

# FCC TEST REPORT

**REPORT NO. :** RF960202L06

**MODEL NO. :** Y-RBC86

**RECEIVED :** Feb. 02, 2007

**TESTED :** Feb. 15 ~ Feb. 16, 2007

**ISSUED :** Mar. 05, 2007

**APPLICANT :** LOGITECH FAR EAST LTD.

**ADDRESS :** #2 Creation Rd. 4, Science-Based Ind. Park  
Hsinchu Taiwan, R.O.C.

**ISSUED BY :** Advance Data Technology Corporation

**LAB ADDRESS :** No. 47, 14<sup>th</sup> Ling, Chia Pau Tsuen, Lin Kou  
Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

**TEST LOCATION :** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Wen Hwa Tsuen, Kwei  
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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## 1. CERTIFICATION

**PRODUCT** : Cordless Number Pad  
**BRAND NAME** : Logitech  
**MODEL NO.** : Y-RBC86  
**APPLICANT** : LOGITECH FAR EAST LTD.  
**TESTED** : Feb. 15 ~ Feb. 16, 2007  
**TEST SAMPLE** : ENGINEERING SAMPLE  
**STANDARDS** : **FCC Part 15, Subpart C (Section 15.249)**  
ANSI C63.4-2003

The above equipment (model: Y-RBC86) have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Wendy Liao , **DATE**: Mar. 05, 2007  
Wendy Liao

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE**: Mar. 05, 2007  
Responsible for RF Long Chen

**APPROVED BY** : Gary Chang , **DATE**: Mar. 05, 2007  
Gary Chang / Supervisor

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.249)			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	NA	Power supply is 3Vdc from batteries
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Minimum passing margin is -6.27dB at 7206.00MHz

### 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	3.59 dB
	200MHz ~1000MHz	3.61 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	Cordless Number Pad
<b>MODEL NO.</b>	Y-RBC86
<b>FCC ID</b>	JNZYRBC86
<b>POWER SUPPLY</b>	3Vdc from batteries (AA battery*2)
<b>MODULATION TYPE</b>	GFSK
<b>RADIO TECHNOLOGY</b>	DSSS
<b>FREQUENCY RANGE</b>	2400 ~ 2483.5 MHz
<b>NUMBER OF CHANNEL</b>	78
<b>ANTENNA TYPE</b>	Printed Antenna with -4.18dBi gain
<b>DATA CABLE</b>	NA
<b>I/O PORT</b>	NA

**NOTE:**

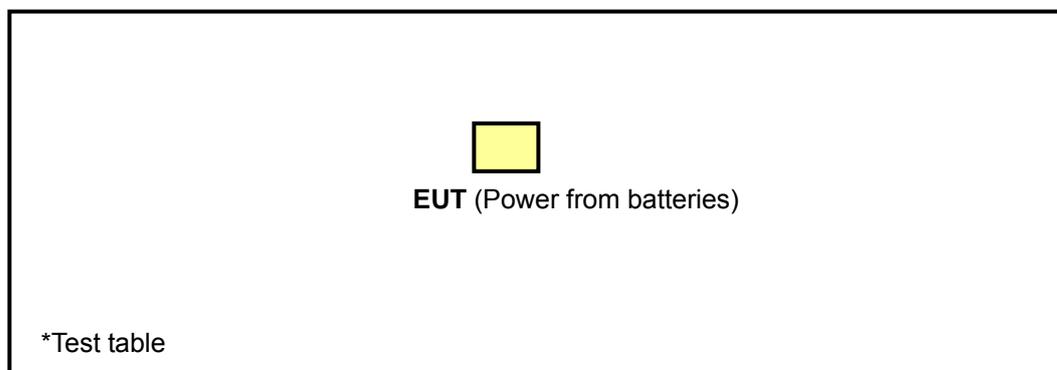
The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

78 channels are provided to this EUT:

Channel	Freq. (MHz)						
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460		
19	2421	39	2441	59	2461		

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE<1G	RE≥1G	BM	
-	NOTE	√	√	√	-

Where **PLC**:: Power Line Conducted Emission

**RE<1G**: Radiated Emission below 1GHz

**RE≥1G**: Radiated Emission above 1GHz

**BM**: Bandedge Measurement

**NOTE**: No need to concern of Conducted Emission due to the EUT is powered by battery.

#### 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 antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	77	DSSS	GFSK

#### RADIATED EMISSION TEST (ABOVE 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	0, 39, 77	DSSS	GFSK

#### BANDEDGE MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
0 to 77	0, 77	DSSS	GFSK



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

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

**FCC Part 15, Subpart C (Section 15.249)**  
**ANSI C63.4-2003**

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**

NA

## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

NA

### 4.2 RADIATED EMISSION MEASUREMENT

#### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209, 15.249 as following:

#### 15.209 Limit

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

#### 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 – 928 MHz	50	500
2400 – 2483.5 MHz	50	500
5725 -5875 MHz	50	500
24.0 – 24.25 GHz	250	2500

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
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
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	May. 08, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 07, 2007
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 04, 2008
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 26, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 16, 2008
Preamplifier Agilent	8449B	3008A01911	Sep. 13, 2007
Preamplifier Agilent	8447D	2944A10638	Dec. 20, 2007
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218188/218189	Nov. 14, 2007
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Mar. 08, 2007
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	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 Chamber 9.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The IC Site Registration No. is IC3789B-9.

#### 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 3 meter semi-anechoic chamber. 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

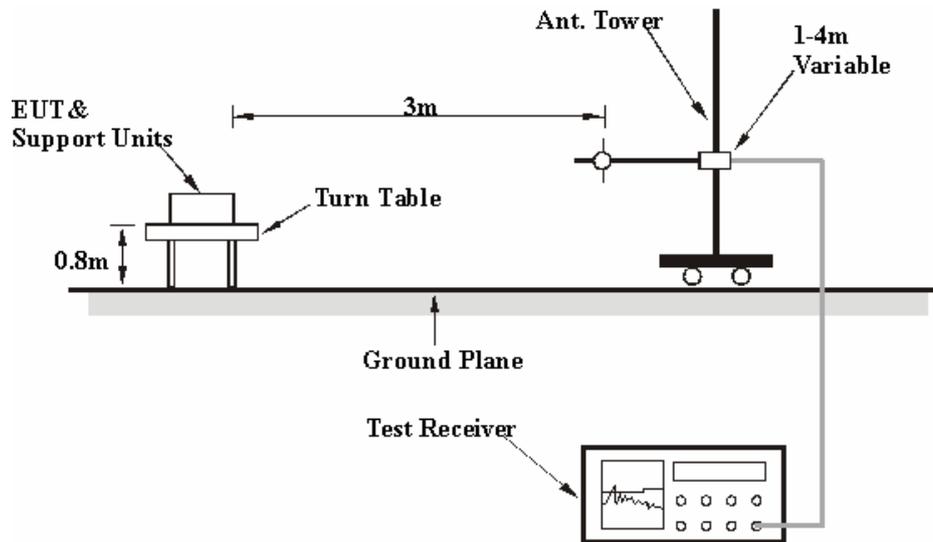
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection 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 attached file (Test Setup Photo).

#### 4.2.6 EUT OPERATING CONDITIONS

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

## 4.2.7 TEST RESULTS

### RADIATED WORST-CASE DATA: BELOW 1GHz

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	29.90	23.03 QP	40.00	-16.97	1.50 H	43	10.94	12.09
2	514.03	23.88 QP	46.00	-22.12	2.00 H	292	4.80	19.08
3	543.19	27.46 QP	46.00	-18.54	1.50 H	10	7.69	19.77
4	572.36	23.28 QP	46.00	-22.72	1.50 H	10	2.83	20.45
5	620.96	22.22 QP	46.00	-23.78	1.00 H	208	0.93	21.29
6	685.13	22.15 QP	46.00	-23.85	1.00 H	232	0.29	21.86
7	712.35	22.45 QP	46.00	-23.55	1.50 H	145	0.16	22.29
8	727.90	22.60 QP	46.00	-23.40	4.00 H	10	-0.07	22.66
9	782.34	24.04 QP	46.00	-21.96	2.50 H	205	0.09	23.95
10	801.78	29.22 QP	46.00	-16.78	1.00 H	70	4.84	24.38
11	838.72	24.80 QP	46.00	-21.20	1.00 H	10	0.06	24.74
12	848.45	25.54 QP	46.00	-20.46	4.00 H	10	0.71	24.83
13	879.55	25.23 QP	46.00	-20.77	2.00 H	223	0.11	25.12
14	916.50	25.75 QP	46.00	-20.25	2.00 H	1	0.30	25.45
15	949.55	29.79 QP	46.00	-16.21	2.00 H	10	4.07	25.72

- 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.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	29.90	22.98 QP	40.00	-17.02	1.50 V	10	10.89	12.09
2	698.74	23.50 QP	46.00	-22.50	1.00 V	10	1.52	21.98
3	749.29	23.18 QP	46.00	-22.82	2.50 V	10	0.00	23.18
4	782.34	24.12 QP	46.00	-21.88	1.50 V	271	0.17	23.95
5	801.78	26.24 QP	46.00	-19.76	2.50 V	10	1.86	24.38
6	838.72	24.76 QP	46.00	-21.24	2.50 V	292	0.02	24.74
7	860.11	25.10 QP	46.00	-20.90	2.00 V	10	0.16	24.94
8	902.89	26.44 QP	46.00	-19.56	1.00 V	262	1.10	25.34
9	908.72	28.58 QP	46.00	-17.42	1.50 V	133	3.20	25.39
10	949.55	31.59 QP	46.00	-14.41	1.00 V	187	5.86	25.72

- 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.



### ABOVE 1GHZ WORST-CASE DATA

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	1601.00	56.48 PK	74.00	-17.52	1.00 H	184	28.72	27.76
2	1601.00	45.08 AV	54.00	-8.92	1.00 H	184	17.32	27.76
3	2352.00	38.99 PK	74.00	-35.01	1.00 H	247	7.74	31.25
4	2352.00	31.04 AV	54.00	-22.96	1.00 H	247	-0.21	31.25
5	2390.00	45.79 PK	74.00	-28.21	1.37 H	211	14.57	31.22
6	2390.00	35.47 AV	54.00	-18.53	1.37 H	211	4.25	31.22
7	2399.00	48.58 PK	74.00	-25.42	1.00 H	254	17.37	31.21
8	2399.00	39.20 AV	54.00	-14.80	1.00 H	254	7.99	31.21
9	*2402.00	85.22 PK	114.00	-28.78	1.37 H	211	54.01	31.21
10	*2402.00	73.82 AV	94.00	-20.18	1.37 H	211	42.61	31.21
11	4804.00	54.29 PK	74.00	-19.71	1.07 H	181	17.85	36.44
12	4804.00	42.89 AV	54.00	-11.11	1.07 H	181	6.45	36.44
13	7206.00	58.47 PK	74.00	-15.53	1.33 H	168	15.55	42.93
14	7206.00	47.07 AV	54.00	-6.93	1.33 H	168	4.15	42.93

- 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.
  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:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$

Please see page 21 for plotted duty.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	1601.00	47.56 PK	74.00	-26.44	1.00 V	306	19.80	27.76
2	1601.00	36.16 AV	54.00	-17.84	1.00 V	306	8.40	27.76
3	2352.00	31.20 PK	74.00	-42.80	1.07 V	76	-0.05	31.25
4	2352.00	25.40 AV	54.00	-28.60	1.07 V	76	-5.85	31.25
5	2390.00	40.46 PK	74.00	-33.54	1.00 V	284	9.24	31.22
6	2390.00	30.33 AV	54.00	-23.67	1.00 V	284	-0.89	31.22
7	2399.00	44.26 PK	74.00	-29.74	1.00 V	74	13.05	31.21
8	2399.00	33.82 AV	54.00	-20.18	1.00 V	74	2.61	31.21
9	*2402.00	77.22 PK	114.00	-36.78	1.00 V	284	46.01	31.21
10	*2402.00	65.82 AV	94.00	-28.18	1.00 V	284	34.61	31.21
11	4804.00	56.57 PK	74.00	-17.43	1.01 V	205	20.13	36.44
12	4804.00	45.17 AV	54.00	-8.83	1.01 V	205	8.73	36.44
13	7206.00	59.13 PK	74.00	-14.87	1.00 V	197	16.21	42.93
14	<b>7206.00</b>	<b>47.73 AV</b>	<b>54.00</b>	<b>-6.27</b>	<b>1.00 V</b>	<b>197</b>	<b>4.81</b>	<b>42.93</b>

- 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.
  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:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$

Please see page 21 for plotted duty

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	1627.00	56.94 PK	74.00	-17.06	1.00 H	180	29.20	27.74
2	1627.00	45.54 AV	54.00	-8.46	1.00 H	180	17.80	27.74
3	*2441.00	82.46 PK	114.00	-31.54	1.08 H	218	51.24	31.22
4	*2441.00	71.06 AV	94.00	-22.94	1.08 H	218	39.84	31.22
5	4882.00	54.19 PK	74.00	-19.81	1.05 H	179	17.60	36.59
6	4882.00	42.79 AV	54.00	-11.21	1.05 H	179	6.20	36.59
7	7323.00	56.43 PK	74.00	-17.57	1.10 H	168	13.40	43.03
8	7323.00	45.03 AV	54.00	-8.97	1.10 H	168	2.00	43.03

- 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.
  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:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$

Please see page 21 for plotted duty

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	1627.00	48.68 PK	74.00	-25.32	1.01 V	306	20.94	27.74
2	1627.00	36.95 AV	54.00	-17.05	1.01 V	306	9.21	27.74
3	*2441.00	75.50 PK	114.00	-38.50	1.63 V	291	44.28	31.22
4	*2441.00	64.10 AV	94.00	-29.90	1.63 V	291	32.88	31.22
5	4882.00	56.83 PK	74.00	-17.17	1.22 V	246	20.24	36.59
6	4882.00	45.43 AV	54.00	-8.57	1.22 V	246	8.84	36.59
7	7323.00	56.99 PK	74.00	-17.01	1.07 V	227	13.96	43.03
8	7323.00	45.59 AV	54.00	-8.41	1.07 V	227	2.56	43.03

- 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.
  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:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$

Please see page 21 for plotted duty

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	1652.00	57.45 PK	74.00	-16.55	1.73 H	177	29.73	27.72
2	1652.00	46.05 AV	54.00	-7.95	1.73 H	177	18.33	27.72
3	*2479.00	81.87 PK	114.00	-32.13	1.06 H	214	50.64	31.23
4	*2479.00	70.47 AV	94.00	-23.53	1.06 H	214	39.24	31.23
5	2483.50	55.94 PK	74.00	-18.06	1.06 H	214	24.70	31.24
6	2483.50	44.72 AV	54.00	-9.28	1.06 H	214	13.48	31.24
7	4958.00	53.92 PK	74.00	-20.08	1.02 H	178	17.18	36.74
8	4958.00	42.52 AV	54.00	-11.48	1.02 H	178	5.78	36.74
9	7437.00	56.29 PK	74.00	-17.71	1.03 H	176	13.23	43.07
10	7437.00	44.89 AV	54.00	-9.11	1.03 H	176	1.83	43.07

- 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.
  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:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$

Please see page 21 for plotted duty

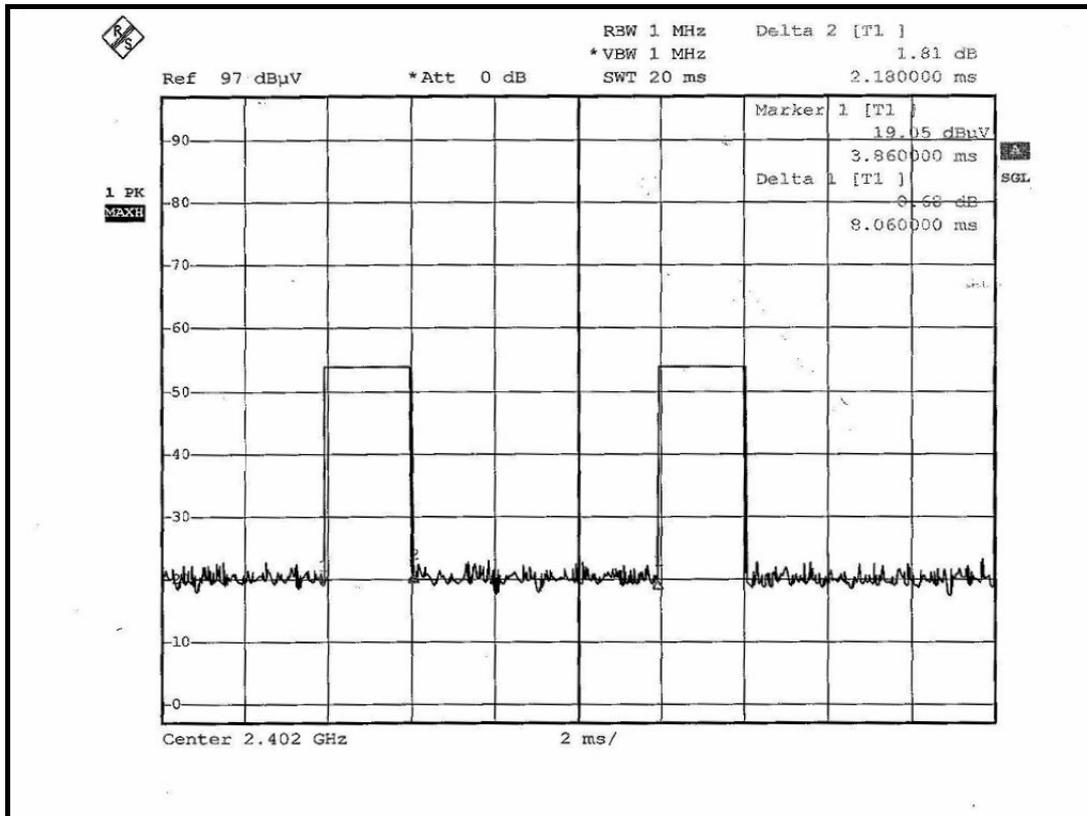
EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 77	FREQUENCY RANGE	1 ~ 25GHz
MODULATION TYPE	GFSK	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 67%RH, 991hPa	TESTED BY	Lori Chiu

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	1652.00	48.89 PK	74.00	-25.11	1.00 V	311	21.17	27.72
2	1652.00	37.49 AV	54.00	-16.51	1.00 V	311	9.77	27.72
3	*2479.00	74.14 PK	114.00	-39.86	1.17 V	297	42.91	31.23
4	*2479.00	62.74 AV	94.00	-31.26	1.17 V	297	31.51	31.23
5	2483.50	54.49 PK	74.00	-19.51	1.17 V	297	23.25	31.24
6	2483.50	44.36 AV	54.00	-9.64	1.17 V	297	13.12	31.24
7	4958.00	55.85 PK	74.00	-18.15	1.10 V	233	19.11	36.74
8	4958.00	44.45 AV	54.00	-9.55	1.10 V	233	7.71	36.74
9	7437.00	56.43 PK	74.00	-17.57	1.03 V	232	13.37	43.07
10	7437.00	45.03 AV	54.00	-8.97	1.03 V	232	1.97	43.07

- 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.
  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:

$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$

Please see page 21 for plotted duty



$$20\log(\text{Duty cycle}) = 20\log \frac{2.18 \text{ ms}}{8.06 \text{ ms}} = -11.4\text{dB}$$



### 4.3 BAND EDGES MEASUREMENT

#### 4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below -50dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

#### 4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
SPECTRUM ANALYZER	FSP40	100040	Jun. 07, 2007

**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 transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots are attached on the following pages.

#### 4.3.4 DEVIATION FROM TEST STANDARD

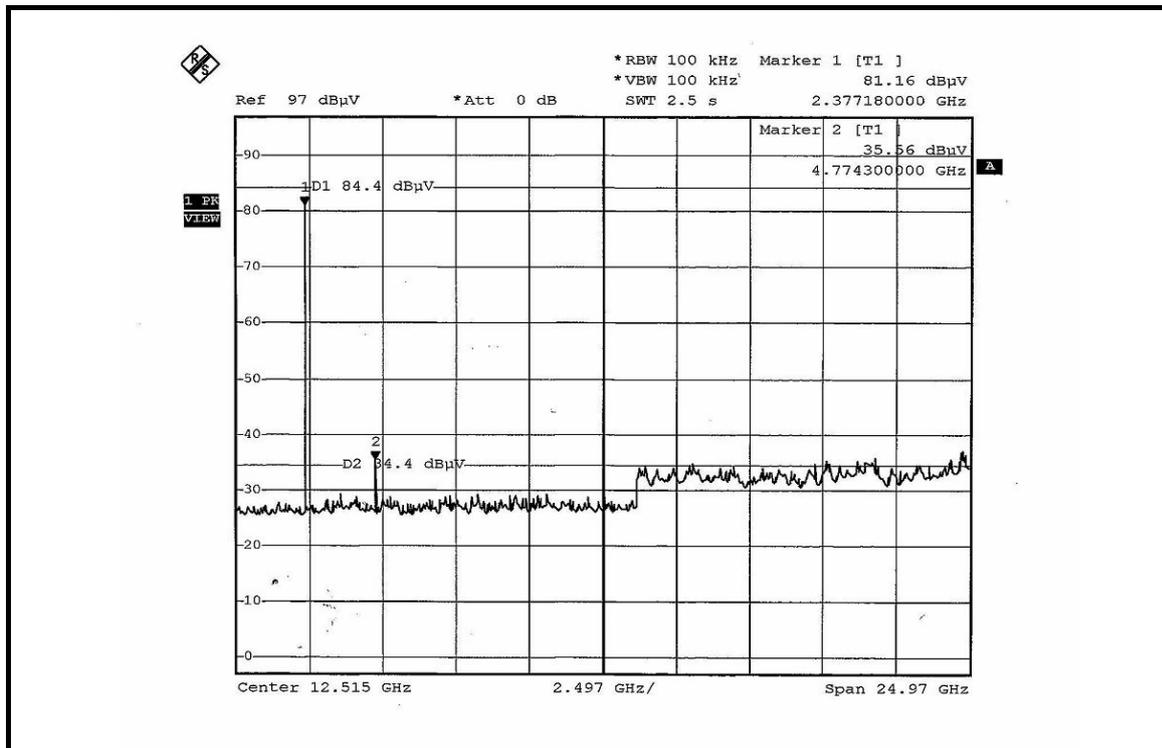
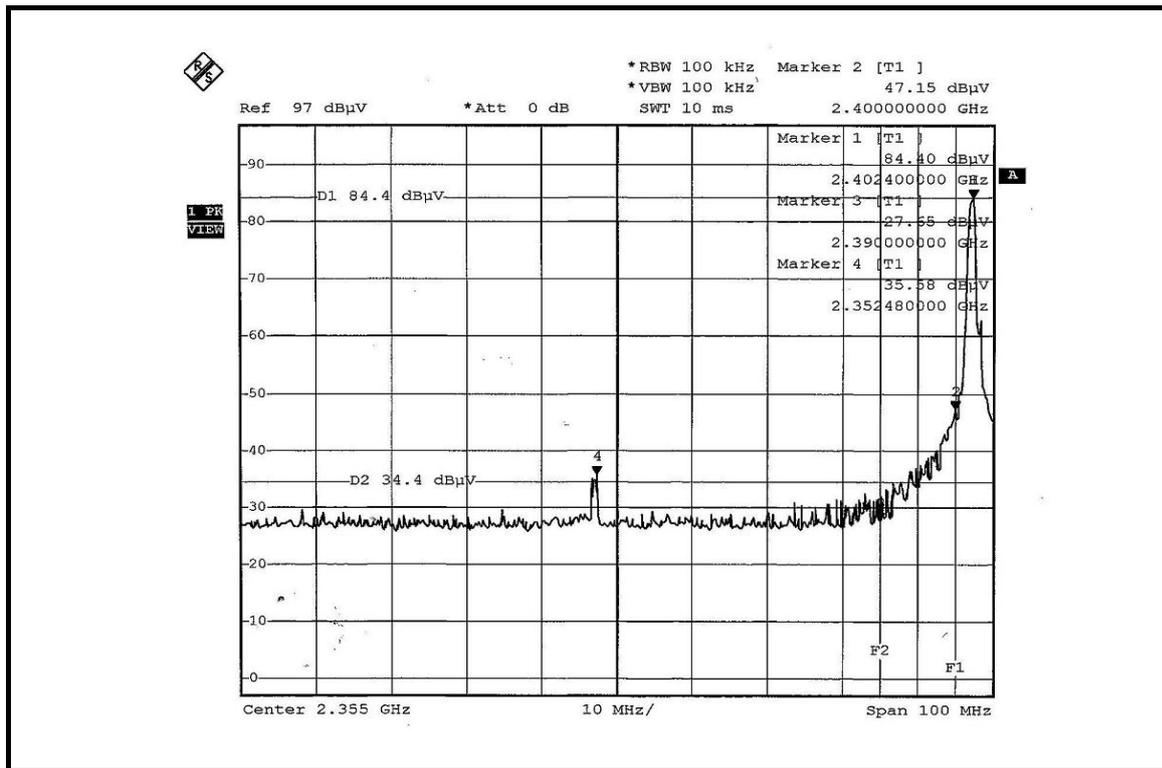
No deviation.

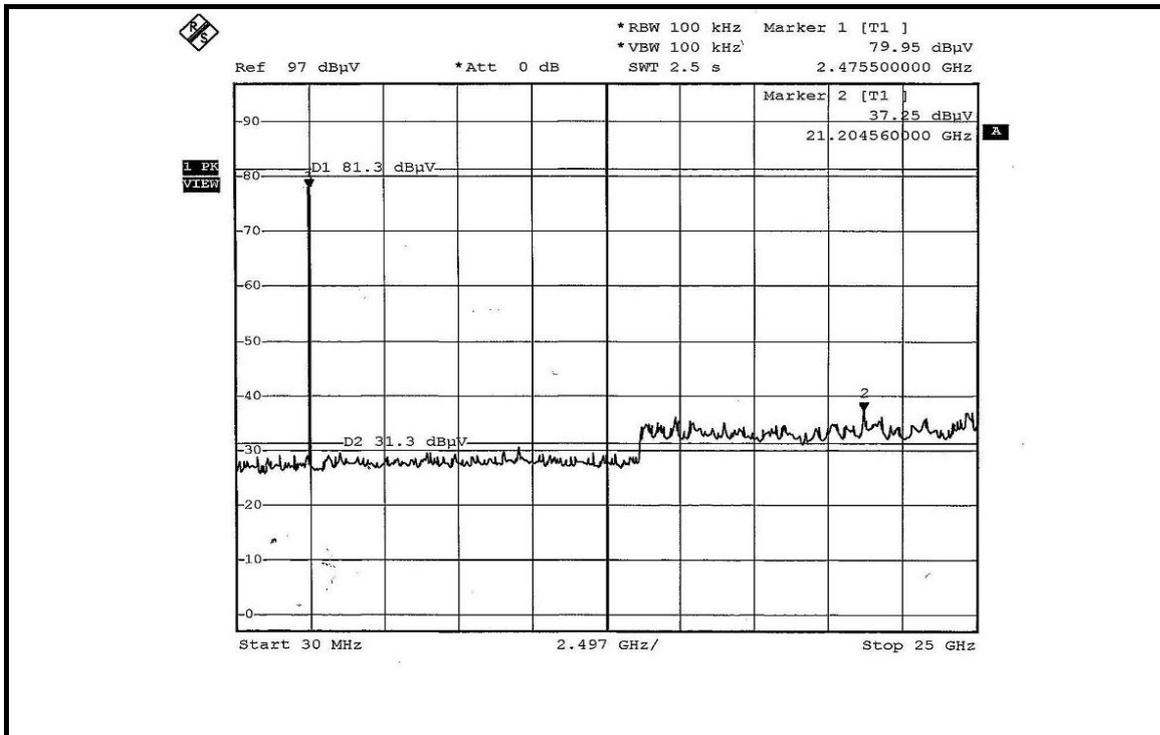
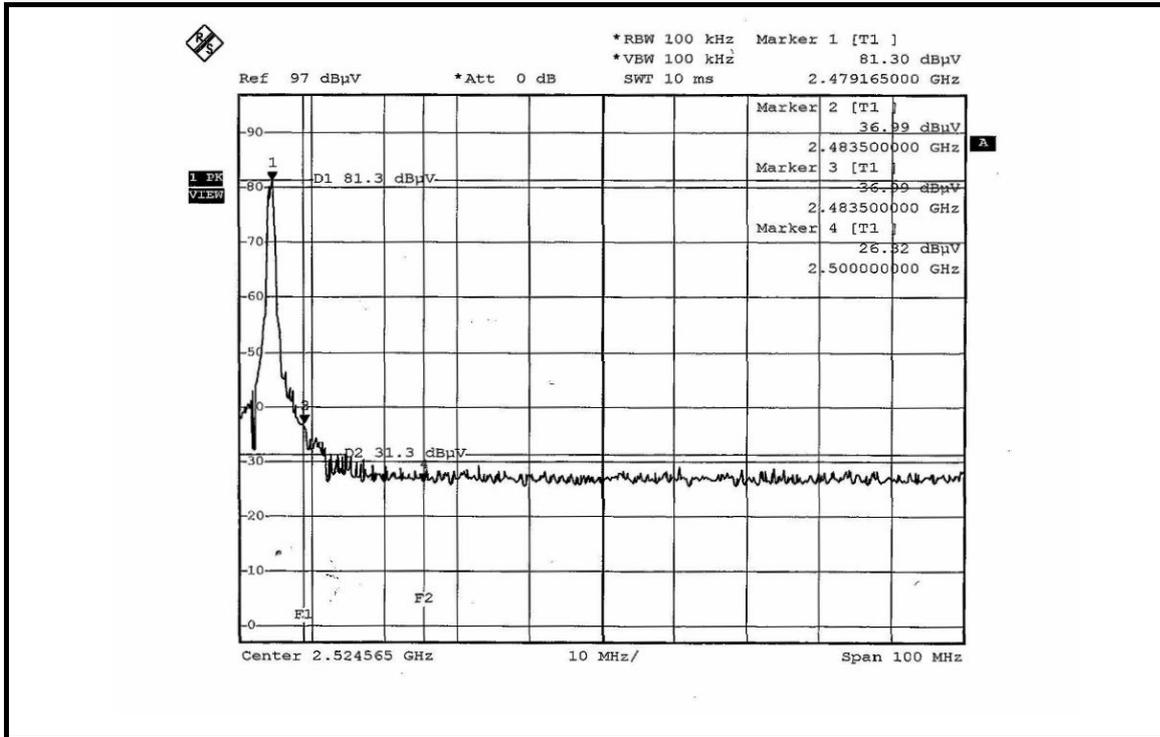
#### 4.3.5 EUT OPERATING CONDITION

Same as Item 4.3.6.

#### 4.3.6 TEST RESULTS

The spectrum plots are attached on the following 4 images. D1 line indicates the highest level, and D2 line indicates the 50dB offset below D1. It shows compliance with the requirement in part 15.249 (d).







## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



## 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, 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, NCC
<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: 886-2-26051924

### **Hsin Chu EMC/RF Lab**

Tel: 886-3-5935343  
Fax: 886-3-5935342

### **Hwa Ya EMC/RF/Safety Telecom Lab**

Tel: 886-3-3183232  
Fax: 886-3-3185050

**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



## **APPENDIX-A**

### **MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.