

# FCC TEST REPORT

**REPORT NO.:** RF940223L07  
**MODEL NO.:** GWT-6A  
**RECEIVED:** Feb. 23, 2005  
**TESTED:** Feb. 25 ~ Mar. 4, 2005  
**ISSUED:** Mar. 07, 2005

**APPLICANT:** Grand Wing Servo-Tech Co., Ltd.

**ADDRESS:** 153, Sec. 2, Ta-Tung Rd., Hsi Chih Chen, Taipei  
Hsien, Taiwan 221, R.O.C.

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei,  
Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Kueishan, Taoyuan,  
Taiwan, R.O.C.

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## 1 CERTIFICATION

**PRODUCT :** Radio-control transmitter  
**BRAND NAME :** GWS  
**MODEL NO. :** GWT-6A  
**TEST SAMPLE :** Engineering Sample  
**APPLICANT :** Grand Wing Servo-Tech Co., Ltd.  
**STANDARDS :** FCC Part 95, Subpart C  
FCC Part 95, Subpart E  
FCC Part 2, Subpart J  
EIA/TIA 603

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Feb. 25 ~ Mar. 4, 2005. 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 :** Rennie Wang, **DATE:** Mar. 07, 2005  
( Rennie Wang )

**TECHNICAL**  
**ACCEPTANCE :** Gary Chang, **DATE:** Mar. 07, 2005  
Responsible for ( Gary Chang )  
RF

**APPROVED BY :** Cody Chang, **DATE:** Mar. 07, 2005  
( Cody Chang, Deputy Manager )

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 95			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
95.210 (a)	Transmitter Power Test	PASS	Meet the requirement of limit
15.107	Conducted Test	PASS	Meet the requirement of limit Minimum passing margin is -26.67dB at 29.004MHz
95.635	Unwanted Radiated Test	PASS	Meet the requirement of limit Minimum passing margin is -1.82dB at 149.62MHz
95.623 (c)	Frequency Stability Test	PASS	Meet the requirement of limit
95.633 (b)	Emission Bandwidth Test	PASS	Meet the requirement of limit
95.631 (b)	Modulation Characteristics Test	PASS	Meet the requirement of limit

### 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.55 dB
	200MHz ~1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 dB

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Radio-control transmitter
<b>MODEL NO.</b>	GWT-6A
<b>POWER SUPPLY</b>	9.6Vdc from battery
	9.6Vdc form AC adapter for charging mode Brand: GWS Model: SLC419648 I/P: 120Vac, 60Hz O/P: 9.6Vdc, 60mA
<b>MODULATION TYPE</b>	PPM (FM)
<b>CARRIER FREQUENCY OF EACH CHANNEL</b>	72.010 ~ 72.990MHz
<b>CHANNEL SPACING</b>	20kHz
<b>NUMBER OF CHANNEL</b>	50
<b>EMISSION DESIGNATOR</b>	5K81F1D
<b>MAXIMUM OUTPUT POWER</b>	47.643mW
<b>ANTENNA TYPE</b>	ROD antenna with 0dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT is a 72MHz Radio-control transmitter.
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

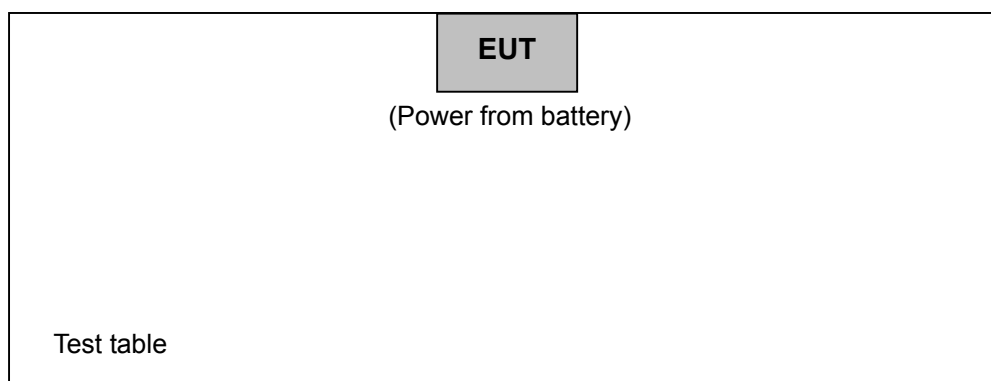
### 3.2 DESCRIPTION OF TEST MODES

50 channels were provided to this EUT.

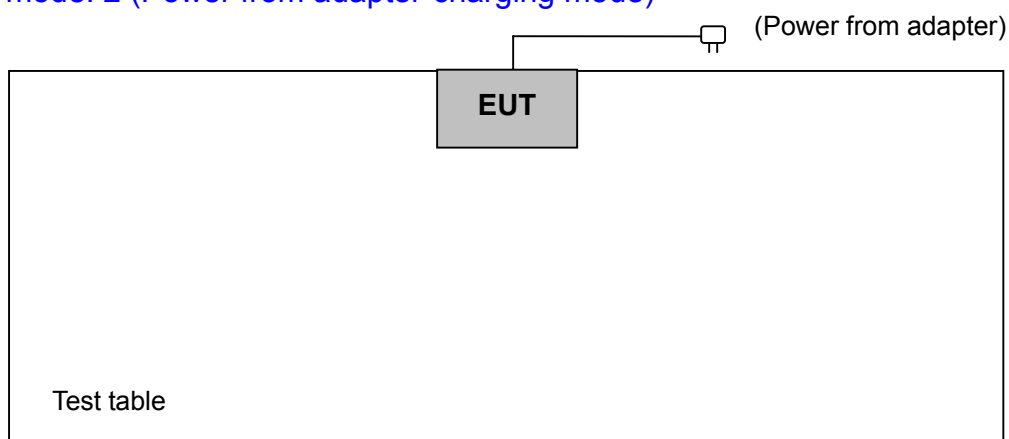
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	72.010	18	72.350	35	72.690
2	72.030	19	72.370	36	72.710
3	72.050	20	72.390	37	72.730
4	72.070	21	72.410	38	72.750
5	72.090	22	72.430	39	72.770
6	72.110	23	72.450	40	72.790
7	72.130	24	72.470	41	72.810
8	72.150	25	72.490	42	72.830
9	72.170	26	72.510	43	72.850
10	72.190	27	72.530	44	72.870
11	72.210	28	72.550	45	72.890
12	72.230	29	72.570	46	72.910
13	72.250	30	72.590	47	72.930
14	72.270	31	72.610	48	72.950
15	72.290	32	72.630	49	72.970
16	72.310	33	72.650	50	72.990
17	72.330	34	72.670		

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

#### Test mode: 1 (Power from battery)



#### Test mode: 2 (Power from adapter-charging mode)





### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT configure mode	Applicable to			Description
	PLC	RE<1G	RCM	
1	-	x	x	EUT only (transmission mode) (powered by battery)
2	x	x	-	EUT with adapter (charging mode) (powered by adapter)

Where PLC: Power Line Conducted Emission

RE&lt;1G RE: Radiated Emission below 1GHz

RCM: Radiated Characteristic Measurement

#### **Power Line Conducted Emission Test:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
2	1 to 50	26	FM	PPM

#### **Radiated Emission Test (Below 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and XYZ axis.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Position
1	1 to 50	26	FM	PPM	X
2	1 to 50	26	-	-	X

#### **Radiated Characteristic Measurement:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type
1	1 to 50	26	FM	PPM

### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is the transmitter part of a Radio-control transmitter. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 95, Subpart C**

**FCC Part 95, Subpart E**

**FCC Part 2, Subpart J**

**EIA/TIA 603**

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

### 3.4 DESCRIPTION OF SUPPORT UNITS

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

## 4 TEST PROCEDURE AND RESULT

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

**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
Test Receiver ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

- 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. The test was performed in HwaYa Shielded Room 1.
  3. The VCCI Site Registration No. is C-2040.
  4. The test was performed in ADT Chamber No. 6.

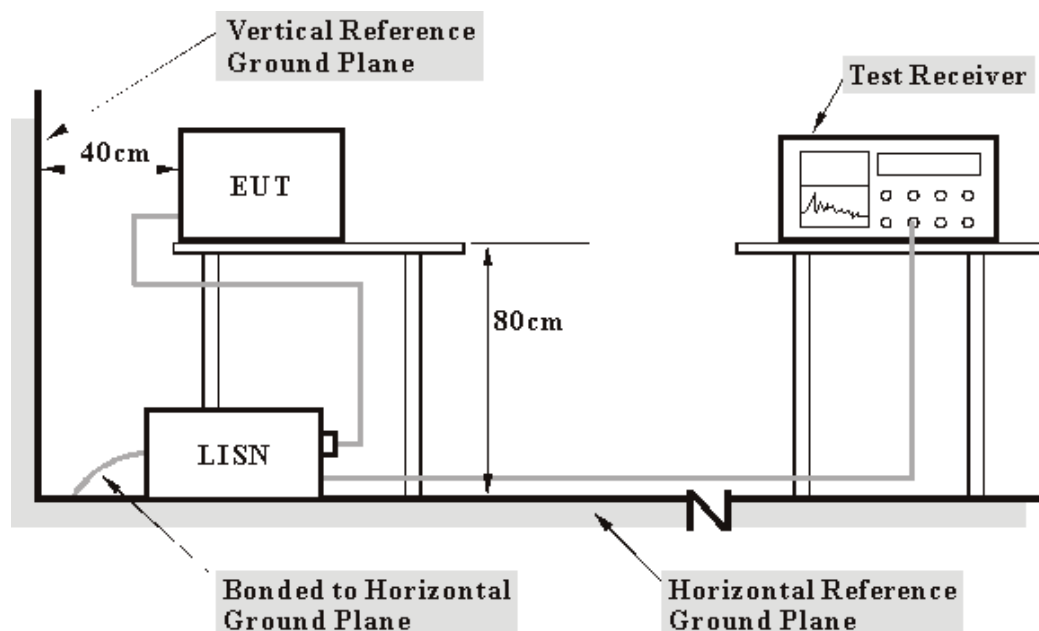
#### 4.1.3 TEST PROCEDURE

- 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 150kHz to 30MHz was searched. Emission levels under Limit - 20dB was not recorded.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 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 – Photographs of the Test Configuration.

#### 4.1.6 EUT OPERATING CONDITION

Enable the EUT under charging condition continuously at specific channel frequencies individually.

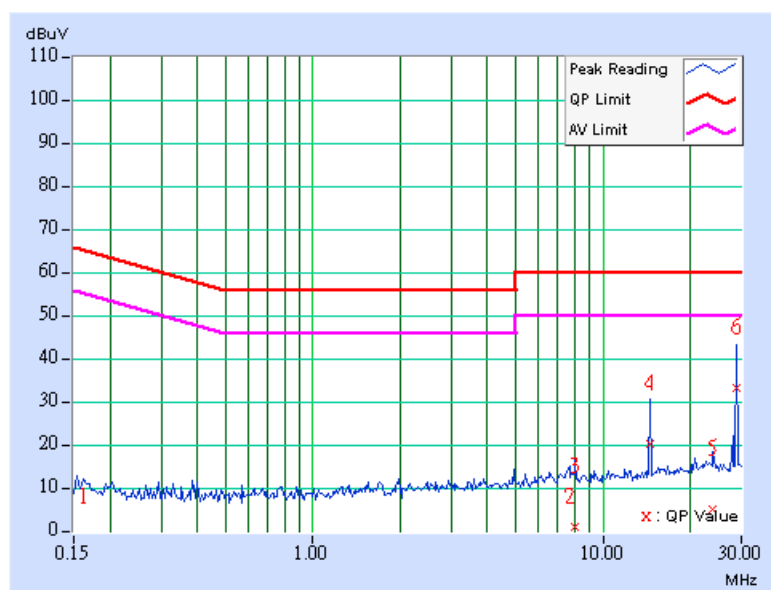
#### 4.1.7 TEST RESULTS

##### Conducted Worst-Case Data (Power from adapter)

<b>EUT</b>	Radio-control transmitter	<b>MODEL</b>	GWT-6A
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 991hPa	<b>TEST MODE</b>	2
<b>TESTED BY</b>	Gary Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.162	0.10	-7.02	-	-6.92	-	65.38	55.38	-72.29	-
2	7.656	0.40	-6.99	-	-6.59	-	60.00	50.00	-66.59	-
3	8.000	0.40	-0.23	-	0.17	-	60.00	50.00	-59.83	-
4	14.504	0.61	19.31	-	19.92	-	60.00	50.00	-40.08	-
5	24.012	1.07	3.81	-	4.88	-	60.00	50.00	-55.12	-
6	29.004	1.21	32.12	-	33.33	-	60.00	50.00	-26.67	-

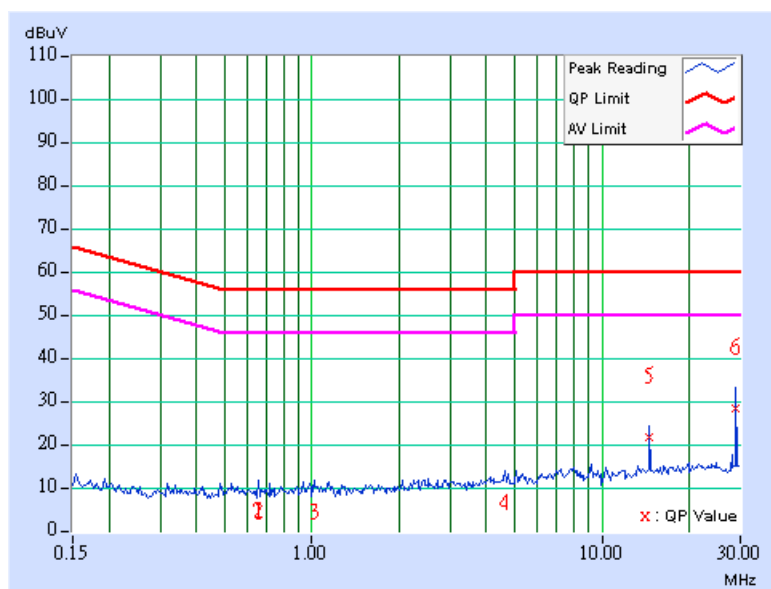
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



<b>EUT</b>	Radio-control transmitter	<b>MODEL</b>	GWT-6A
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	23deg. C, 65%RH, 991hPa	<b>TEST MODE</b>	2
<b>TESTED BY</b>	Gary Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.654	0.13	-10.12	-	-9.99	-	56.00	46.00	-65.99	-
2	0.654	0.13	-9.86	-	-9.73	-	56.00	46.00	-65.73	-
3	1.020	0.18	-10.25	-	-10.07	-	56.00	46.00	-66.07	-
4	4.613	0.30	-7.90	-	-7.60	-	56.00	46.00	-63.60	-
5	14.500	0.48	21.36	-	21.84	-	60.00	50.00	-38.16	-
6	29.004	0.49	27.97	-	28.46	-	60.00	50.00	-31.54	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





## **4.2 RADIATED EMISSIONS MEASUREMENT**

### **4.2.1 LIMITS OF FUNDAMENTAL FREQUENCY MEASUREMENT**

The maximum transmitter output power is 0.75 W.

### **4.2.2 LIMITS OF UNWANTED RADIATED EMISSIONS MEASUREMENT**

The unwanted emissions should be less than the transmitter field strength by at least  $56 + 10 \log (TP)$  dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

## 4.2.3 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	Jun. 08, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Jun. 03, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Jun. 01, 2005
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

- 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. The test was performed in HwaYa Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC4924-3.

#### 4.2.4 TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
3. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
4. Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.25m above the ground.
5. The signal generator level has to be adjusted to have the same emission nature.
6. The radiated power can be calculated via the factor and antenna gain.
7. Repeat step 1-6 for horizontal polarization.

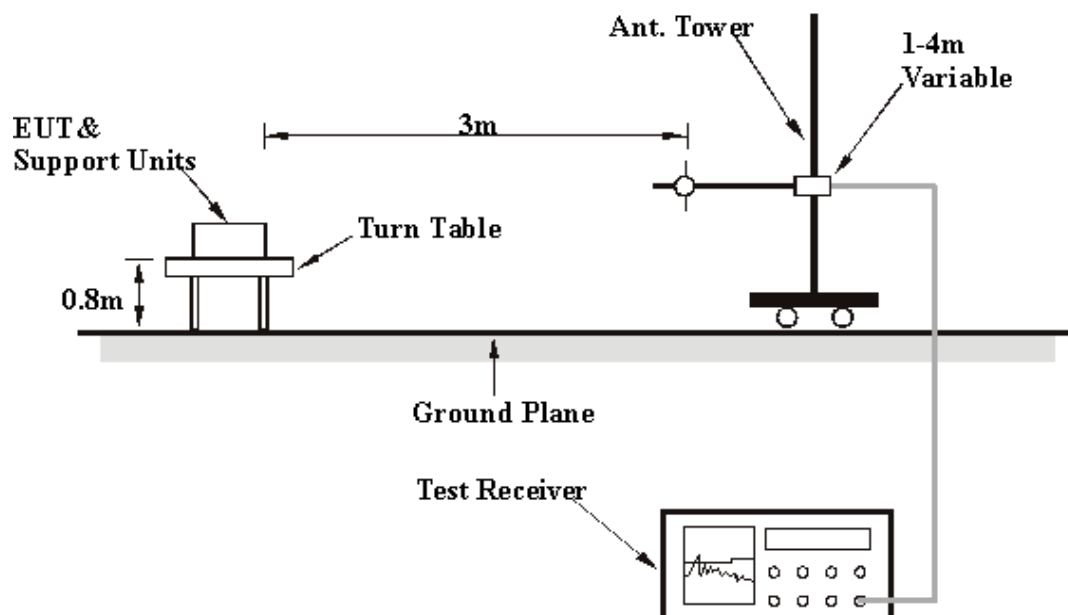
**NOTE:**

The resolution bandwidth of spectrum analyzer is 100kHz and the video bandwidth is 100kHz for the transmitter output measurement,.

#### 4.2.5 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.6 TEST SETUP



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

#### 4.2.7 EUT OPERATING CONDITION

Test mode 1:

Enable the EUT under transmission condition continuously.

Test mode 2:

Enable the EUT under charging condition continuously.

## 4.2.8 TEST RESULTS

**Below 1GHz Worst-Case Data (Power from battery)**

<b>EUT</b>	Radio-control transmitter	<b>MODEL</b>	GWT-6A
<b>CHANNEL</b>	Channel 26	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>MODULATION TYPE</b>	PPM	<b>DETECTOR FUNCTION</b>	Peak
<b>INPUT POWER (SYSTEM)</b>	9.6Vdc	<b>TEST MODE</b>	1
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 68 % RH, 991 hPa	<b>TESTED BY:</b> Long Chen	

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	Margin (dB)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	72.51	108 PK	28.00	-15.22	20.72	-7.94	12.78
Antenna Gain: 0dBi				Conducted Output Power : 16.78 (dBm)			

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	Margin (dB)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	86.51	45.12 PK	-26.17	-23.93	-42.15	-7.95	-50.10
2	145.02	57.32 PK	-26.17	-11.73	-29.90	-8.00	-37.90
3	217.52	47.91 PK	-26.17	-21.14	-39.24	-8.07	-47.31
4	290.04	49.76 PK	-26.17	-19.29	-37.28	-8.18	-45.46
5	362.55	48.94 PK	-26.17	-20.11	-38.38	-7.90	-46.28
6	435.06	49.44 PK	-26.17	-19.61	-37.77	-8.01	-45.78
7	507.58	43.87 PK	-26.17	-25.18	-43.23	-8.12	-51.35
8	580.07	47.85 PK	-26.17	-21.20	-39.17	-8.20	-47.37
9	652.59	46.96 PK	-26.17	-22.09	-39.98	-8.28	-48.26
10	725.09	53.72 PK	-26.17	-15.33	-33.29	-8.21	-41.50
11	797.61	51.64 PK	-26.17	-17.41	-35.28	-8.30	-43.58
12	870.1	50.98 PK	-26.17	-18.07	-35.84	-8.40	-44.24
13	942.61	47.72 PK	-26.17	-21.33	-39.00	-8.50	-47.50

**NOTE:**

1. Emission level(dBm)=Raw Value(dBm) + Correction Factor(dB).
2. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB)
3. Margin value = Emission level - Limit value
4. “ \* “ : Fundamental Frequency (主頻)
5. Unwanted emissions more than 20kHz from the channel center frequency shall be attenuated at least  $56 + \log(\text{maximum output power}) = 16.78 - (56 + 10\log(0.04764)) = -26.17\text{dBm}$
6. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

<b>EUT</b>	Radio-control transmitter	<b>MODEL</b>	GWT-6A
<b>CHANNEL</b>	Channel 26	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>MODULATION TYPE</b>	PPM	<b>DETECTOR FUNCTION</b>	Peak
<b>INPUT POWER (SYSTEM)</b>	9.6Vdc	<b>TEST MODE</b>	1
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 68 % RH, 991 hPa	<b>TESTED BY:</b> Long Chen	

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	Margin (dB)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	72.51	112 PK	28.00	-11.22	24.72	-7.94	16.78
Antenna Gain: 0dBi				Conducted Output Power : 16.78 (dBm)			

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	Margin (dB)	S.G Power Value (dBm)	Correction Factor (dB)	Power Value (dBm)
1	136.08	48.51 PK	-26.17	-20.54	-38.73	-7.98	-46.71
2	142.08	47.78 PK	-26.17	-20.54	-38.73	-7.98	-46.71
3	145.02	67.40 PK	-26.17	-21.27	-39.44	-8.00	-47.44
4	149.62	46.53 PK	-26.17	-1.65	-19.82	-8.00	-27.82
5	217.52	55.05 PK	-26.17	-22.52	-40.62	-8.07	-48.69
6	290.04	58.98 PK	-26.17	-14.00	-31.99	-8.18	-40.17
7	362.55	55.83 PK	-26.17	-10.07	-28.34	-7.90	-36.24
8	435.06	48.40 PK	-26.17	-13.22	-31.38	-8.01	-39.39
9	507.58	55.79 PK	-26.17	-20.65	-38.70	-8.12	-46.82
10	580.07	56.60 PK	-26.17	-13.26	-31.23	-8.20	-39.43
11	652.59	55.56 PK	-26.17	-12.45	-30.34	-8.28	-38.62
12	667.59	45.41 PK	-26.17	-13.49	-31.42	-8.24	-39.66
13	710.42	47.36 PK	-26.17	-23.64	-41.60	-8.21	-49.81
14	725.09	62.23 PK	-26.17	-21.69	-39.65	-8.21	-47.86
15	739.48	48.66 PK	-26.17	-6.82	-24.75	-8.24	-32.99
16	783.57	47.00 PK	-26.17	-20.39	-38.30	-8.26	-46.56
17	797.61	59.74 PK	-26.17	-22.05	-39.92	-8.30	-48.22
18	812.63	44.89 PK	-26.17	-24.16	-41.99	-8.34	-50.33
19	870.10	52.46 PK	-26.17	-16.59	-34.36	-8.40	-42.76
20	942.61	48.13 PK	-26.17	-20.92	-38.59	-8.50	-47.09
21	957.92	38.21 PK	-26.17	-30.84	-48.51	-8.50	-57.01

**NOTE:**

1. Emission level(dBm)=Raw Value(dBm) + Correction Factor(dB).
2. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB)
3. Margin value = Emission level - Limit value
4. “\*” : Fundamental Frequency (主頻)
5. Unwanted emissions more than 20kHz from the channel center frequency shall be attenuated at least  $56 + \log(\text{maximum output power}) = 16.78 - (56 + 10\log(0.04764)) = -26.17\text{dBm}$
6. Power Value (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

**Below 1GHz Worst-Case Data (Power from adapter)**

<b>EUT</b>	Radio-control transmitter	<b>MODEL</b>	GWT-6A
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 68 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TEST MODE</b>	2	<b>TESTED BY</b>	Long Chen

**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	140.80	22.68 QP	43.50	-20.82	2.00 H	217	7.92	14.76
2	723.97	24.74 QP	46.00	-21.26	1.50 H	271	1.15	23.58
3	836.71	25.03 QP	46.00	-20.97	4.00 H	346	0.14	24.89
4	877.54	25.92 QP	46.00	-20.08	2.00 H	118	0.42	25.50
5	912.53	25.65 QP	46.00	-20.35	2.00 H	175	-0.40	26.05
6	945.57	26.40 QP	46.00	-19.60	2.50 H	79	-0.04	26.43

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.

<b>EUT</b>	Radio-control transmitter	<b>MODEL</b>	GWT-6A
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>FREQUENCY RANGE</b>	Below 1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 68 % RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TEST MODE</b>	2	<b>TESTED BY</b>	Long Chen

<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	51.38	15.56 QP	40.00	-24.44	1.00 V	154	0.69	14.87
2	74.71	20.63 QP	40.00	-19.37	1.50 V	217	8.96	11.67
3	99.98	13.70 QP	43.50	-29.80	1.00 V	61	2.41	11.29
4	117.47	15.47 QP	43.50	-28.03	1.00 V	340	2.36	13.11
5	792.00	24.37 QP	46.00	-21.63	2.00 V	172	-0.16	24.53
6	834.77	25.00 QP	46.00	-21.00	1.50 V	106	0.13	24.87

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.



### 4.3 FREQUENCY STABILITY

#### 4.3.1 LIMIT OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.002% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

#### 4.3.2 TEST INSTRUMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Feb. 09, 2006
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jul. 18, 2005

**NOTE:**

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

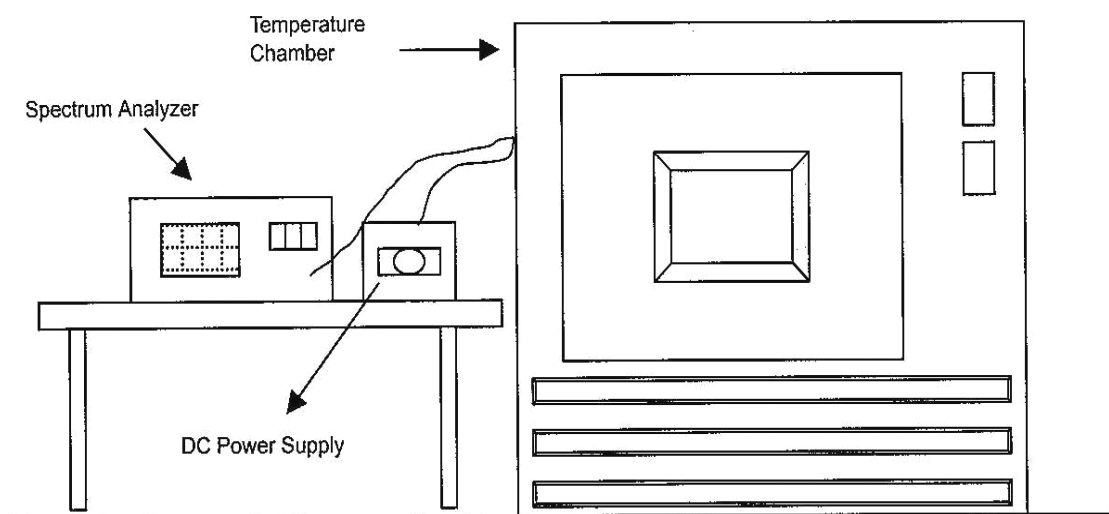
#### 4.3.3 TEST PROCEDURE

- The EUT was situated inside the environmental test chamber and supply the EUT with nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITION

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

## 4.3.7 TEST RESULTS

Operating frequency: 72.51MHz				Limit: $\pm 0.002\%$	
Temp. (°C)	Power supply (Vdc)	0 minute		2 minute	
		(MHz)	(%)	(MHz)	(%)
50	11.04	72.50930	-0.0009654	72.50940	-0.0008275
	9.60	72.50920	-0.0011033	72.50920	-0.0011033
	8.16	72.50900	-0.0013791	72.50900	-0.0013791
40	11.04	72.50913	-0.0011998	72.50950	-0.0006896
	9.60	72.50912	-0.0012136	72.50930	-0.0009654
	8.16	72.50911	-0.0012274	72.50920	-0.0011033
30	11.04	72.50951	-0.0006758	72.50954	-0.0006344
	9.60	72.50953	-0.0006482	72.50953	-0.0006482
	8.16	72.50952	-0.0006620	72.50951	-0.0006758
20	11.04	72.50954	-0.0006344	72.50952	-0.0006620
	9.60	72.50953	-0.0006482	72.50950	-0.0006896
	8.16	72.50950	-0.0006896	72.50953	-0.0006482
10	11.04	72.50942	-0.0007999	72.50943	-0.0007861
	9.60	72.50940	-0.0008275	72.50944	-0.0007723
	8.16	72.50939	-0.0008413	72.50946	-0.0007447
0	11.04	72.50953	-0.0006482	72.50955	-0.0006206
	9.60	72.50956	-0.0006068	72.50958	-0.0005792
	8.16	72.50957	-0.0005930	72.50950	-0.0006896
-10	11.04	72.50978	-0.0003034	72.50973	-0.0003724
	9.60	72.50975	-0.0003448	72.50975	-0.0003448
	8.16	72.50916	-0.0011585	72.50976	-0.0003310
-20	11.04	72.50990	-0.0001379	72.50992	-0.0001103
	9.60	72.50993	-0.0000965	72.50990	-0.0001379
	8.16	72.50992	-0.0001103	72.50995	-0.0000690
-30	11.04	72.50987	-0.0001793	72.50984	-0.0002207
	9.60	72.50985	-0.0002069	72.50982	-0.0002482
	8.16	72.50983	-0.0002345	72.50981	-0.0002620

Operating frequency: 72.51MHz				Limit: $\pm 0.002\%$	
Temp. (°C)	Power supply (Vdc)	5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)
50	11.04	72.50930	-0.0009654	72.50940	-0.0008275
	9.60	72.50950	-0.0006896	72.50970	-0.0004137
	8.16	72.50900	-0.0013791	72.50960	-0.0005516
40	11.04	72.50940	-0.0008275	72.50913	-0.0011998
	9.60	72.50919	-0.0011171	72.50911	-0.0012274
	8.16	72.50915	-0.0011723	72.50910	-0.0012412
30	11.04	72.50950	-0.0006896	72.50954	-0.0006344
	9.60	72.50953	-0.0006482	72.50952	-0.0006620
	8.16	72.50952	-0.0006620	72.50953	-0.0006482
20	11.04	72.50953	-0.0006482	72.50955	-0.0006206
	9.60	72.50951	-0.0006758	72.50957	-0.0005930
	8.16	72.50957	-0.0005930	72.50954	-0.0006344
10	11.04	72.50946	-0.0007447	72.50941	-0.0008137
	9.60	72.50945	-0.0007585	72.50943	-0.0007861
	8.16	72.50947	-0.0007309	72.50946	-0.0007447
0	11.04	72.50950	-0.0006896	72.50957	-0.0005930
	9.60	72.50952	-0.0006620	72.50959	-0.0005654
	8.16	72.50954	-0.0006344	72.50953	-0.0006482
-10	11.04	72.50976	-0.0003310	72.50975	-0.0003448
	9.60	72.50972	-0.0003862	72.50972	-0.0003862
	8.16	72.50975	-0.0003448	72.50977	-0.0003172
-20	11.04	72.50993	-0.0000965	72.50995	-0.0000690
	9.60	72.50995	-0.0000690	72.50997	-0.0000414
	8.16	72.50996	-0.0000552	72.50994	-0.0000827
-30	11.04	72.50986	-0.0001931	72.50985	-0.0002069
	9.60	72.50983	-0.0002345	72.50987	-0.0001793
	8.16	72.50981	-0.0002620	72.50988	-0.0001655

#### 4.4 EMISSION BANDWIDTH

##### 4.4.1 LIMIT OF FREQUENCY STABILITY MEASUREMENT

An R/C transmitter is allowed to transmit any appropriate non-voice emission, which meets the emission limitations for an R/C transmitter. The authorized bandwidth for any emission type transmitted by an R/C transmitter is 8kHz.

##### 4.4.2 TEST INSTRUMENT

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.

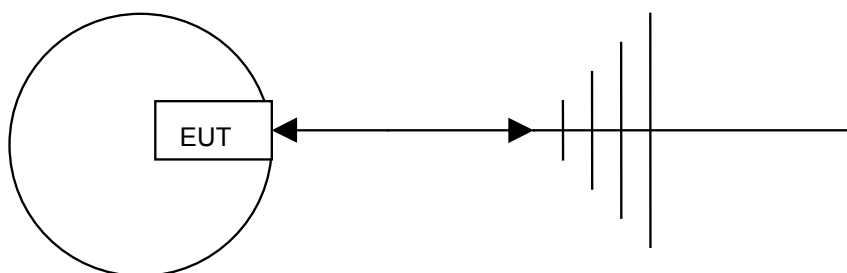
#### 4.4.3 TEST PROCEDURE

- a. The EUT was placed on the turning table.
- b. The signal was coupled to the spectrum analyzer through an antenna.
- c. Set the resolution bandwidth and video bandwidth to 300Hz and select Peak function to scan the channel frequency.
- d. The 26dBc bandwidth was measured and recorded.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITION

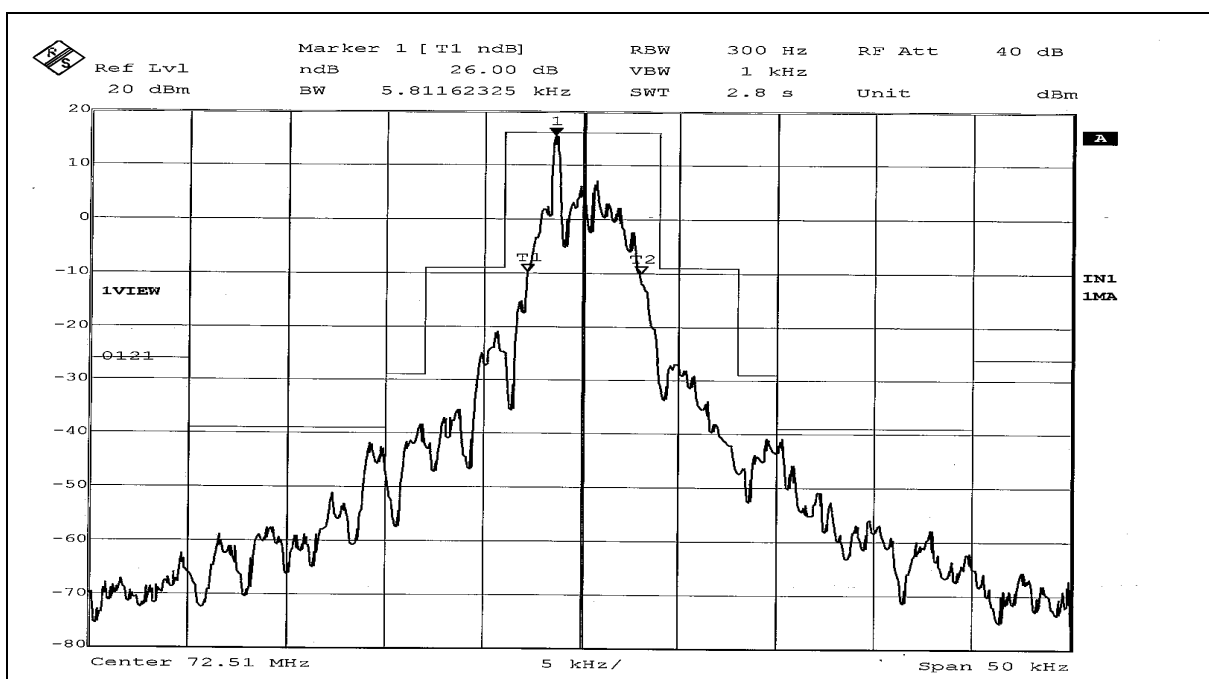
Same as item 4.3.6

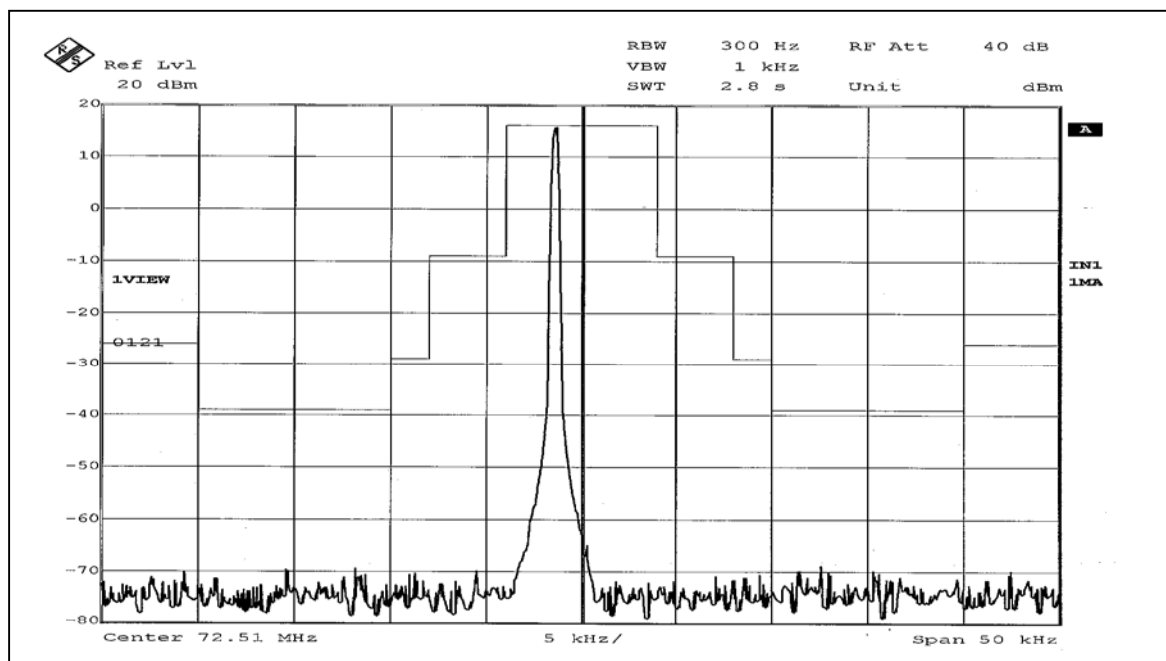
#### 4.4.7 TEST RESULTS

The occupied bandwidth of the EUT complied with the emission bandwidth requirement. During testing, all control switches and buttons were investigated for the worse case modulated signal. The occupied bandwidth plot submitted was the worst case condition.

CHANNEL FREQUENCY (MHz)	26dB BW BANDWIDTH (kHz)	MAXIMUM LIMIT (kHz)	PASS/FAIL
72.51	5.811	8	PASS

Refer to following image for test plots.

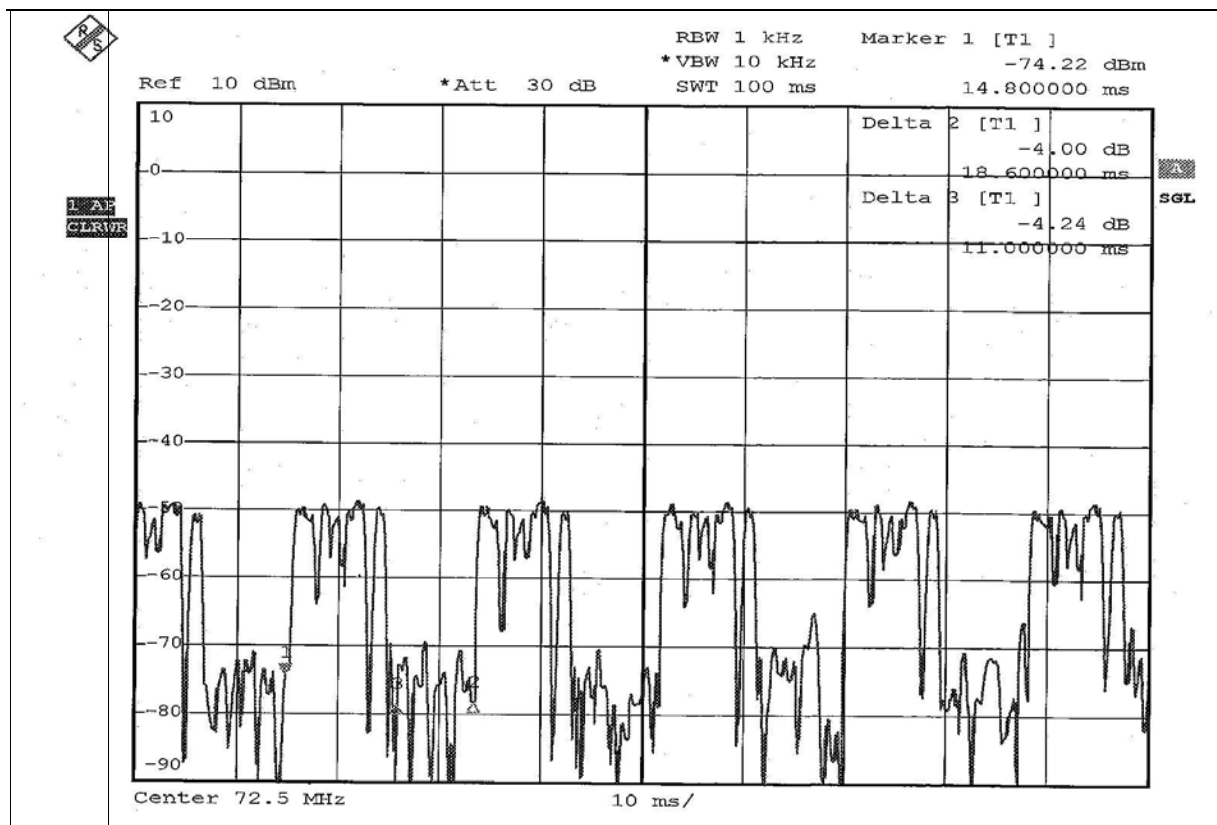






## 4.5 MODULATION CHARACTERISTICS

Refer to following image for test plots.

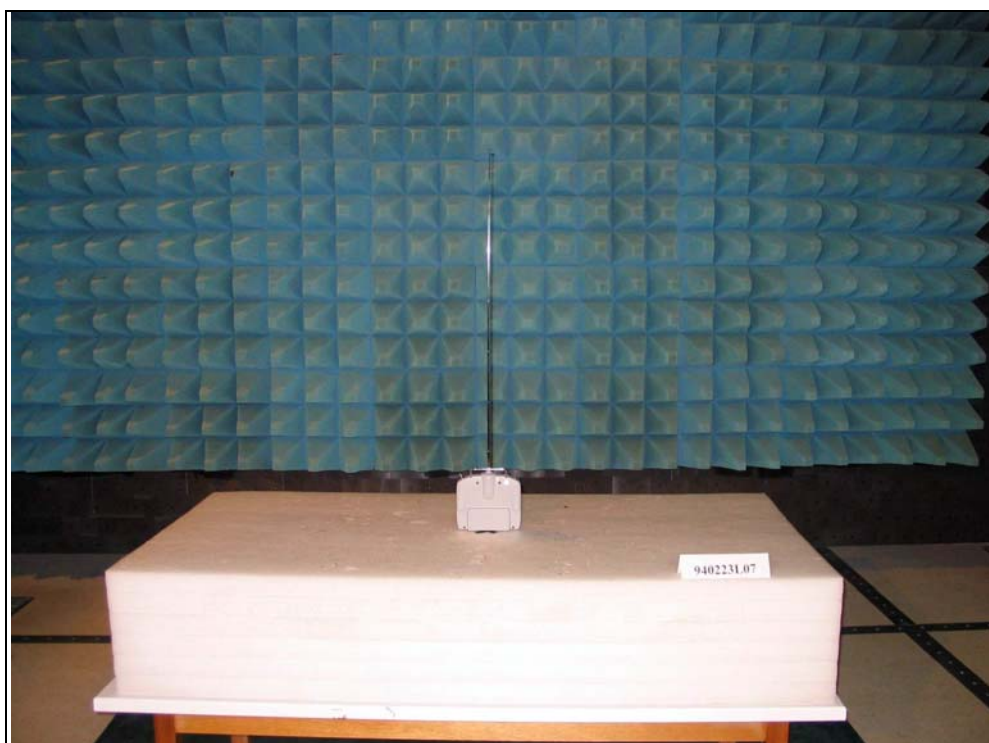


## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

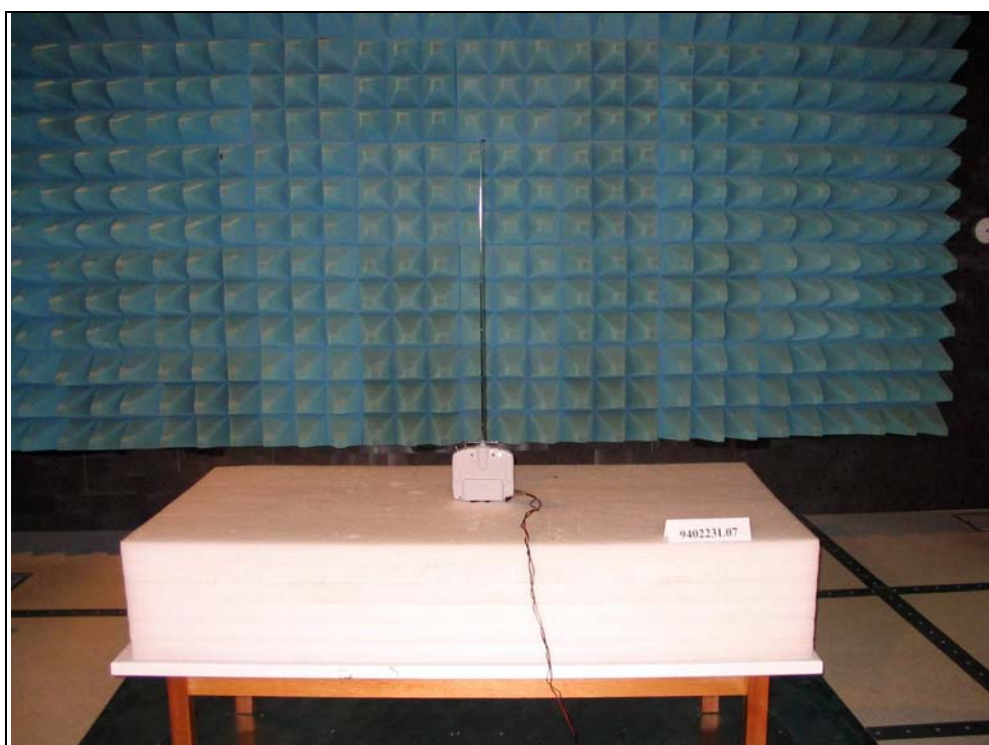
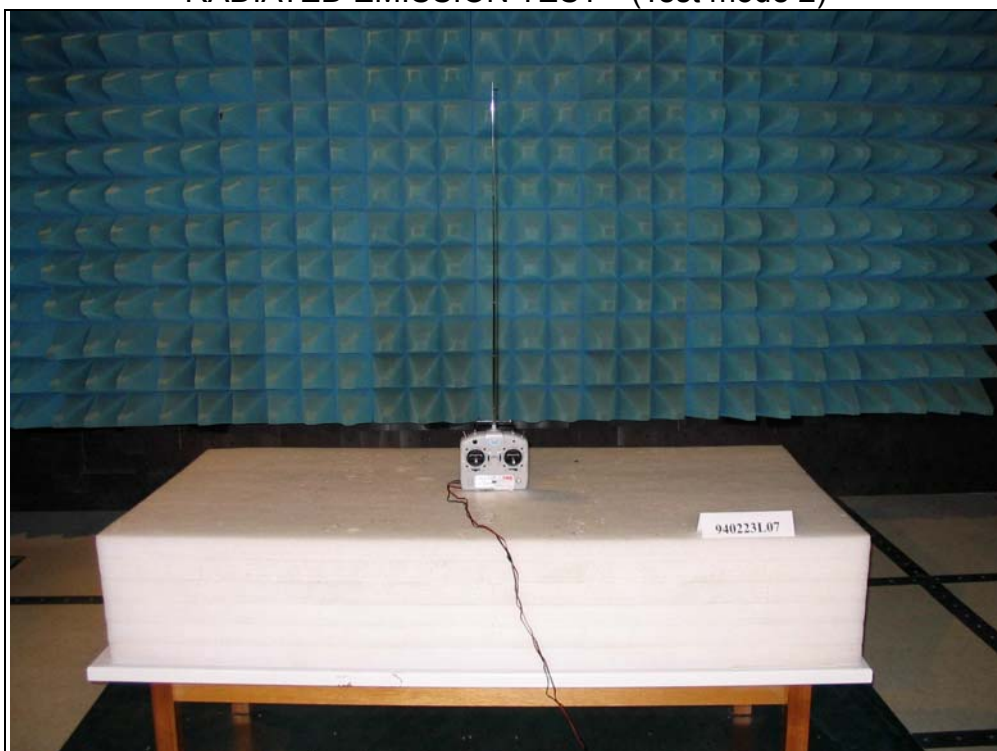
CONDUCTED EMISSION TEST (Test mode 2)



### RADIATED EMISSION TEST (Test mode 1)



### RADIATED EMISSION TEST (Test mode 2)





## 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.

<b>USA</b>	FCC, NVLAP, UL, A2LA
<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).  
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The address and road map of all our labs can be found in our web site also.