

FCC TEST REPORT

REPORT NO.: RF900621R02

MODEL NO.: MH-4000B

RECEIVED: June 21, 2001

TESTED: July 12, 2001

APPLICANT: FAN SHAING ELECTRONICS CO., LTD

ADDRESS: No 54 Wu-Chuang RD, WU-KU Industrial Park
Taipei Hsien TAIWAN R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chia Pau Tsuen, Linkou Hsiang,
Taipei, Taiwan, R.O.C.

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0528



Lab Code: 200102-0

Table of Contents

1	CERTIFICATION.....	3
2	SUMMARY OF TEST RESULTS	4
3	GENERAL INFORMATION	5
3.1	GENERAL DESCRIPTION OF EUT	5
3.2	DESCRIPTION OF TEST MODES	6
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	6
3.4	DESCRIPTION OF SUPPORT UNITS	6
4	TEST PROCEDURE AND RESULT	7
4.1	CONDUCTED EMISSION MEASUREMENT.....	7
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	7
4.1.2	TEST INSTRUMENT	8
4.1.3	TEST PROCEDURE.....	8
4.1.4	TEST SETUP.....	9
4.1.5	EUT OPERATING CONDITION.....	9
4.1.6	TEST RESULT.....	10
4.2	RADIATED EMISSION MEASUREMENT.....	12
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	12
4.2.2	TEST INSTRUMENT	13
4.2.3	TEST PROCEDURE.....	14
4.2.4	TEST SETUP.....	15
4.2.5	EUT OPERATING CONDITION.....	15
4.2.6	TEST RESULT.....	16
4.3	BAND EDGES MEASUREMENT	18
4.3.1	LIMITS OF BAND EDGES MEASUREMENT	18
4.3.2	TEST INSTRUMENTS.....	18
4.3.3	TEST PROCEDURE.....	18
4.3.4	EUT OPERATING CONDITION.....	18
4.3.5	TEST RESULTS	19
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	20
6	INFORMATION ON THE TESTING LABORATORIES	22



1 CERTIFICATION

PRODUCT : Wireless earphone base
BRAND NAME : MONIX
MODEL NO : MH-4000B
APPLICANT : FAN SHAING ELECTRONICS CO., LTD
STANDARDS : 47 CFR Part 15, Subpart C (15.235),
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on July 12, 2001. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY: Gary Chang, **DATE:** July 17, 2001
Gary Chang

CHECKED BY: Demi Chen, **DATE:** July 17, 2001
Demi Chen

APPROVED BY: Alan Lane, **DATE:** July 17, 2001
Dr. Alan Lane
Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.107	Conducted Emission Test	N/A	Minimum passing margin is -18.53dBuV at 0.59700MHz
15.235	Radiated Emission Test	PASS	Minimum passing margin is -10.5dBuV at 448.17MHz
15.235(b)	Band Edge Test	PASS	Meet the requirement of limit

NOTE: The receiver part to communicate with the EUT has been verified to comply with FCC Part 15, Subpart B, Class B (DoC). The test report can be provided upon request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless earphone base
MODEL NO.	MH-4000B
POWER SUPPLY	3.6VDC from battery 9VDC from AC/DC adapter for charged mode of transceiver
MODULATION TYPE	FM
FREQUENCY RANGE	NA
CARRIER FREQUENCY OF EACH CHANNEL	49.845 MHz
BANDWIDTH OF EACH CHANNEL	NA
NUMBER OF CHANNEL	1
ANTENNA TYPE	Wired Antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The power adapter below was used while the battery of EUT is being charged.

Model Name :	SCP35-9060
Input Power :	110V 60Hz
Output Power :	9VDC 60mA

2. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

One channel is provided in this EUT.

Channel	Frequency	Channel	Frequency
1	49.845 MHz		

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the transceiver part of a Wireless handsfree kit. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC CFR 47 Part 15, Subpart C (15.235)

ANSI C63.4-1992

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

3.4 DESCRIPTION OF SUPPORT UNITS

NA

4 TEST PROCEDURE AND RESULT

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.45 – 30	48	-	48	-

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. 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 INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 4, 2002
*ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 3, 2002
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 28, 2001
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 3, 2001
*EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 3, 2002
*Software	Cond-V2J	NA	NA
*RF cable (JYEBAO)	RG-58A/U	Cable-C02.01	July 9, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 2002
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	NA

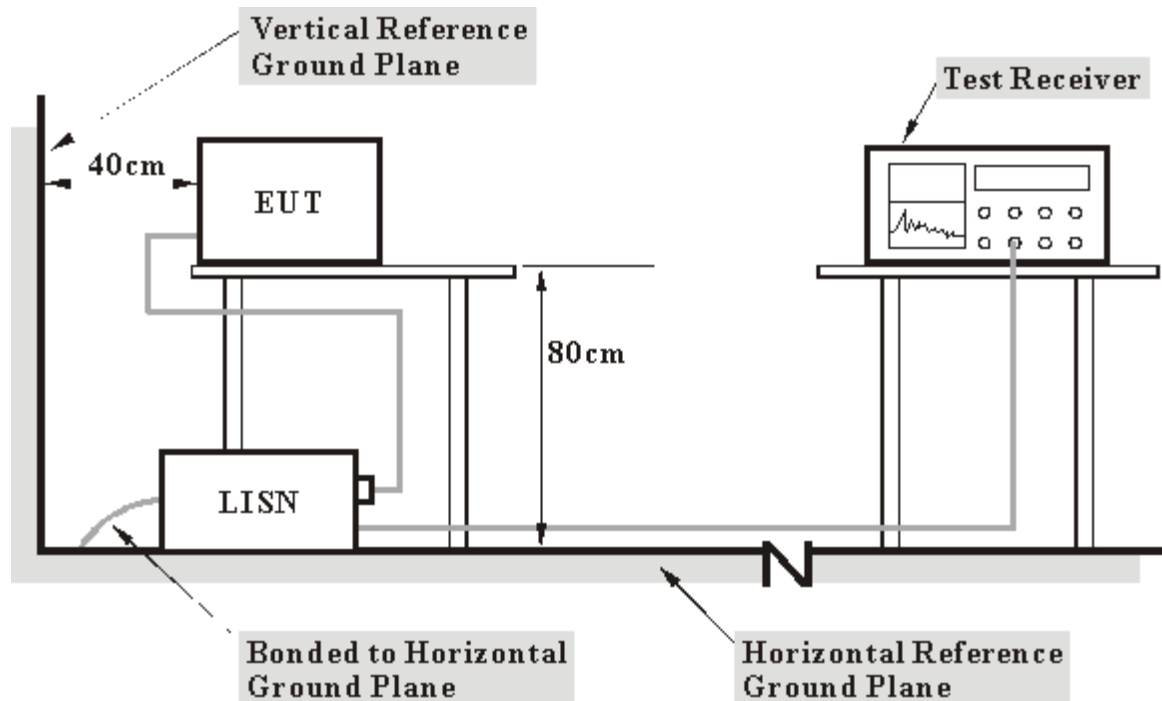
NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

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 over 10dB under the prescribed limits could not be reported.

4.1.4 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

4.1.5 EUT OPERATING CONDITION

The EUT was set to enable EUT under transmission condition continuously at specific channel frequency.

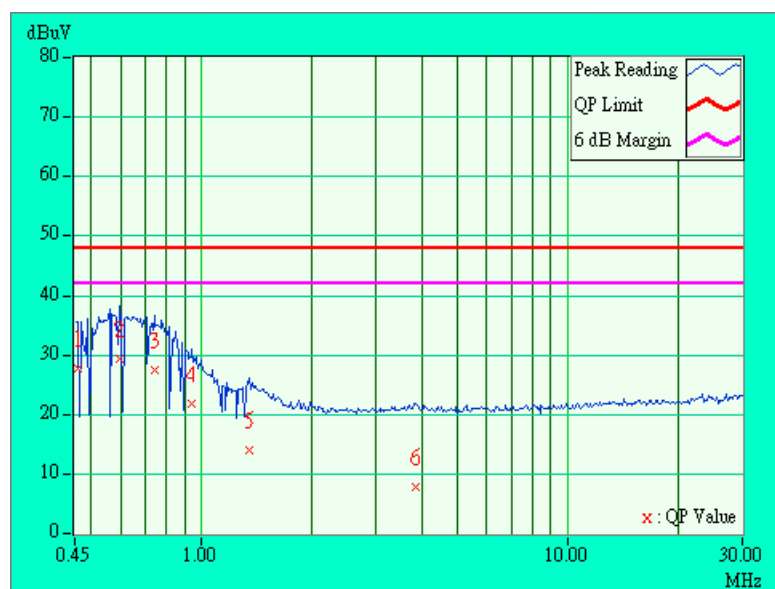
4.1.6 TEST RESULT

EUT	Wireless earphone base	MODEL	MH-4000B
MODE	Charged mode	6dB BANDWIDTH	10 kHz
INPUT POWER	110Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	TESTED BY: Gary Chang	

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.45900	0.20	27.68	---	27.88	---	48.00	---	-20.12	---
2	0.59700	0.20	29.27	---	29.47	---	48.00	---	-18.53	---
3	0.74100	0.20	27.51	---	27.71	---	48.00	---	-20.29	---
4	0.93900	0.20	21.73	---	21.93	---	48.00	---	-26.07	---
5	1.34700	0.20	14.12	---	14.32	---	48.00	---	-33.68	---
6	3.84300	0.38	7.79	---	8.17	---	48.00	---	-39.83	---

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Correction Factor + Reading Value.

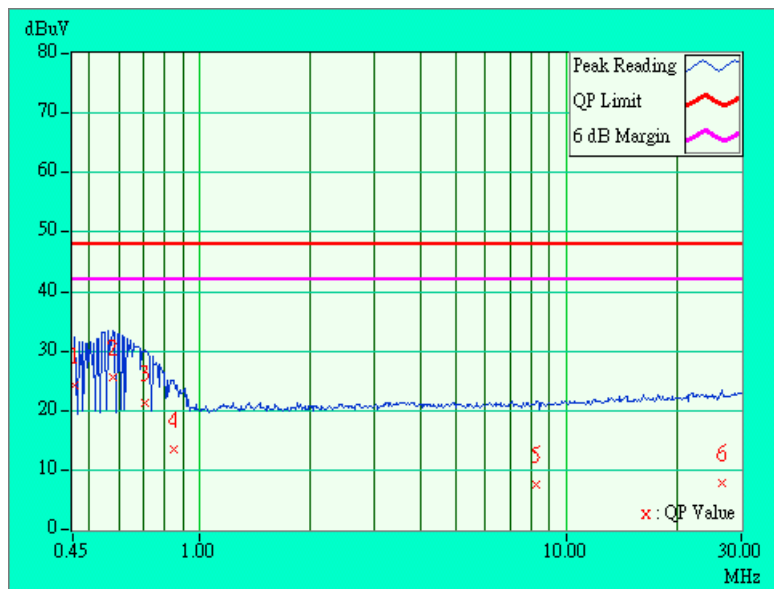


EUT	Wireless earphone base	MODEL	MH-4000B
MODE	Charged mode	6dB BANDWIDTH	10 kHz
INPUT POWER	110Vac, 60 Hz	PHASE	Line (N)
ENVIRONMENTAL CONDITIONS	30 deg. C, 60%RH, 1005 hPa	TESTED BY: Gary Chang	

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.45300	0.20	24.21	---	24.41	---	48.00	---	-23.59	---
2	0.57600	0.20	25.69	---	25.89	---	48.00	---	-22.11	---
3	0.70800	0.20	21.22	---	21.42	---	48.00	---	-26.58	---
4	0.84900	0.20	13.52	---	13.72	---	48.00	---	-34.28	---
5	8.26700	0.54	7.54	---	8.08	---	48.00	---	-39.92	---
6	26.59400	1.33	7.84	---	9.17	---	48.00	---	-38.83	---

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Correction Factor + Reading Value.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.235 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
49.82-49.90	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:

Other Frequencies (MHz)	Field Strength of Fundamental	
	uV/meter	dBuV/meter
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8590L	3544A01176	May 7, 2002
*HP Preamplifier	8447D	2944A08485	Nov. 3, 2001
* HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
* HP Preamplifier	8449B	3008A01292	Aug. 21, 2001
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 25, 2002
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2001
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 4, 2001
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 6, 2002
* EMCO Horn Antenna	3115	9312-4192	April 15, 2002
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D3	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Aug. 4, 2001
* TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 4, 2001
Antenna (Horn)	BBHA9120-D	D130	July 10, 2002
Open Field Test Site	Site 5	ADT-R05	July 28, 2001
VCCI Site Registration No.	Site 5	R-1039	NA
Site Registration No.	FCC: 90422 Canada IC: IC 3789 VCCI : R-1039		

NOTE: 1.The measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.

2.The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

3. "*" = These equipment are used for the final measurement.

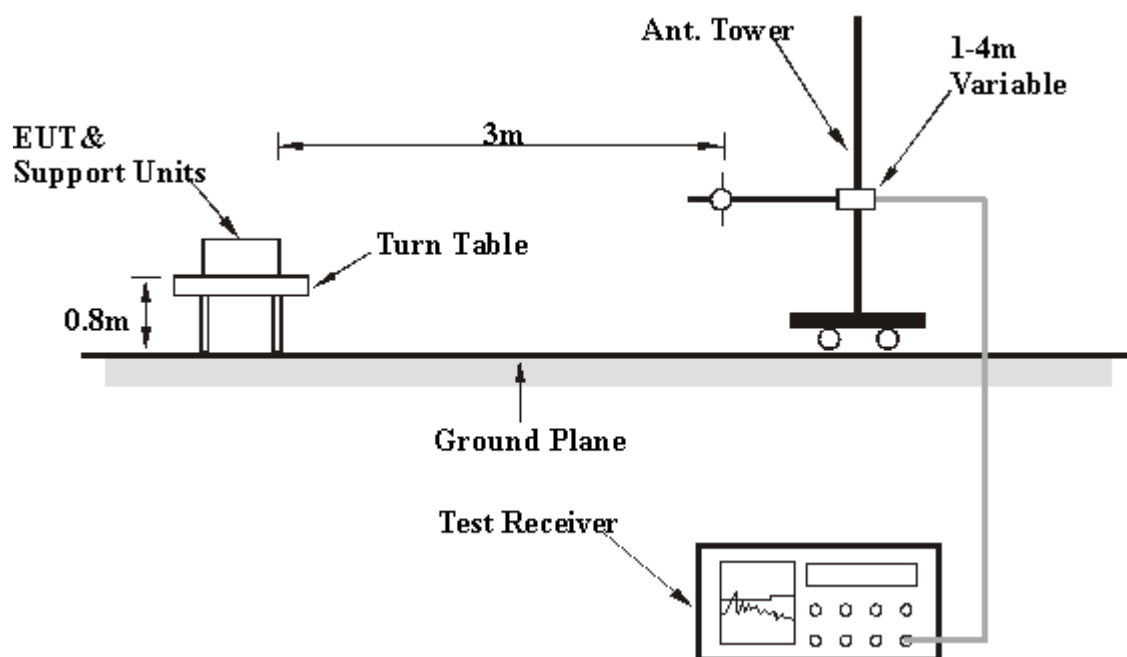
4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and 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.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) 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 4.1.5

4.2.6 TEST RESULT

EUT	Wireless earphone base	MODEL	MH-4000B
MODE	Channel frequency	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	110Vac, 60 Hz	DETECTOR FUNCTION	Peak / Quasi-Peak / Average
ENVIRONMENTAL CONDITIONS	30 deg. C, 60 % RH, 1050 hPa	TESTED BY: Gary Chang	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*49.84	53.4 PK	100.00	-46.60	1.86H	15	71.03	7.25	2.07	27.00	17.67
2	*49.84	40.5 AV	80.00	-39.50	1.86H	15	31.20	7.25	2.07	0.00	-9.33
3	120.87	31.9 QP	43.50	-11.60	1.37H	209	18.20	11.27	2.45	0.00	-13.72
4	249.85	32.8 QP	46.00	-13.20	1.05H	145	18.40	11.50	2.89	0.00	-14.39
5	349.87	32.9 QP	46.00	-13.10	2.02H	101	15.70	13.80	3.37	0.00	-17.17
6	360.47	33.4 QP	46.00	-12.60	1.58H	174	15.90	14.10	3.39	0.00	-17.49
7	448.17	35.5 QP	46.00	-10.50	1.69H	82	16.20	16.04	3.23	0.00	-19.28

NOTE:

1. Emission level = Raw Value – Correction Factor
2. Correction Factor = Pre-Amplifier Factor - Antenna Factor - Cable Factor
3. Pre-Amplifier Factor = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.
6. “*” : Fundamental frequency.

EUT	Wireless earphone base	MODEL	MH-4000B
MODE	Channel frequency	FREQUENCY RANGE	30-1000 MHz
INPUT POWER (SYSTEM)	110Vac, 60 Hz	DETECTOR FUNCTION	Peak / Quasi-Peak / Average
ENVIRONMENTAL CONDITIONS	30 deg. C, 60 % RH, 1050 hPa	TESTED BY: Gary Chang	

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)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*49.85	61.5 PK	100.00	-38.50	1.07V	68	79.17	7.25	2.07	27.00	17.67
2	*49.85	49.4 AV	80.00	-30.60	1.07V	68	40.10	7.25	2.07	0.00	-9.34
3	120.47	31.9 QP	43.50	-11.60	1.50V	261	18.20	11.27	2.45	0.00	-13.72
4	149.52	30.8 QP	43.50	-12.70	1.90V	62	18.20	10.03	2.59	0.00	-12.62
5	249.70	32.6 QP	46.00	-13.40	1.40V	233	18.20	11.50	2.89	0.00	-14.39
6	320.48	31.6 QP	46.00	-14.40	1.39V	342	15.30	13.08	3.21	0.00	-16.29
7	348.51	32.8 QP	46.00	-13.20	2.15V	37	15.70	13.74	3.36	0.00	-17.11
8	448.24	33.1 QP	46.00	-12.90	1.72V	123	13.80	16.04	3.23	0.00	-19.27

NOTE:

1. Emission level = Raw Value – Correction Factor
2. Correction Factor = Pre-Amplifier Factor - Antenna Factor - Cable Factor
3. Pre-Amplifier Factor = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.
6. “*” : Fundamental frequency

4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

The field strength of any emission appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	848926/005 846839/018	Dec 28, 2001
HP ATTENUATOR	8496B	3247A18505	Cal. on use
HP PLOTTER	7475A	2641V27755	N/A

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

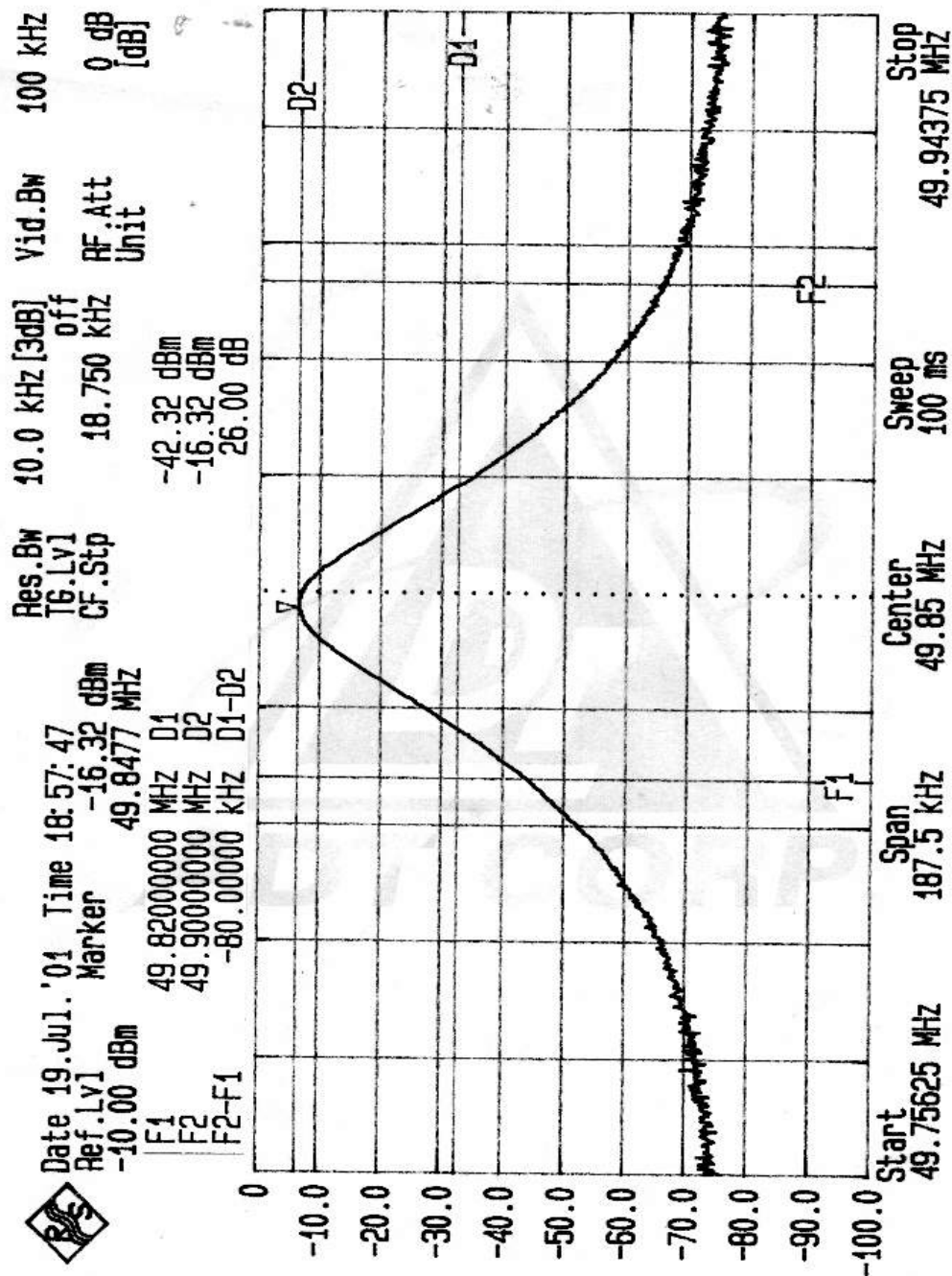
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 10 kHz and 100 kHz with suitable frequency span including 10 kHz bandwidth from band edge. The band edges was measured and recorded.

4.3.4 EUT OPERATING CONDITION

Same as Item 4.1.5

4.3.5 TEST RESULTS



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 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
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	BSMI, DGT, CNLA

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:

Lin Kou EMC Lab:

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