FCC TEST REPORT

REPORT NO.: RF90041610
MODEL NO.: MASTER CONCEPTS
RECEIVED: April 30, 2001
TESTED: May 07, 2001

APPLICANT: VISION AUTO MOBILE ELECTRONICS INDUSTRAL CO., LTD.

ADDRESS: No.17, Alley 92, Lane 189, Sec. 1, An Chung Rd, Tainan, Taiwan R.O.C

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

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0528

Lab Code: 200102-0

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1 CERTIFICATION

PRODUCT :	Brakebuddy Alert System (Transmitter Part)
BRAND NAME :	VISION
MODEL NO :	MASTER CONCEPTS
APPLICANT :	VISION AUTO MOBILE ELECTRONICS INDUSTRAL CO., LTD.
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.231) , ANSI C63.4-1992
SITE REGISTERATION NO :	90422 (FCC) IC 3789-5 (Canada IC)

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on May 07, 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:** May 28, 2001
(Gary Chang)

CHECKED BY: Demi Chen , **DATE:** May 28, 2001
(Demi Chen)

APPROVED BY: , **DATE:** May 28, 2001
(Harris W. Lai)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard Section	Test Type	Result	Remarks
FCC PART 15, SUBPART C, 15.107, 15.209, 15.231	Conducted Test	NA	NA
	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is –2.5dBuV at 405.19 MHz
	20 dB Bandwidth	PASS	

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Brakebuddy Alert System (Transmitter Part)
MODEL NO.	MASTER CONCEPTS
POWER SUPPLY	12VDC
DATA CABLE	NA
I/O PORTS	NA
MODULATION TYPE	AM
FREQUENCY RANGE	NA
CARRIER FREQUENCY OF EACH CHANNEL	433.92MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Monopole Antenna
ASSOCIATED DEVICES	NA
DESCRIPTION OF MODELS	NA

NOTE : The alert system allows you to monitor the braking in the towed vehicle conveniently at any time. The EUT is the transmitter part of the alert system.

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

3.2 DESCRIPTION OF TEST MODES

One channels are provided from EUT.

Channel	Frequency	Channel	Frequency
1	433.92 MHz	7	
2		8	
3		9	
4		10	
5		11	
6			

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the transmitter part of a Brakebuddy Alert System. According to the specifications of the manufacturers, it must comply with the requirements of the following standards:

FCC CFR 47 Part 15, Subpart C.

ANSI C63.4-1992

All tests have been performed and recorded as per the above standards. The conducted test is not necessary, as the power input of EUT is DC 12V from motor coach.

3.4 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.	I/O Cable
1	DC Power Supply	GW	GPC-3030DQ	8070434	Nonshielded Power (1.8m)

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

NA

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.231 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		Field Strength of Spurious	
	uV/meter	dBuV/meter	uV/meter	dBuV/meter
40.66 – 40.70	2250	67.04	225	48.04
70 – 130	1250	61.94	125	41.94
130 – 174	1250 to 3750	61.94 to 71.48	125 to 375	41.94 to 51.48
174 – 260	3750	71.48	75	37.50
260 – 470	3750 to 12500	71.48 to 81.94	375 to 1250	51.48 to 61.94
Above 470	12500	81.94	1250	61.94

NOTE:

(1) Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)-7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

(2) The above field strength limits are specified at a distance of 3meters. The tighter limits apply at the band edges.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8590L	3544A01176	May 7, 2002
*HP Preamplifier	8447D	2944A08485	Nov. 4, 2001
* HP Preamplifier	8449B	3008A01201	Dec. 13, 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
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	AS61D	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, 2001
Open Field Test Site	Site 5	ADT-R05	July 28, 2001
VCCI Site Registration No.	Site 5	R-1039	NA

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 equipments are used for the final measurement.

4.2.3 TEST PROCEDURES

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.

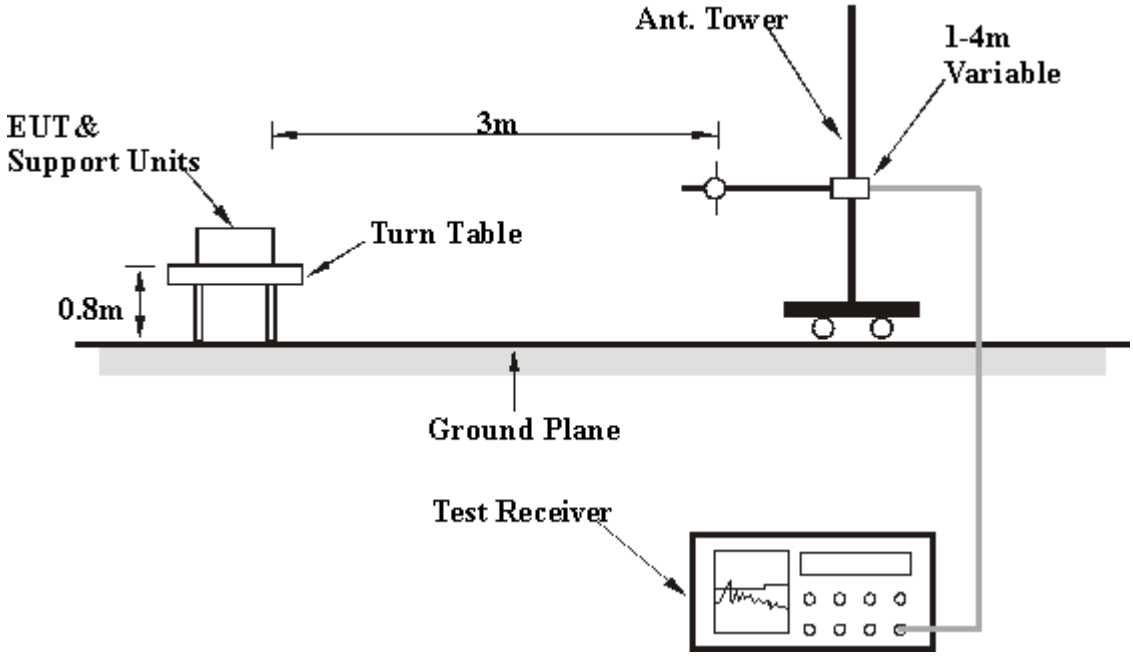
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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 – Photographs of the Test Configuration.

4.2.5 EUT OPERATING CONDITIONS

a. Turn on the power of all equipment.
b. The EUT was operated at transmitting condition continuously during the test.

4.2.6 TEST RESULTS

EUT	Brakebuddy Alert System (Transmitter Part)	**MODEL**	Master Concepts
MODE	433.92MHz	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION & BANDWIDTH**	Peak / Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	24 deg. C, 70 % 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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	*433.93	75.4 PK	80.83	-5.43	280	160	83.26	15.86	3.30	27.00	7.85
2	867.88	58.1 QP	60.83	-2.73	151	304	34.10	19.68	4.37	0.00	-24.05

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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	*433.93	74.9 PK	80.83	-5.93	166	271	82.71	15.86	3.30	27.00	7.85
2	867.89	50.9 PK	60.83	-9.93	273	52	53.83	19.68	4.37	27.00	2.95

NOTE:

1. Emission level (dBuV/m) = Reading value (dBuV) - Correction Factor (dB)
2. Correction Factor (dB) = External Preamp. Gain (dB)-Ant. Factor (dB) -Cable loss (dB)
   (External Preamp. Gain = 0, when the test receiver is used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

EUT	Brakebuddy Alert System (Transmitter Part)	**MODEL**	Master Concepts
MODE	433.92MHz	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION & BANDWIDTH**	Peak , 120 kHz Average, 1MHz
ENVIRONMENTAL CONDITIONS	24 deg. C, 70 % 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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	1301.9	50.6 PK	80.83	-30.23	1.04	312	22.98	25.00	2.61	0.00	-27.61

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/m)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB/m)
1	1301.7	52.2 PK	80.83	-28.63	1.03	12	24.60	25.00	2.61	0.00	-27.61

NOTE:

1. Emission level (dBuV/m) = Reading value (dBuV) - Correction Factor (dB)
2. Correction Factor (dB) = External Preamp. Gain (dB)-Ant. Factor (dB) -Cable loss (dB) (External Preamp. Gain = 0, when the test receiver is used for the test.)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

4.3 20dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 20 dB BANDWIDTH MEASUREMENT

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.

Fundamental Frequency (MHz)	Limit of 20 dB Bandwidth(kHz)
433.92	1084.8

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ TEST RECEIVER	ESMI	846839/018 848926/005	Dec 28, 2001
CHASE BILOG Antenna	CBL6112A	2345	Apr. 17, 2002
HP Plotter	7475A	2641V27755	NA

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.

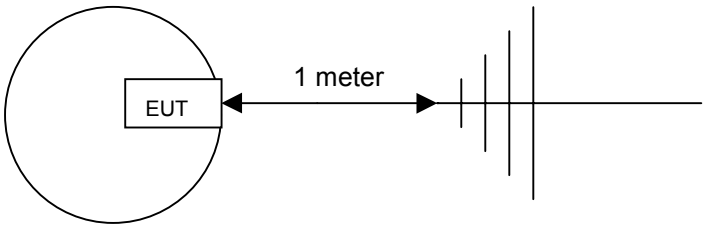
4.3.3 TEST PROCEDURES

(1) The EUT was placed on the turn table .

(2) The signal was coupled to the spectrum analyzer through an antenna.

(3) Set the resolution bandwidth and video bandwidth to 100kHz and select Peak function to scan the channel frequency.
The 20 dB bandwidth was measured and recorded.

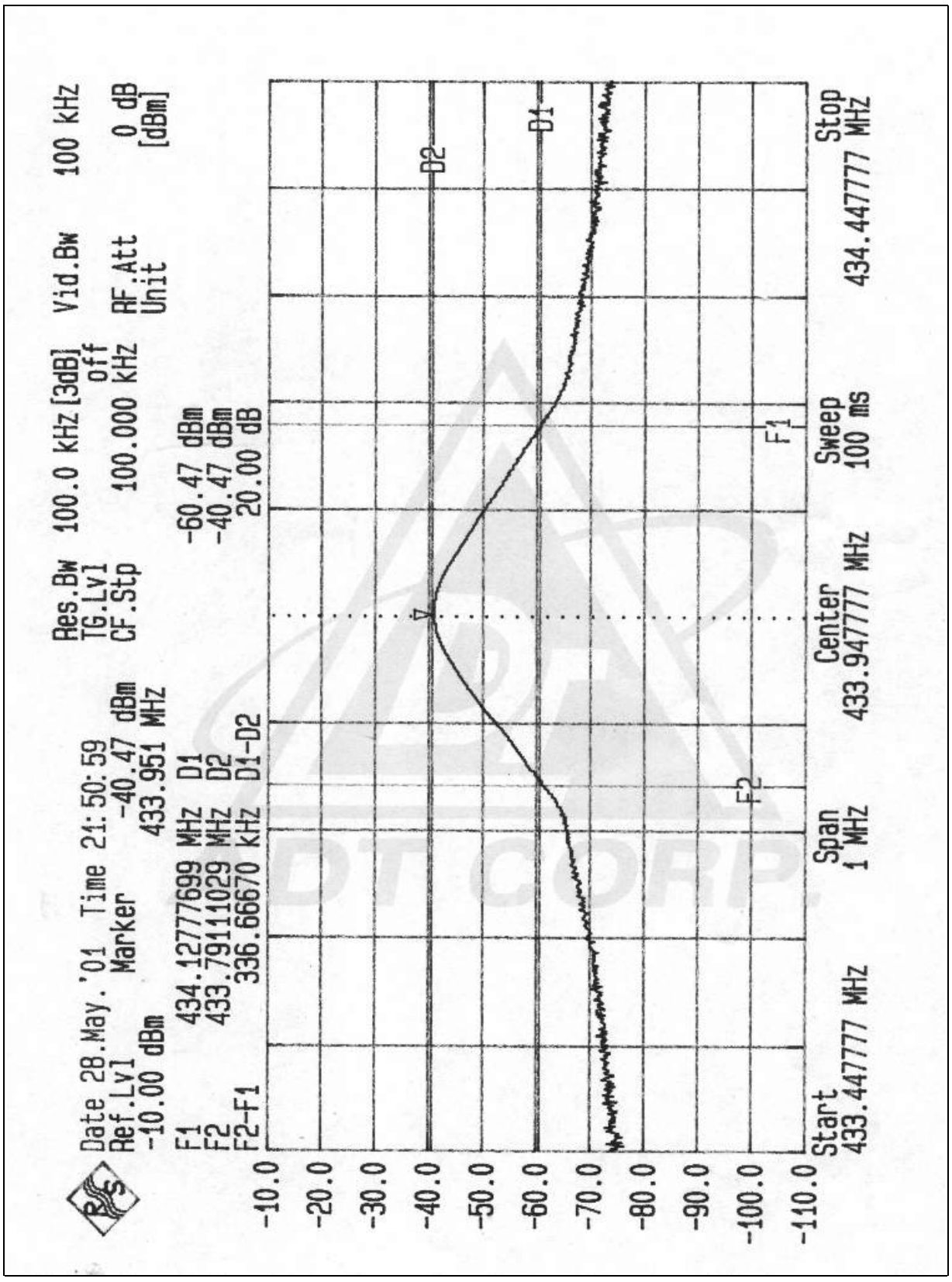
4.3.4 TEST SETUP



4.3.5 TEST RESULTS

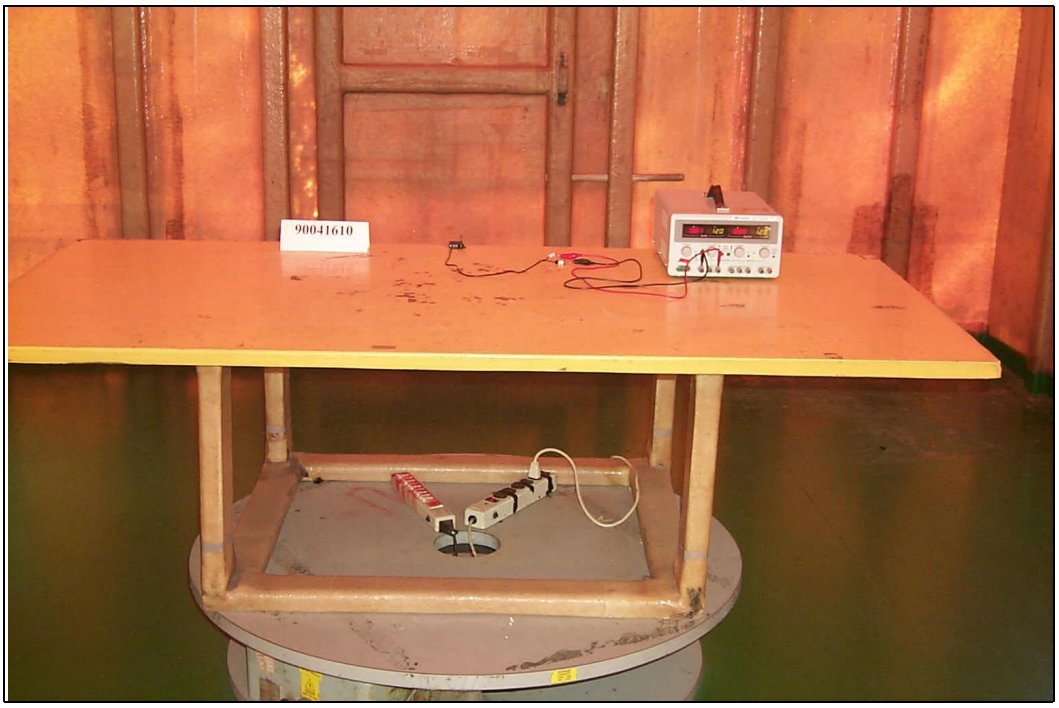
Frequency (MHz)	20 dB bandwidth (kHz)	Maximum limit (kHz)	PASS/FAIL
433.92	336.67	1084.80	PASS

The plot of test result is attached as below.


Date 28.May.'01 Time 21:50:59
Ref.Lvl -10.00 dBm
Marker -40.47 dBm
433.951 MHz
F1 434.1277699 MHz D1 -60.47 dBm
F2 433.7911029 MHz D2 -40.47 dBm
F2-F1 336.66670 kHz D1-D2 20.00 dB
Res.Bw 100.0 kHz [3dB] Vid.Bw 100 kHz
TG.Lvl off
CF.Stp 100.000 kHz RF.Att 0 dB
Unit [dBm]
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
-110.0
D2
D1
F1
F2
Start 433.447777 MHz
Span 1 MHz
Center 433.947777 MHz
Sweep 100 ms
Stop 434.447777 MHz

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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