



# FCC TEST REPORT

**REPORT NO.:** RF930219R08

**MODEL NO.:** HA51R

**RECEIVED:** February 19, 2004

**TESTED:** February 25 ~ February 26, 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.

This test report consists of 27 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA or any government agencies. The test results in the report only apply to the tested sample.



0528  
ILAC MRA



## 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 .....	7
3.5	CONFIGURATION OF SYSTEM UNDER TEST .....	7
4.	TEST TYPES AND RESULTS .....	8
4.1	CONDUCTED EMISSION MEASUREMENT .....	8
4.2	RADIATED EMISSION MEASUREMENT .....	8
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	8
4.2.2	TEST INSTRUMENTS.....	9
4.2.3	TEST PROCEDURES .....	10
4.2.4	DEVIATION FROM TEST STANDARD .....	10
4.2.5	TEST SETUP .....	11
4.2.6	EUT OPERATING CONDITIONS .....	11
4.2.7	TEST RESULTS .....	12
4.3	20dB OCCUPIED BANDWIDTH MEASUREMENT .....	21
4.3.1	LIMITS OF BAND EDGES MEASUREMENT .....	21
4.3.2	TEST INSTRUMENTS.....	21
4.3.3	TEST PROCEDURES .....	21
4.3.4	DEVIATION FROM TEST STANDARD .....	22
4.3.5	TEST SETUP .....	22
4.3.6	TEST RESULTS .....	22
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	24
6.	INFORMATION ON THE TESTING LABORATORIES .....	27



**1 CERTIFICATION**

**PRODUCT :** Wireless Alarm System  
**MODEL NO.:** HA51R  
**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 from February 25, 2004 to February 26, 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 17, 2004  
Stacy Hsueh

**APPROVED BY:** Ellis Wu , **DATE:** March 17, 2004  
Ellis Wu / Manager



## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: FCC Part 15, Subpart C</b>			
<b>STANDARD PARAGRAPH</b>	<b>TEST TYPE</b>	<b>RESULT</b>	<b>REMARK</b>
15.207	Conducted Emission Test	NA	12Vdc from batteries
15.209 15.231	Radiated Emission Test	PASS	Minimum passing margin is -4.21dB at 1735.51MHz
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

<b>PRODUCT</b>	Wireless Alarm System
<b>MODEL NO.</b>	HA51R
<b>BRAND</b>	EVERSPRING
<b>POWER SUPPLY</b>	12Vdc from batteries
<b>MODULATION TYPE</b>	ASK
<b>CARRIER FREQUENCY OF EACH CHANNEL</b>	433.92MHz
<b>NUMBER OF CHANNEL</b>	1
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA

**NOTE:**

1. The EUT include Transmitter part and Receiver part. The model no.: HA51R 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

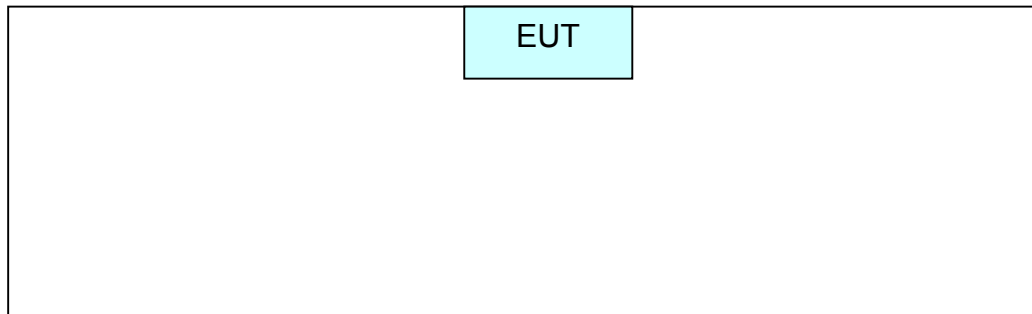
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

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.

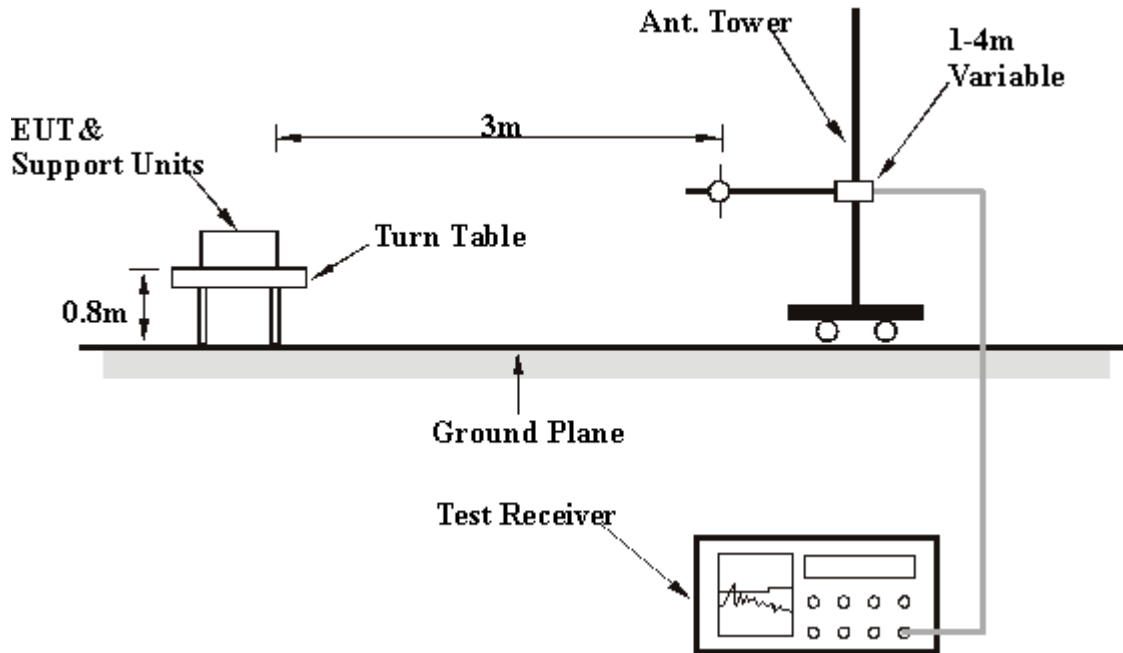
**NOTE:**

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

<b>EUT</b>	Wireless Alarm System	<b>MODEL</b>	HA51R
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>MODE</b>	X axis
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK), 10V
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 70%RH, 991hPa	<b>TESTED BY:</b> 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	*433.83	81.50 PK	100.80	-19.30	1.00 H	282	61.44	20.06
1	*433.83	72.99 AV	80.80	-7.81	1.00 H	282	52.93	20.06
2	867.67	55.06 PK	80.80	-25.74	1.74 V	64	25.86	29.20
2	867.67	46.55 AV	60.80	-14.25	1.74 V	64	17.35	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	*433.84	69.74 PK	100.80	-31.06	2.99 V	354	49.68	20.06
1	*433.84	61.23 AV	80.80	-19.57	2.99 V	354	41.17	20.06
2	867.67	45.97 PK	80.80	-34.83	1.00 V	136	16.77	29.20
2	867.67	37.46 AV	60.80	-23.34	1.00 V	136	8.26	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:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.34\text{ms} \times 2) + (0.63\text{ms} \times 11)}{20.28\text{ms}} = -8.51\text{dB}$$

please see page 18,19, 20 for plotted duty



<b>EUT</b>	Wireless Alarm System	<b>MODEL</b>	HA51R
<b>FREQUENCY RANGE</b>	Above 1000MHz	<b>MODE</b>	X axis
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH, 991hPa	<b>TESTED BY:</b> Martin Lee	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	1301.45	51.43 PK	74.00	-22.57	1.00 H	240	23.93	27.50
2	1735.00	54.12 PK	74.00	-19.88	1.00 H	259	25.19	28.93
2	1735.00	45.61 AV	54.00	-8.39	1.00 H	259	16.68	28.93
3	2169.00	52.54 PK	74.00	-21.46	1.00 H	22	21.98	30.56
4	2603.00	47.70 PK	74.00	-26.30	1.00 H	22	16.54	31.16

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	1301.00	48.77 PK	74.00	-25.23	1.20 V	133	21.27	27.50
2	1735.40	48.47 PK	74.00	-25.53	1.27 V	138	19.53	28.93
3	2169.00	50.53 PK	74.00	-23.47	1.22 V	306	19.97	30.56

- 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:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.34\text{ms} \cdot 2) + (0.63\text{ms} \cdot 11)}{20.28\text{ms}} = -8.51\text{dB}$$

please see page 18,19, 20 for plotted duty



<b>EUT</b>	Wireless Alarm System	<b>MODEL</b>	HA51R
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>MODE</b>	Y axis
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK), 10V
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 70%RH, 991hPa	<b>TESTED BY:</b> Martin Lee	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	*433.83	79.48 PK	100.80	-21.32	1.00 H	97	59.42	20.06
1	*433.83	70.97 AV	80.80	-9.83	1.00 H	97	50.91	20.06
2	867.67	48.75 PK	80.80	-32.05	1.45 H	96	19.55	29.20
2	867.67	40.24 AV	60.80	-20.56	1.45 H	96	11.04	29.20

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	*433.83	72.72 PK	100.80	-28.08	1.71 V	131	52.66	20.06
1	*433.83	64.21 AV	80.80	-16.59	1.71 V	131	44.15	20.06
2	867.67	46.25 PK	80.80	-34.55	1.15 V	158	17.05	29.20
2	867.67	37.74 AV	60.80	-23.06	1.15 V	158	8.54	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:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.34\text{ms} \cdot 2) + (0.63\text{ms} \cdot 11)}{20.28\text{ms}} = -8.51\text{dB}$$

please see page 18,19, 20 for plotted duty



<b>EUT</b>	Wireless Alarm System	<b>MODEL</b>	HA51R
<b>FREQUENCY RANGE</b>	Above 1000MHz	<b>MODE</b>	Y axis
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH, 991hPa	<b>TESTED BY:</b> 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	1301.30	53.10 PK	74.00	-20.90	1.00 H	110	25.60	27.50
2	1735.36	51.47 PK	74.00	-22.53	1.00 H	266	22.53	28.93
2	1735.36	42.96 AV	54.00	-11.04	1.00 H	266	14.03	28.93
3	2169.00	51.01 PK	74.00	-22.99	1.00 H	290	20.45	30.56
4	2602.00	48.56 PK	74.00	-25.44	1.00 H	70	17.41	31.15
5	3036.00	48.30 PK	74.00	-25.70	1.00 H	76	14.86	33.43

**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	1301.30	50.27 PK	74.00	-23.73	1.00 V	269	22.77	27.50
2	1735.00	48.46 PK	74.00	-25.54	1.10 V	96	19.53	28.93
2	1735.00	39.95 AV	54.00	-14.05	1.10 V	96	11.02	28.93
3	2169.00	52.19 PK	74.00	-21.81	1.18 V	338	21.63	30.56
4	2602.00	47.07 PK	74.00	-26.93	1.00 V	87	15.92	31.15

- 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:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.34\text{ms} \times 2) + (0.63\text{ms} \times 11)}{20.28\text{ms}} = -8.51\text{dB}$$

please see page 18,19, 20 for plotted duty



<b>EUT</b>	Wireless Alarm System	<b>MODEL</b>	HA51R
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>MODE</b>	Z axis
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK), 10V
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 70%RH, 991hPa	<b>TESTED BY:</b> Martin Lee	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	*433.85	67.97 PK	100.80	-32.83	1.53 H	20	47.91	20.06
1	*433.85	59.46 AV	80.80	-21.34	1.53 H	20	39.40	20.06
2	867.67	42.90 PK	80.80	-37.90	1.00 H	41	13.70	29.20
2	867.67	34.39 AV	60.80	-26.41	1.00 H	41	5.19	29.20

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	*433.85	80.11 PK	100.80	-20.69	1.39 V	0	60.05	20.06
1	*433.85	71.60 AV	80.80	-9.20	1.39 V	0	51.54	20.06
2	867.67	52.38 PK	80.80	-28.42	2.11 V	354	23.18	29.20
2	867.67	43.87 AV	60.80	-16.93	2.11 V	354	14.67	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:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.34\text{ms} \times 2) + (0.63\text{ms} \times 11)}{20.28\text{ms}} = -8.51\text{dB}$$

please see page 18,19, 20 for plotted duty





<b>EUT</b>	Wireless Alarm System	<b>MODEL</b>	HA51R
<b>FREQUENCY RANGE</b>	Above 1000MHz	<b>MODE</b>	Z axis
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 70%RH, 991hPa	<b>TESTED BY:</b> Martin Lee	

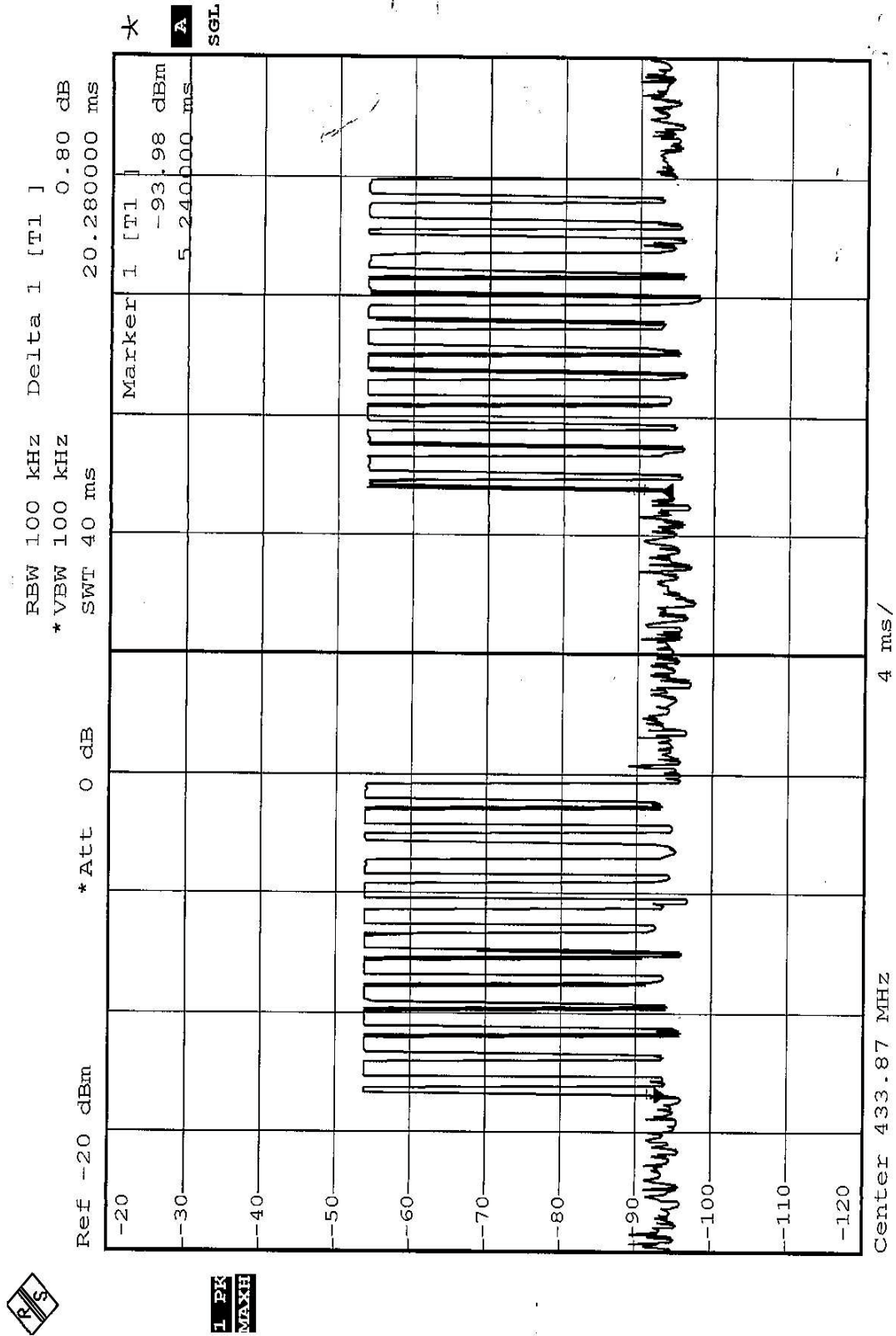
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1301.00	41.90 PK	74.00	-32.10	1.00 H	262	14.40	27.50
2	1735.00	46.39 PK	74.00	-27.61	1.02 H	36	17.46	28.93
2	1735.00	37.88 AV	54.00	-16.12	1.02 H	36	8.95	28.93
3	2602.00	44.49 PK	74.00	-29.51	1.14 H	158	13.34	31.15
4	3036.00	46.75 PK	74.00	-27.25	1.45 H	21	13.31	33.43

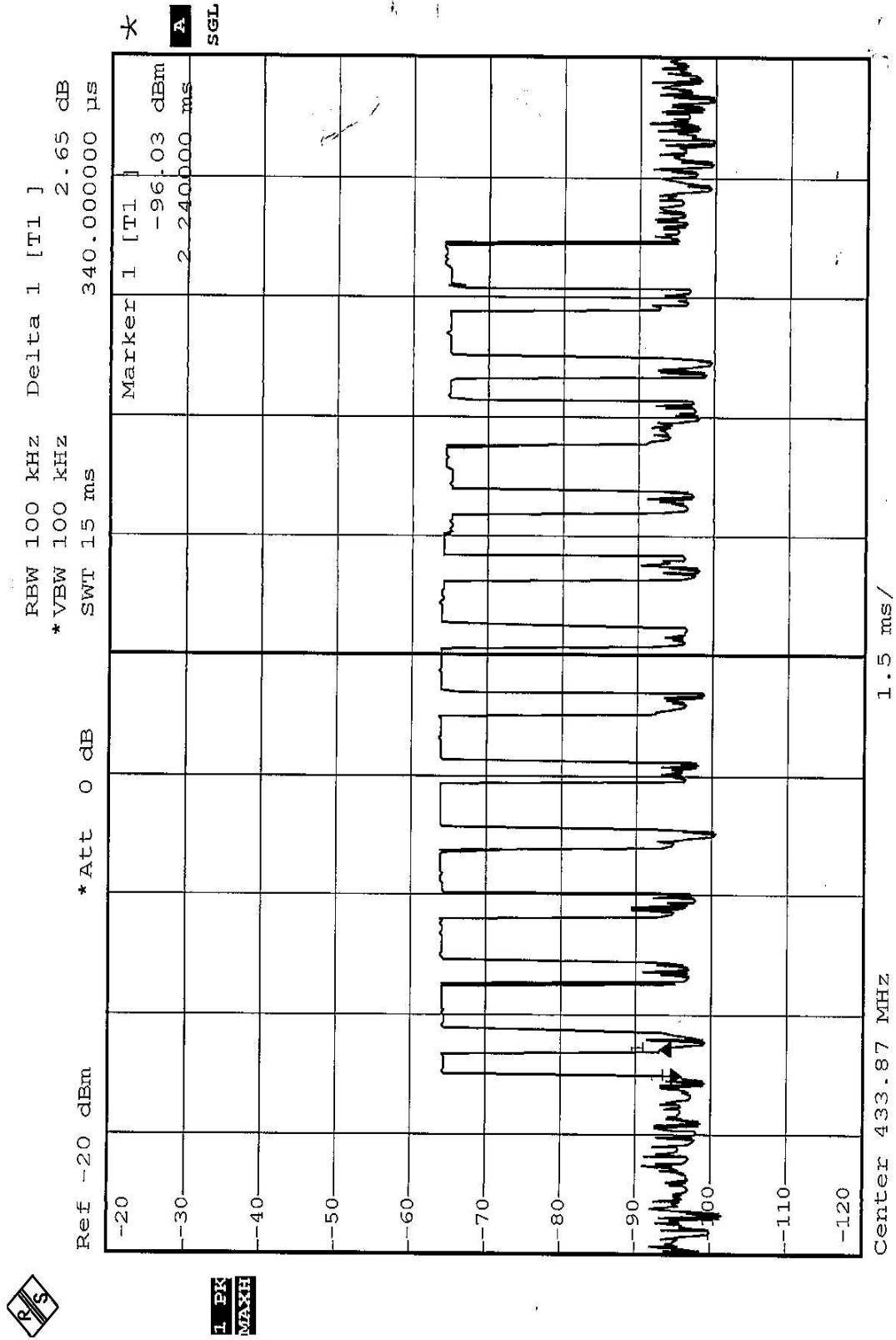
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1301.00	56.17 PK	74.00	-17.83	1.00 V	262	28.67	27.50
1	1301.00	47.66 AV	54.00	-6.34	1.00 V	262	20.16	27.50
2	1735.51	58.30 PK	74.00	-15.70	1.00 V	354	29.36	28.93
<b>2</b>	<b>1735.51</b>	<b>49.79 AV</b>	<b>54.00</b>	<b>-4.21</b>	<b>1.00 V</b>	<b>354</b>	<b>20.86</b>	<b>28.93</b>
3	2602.00	52.06 PK	74.00	-21.94	1.03 V	0	20.91	31.15
4	3036.00	49.96 PK	74.00	-24.04	1.07 V	285	16.52	33.43

- 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:

$$20\log(\text{Duty cycle}) = 20\log \frac{(0.34\text{ms} \times 2) + (0.63\text{ms} \times 11)}{20.28\text{ms}} = -8.51\text{dB}$$

please see page 18,19, 20 for plotted duty

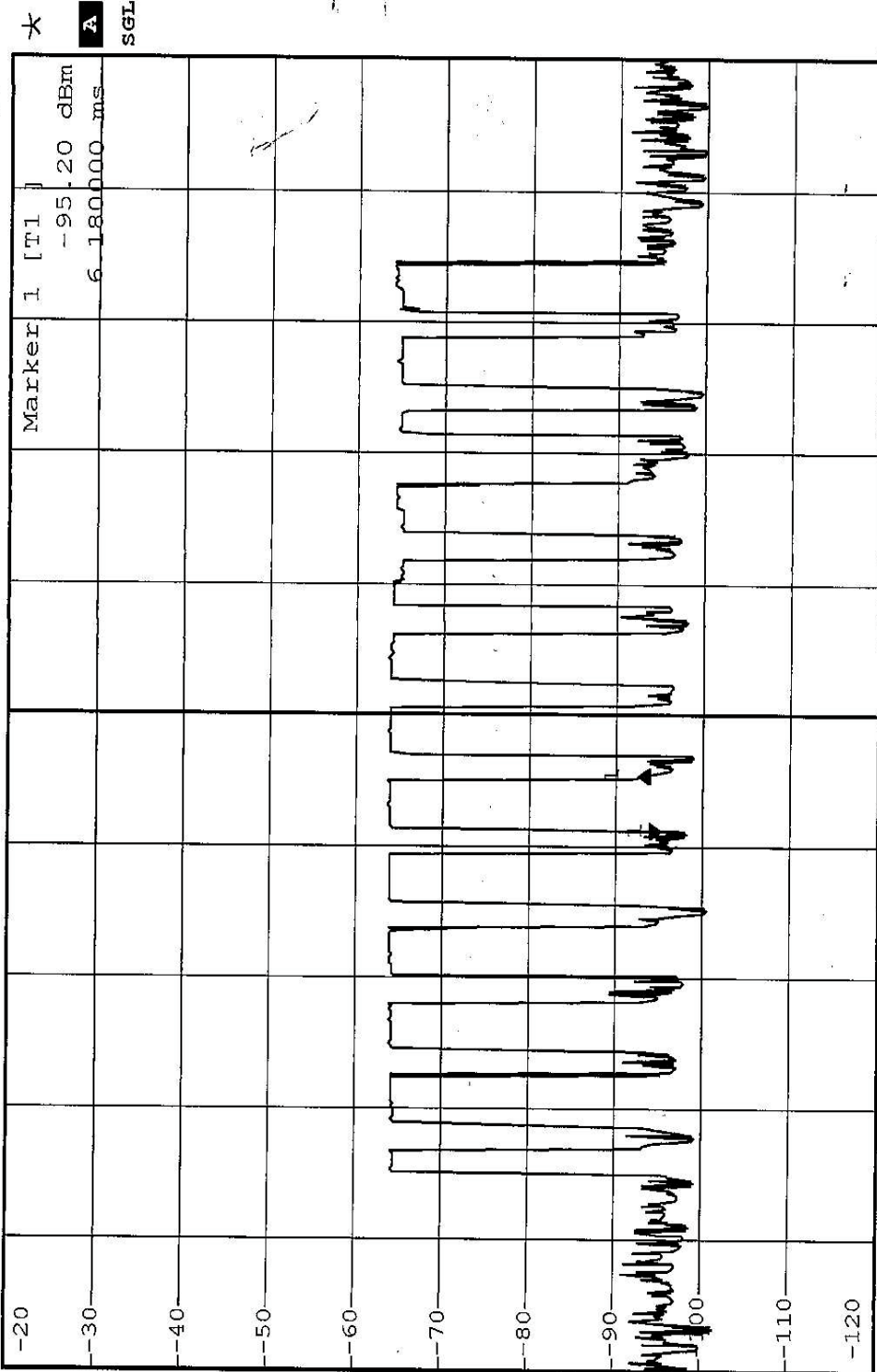






1 PK  
MAXH

RBW 100 KHZ Delta 1 [T1 ] 2.66 dB  
 \*VBW 100 KHZ  
 \*Att 0 dB  
 Ref -20 dBm  
 SWT 15 ms  
 630.000000  $\mu$ s



\* A SGL

### 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.

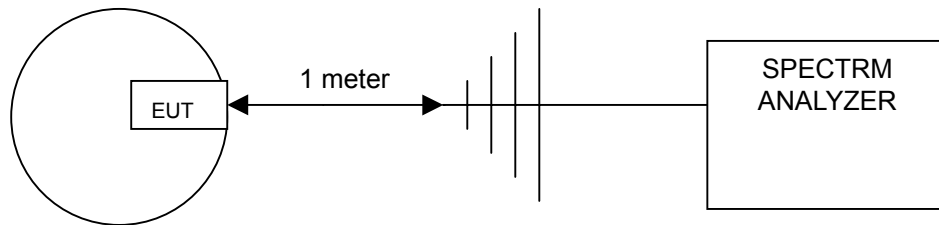
#### 4.3.3 TEST PROCEDURES

- 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	58.00	1084.80	PASS

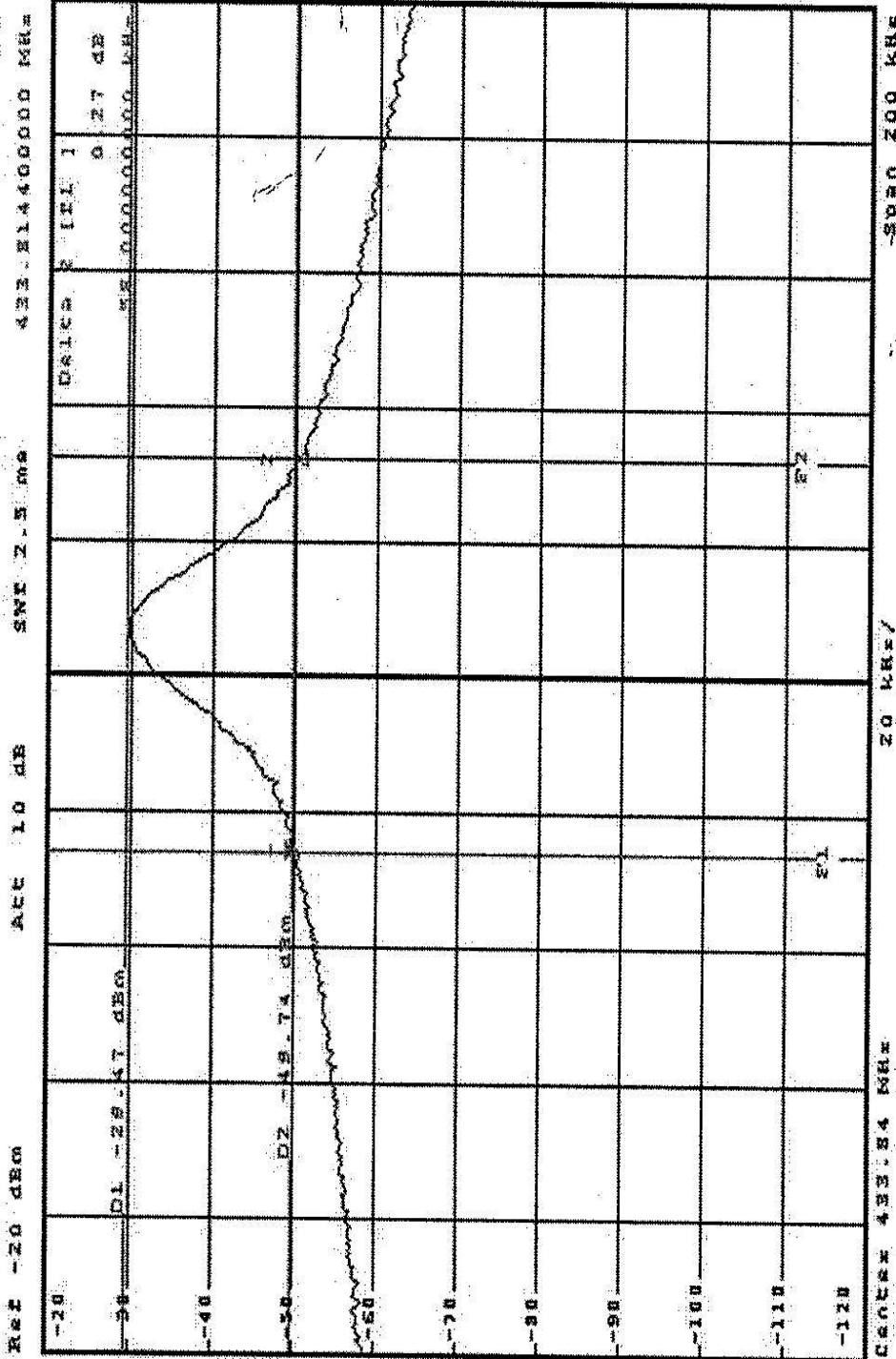
The plot of test result is attached as below.



ha51r.jpg (639x493x16M jpeg)

MARKER 1 [ III ]  
 -30.34 dBm  
 433.3140000 MHz

RESW 10 MHz  
 VSW 30 MHz  
 SWI 2.5 ms



1 9X  
 V2XW

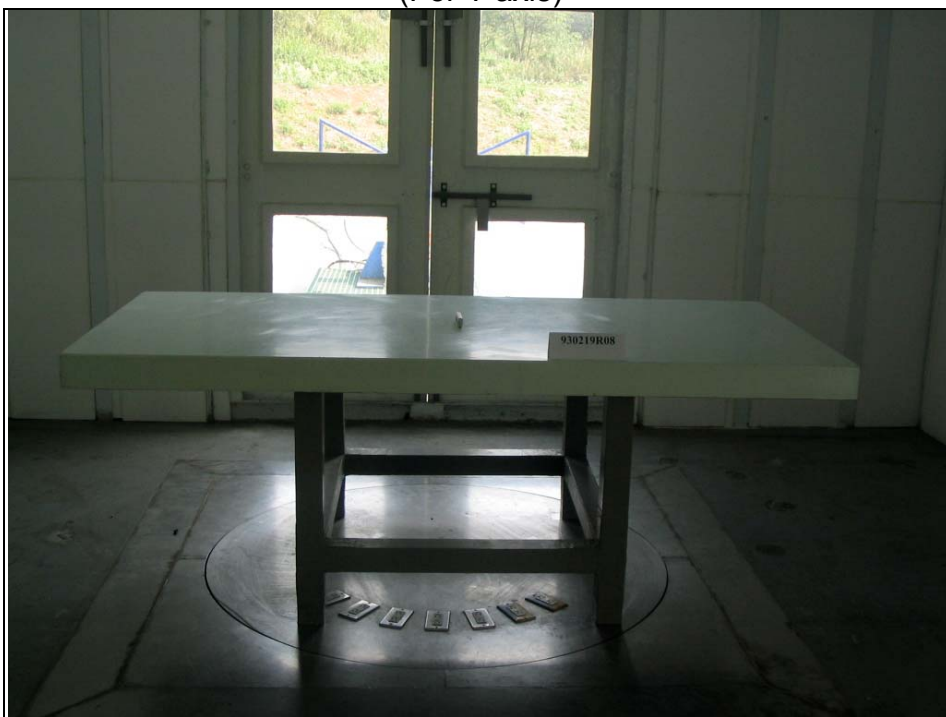
Date: 27-SEP-2004 11:23:25

**5. PHOTOGRAPHS OF THE TEST CONFIGURATION**  
**RADIATED EMISSION TEST**  
**(For X axis)**





(For Y axis)



(For Z axis)





## 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:

<b>USA</b>	FCC, NVLAP, UL
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	CNLA, BSMI, DGT
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB , GOST-ASIA(MOU)
<b>Russia</b>	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](http://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](mailto:service@mail.adt.com.tw)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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