



FCC TEST REPORT

REPORT NO.: RF930219R04

MODEL NO.: HA51P

RECEIVED: February 19, 2004

TESTED: February 25, 2004

APPLICANT: EVERSPRING INDUSTRY CO., LTD

ADDRESS: 7FL.609 Wan Shou Road, Sec.1, Kweishan,
Taoyuan Hsien 333, 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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1 CERTIFICATION

PRODUCT : Wireless Alarm System
MODEL NO.: HA51P
BRAND: EVERSPRING
APPLICANT : EVERSPRING INDUSTRY CO., LTD
TEST ITEM: ENGINEERING SAMPLE
STANDARDS : FCC Part 15, Subpart C (Section 15.231),
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on February 25, 2004. 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.

PREPARED BY: Stacy Hsueh , **DATE:** March 11, 2004
Stacy Hsueh
APPROVED BY: Ellis Wu , **DATE:** March 11, 2004
Ellis Wu / Manager



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	NA	9Vdc from batteries
15.209 15.231	Radiated Emission Test	PASS	Minimum passing margin is -5.85dB at 1301.70MHz
15.231	20dB Occupied Bandwidth Measurement	PASS	Meet the requirement of limit

NOTE:

The information of measurement uncertainty is available upon the customer's request.



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Alarm System
MODEL NO.	HA51P
BRAND	EVERSPRING
POWER SUPPLY	9Vdc from batteries
MODULATION TYPE	ASK
CARRIER FREQUENCY OF EACH CHANNEL	433.92MHz
NUMBER OF CHANNEL	1
DATA CABLE	NA
I/O PORTS	NA

NOTE:

1. The EUT include Transmitter part and Receiver part. The model no.: HA51P includes Tx of 433.92MHz application used for control signal transmitting. Receiver part which model no.: HA51 has been presented in DoC report of number 930219R02.
2. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.



3.2 DESCRIPTION OF TEST MODES

One channel is provided in the EUT :

Channel	Frequency
1	433.92 MHz

NOTE: 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 Z-plane. There for only the test data of this Z-plane was used for Radiated test.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless Alarm System. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.231)

ANSI C63.4: 1992

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



3.4 DESCRIPTION OF SUPPORT UNITS

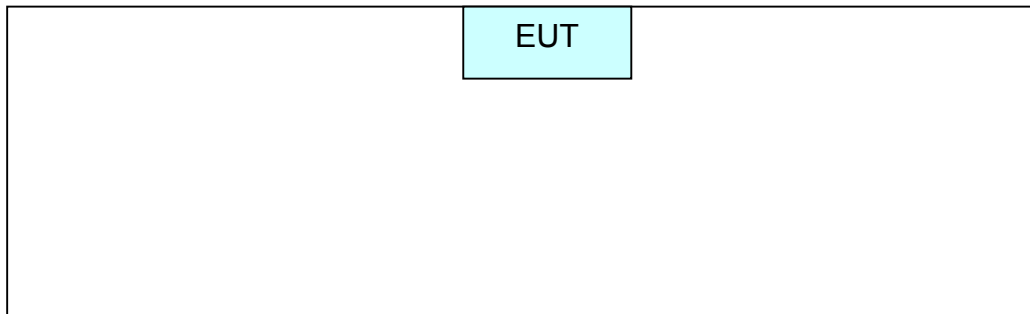
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NA				

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

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES 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.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:



Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8593E	3911A07465	Jul. 07, 2004
*HP Preamplifier	8447D	2944A10386	Aug. 12, 2004
* HP Preamplifier	8449B	3008A01292	Aug. 11, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Jun. 26, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
*SCHAFFNER TEST RECEIVER	SCR 3501	409	Nov. 06, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	Jul. 15, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun 30, 2004
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V 5.14	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 17, 2004
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 17, 2004

- 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. "*" = These equipment are used for the final measurement.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The test was performed in ADT Open Site No. 10.
 5. The VCCI Site Registration No. is R-1625..



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.

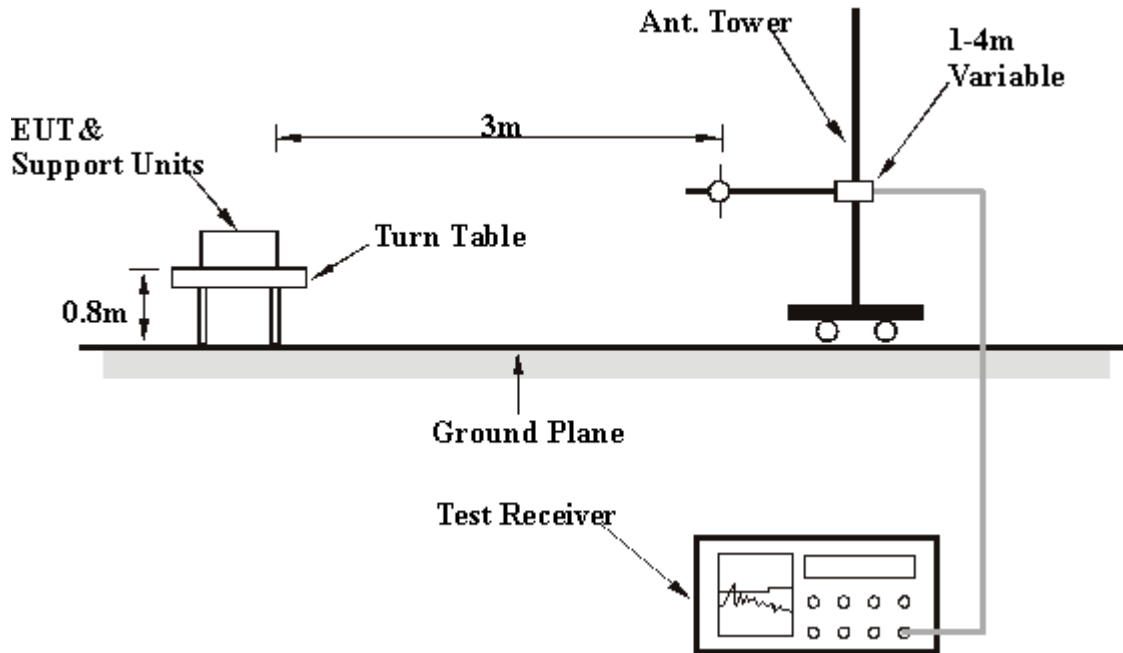
NOTE:

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 10 Hz for Average detection (AV) at frequency above 1GHz.

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

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



4.2.7 TEST RESULTS

EUT	Wireless Alarm System	MODEL	HA51P
FREQUENCY RANGE	Below 1000MHz	DETECTOR FUNCTION	Peak(PK), 10V
ENVIRONMENTAL CONDITIONS	22deg. C, 70%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Martin Lee		

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	*433.91	77.05 PK	100.80	-23.75	1.00 H	80	56.99	20.06
1	*433.91	69.93 AV	80.80	-10.87	1.00 H	80	49.87	20.06
2	867.82	54.92 PK	80.80	-25.88	1.29 V	256	12.72	29.20
2	867.82	47.80 AV	60.80	-13.00	1.29 V	256	18.60	29.20

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	*433.91	67.60 PK	100.80	-33.20	1.21 V	147	47.54	20.06
1	*433.91	60.48 AV	80.80	-20.32	1.21 V	147	40.42	20.06
2	867.82	44.95 PK	80.80	-35.85	2.20 V	230	15.75	29.20
2	867.82	37.83 AV	60.80	-22.97	2.20 V	230	22.08	29.20

- NOTE:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) = Antenna Factor (dB) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. "*" = Fundamental frequency
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)
Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.39\text{ms} \cdot 2) + (0.67\text{ms} \cdot 11)}{18.5\text{ms}} = -7.12\text{dB}$$

please see page 14, 15, 16 for plotted duty



EUT	Wireless Alarm System	MODEL	HA51P
FREQUENCY RANGE	1~25GHz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Martin Lee		

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	1301.70	55.27 PK	74.00	-18.73	1.00 H	304	27.77	27.50
1	1301.70	48.15 AV	54.00	-5.85	1.00 H	304	20.65	27.50
2	1735.67	43.63 PK	74.00	-30.37	1.00 H	77	14.69	28.94
2	1735.67	36.51 AV	54.00	-17.49	1.00 H	77	7.57	28.94
3	2603.59	46.40 PK	74.00	-27.60	1.00 H	345	15.24	31.16
3	2603.59	39.28 AV	54.00	-14.72	1.00 H	345	8.12	31.16

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	1301.70	53.77 PK	74.00	-20.23	1.00 V	2	26.27	27.50
1	1301.70	46.65 AV	54.00	-7.35	1.00 V	2	19.15	27.50
2	1735.00	45.12 PK	74.00	-28.88	1.02 V	229	16.19	28.93
2	1735.00	38.00 AV	54.00	-16.00	1.02 V	229	9.07	28.93
3	2169.60	48.86 PK	74.00	-25.14	1.00 V	17	18.30	30.56
3	2169.60	41.74 AV	54.00	-12.26	1.00 V	17	11.18	30.56
4	2603.46	51.40 PK	74.00	-22.60	1.03 V	4	20.24	31.16
4	2603.46	44.28 AV	54.00	-9.72	1.03 V	4	13.12	31.16
5	3037.39	47.96 PK	74.00	-26.04	1.17 V	3	14.53	33.43
5	3037.39	40.84 AV	54.00	-13.16	1.17 V	3	7.41	33.43
6	3471.33	44.80 PK	74.00	-29.20	1.00 V	16	11.37	33.42
6	3471.33	37.68 AV	54.00	-16.32	1.00 V	16	4.26	33.42

NOTE:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB) = Antenna Factor (dB) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle)
Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.39\text{ms} \cdot 2) + (0.67\text{ms} \cdot 11)}{18.5\text{ms}} = -7.12\text{dB}$$

please see page 14, 15, 16 for plotted duty

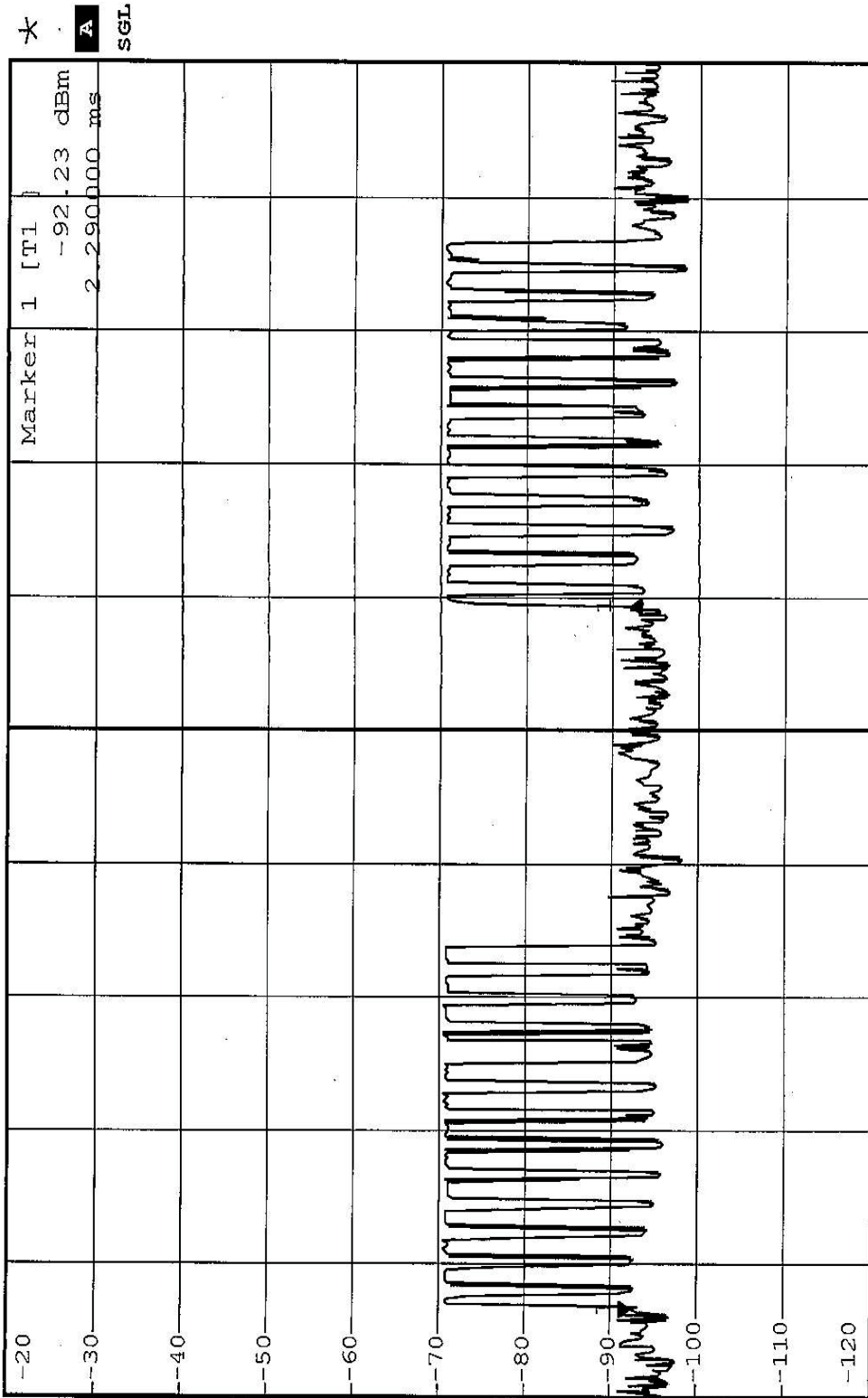


RBW 100 kHz Delta 1 [T1]
 *VBW 100 kHz 0.14 dB
 SWT 35 ms 18.500000 ms

*Att 0 dB

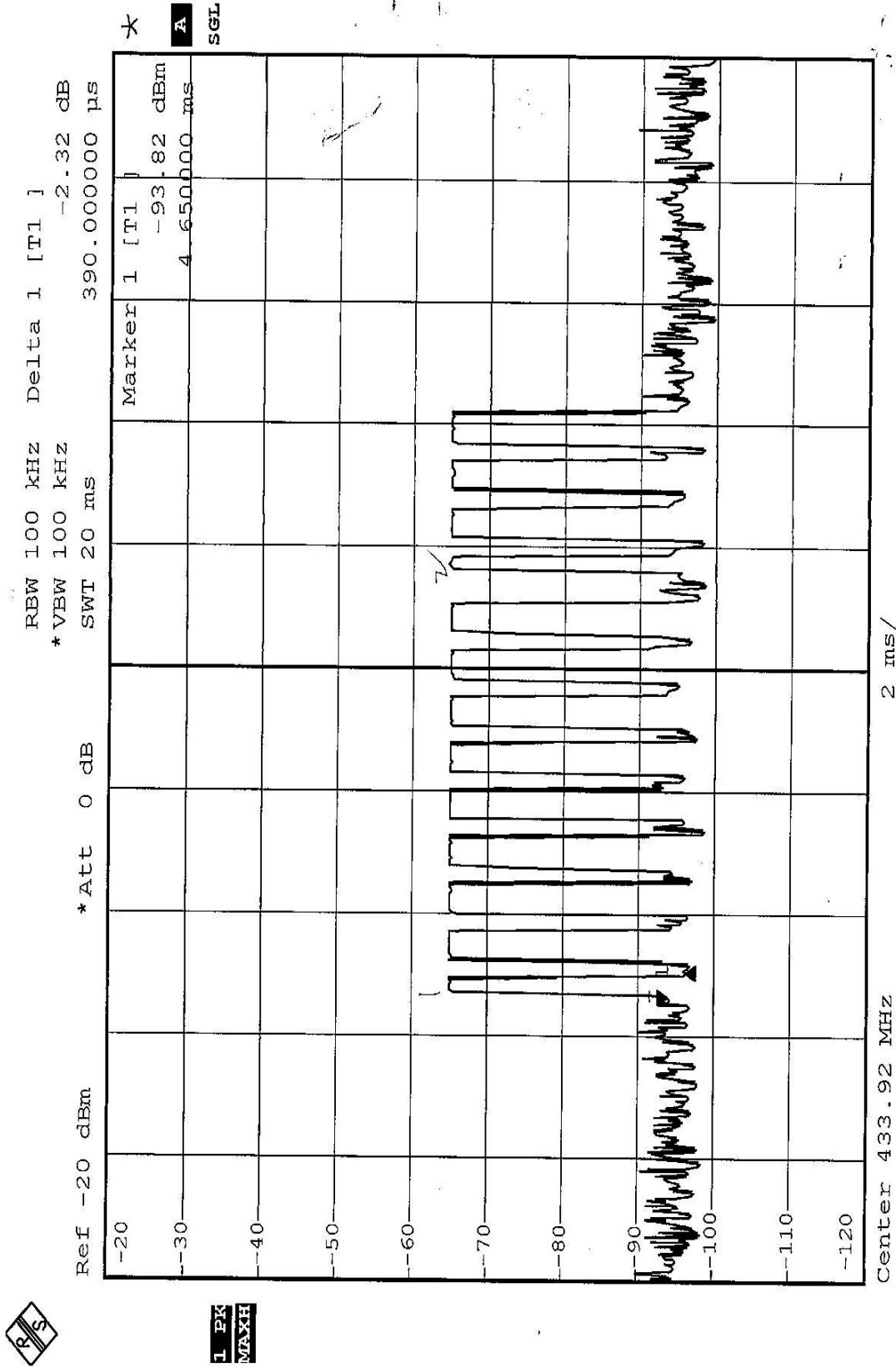
Ref -20 dBm

Center 433.92 MHz



1 PK
 MAXH

3.5 ms/

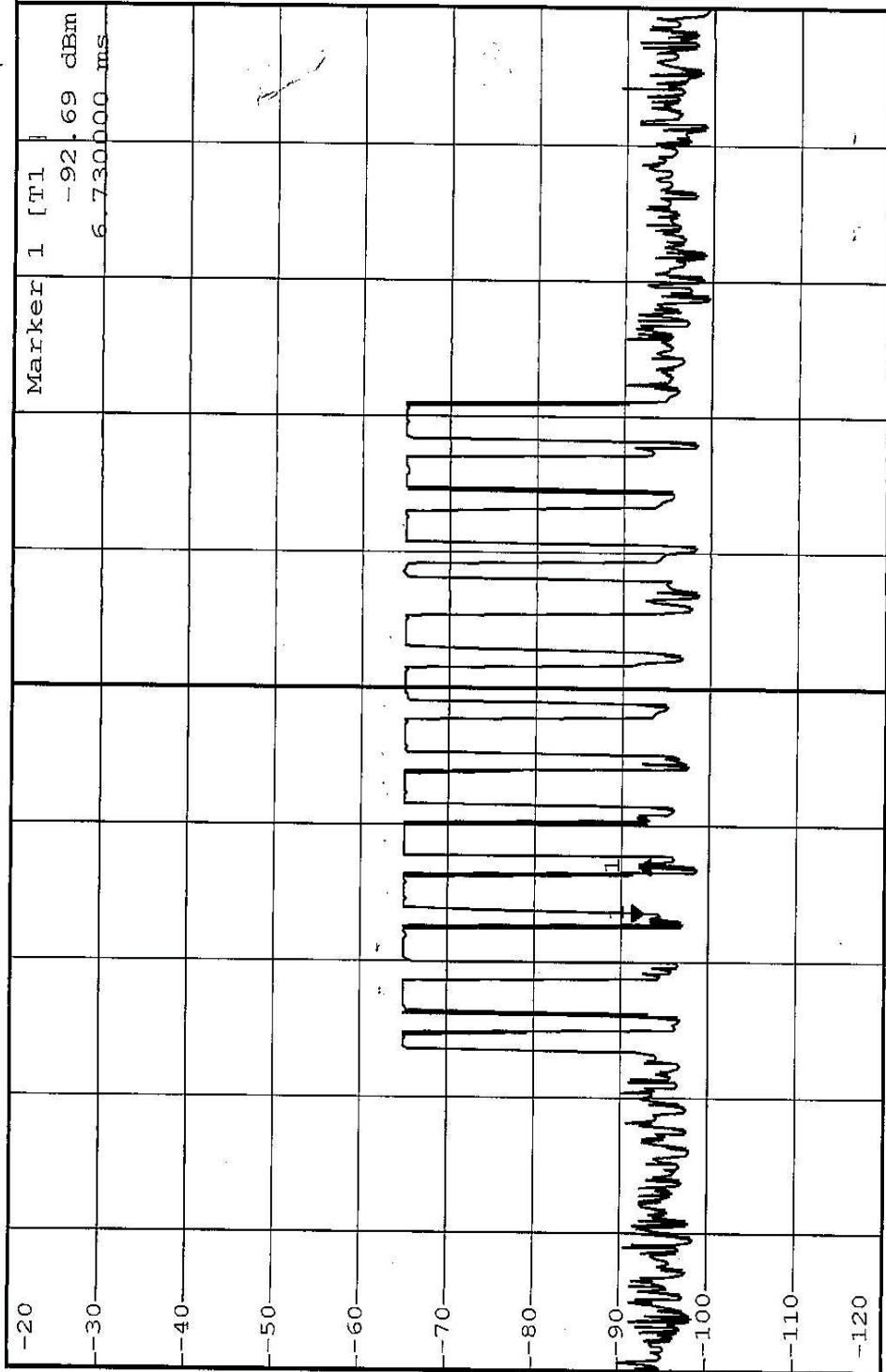




RBW 100 kHz Delta 1 [T1] 0.61 dB
*VBW 100 kHz
SWT 20 ms 670.000000 μs

*Att 0 dB

Ref -20 dBm



* A SGL



1 PK
MAXH

4.3 20dB OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF BAND EDGES 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
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

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

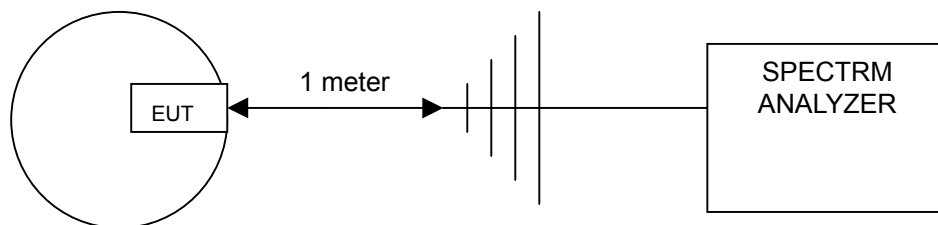
4.3.3 TEST PROCEDURES

- 1 The EUT was placed on the turning table.
- 2 The signal was coupled to the spectrum analyzer through an antenna.
- 3 Set the resolution bandwidth to 100kHz and video bandwidth to 100kHz then select Peak function to scan the channel frequency.
- 4 The 20dB bandwidth was measured and recorded.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

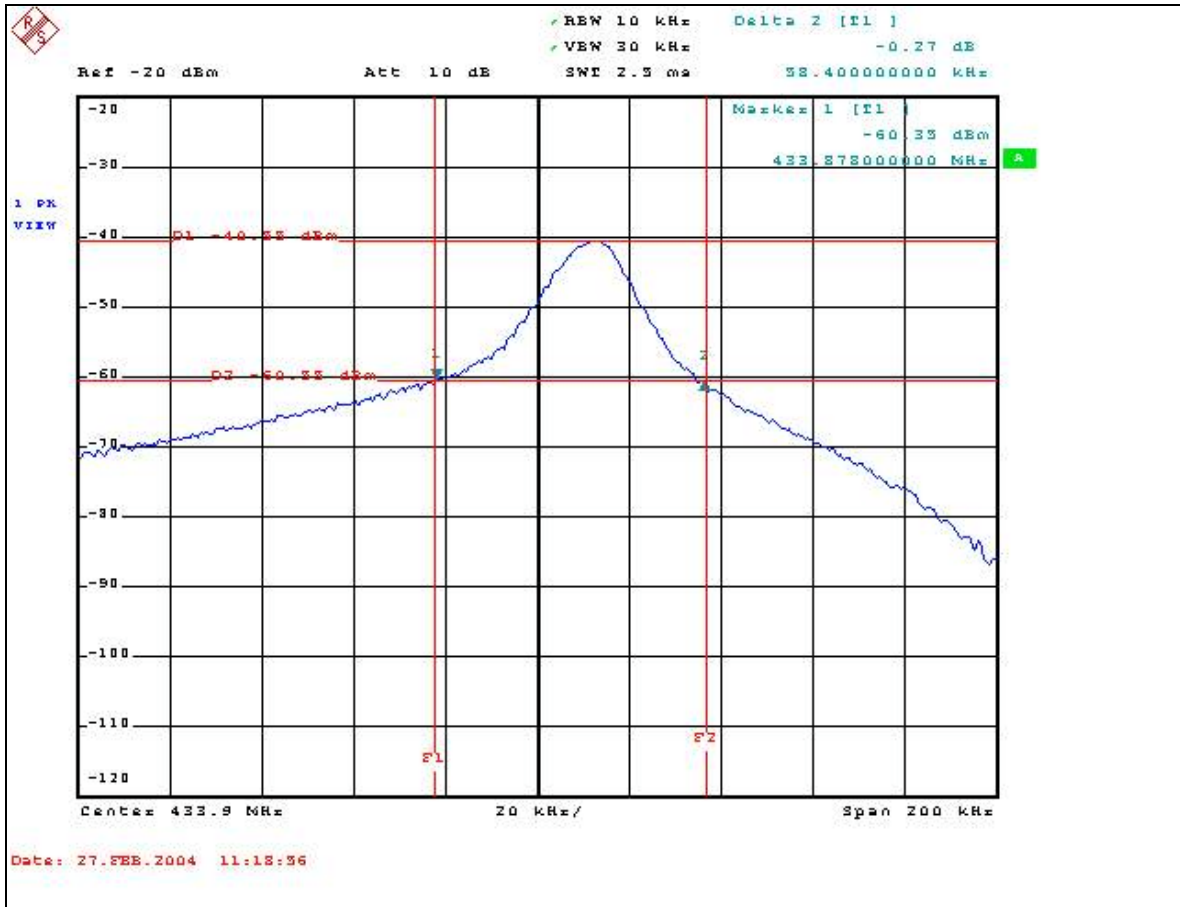
4.3.5 TEST SETUP



4.3.6 TEST RESULTS

Frequency (MHz)	20 dB bandwidth (kHz)	Maximum limit (kHz)	PASS/FAIL
433.92	58.40	1084.80	PASS

The plot of test result is attached as below.



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, 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: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Linko RF & Telecom Lab.

Tel: 886-3-3270910

Fax: 886-3-3270892

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.