



**Spectrum Research
& Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.:FCCA03010705
Page: 1 of 15
Date: Feb. 10, 2003

Product Name: FM MODULATOR
Model Number: MRU201
Applicant: HAMG SHING TECHNOLOGY CORP.
957, PO AI ST, CHU PEI CITY, TAIWAN
Date of Receipt: Jan. 27, 2003
Finished date of Test: Feb. 02, 2003
Applicable Standards: 47 CFR Part 15, Subpart C
ANSI C63.4:1992

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By : S. Wang, Date: Feb. 10, 2003
(Spring Wang)

Approved By : J. H., Date: 2/10/2003
(Johnson Ho, Director)

NVLAP[®]

Lab Code: 200099-0

FCC ID : QTQ00MRU201



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No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 2 of 15
Date: Feb. 10, 2003

Table of Contents

1. DOCUMENT POLICY AND TEST STATEMENT.....	3
1.1 DOCUMENT POLICY	3
1.2 TEST STATEMENT.....	3
2. DESCRIPTION OF EUT AND TEST MODE	4
2.1 GENERAL DESCRIPTION OF EUT	4
2.2 DESCRIPTION OF EUT INTERNAL DEVICE.....	4
2.3 DESCRIPTION OF TEST MODE	4
2.4 DESCRIPTION OF SUPPORT UNIT	5
3. DESCRIPTION OF APPLIED STANDARDS	6
4. RADIATED EMISSION TEST	6
4.1 RADIATED EMISSION LIMIT.....	6
4.2 TEST EQUIPMENT.....	7
4.3 TEST SET-UP	8
4.4 TEST PROCEDURE	9
4.5 EUT OPERATING CONDITION	9
4.6 RADIATED EMISSION TEST RESULT.....	10
5 BAND EDGE.....	12
5.2 BAND EDGE LIMIT	12
5.2 TEST EQUIPMENT.....	12
5.3 TEST SET-UP	12
5.3 TEST PROCEDURE.....	12
5.5 EUT OPERATING CONDITION	12
5.6 BAND EDGE TEST RESULT.....	13
6 TERMS OF ABRIVATION.....	15

 <p>Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan</p>	TEST REPORT	Reference No.:A03010705 Report No.: FCCA03010705 Page: 3 of 15 Date: Feb. 10, 2003
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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source, 12V from DC power supply, was used during the test.



**Spectrum Research
& Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 4 of 15
Date: Feb. 10, 2003

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	FM MODULATOR
MODEL NO.	MRU201
POWER SUPPLY	DC 12V from Vehicle Battery
CABLE	Power port x 1
I/O PORT	Audio cable x 1
FREQUENCY BAND	88 ~ 108 MHz
CARRIER FREQUENCY	88.7 MHz,89.1MHz
NUMBER OF CHANNEL	2
CHANNEL SPACING	400 kHz
RF OUTPUT POWER	-40 dBm
I.F. & L.O.	I.F. 0MHz, L.O. 88.7 MHz,89.1MHz
MODULATION TYPE	FM
ANTENNA TYPE	Printed loop antenna

NOTE : The EUT is the transmitter part of a FM modulator. For more detailed features, please refer to the User's Manual of EUT.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID/DOC	REMARK
Power supply	Lurich	RPS-1512MB/910054	DOC	1.8m unshielded power cord
DVD player	Sony	DVP-S300/0269057	DOC	1.8m unshielded power cord

2.3 DESCRIPTION OF TEST MODE

N/A (It is only applicable to more than one test mode.)



**Spectrum Research
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No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 5 of 15
Date: Feb. 10, 2003

2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NOTE : For the actual test configuration, please refer to the photos of testing.



**Spectrum Research
& Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 6 of 15
Date: Feb. 10, 2003

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of ITE and according to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

ANSI C63.4:1992

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

4. RADIATED EMISSION TEST

4.1 RADIATED EMISSION LIMIT

All emission from EUT, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

FCC Part 15, Subpart C Section 15.239.

FREQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (dB μ V/m)	
		PEAK	AVERAGE
88 - 108	3	68	48.0

FCC Part 15, Subpart C Section 15.209.

FREQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (dB μ V/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0

NOTE : 1. In the emission tables above , the tighter limit applies at the band edges.

2. Distance refers to the distance between measuring instrument , antemma , and the closest point of any part of the device or system.



**Spectrum Research
& Testing Lab., Inc.**

No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 7 of 15
Date: Feb. 10, 2003

4.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test :

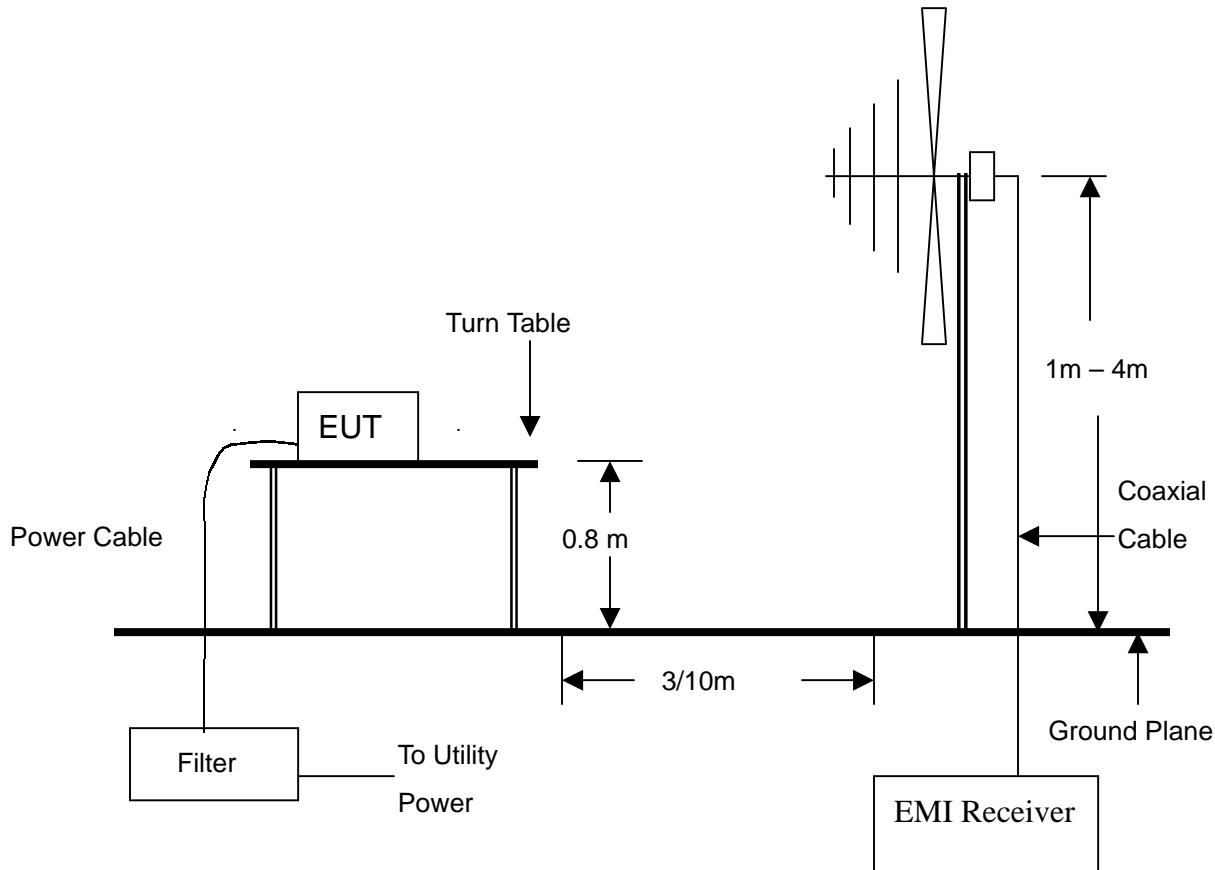
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz TO 26.5 GHz	ROHDE & SCHWARZ	ESI26,FSE-B10	MAY. 2003 R&S
BI-LOG ANTENNA	30 MHz TO 3 GHz	ROHDE & SCHWARZ	HL562/ 830547/010	MAY. 2003 ETC
PRE-AMPLIFIER	9kHz TO 3GHz	ADVANTEST	BB525C	NOV 2003 ETC
OATS	3 - 10 M measurement	TATUNG	TATUNG	JAN 2004

NOTE:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The 10M semi-chamber is registered by FCC with No.474046.



4.3 TEST SET-UP



NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.



**Spectrum Research
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No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 9 of 15
Date: Feb. 10, 2003

4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4. The measurements were made at an open area test site with 3 meter measurement distance. The frequency spectrum measured started from 30 MHz. Under 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver.

4.5 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at specific channel frequency.

 <p>Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan</p>	<h1>TEST REPORT</h1>	Reference No.: A03010705 Report No.: FCCA03010705 Page: 10 of 15 Date: Feb. 10, 2003
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4.6 RADIATED EMISSION TEST RESULT

Temperature:	23 °C	Humidity:	60 %RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	3m
Channel:	1	Receiver Detector:	PK., Q.P. or AV.
Tested by	James Lee		

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	EL(m)	AZ(°)
88.7266(F)	-34.30	8.50	72.6	46.8(PK)	68.0	-21.2	48	3.1
88.7266(F)	-34.30	8.50	70.7	44.9 (AV)	48.0	-3.1	48	3.1
177.4344	-34.10	6.70	43.1	15.7	43.5	-27.8	96	2
266.1297	-33.82	9.80	44.7	20.7	46.0	-25.3	160	1.4
354.8375	-33.70	12.60	49.1	28.0	46.0	-18.0	64	1
443.5378	-33.50	14.40	49.8	30.7	46.0	-15.3	134	1
532.2412	-33.10	16.50	27.3	10.7	46.0	-35.3	113	1

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	EL(m)	AZ(°)
88.7150 (F)	-34.30	8.50	73.6	47.8 (PK)	68.0	-20.2	187	1
88.7150 (F)	-34.30	8.50	71.6	45.8 (AV)	48.0	-2.2	187	1
177.4220	-34.10	6.70	45.1	17.7	43.5	-25.9	267	1
266.1400	-33.82	9.80	37.0	13.0	46.0	-33.0	208	2.2
354.8263	-33.70	12.60	47.0	25.9	46.0	-20.1	170	1.8
443.5338	-33.50	14.40	40.5	21.4	46.0	-24.6	354	1
532.2469	-33.10	16.50	29.8	13.2	46.0	-32.8	41	1

NOTE :

1. Measurement uncertainty is less than +/- 4dB
2. **: Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss
4. The field strength of other emission frequencies were very low against the limit.
5. (F) : Fundamental frequency of transmitter.



**Spectrum Research
& Testing Lab., Inc.**

No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 11 of 15
Date: Feb. 10, 2003

Temperature: 30 °C
Ferquency Range: 30 – 1000 MHz
Channel: 2
Tested by James Lee

Humidity: 64 %RH
Measured Distance: 3m
Receiver Detector: PK.、Q.P. or AV.

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	EL(m)	AZ(°)
89.1187(F)	-34.30	8.50	73.5	47.7 (PK)	68.0	-20.3	42	2.8
89.1187(F)	-34.30	8.50	70.5	44.7 (AV)	48.0	-3.3	42	2.8
178.2225	-34.10	6.70	43.8	16.4	43.5	-27.1	93	2.1
267.3288	-33.82	9.80	46.3	22.3	46.0	-23.8	160	1.5
356.4400	-33.70	12.60	49.9	28.8	46.0	-17.2	65	1
445.5315	-33.50	14.40	52.2	33.1	46.0	-13.0	140	1
534.6370	-33.10	16.50	36.1	19.5	46.0	-26.5	130	1

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	EL(m)	AZ(°)
89.1225 (F)	-34.30	8.50	74.4	48.6(PK)	68.0	-19.4	187	1.2
89.1225 (F)	-34.30	8.50	71.8	46.0 (AV)	48.0	-2.0	187	1.2
178.2200	-34.10	6.70	46.0	18.6	43.5	-24.9	227	1
267.3200	-33.82	9.80	38.5	14.5	46.0	-31.5	181	2.2
356.4125	-33.70	12.60	47.3	26.2	46.0	-19.8	177	1.7
445.4912	-33.50	14.40	44.3	25.2	46.0	-20.8	51	1
534.6237	-33.10	16.50	34.8	18.2	46.0	-27.8	163	1

NOTE :

1. Measurement uncertainty is less than +/- 4dB
2. **: Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss
4. The field strength of other emission frequencies were very low against the limit.
5. (F) : Fundamental frequency of transmitter.

 <p>Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan</p>	<h1>TEST REPORT</h1>	Reference No.:A03010705 Report No.: FCCA03010705 Page: 12 of 15 Date: Feb. 10, 2003
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5 BAND EDGE

5.2 BAND EDGE LIMIT

The limit is less than 26dB with respect to the amplitude of fundamental frequency.

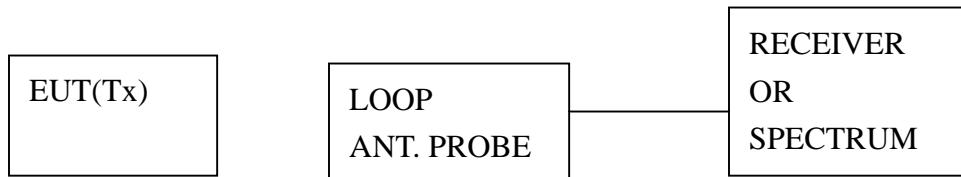
5.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9 kHz TO 7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAR. 2003 ETC

NOTE: 1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

5.3 TEST SET-UP



5.3 TEST PROCEDURE

A specific loop antenna was connected to receiver to detect the EUT's power level.

The Receiver displayed the EUT's power level and printed out the plot of measurement.

5.5 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at specific channel frequency.



**Spectrum Research
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No. 101-10, Ling 8,
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City, Taoyuan, Taiwan

TEST REPORT

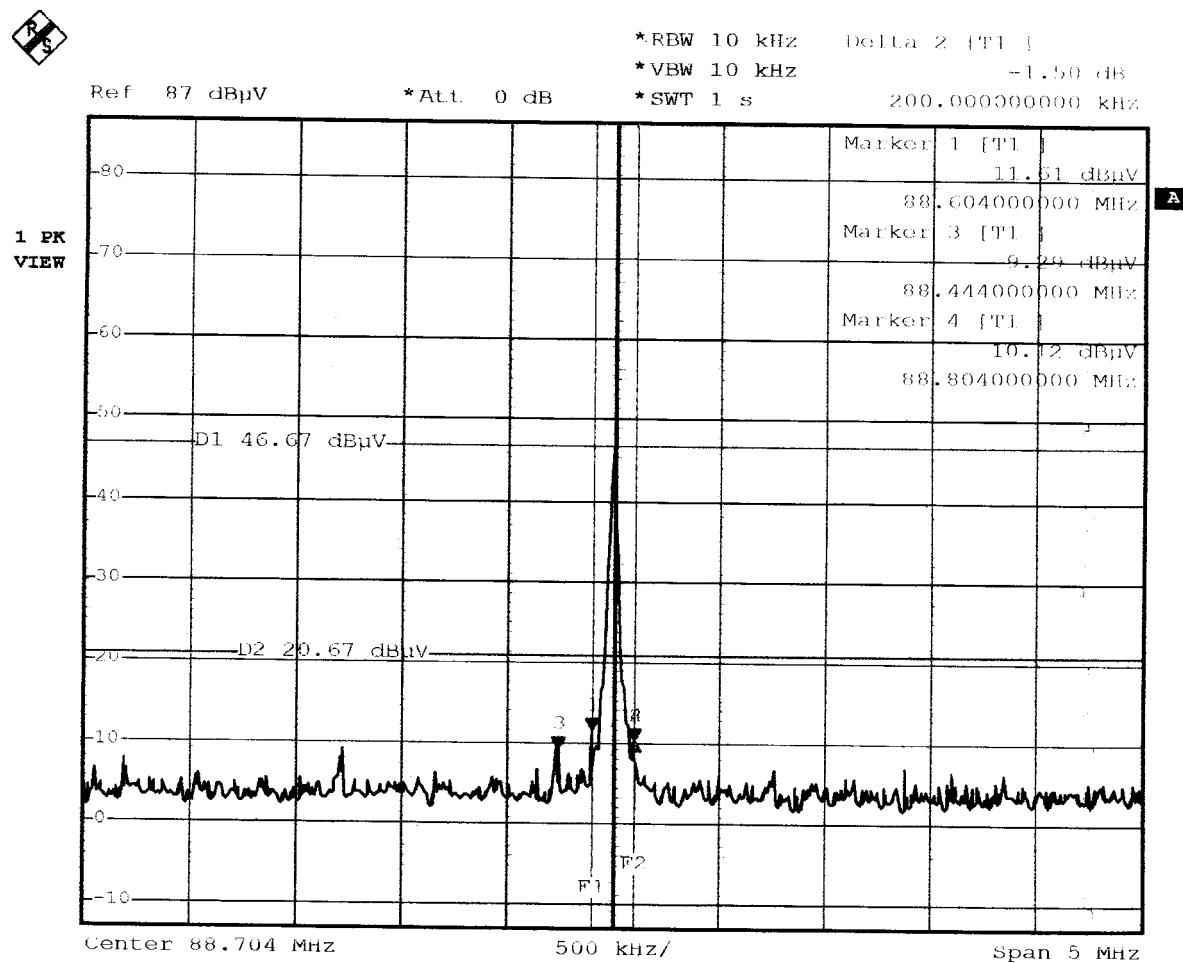
Reference No.:A03010705
Report No.: FCCA03010705
Page: 13 of 15
Date: Feb. 10, 2003

5.6 BAND EDGE TEST RESULT

Temperature: 20°C
Receiver Detector: Peak
Channel: 1

Humidity: 60 %RH
Tested by James Lee
Test Result: Pass

FREQUENCY (MHZ)	RF LEVEL 10kHz BW (dBuV)	LIMIT (dBuV)	MARGIN (dB)
88.604	11.61	20.67	-9.06
88.804	10.12	20.67	-10.55





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& Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

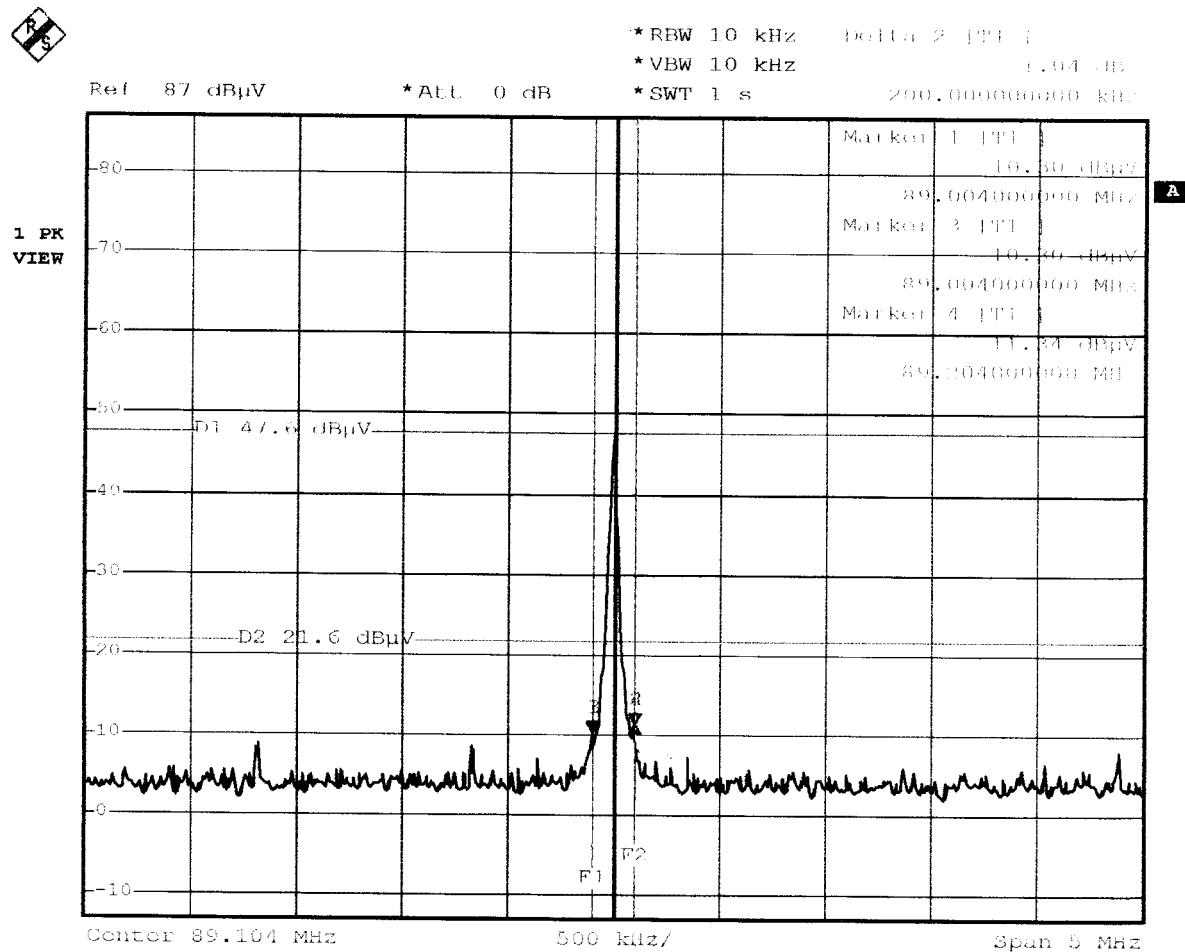
TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 14 of 15
Date: Feb. 10, 2003

Temperature: 20°C
Receiver Detector: Peak
Channel: 2

Humidity: 55 %RH
Tested by James Lee
Test Result: Pass

FREQUENCY (MHZ)	RF LEVEL 10kHz BW (dBuV)	LIMIT (dBuV)	MARGIN (dB)
89.004	10.30	21.60	-11.30
89.204	11.34	21.60	-10.26





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& Testing Lab., Inc.**

No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.:A03010705
Report No.: FCCA03010705
Page: 15 of 15
Date: Feb. 10, 2003

6 TERMS OF ABRIVATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction