

FCC TEST REPORT

REPORT NO. : RF950124A08

MODEL NO. : 9019URF3

RECEIVED : Jan. 24, 2006

TESTED : Feb. 6 ~ 14, 2006

ISSUED : Feb. 20, 2006

APPLICANT : BEHAVIOR TECH COMPUTER CORP.

ADDRESS : 2F, 51, Tung Hsing Rd., Taipei, Taiwan, R.O.C.

ISSUED BY : Advance Data Technology Corporation

LAB LOCATION : No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang
244, Taipei Hsien, Taiwan, R.O.C.

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1. CERTIFICATION

PRODUCT : Wireless Keyboard
BRAND NAME : BTC, acer
MODEL NO. : 9019URF3
TEST SAMPLE : ENGINEERING SAMPLE
APPLICANT : BEHAVIOR TECH COMPUTER CORP.
TESTED : Feb. 6 ~ 14, 2006
STANDARDS : FCC Part 15, Subpart C (Section 15.249)
ANSI C63.4-2003

The above equipment has 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 : Annie Chang , **DATE:** Feb. 20, 2006
(Annie Chang)

TECHNICAL
ACCEPTANCE : Ken Liu , **DATE:** Feb. 20, 2006
Responsible for RF (Ken Liu)

APPROVED BY : Gary Chang , **DATE:** Feb. 20, 2006
(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	N/A	Power supply is 6Vdc 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 -2.66dB at 2440.00MHz

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:

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

Measurement	Uncertainty
Radiated emissions	3.86 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Wireless Keyboard
MODEL NO.	9019URF3
FCC ID	E5XKB9109URF3
POWER SUPPLY	6.0Vdc from batteries
MODULATION TYPE	GFSK
FREQUENCY RANGE	2403MHz ~ 2480MHz
NUMBER OF CHANNEL	49
ANTENNA TYPE	Printed Antenna with –1dBi Gain
DATA CABLE	N/A
I/O PORT	N/A

NOTE:

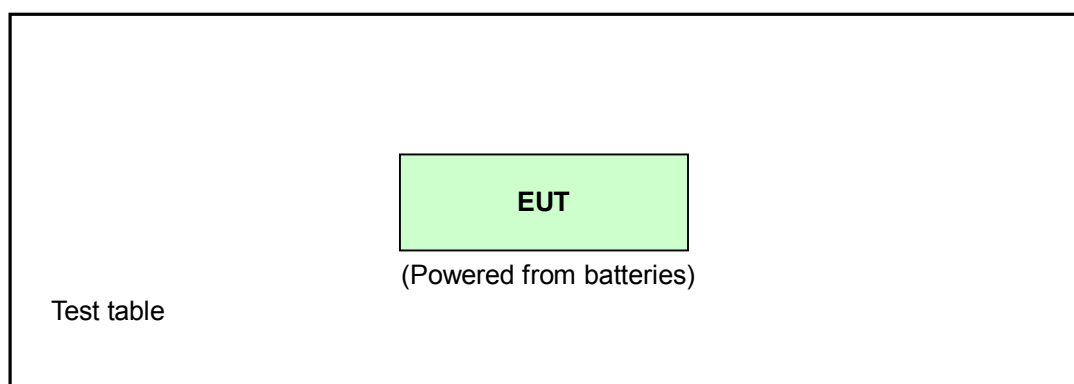
1. The EUT is a wireless keyboard.
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Three channels were provided to this EUT :

Channel	Frequency
1	2403MHz
24	2440MHz
49	2480MHz

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	
-	Note	√	√	N/A

Where PLC: Power Line Conducted Emission
 RE<1G: Radiated Emission below 1GHz
 RE≥1G: Radiated Emission above 1GHz

Note : Conducted RF measurement is independent of power supply.

Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X, Y, Z Axis 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 Type	Axis
1 to 49	24	GFSK	X

Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X, Y, Z Axis 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 Type	Axis
1 to 49	1, 24, 49	GFSK	X

Bandedge Measurement:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates 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 Type
1 to 49	1, 49	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

The EUT has been tested as an independent.

4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

N/A

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 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

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
HP Preamplifier	8447D	2432A03504	May 22, 2006
HP Preamplifier	8449B	3008A01924	Sep. 06, 2006
HP Preamplifier	8449B	3008A01638	Sep. 21, 2006
ROHDE & SCHWARZ TEST RECEIVER	ESI7	836697/012	Nov. 01, 2006
Schwarzbeck Antenna	VULB 9168	137	Feb. 27, 2006
Schwarzbeck Antenna	VHBA 9123	480	Apr. 11, 2006
EMCO Horn Antenna	3115	6714	Oct. 26, 2006
EMCO Horn Antenna	3115	9312-4192	Feb. 28, 2006
ADT. Turn Table	TT100	0306	NA
ADT. Tower	AT100	0306	NA
Software	ADT_Radiated_V 6	NA	NA
TIMES RF cable	LL142	CABLE-CH6-01	Dec. 19, 2006
ROHDE & SCHWARZ Spectrum Analyzer	FSP 40	100036	Mar. 20. 2006

- 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 horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 3. The test was performed in ADT Chamber No. 6.
 4. The Industry Canada Reference No. IC 3789-6.

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 meters 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 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.

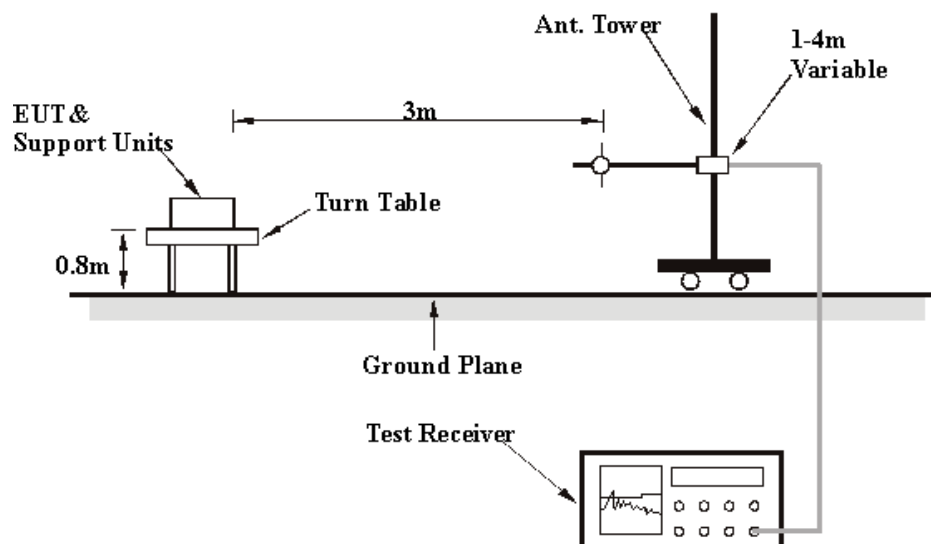
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) 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 EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

RADIATED WORST CASE DATA: BELOW 1GHz

MODULATION TYPE	GFSK	CHANNEL	24
INPUT POWER	6Vdc	FREQUENCY RANGE	Below 1 GHz
ENVIRONMENTAL CONDITIONS	15 deg. C, 81% RH, 1006 hPa	DETECTOR FUNCTION	Quasi-Peak
TESTED BY	Jamison Chan		

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	245.77	18.73 QP	46.00	-27.27	1.00 H	214	15.23	3.50
2	280.76	21.88 QP	46.00	-24.12	1.00 H	196	15.85	6.04
3	414.89	21.27 QP	46.00	-24.73	2.00 H	214	7.27	14.00
4	663.71	19.22 QP	46.00	-26.78	1.25 H	301	0.49	18.72
5	702.59	18.57 QP	46.00	-27.43	1.00 H	304	-0.98	19.55
6	782.28	18.08 QP	46.00	-27.92	3.00 H	295	-0.92	19.00

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	43.61	17.70 QP	40.00	-22.30	1.25 V	43	11.70	6.00
2	183.57	17.44 QP	43.50	-26.06	1.00 V	217	7.79	9.64
3	788.12	16.81 QP	46.00	-29.19	1.50 V	88	-1.10	17.91
4	838.66	20.09 QP	46.00	-25.91	1.50 V	322	-1.25	21.33
5	885.31	17.00 QP	46.00	-29.00	1.00 V	115	-1.13	18.13
6	945.57	17.53 QP	46.00	-28.47	1.00 V	118	-0.47	18.00

- 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.

RADIATED WORST CASE DATA: ABOVE 1GHz

MODULATION TYPE	GFSK	CHANNEL	1
INPUT POWER	6Vdc	FREQUENCY RANGE	1 ~ 25 GHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 77% RH, 1006 hPa	DETECTOR FUNCTION	Peak (PK) Average (AV)
TESTED BY	Jamison Chan		

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	2390.00	57.44 PK	74.00	-16.56	1.28 H	271	23.62	33.82
1	2390.00	47.13 AV	54.00	-6.87	1.28 H	271	13.31	33.82
2	*2403.00	90.97 PK	114.00	-23.03	1.28 H	271	57.10	33.87
2	*2403.00	90.52 AV	94.00	-3.48	1.28 H	271	56.65	33.87
3	4806.00	56.57 PK	74.00	-17.43	1.00 H	273	16.15	40.42
3	4806.00	50.75 AV	54.00	-3.25	1.00 H	273	10.33	40.42

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	2390.00	56.24 PK	74.00	-17.76	1.49 V	232	22.42	33.82
1	2390.00	46.59 AV	54.00	-7.41	1.49 V	232	12.77	33.82
2	*2403.00	83.96 PK	114.00	-30.04	1.49 V	232	50.09	33.87
2	*2403.00	83.51 AV	94.00	-10.49	1.49 V	232	49.64	33.87
3	4806.00	56.22 PK	74.00	-17.78	1.00 V	137	15.80	40.42
3	4806.00	49.18 AV	54.00	-4.82	1.00 V	137	8.76	40.42

- 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

MODULATION TYPE	GFSK	CHANNEL	24
INPUT POWER	6Vdc	FREQUENCY RANGE	1 ~ 25 GHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 77% RH, 1006 hPa	DETECTOR FUNCTION	Peak (PK) Average (AV)
TESTED BY	Jamison Chan		

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	*2440.00	91.81 PK	114.00	-22.19	1.22 H	269	57.85	33.96
1	*2440.00	91.34 AV	94.00	-2.66	1.22 H	269	57.38	33.96
2	4880.00	56.35 PK	74.00	-17.65	1.16 H	272	15.88	40.47
2	4880.00	50.46 AV	54.00	-3.54	1.16 H	272	9.99	40.47

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	*2440.00	87.01 PK	114.00	-26.99	1.10 V	267	53.92	33.09
1	*2440.00	86.02 AV	94.00	-7.98	1.10 V	267	52.93	33.09
2	4880.00	51.06 PK	74.00	-22.94	1.06 V	320	12.16	38.89
2	4880.00	44.29 AV	54.00	-9.71	1.06 V	320	5.39	38.89

- 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

MODULATION TYPE	GFSK	CHANNEL	49
INPUT POWER	6Vdc	FREQUENCY RANGE	1 ~ 25 GHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 77% RH, 1006 hPa	DETECTOR FUNCTION	Peak (PK) Average (AV)
TESTED BY	Jamison Chan		

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	*2480.00	90.96 PK	114.00	-23.04	1.23 H	270	56.91	34.05
1	*2480.00	90.75 AV	94.00	-3.25	1.23 H	270	56.70	34.05
2	2483.50	59.78 PK	74.00	-14.22	1.23 H	270	25.72	34.06
2	2483.50	50.40 AV	54.00	-3.60	1.23 H	270	16.34	34.06
3	4960.00	57.26 PK	74.00	-16.74	1.11 H	271	16.65	40.61
3	4960.00	51.20 AV	54.00	-2.80	1.11 H	271	10.59	40.61

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	85.70 PK	114.00	-28.30	1.52 V	110	51.65	34.05
1	*2480.00	85.20 AV	94.00	-8.80	1.52 V	110	51.15	34.05
2	2483.50	56.77 PK	74.00	-17.23	1.52 V	110	22.71	34.06
2	2483.50	48.16 AV	54.00	-5.84	1.52 V	110	14.10	34.06
3	4960.00	55.52 PK	74.00	-18.48	1.08 V	150	14.91	40.61
3	4960.00	47.59 AV	54.00	-6.41	1.08 V	150	6.98	40.61

- 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

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	FSP 40	100036	Mar. 20. 2006

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

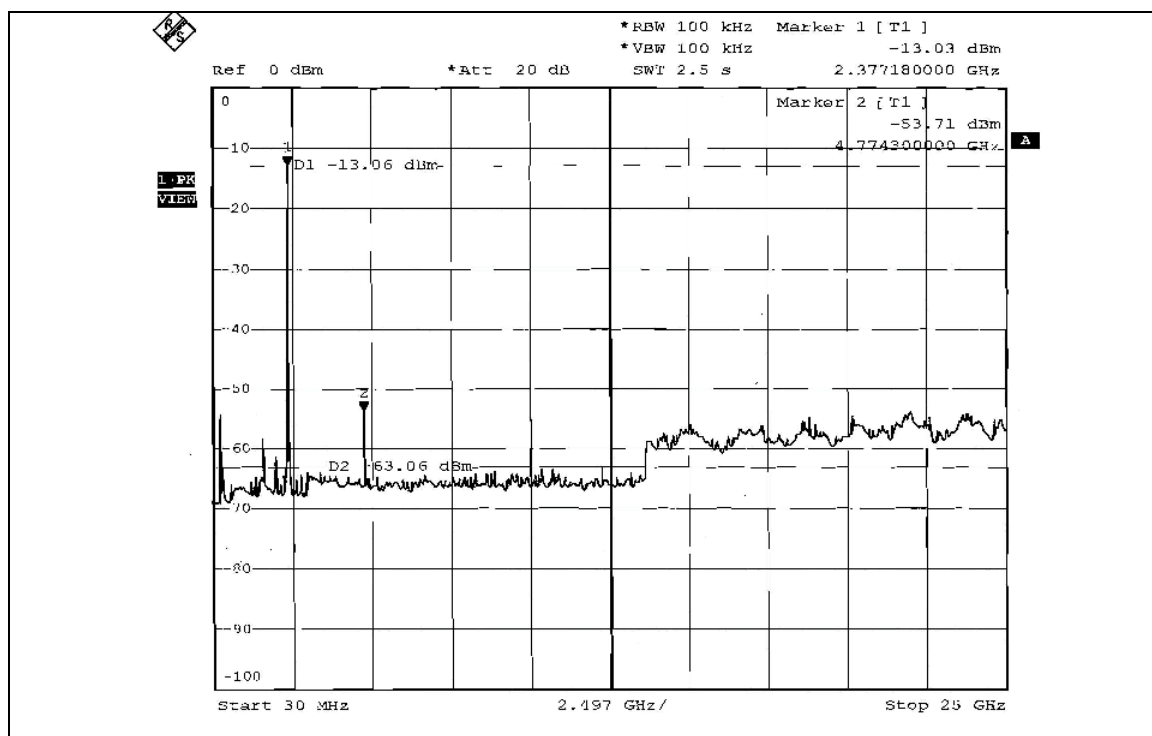
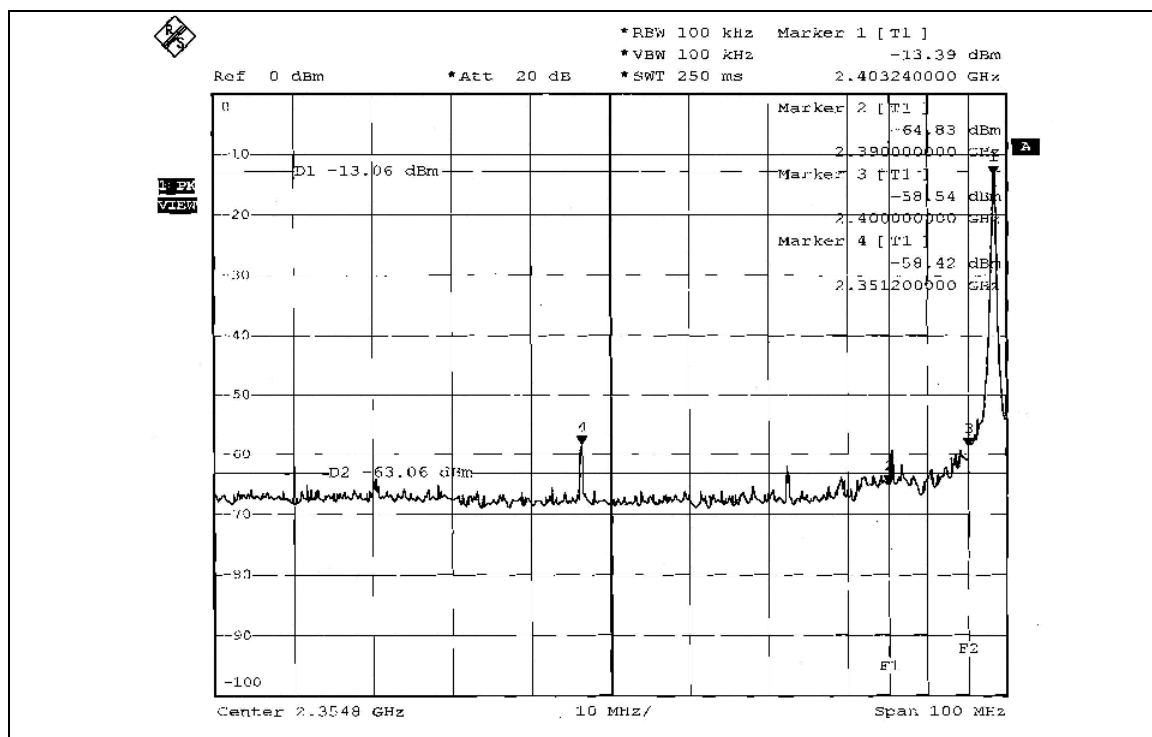
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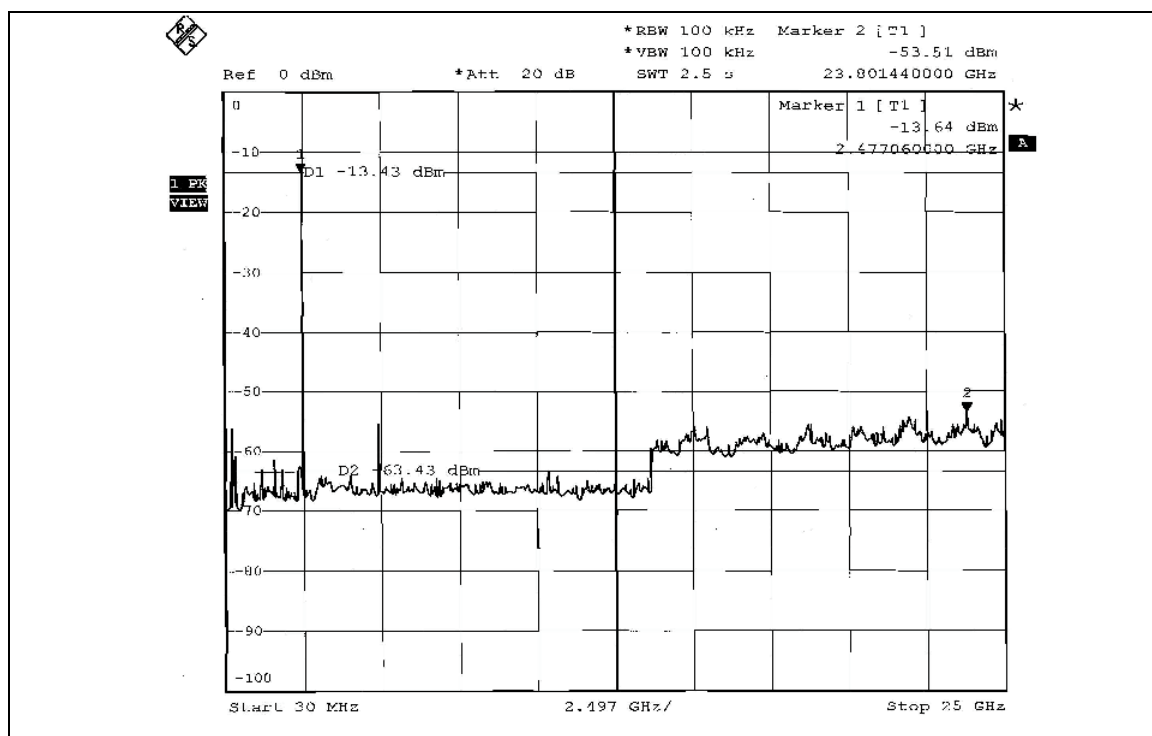
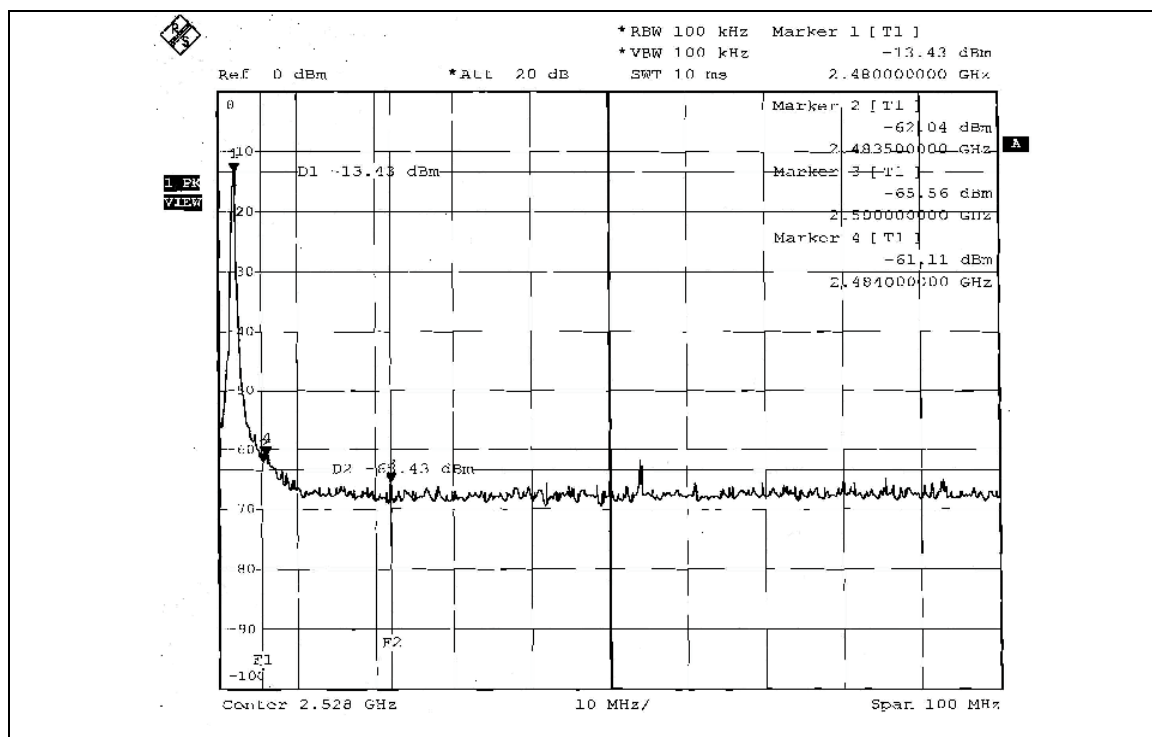
4.3.5 EUT OPERATING CONDITION

Same as Item 4.2.6.

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

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.

USA	FCC, UL, A2LA
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 Telecom Lab

Tel: 886-3-3183232

Fax: 886-3-3185050

Web Site: 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.