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
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: 886-2-2605 2180

Fax: 886-2-2605 2943

Hsin Chu EMC/RF Lab:

Tel: 886-3-593 5343

Fax: 886-3-593 5342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-318 3232

Fax: 886-3-318 5050

Linko RF & Telecom Lab.

Tel: 886-3-32 70910

Fax: 886-3-327 0892

Email: service@mail.adt.com.tw

Web Site: www.adt.com.tw

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