

# FCC TEST REPORT

**REPORT NO.:** RF921103R04

**MODEL NO.:** XC1

**RECEIVED:** Nov. 03, 2003

**TESTED:** Nov. 04 ~ Nov. 20, 2003

**APPLICANT:** Addvalue Communications Pte Ltd.

**ADDRESS:** 750D Chai Chee Road #03-03 Technopark  
@ Chai Chee Singapore 469004

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14th Lin, Chiapau Tsun, Linko, Taipei,  
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0528  
ILAC MRA



Lab Code: 200102-0

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## 1 CERTIFICATION

**PRODUCT :** XBOX 2.4GHz Game Controller  
**BRAND NAME :** Wideye  
**MODEL NO :** XC1  
**TEST ITEM:** Engineering Sample  
**APPLICANT :** Addvalue Communications Pte Ltd.  
**STANDARDS :** 47 CFR Part 15, Subpart C (15.249)  
ANSI C63.4-2001

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Nov. 04 to Nov. 20, 2003. 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:** Landy Soong, **DATE:** Nov. 21, 2003  
Landy Soong  
**APPROVED BY:** Ellis Wu, **DATE:** Nov. 21, 2003  
Ellis Wu /  
Technical Manager

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: 47 CFR Part 15, Subpart C |                         |        |                                                 |
|---------------------------------------------|-------------------------|--------|-------------------------------------------------|
| Standard Paragraph                          | Test Type               | Result | Remark                                          |
| 15.207                                      | Conducted Emission Test | PASS   | Minimum passing margin is -15.55dB at 0.177MHz  |
| 15.249                                      | Radiated Emission Test  | PASS   | Minimum passing margin is -2.43dB at 2483.60MHz |
| 15.249                                      | Band Edge 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>                           | XBOX 2.4GHz Game Controller           |
| <b>MODEL NO.</b>                         | XC1                                   |
| <b>POWER SUPPLY</b>                      | 120 VAC from Xbox Video Game System   |
| <b>MODULATION TYPE</b>                   | GFSK                                  |
| <b>MODULATION TECHNOLOGY</b>             | FHSS                                  |
| <b>CARRIER FREQUENCY OF EACH CHANNEL</b> | 2402MHz ~ 2480MHz                     |
| <b>BANDWIDTH OF EACH CHANNEL</b>         | 1MHz                                  |
| <b>NUMBER OF CHANNEL</b>                 | 79                                    |
| <b>ANTENNA TYPE</b>                      | Integral (non-removable) loop antenna |
| <b>DATA CABLE</b>                        | NA                                    |
| <b>I/O PORTS</b>                         | NA                                    |
| <b>ASSOCIATED DEVICES</b>                | NA                                    |

**NOTE:**

1. For more detailed feature description of the EUT, please refer to user's manual.
2. XBOX Video Game System includes the XBOX host system and the joystick. The whole system is powered by AC 120V.

### 3.2 DESCRIPTION OF TEST MODES

Seventy-eight channels are provided to this EUT.

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | 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      | 2431        | 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        | 78      | 2480        |
| 19      | 2421        | 39      | 2441        | 59      | 2461        |         |             |

**NOTE:**

1. Below 1 GHz, the channel 0, 39, and 78 were pre-tested in chamber. The channel 78, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 0, 39, and 78 were tested individually.

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a XBOX 2.4GHz Game Controller. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 15, Subpart C. (15.249)**

**ANSI C63.4 :2001**

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

**NOTES:** 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   | TV MONITOR             | HACE                  | CC14A     | 23719011000400 | VERIFICATION |
| 2   | Xbox Video Game System | Microsoft Corporation | F23-00064 | 5029397300105  | NA           |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | NA                                                  |
| 2   | NA                                                  |

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

## 4 TEST PROCEDURES AND RESULTS

### 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       |

Notes:

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 INSTRUMENTS

| DESCRIPTION & MANUFACTURER                                 | MODEL NO.  | SERIAL NO.   | CALIBRATED UNTIL |
|------------------------------------------------------------|------------|--------------|------------------|
| ROHDE & SCHWARZ Test Receiver                              | ESCS 30    | 838251/021   | Jan. 20, 2004    |
| ROHDE & SCHWARZ Artificial Mains Network (for EUT)         | ESH3-Z5    | 100218       | Dec. 18, 2003    |
| ROHDE & SCHWARZ Artificial Mains Network (for peripherals) | ESH3-Z5    | 100219       | Dec. 18, 2003    |
| ROHDE & SCHWARZ Artificial Mains Network (for peripherals) | ESH3-Z5    | 100220       | Dec. 18, 2003    |
| ROHDE & SCHWARZ 4-wire ISN                                 | ENY41      | 837032/016   | Nov. 29 2003     |
| ROHDE & SCHWARZ 2-wire ISN                                 | ENY22      | 837497/016   | Nov. 29 2003     |
| Software                                                   | Cond-V2M3  | NA           | NA               |
| RF cable (JYEBAO)                                          | 5D-FB      | Cable-C10.01 | May. 01, 2004    |
| SUHNTER Terminator (For ROHDE & SCHWARZ LISN)              | 65BNC-5001 | E1-010770    | Mar. 24, 2004    |
| SUHNTER Terminator (For ROHDE & SCHWARZ LISN)              | 65BNC-5001 | E1-010773    | Apr. 06, 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 conducted telecom port test only (if tested).
  3. The test was performed in ADT Shielded Room No. 10.
  4. The VCCI Site Registration No. is C-1312.

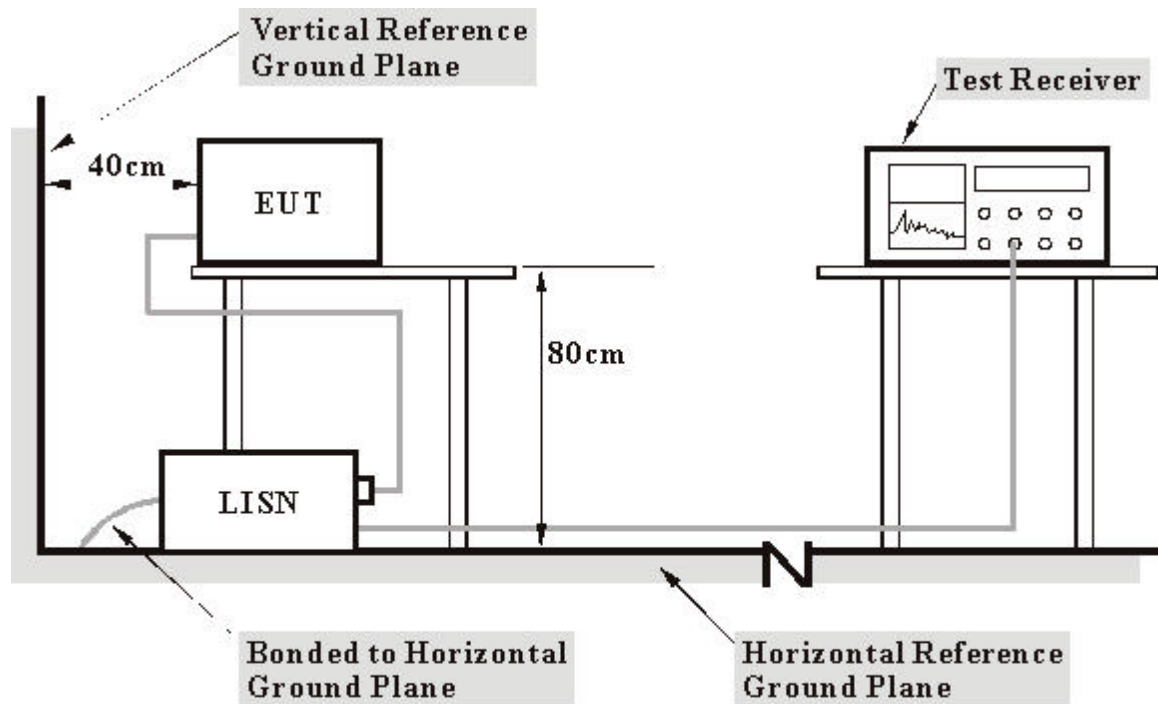
#### 4.1.3 TEST PROCEDURES

- 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 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

#### 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 CONDITIONS

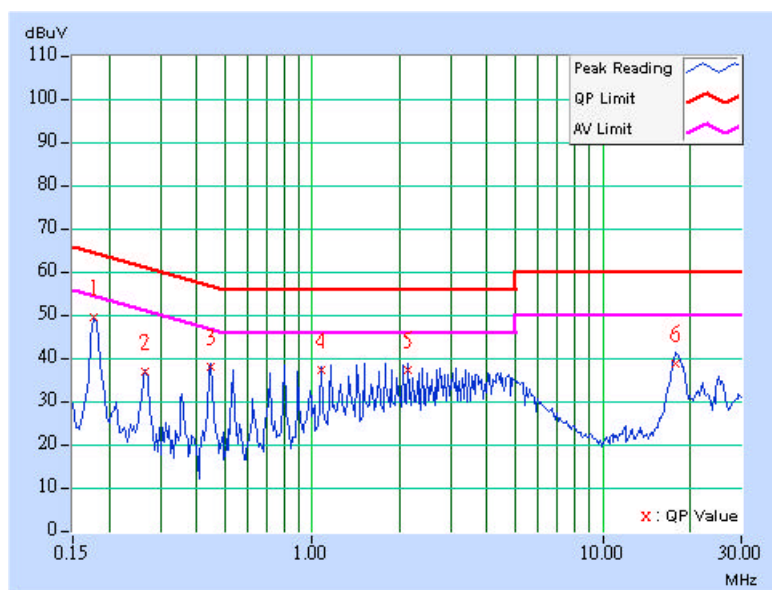
- Connected the EUT to the XBOX Video Game System.
- Press the button of the EUT to run the testing program under transmitting/receiving condition continuously at specific channel frequency.

## 4.1.7 TEST RESULTS

|                                 |                             |                             |          |
|---------------------------------|-----------------------------|-----------------------------|----------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1      |
| <b>MODE</b>                     | Channel 0                   | <b>6dB BANDWIDTH</b>        | 9 kHz    |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>PHASE</b>                | Line (L) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 22 deg. C, 70%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |          |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.177          | 0.06                    | 48.98         | -   | 49.04          | -   | 64.61     | 54.61 | -15.57 | -   |
| 2  | 0.267          | 0.06                    | 36.46         | -   | 36.52          | -   | 61.20     | 51.20 | -24.68 | -   |
| 3  | 0.447          | 0.07                    | 37.53         | -   | 37.60          | -   | 56.93     | 46.93 | -19.34 | -   |
| 4  | 1.070          | 0.16                    | 36.83         | -   | 36.99          | -   | 56.00     | 46.00 | -19.01 | -   |
| 5  | 2.141          | 0.18                    | 36.91         | -   | 37.09          | -   | 56.00     | 46.00 | -18.91 | -   |
| 6  | 17.922         | 0.61                    | 38.28         | -   | 38.89          | -   | 60.00     | 50.00 | -21.11 | -   |

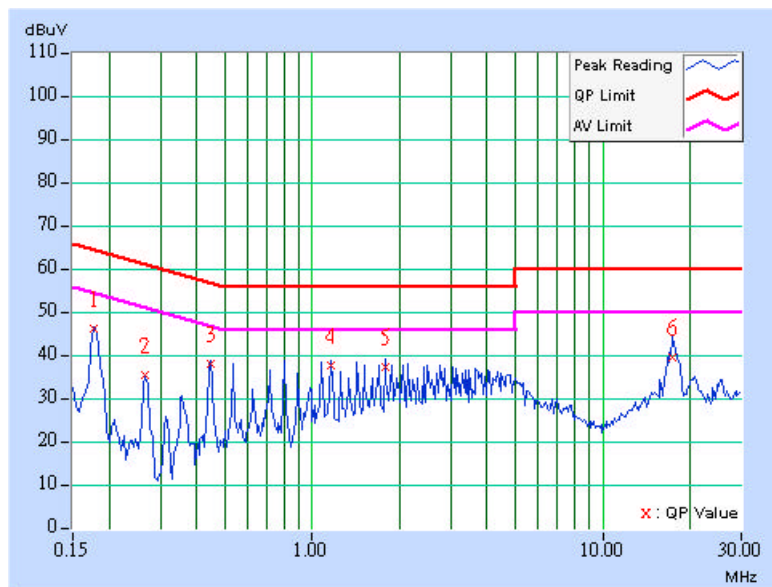
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.  
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.  
3. The emission levels of other frequencies were very low against the limit.  
4. Margin value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



|                                 |                             |                             |             |
|---------------------------------|-----------------------------|-----------------------------|-------------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1         |
| <b>MODE</b>                     | Channel 0                   | <b>6dB BANDWIDTH</b>        | 9 kHz       |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>PHASE</b>                | Neutral (N) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 22 deg. C, 70%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |             |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.177          | 0.05                    | 45.95         | -   | 46.00          | -   | 64.61     | 54.61 | -18.61 | -   |
| 2  | 0.267          | 0.05                    | 34.95         | -   | 35.00          | -   | 61.20     | 51.20 | -26.20 | -   |
| 3  | 0.447          | 0.06                    | 37.65         | -   | 37.71          | -   | 56.93     | 46.93 | -19.23 | -   |
| 4  | 1.160          | 0.16                    | 37.39         | -   | 37.55          | -   | 56.00     | 46.00 | -18.45 | -   |
| 5  | 1.785          | 0.18                    | 37.02         | -   | 37.20          | -   | 56.00     | 46.00 | -18.80 | -   |
| 6  | 17.480         | 0.50                    | 38.97         | -   | 39.47          | -   | 60.00     | 50.00 | -20.53 | -   |

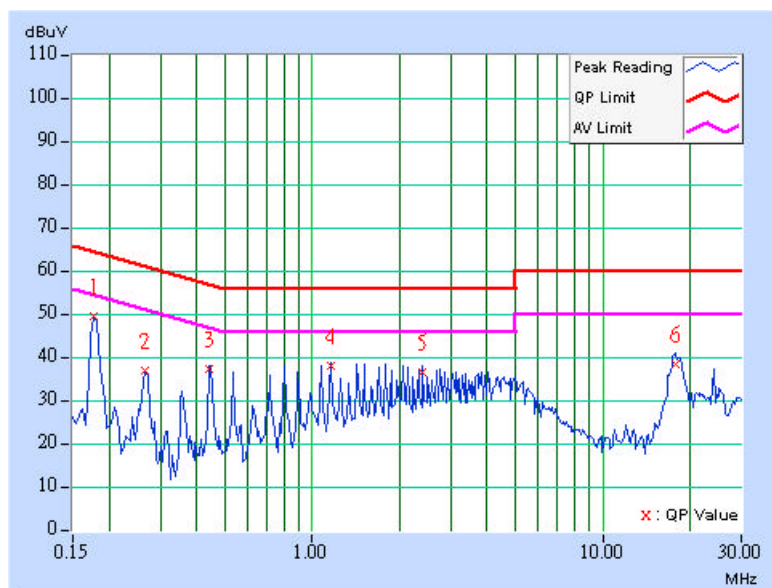
- REMARKS:**
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  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level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



|                                 |                             |                             |          |
|---------------------------------|-----------------------------|-----------------------------|----------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1      |
| <b>MODE</b>                     | Channel 39                  | <b>6dB BANDWIDTH</b>        | 9 kHz    |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>PHASE</b>                | Line (L) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 22 deg. C, 70%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |          |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.177          | 0.06                    | 49.00         | -   | 49.06          | -   | 64.61     | 54.61 | -15.55 | -   |
| 2  | 0.267          | 0.06                    | 36.55         | -   | 36.61          | -   | 61.20     | 51.20 | -24.59 | -   |
| 3  | 0.443          | 0.07                    | 36.65         | -   | 36.72          | -   | 57.01     | 47.01 | -20.29 | -   |
| 4  | 1.160          | 0.16                    | 37.55         | -   | 37.71          | -   | 56.00     | 46.00 | -18.29 | -   |
| 5  | 2.406          | 0.19                    | 36.21         | -   | 36.40          | -   | 56.00     | 46.00 | -19.60 | -   |
| 6  | 17.745         | 0.60                    | 37.90         | -   | 38.50          | -   | 60.00     | 50.00 | -21.50 | -   |

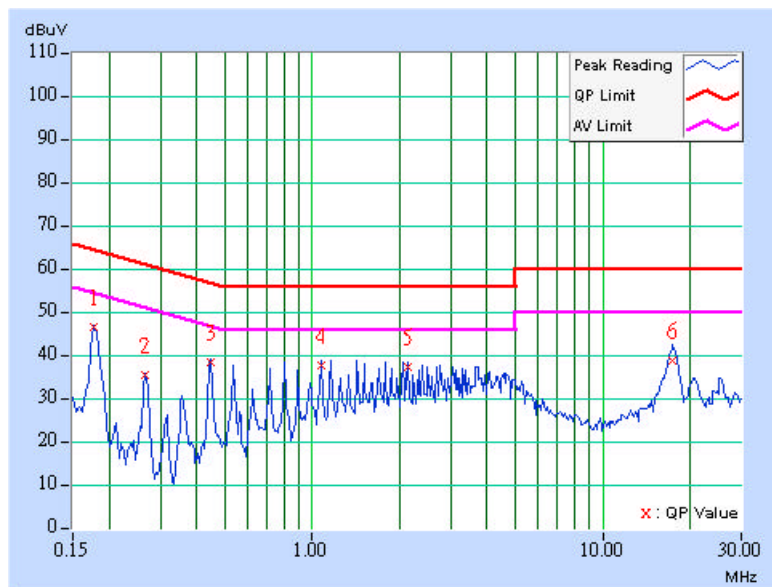
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  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



|                                 |                             |                             |             |
|---------------------------------|-----------------------------|-----------------------------|-------------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1         |
| <b>MODE</b>                     | Channel 39                  | <b>6dB BANDWIDTH</b>        | 9 kHz       |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>PHASE</b>                | Neutral (N) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 22 deg. C, 70%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |             |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.177          | 0.05                    | 46.31         | -   | 46.36          | -   | 64.61     | 54.61 | -18.25 | -   |
| 2  | 0.267          | 0.05                    | 35.20         | -   | 35.25          | -   | 61.20     | 51.20 | -25.95 | -   |
| 3  | 0.447          | 0.06                    | 37.86         | -   | 37.92          | -   | 56.93     | 46.93 | -19.02 | -   |
| 4  | 1.070          | 0.16                    | 37.31         | -   | 37.47          | -   | 56.00     | 46.00 | -18.53 | -   |
| 5  | 2.141          | 0.18                    | 36.97         | -   | 37.15          | -   | 56.00     | 46.00 | -18.85 | -   |
| 6  | 17.480         | 0.50                    | 38.27         | -   | 38.77          | -   | 60.00     | 50.00 | -21.23 | -   |

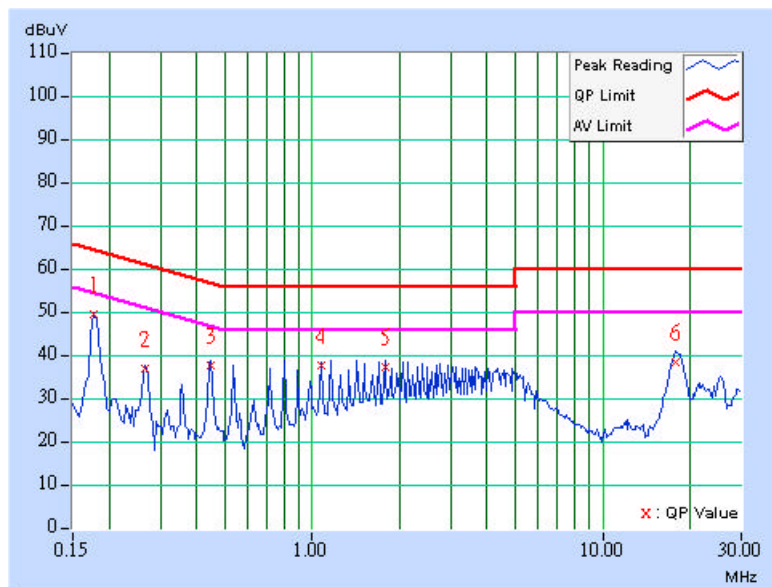
- REMARKS:**
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  3. The emission levels of other frequencies were very low against the limit.
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  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



|                                 |                             |                             |          |
|---------------------------------|-----------------------------|-----------------------------|----------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1      |
| <b>MODE</b>                     | Channel 78                  | <b>6dB BANDWIDTH</b>        | 9 kHz    |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>PHASE</b>                | Line (L) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 22 deg. C, 70%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |          |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.177          | 0.06                    | 48.94         | -   | 49.00          | -   | 64.61     | 54.61 | -15.61 | -   |
| 2  | 0.267          | 0.06                    | 36.26         | -   | 36.32          | -   | 61.20     | 51.20 | -24.88 | -   |
| 3  | 0.447          | 0.07                    | 37.33         | -   | 37.40          | -   | 56.93     | 46.93 | -19.54 | -   |
| 4  | 1.070          | 0.16                    | 36.99         | -   | 37.15          | -   | 56.00     | 46.00 | -18.85 | -   |
| 5  | 1.781          | 0.18                    | 36.76         | -   | 36.94          | -   | 56.00     | 46.00 | -19.06 | -   |
| 6  | 17.922         | 0.61                    | 37.73         | -   | 38.34          | -   | 60.00     | 50.00 | -21.66 | -   |

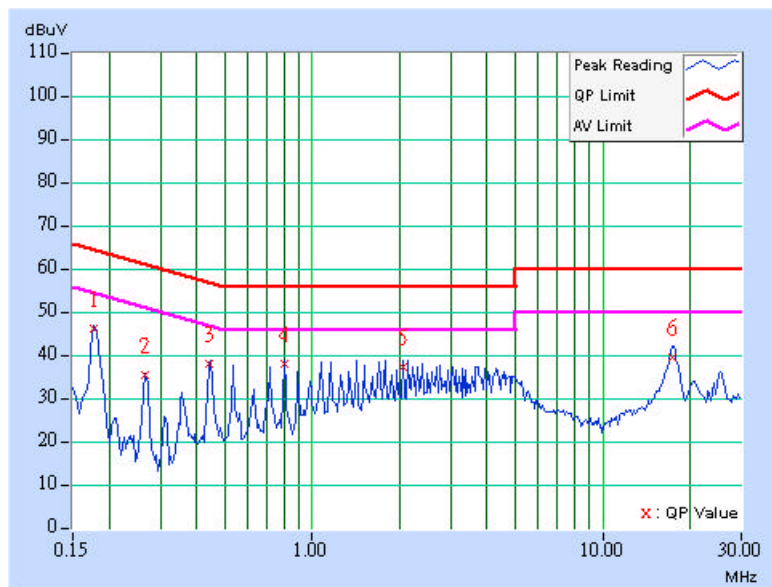
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



|                                 |                             |                             |            |
|---------------------------------|-----------------------------|-----------------------------|------------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1        |
| <b>MODE</b>                     | Channel 78                  | <b>6dB BANDWIDTH</b>        | 9 kHz      |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>PHASE</b>                | Neural (N) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 22 deg. C, 70%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |            |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.177          | 0.05                    | 45.97         | -   | 46.02          | -   | 64.61     | 54.61 | -18.59 | -   |
| 2  | 0.267          | 0.05                    | 35.11         | -   | 35.16          | -   | 61.20     | 51.20 | -26.04 | -   |
| 3  | 0.444          | 0.06                    | 37.80         | -   | 37.86          | -   | 56.99     | 46.99 | -19.14 | -   |
| 4  | 0.802          | 0.12                    | 37.67         | -   | 37.79          | -   | 56.00     | 46.00 | -18.21 | -   |
| 5  | 2.051          | 0.18                    | 36.74         | -   | 36.92          | -   | 56.00     | 46.00 | -19.08 | -   |
| 6  | 17.389         | 0.50                    | 38.96         | -   | 39.46          | -   | 60.00     | 50.00 | -20.54 | -   |

- 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 EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.249 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 (dBuV/m) |         |
|-----------------------------|----------------------------------------|---------|
|                             | Peak                                   | Average |
| 2400 ~ 2483.5               | 114                                    | 94      |

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       | $2400/F(\text{kHz})$              | 300                           |
| 0.490-1.705       | $24000/F(\text{kHz})$             | 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             | 8594E                  | 3911A07465               | July 07, 2004    |
| * HP Preamplifier                  | 8447D                  | 2432A03504               | June 10, 2004    |
| HP Preamplifier                    | 8449B                  | 3008A01201               | Dec. 01, 2003    |
| * HP Preamplifier                  | 8449B                  | 3008A01292               | Aug. 11, 2004    |
| SCHAFFNER Tunable Dipole Antenna   | VHBA 9123              | 459                      | Nov. 22, 2003    |
| SCHWARZBECK Tunable Dipole Antenna | UHA 9105               | 977                      |                  |
| * ROHDE & SCHWARZ TEST RECEIVER    | ESMI                   | 839013/007<br>839379/002 | Feb. 13, 2004    |
| *Schwarzbeck Antenna               | VULB9168               | 137                      | Apr. 03, 2004    |
| * SCHWARZBECK Horn Antenna         | BBHA9120-D1            | D130                     | June 30, 2004    |
| * EMCO Horn Antenna                | 3115                   | 9312-4192                | Mar. 23, 2004    |
| *ADT. Turn Table                   | TT100                  | 0306                     | NA               |
| *ADT. Tower                        | AT100                  | 0306                     | NA               |
| *Software                          | ADT_Radiated_V<br>5.14 | NA                       | NA               |
| *TIMES RF cable                    | LL142                  | CABLE-CH6-01             | Apr. 30, 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 Chamber No. 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 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 peak, quasi-peak or average method as specified and then reported in a data sheet.

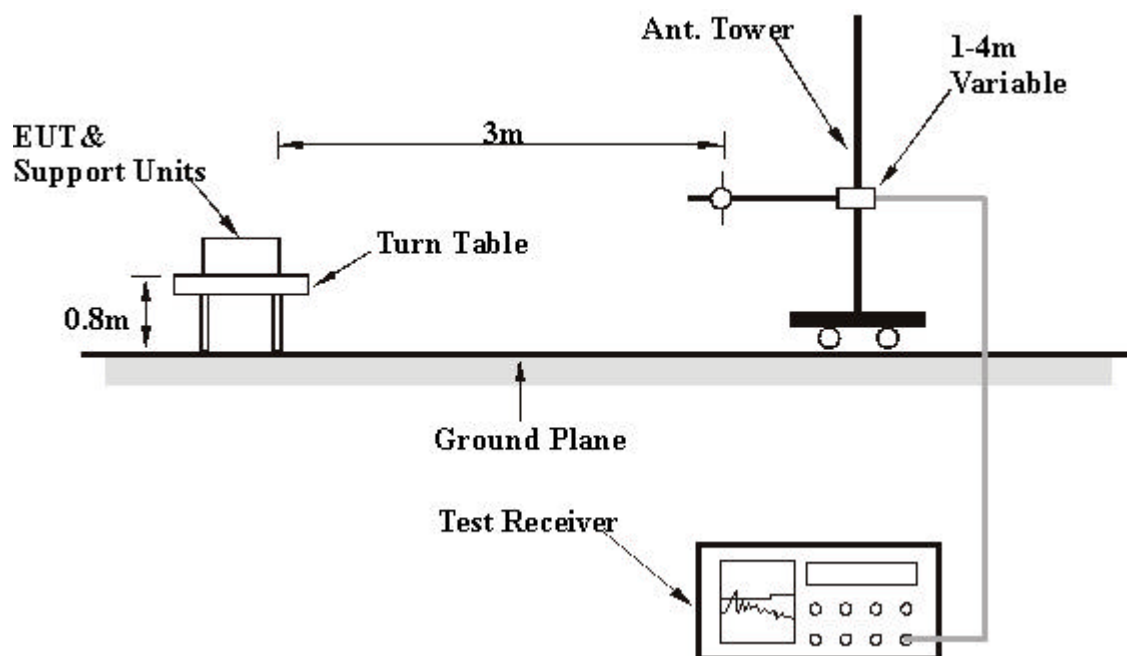
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for 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 TEST RESULTS

|                                 |                             |                             |                |
|---------------------------------|-----------------------------|-----------------------------|----------------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller | <b>MODEL</b>                | XC1            |
| <b>MODE</b>                     | Channel 78                  | <b>FREQUENCY RANGE</b>      | Below 1000 MHz |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz               | <b>DETECTOR FUNCTION</b>    | Quasi-Peak     |
| <b>ENVIRONMENTAL CONDITIONS</b> | 23 deg. C, 62%RH, 991 hPa   | <b>TESTED BY:</b> Steven Lu |                |

| 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                                                   | 132.39      | 33.40 QP                | 43.50          | -10.10      | 1.50 H             | 256                  | 20.19            | 13.22                    |
| 2                                                   | 144.24      | 37.54 QP                | 43.50          | -5.96       | 1.25 H             | 316                  | 23.66            | 13.88                    |
| 3                                                   | 241.24      | 38.77 QP                | 46.00          | -7.23       | 1.00 H             | 286                  | 25.57            | 13.20                    |
| 4                                                   | 321.00      | 35.15 QP                | 46.00          | -10.85      | 1.00 H             | 52                   | 19.50            | 15.65                    |
| 5                                                   | 433.09      | 30.14 QP                | 46.00          | -15.86      | 2.00 H             | 334                  | 11.37            | 18.76                    |
| 6                                                   | 865.28      | 34.47 QP                | 46.00          | -11.53      | 1.00 H             | 226                  | 8.02             | 26.45                    |

| 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                                                 | 228.31      | 28.72 QP                | 46.00          | -17.28      | 1.75 V             | 208                  | 16.12            | 12.60                    |
| 2                                                 | 241.24      | 30.77 QP                | 46.00          | -15.23      | 1.00 V             | 268                  | 17.57            | 13.20                    |
| 3                                                 | 253.10      | 28.26 QP                | 46.00          | -17.74      | 1.50 V             | 256                  | 14.80            | 13.45                    |
| 4                                                 | 267.11      | 28.85 QP                | 46.00          | -17.15      | 1.00 V             | 352                  | 14.88            | 13.98                    |
| 5                                                 | 321.00      | 31.39 QP                | 46.00          | -14.61      | 1.75 V             | 352                  | 15.74            | 15.65                    |
| 6                                                 | 831.87      | 36.72 QP                | 46.00          | -9.28       | 1.50 V             | 190                  | 10.76            | 25.95                    |
| 7                                                 | 848.03      | 36.10 QP                | 46.00          | -9.90       | 1.50 V             | 178                  | 9.98             | 26.12                    |

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  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>                      | XBOX 2.4GHz Game Controller  | <b>MODEL</b>                | XC1                      |
| <b>MODE</b>                     | Channel 0                    | <b>FREQUENCY RANGE</b>      | Above 1000 MHz           |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>DETECTOR FUNCTION</b>    | Peak(PK)<br>Average (AV) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 60%RH,<br>991 hPa | <b>TESTED BY:</b> Steven Lu |                          |

| <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                                                              | 1202.00     | 32.07 PK                | 74.00          | -41.93      | 1.19 H             | 94                   | 4.10             | 27.97                    |
| 2                                                              | *2402.00    | 97.26 PK                | 114.00         | -16.74      | 1.22 H             | 245                  | 63.80            | 33.46                    |
| 2                                                              | *2402.00    | 69.84 AV                | 94.00          | -24.16      | 1.22 H             | 245                  | 36.38            | 33.46                    |
| 3                                                              | 4804.00     | 48.03 PK                | 74.00          | -25.97      | 1.38 H             | 314                  | 6.80             | 41.23                    |
| 4                                                              | 7206.00     | 57.41 PK                | 74.00          | -16.59      | 1.36 H             | 117                  | 12.02            | 45.39                    |
| 5                                                              | 9608.00     | 49.80 PK                | 74.00          | -24.20      | 1.28 H             | 178                  | 1.64             | 48.16                    |

| <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                                                            | 1202.00     | 32.07 PK                | 74.00          | -41.93      | 1.19 V             | 254                  | 4.10             | 27.97                    |
| 2                                                            | *2402.00    | 95.16 PK                | 114.00         | -18.84      | 1.38 V             | 161                  | 61.70            | 33.46                    |
| 2                                                            | *2402.00    | 67.74 AV                | 94.00          | -26.26      | 1.38 V             | 161                  | 34.28            | 33.46                    |
| 3                                                            | 4804.00     | 45.73 PK                | 74.00          | -28.27      | 1.22 V             | 157                  | 4.50             | 41.23                    |
| 4                                                            | 7206.00     | 48.11 PK                | 74.00          | -25.89      | 1.47 V             | 341                  | 2.72             | 45.39                    |
| 5                                                            | 9608.00     | 49.50 PK                | 74.00          | -24.50      | 1.24 V             | 74                   | 1.34             | 48.16                    |

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. “ \* ” : Fundamental frequency
5. The other emission levels were very low against the limit.
6. The worst case of duty cycle is evaluated as 0.64/15.04=0.043
7. Average value = peak reading +20log(duty cycle) =peak reading -27.42 (refer to page 25)

|                                 |                              |                             |                          |
|---------------------------------|------------------------------|-----------------------------|--------------------------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller  | <b>MODEL</b>                | XC1                      |
| <b>MODE</b>                     | Channel 39                   | <b>FREQUENCY RANGE</b>      | Above 1000 MHz           |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>DETECTOR FUNCTION</b>    | Peak(PK)<br>Average (AV) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 60%RH,<br>991 hPa | <b>TESTED BY:</b> Steven Lu |                          |

#### 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   | 1221.00     | 33.77 PK                | 74.00          | -40.23      | 1.14 H             | 87                   | 5.74             | 28.03                    |
| 2   | *2441.00    | 97.72 PK                | 114.00         | -16.28      | 1.24 H             | 127                  | 64.11            | 33.61                    |
| 2   | *2441.00    | 70.30 AV                | 94.00          | -23.70      | 1.24 H             | 127                  | 36.69            | 33.61                    |
| 3   | 4882.00     | 60.07 PK                | 74.00          | -13.93      | 1.35 H             | 271                  | 18.90            | 41.17                    |
| 4   | 7322.00     | 54.51 PK                | 74.00          | -19.49      | 1.07 H             | 174                  | 8.87             | 45.64                    |
| 5   | 9764.00     | 49.18 PK                | 74.00          | -24.82      | 1.00 H             | 21                   | 0.71             | 48.48                    |

#### 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   | 1221.00     | 33.47 PK                | 74.00          | -40.53      | 1.11 V             | 253                  | 5.44             | 28.03                    |
| 2   | *2441.00    | 98.22 PK                | 114.00         | -15.78      | 1.47 V             | 118                  | 64.61            | 33.61                    |
| 2   | *2441.00    | 70.80 AV                | 94.00          | -23.20      | 1.47 V             | 118                  | 37.19            | 33.61                    |
| 3   | 4882.00     | 56.77 PK                | 74.00          | -17.23      | 1.14 V             | 108                  | 15.60            | 41.17                    |
| 4   | 7322.00     | 56.51 PK                | 74.00          | -17.49      | 1.34 V             | 34                   | 10.87            | 45.64                    |
| 5   | 9764.00     | 53.48 PK                | 74.00          | -20.52      | 1.25 V             | 94                   | 5.01             | 48.48                    |

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. " \* " : Fundamental frequency
5. The other emission levels were very low against the limit.
6. The worst case of duty cycle is evaluated as 0.64/15.04=0.043
7. Average value = peak reading +20log(duty cycle) =peak reading -27.42 (refer to page 25)

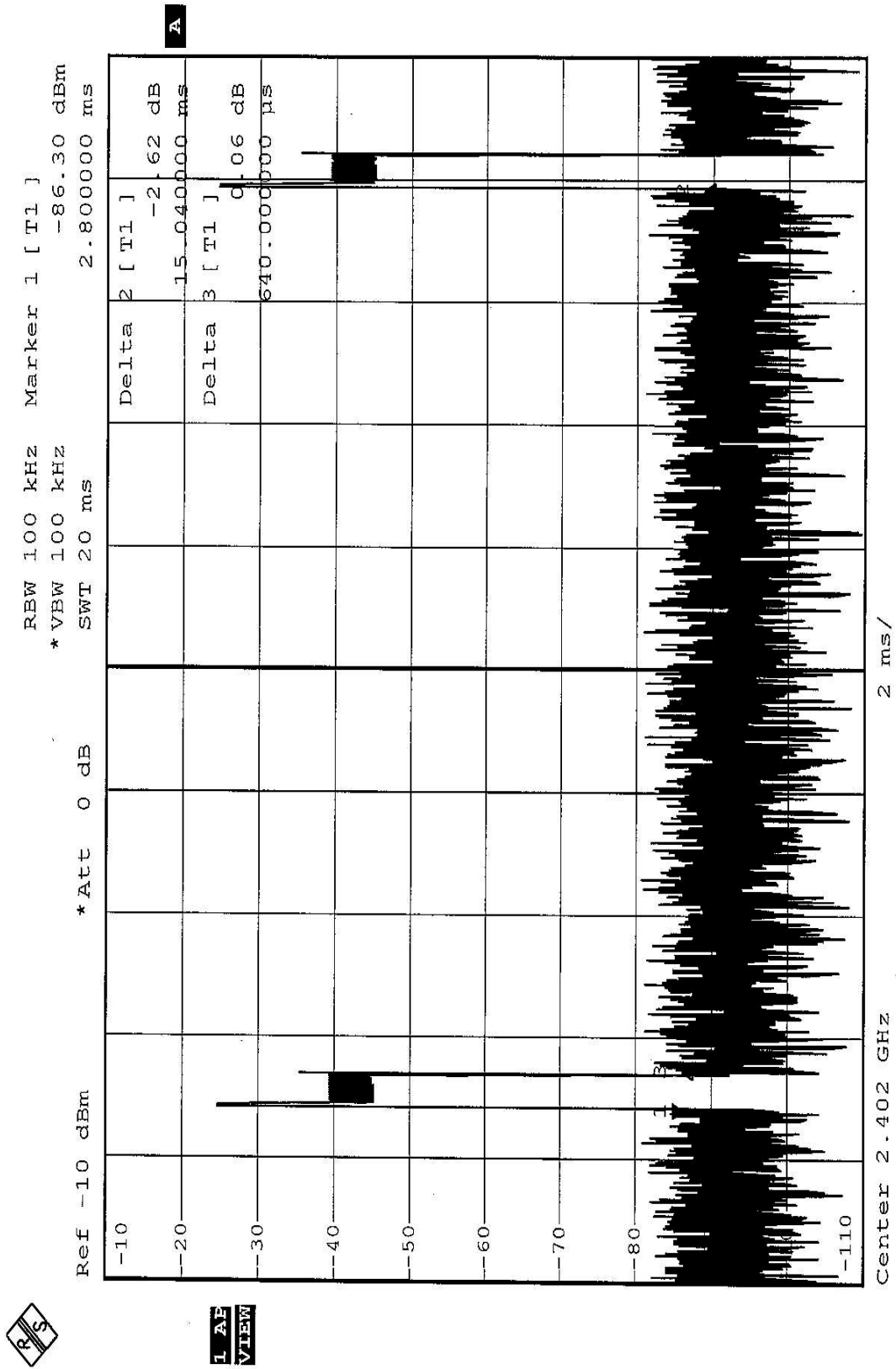
|                                 |                              |                             |                          |
|---------------------------------|------------------------------|-----------------------------|--------------------------|
| <b>EUT</b>                      | XBOX 2.4GHz Game Controller  | <b>MODEL</b>                | XC1                      |
| <b>MODE</b>                     | Channel 78                   | <b>FREQUENCY RANGE</b>      | Above 1000 MHz           |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>DETECTOR FUNCTION</b>    | Peak(PK)<br>Average (AV) |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 60%RH,<br>991 hPa | <b>TESTED BY:</b> Steven Lu |                          |

| <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                                                              | 1240.80        | 32.97 PK                | 74.00          | -41.03       | 1.13 H             | 34                   | 4.88             | 28.09                    |
| 2                                                              | *2480.00       | 97.15 PK                | 114.00         | -16.85       | 1.20 H             | 235                  | 63.40            | 33.75                    |
| 2                                                              | *2480.00       | 69.73 AV                | 94.00          | -24.27       | 1.20 H             | 235                  | 35.98            | 33.75                    |
| <b>3</b>                                                       | <b>2483.60</b> | <b>71.57 PK</b>         | <b>74.00</b>   | <b>-2.43</b> | <b>1.20 H</b>      | <b>235</b>           | <b>37.80</b>     | <b>33.77</b>             |
| 4                                                              | 4960.00        | 54.02 PK                | 74.00          | -19.98       | 1.13 H             | 34                   | 12.80            | 41.22                    |
| 5                                                              | 7438.00        | 54.91 PK                | 74.00          | -19.09       | 1.40 H             | 221                  | 9.12             | 45.78                    |
| 6                                                              | 9920.00        | 54.40 PK                | 74.00          | -19.60       | 1.18 H             | 13                   | 5.37             | 49.03                    |

| <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                                                            | 1240.10     | 33.96 PK                | 74.00          | -40.04      | 1.22 V             | 71                   | 5.88             | 28.08                    |
| 2                                                            | *2480.00    | 94.95 PK                | 114.00         | -19.05      | 1.00 V             | 168                  | 61.20            | 33.75                    |
| 2                                                            | *2480.00    | 67.53 AV                | 94.00          | -26.47      | 1.00 V             | 168                  | 33.78            | 33.75                    |
| 3                                                            | 2483.60     | 70.87 PK                | 74.00          | -3.13       | 1.00 V             | 168                  | 37.10            | 33.77                    |
| 4                                                            | 4960.00     | 51.32 PK                | 74.00          | -22.68      | 1.20 V             | 224                  | 10.10            | 41.22                    |
| 5                                                            | 7440.00     | 51.91 PK                | 74.00          | -22.09      | 1.47 V             | 34                   | 6.12             | 45.79                    |
| 6                                                            | 9920.00     | 53.90 PK                | 74.00          | -20.10      | 1.16 V             | 91                   | 4.87             | 49.03                    |

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. Margin value = Emission level - Limit value
4. " \* " : Fundamental frequency
5. The other emission levels were very low against the limit.
6. The worst case of duty cycle is evaluated as  $0.64/15.04=0.043$
7. Average value = peak reading  $+20\log(\text{duty cycle})$  =peak reading -27.42 (refer to page 25)



Date: 18.NOV.2003 19:45:36

## 4.8 BAND EDGES MEASUREMENT

### 4.8.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz RB).

### 4.8.2 TEST INSTRUMENTS

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|----------------------------|-----------|------------|------------------|
| SPECTRUM ANALYZER          | FSEK30    | 100049     | Aug. 12, 2004    |

#### NOTES:

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

### 4.8.3 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 with suitable frequency span including 100 MHz bandwidth from band edge. The band edges were measured and recorded.

### 4.8.4 DEVIATION FROM TEST STANDARD

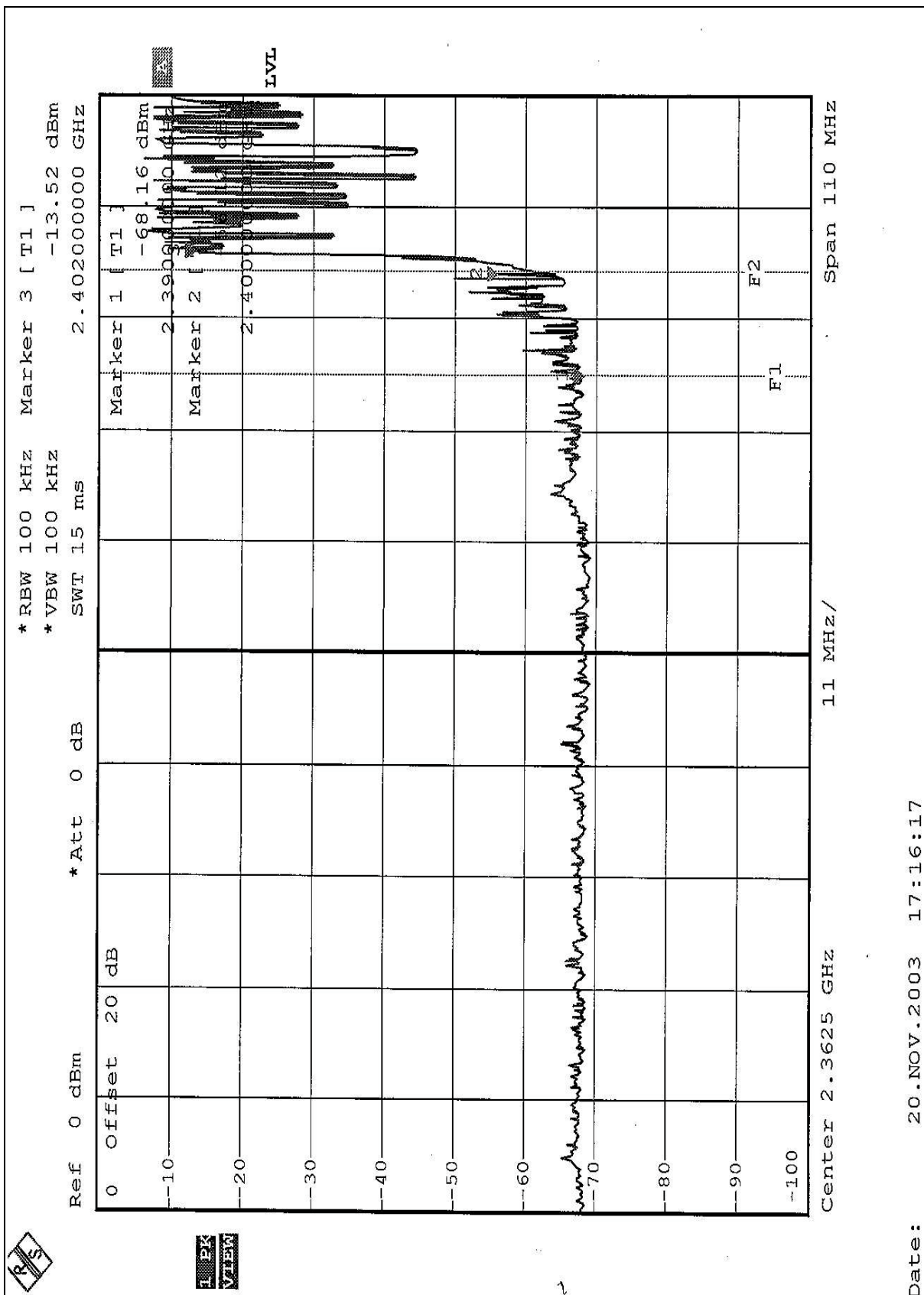
No deviation

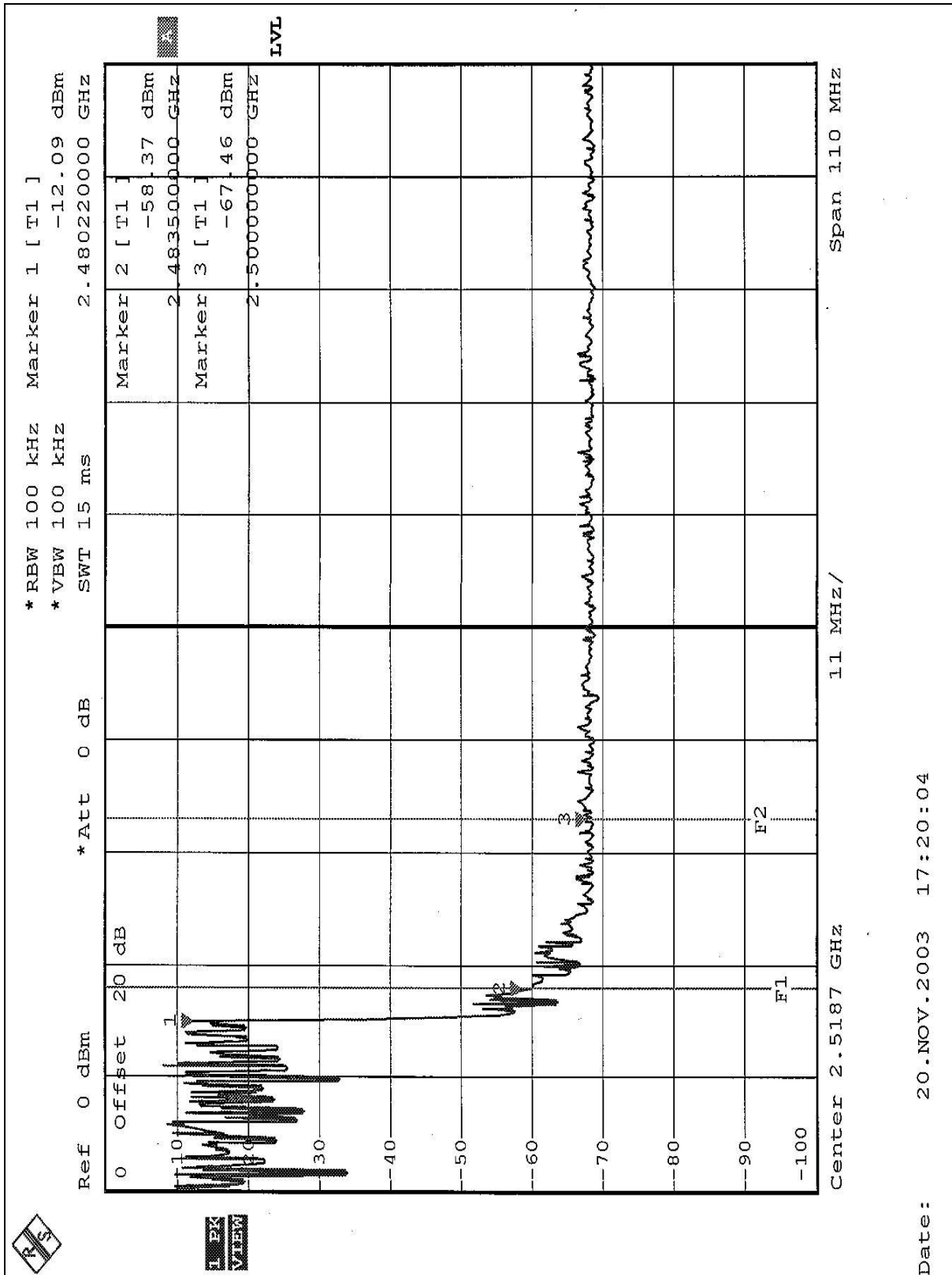
#### 4.8.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

#### 4.8.6 TEST RESULTS

The spectrum plots are attached on the following 2 pages. All the transmitting emissions locate in 2.4GHz to 2.4835GHz. It shows compliance with the requirement in part 15.249.



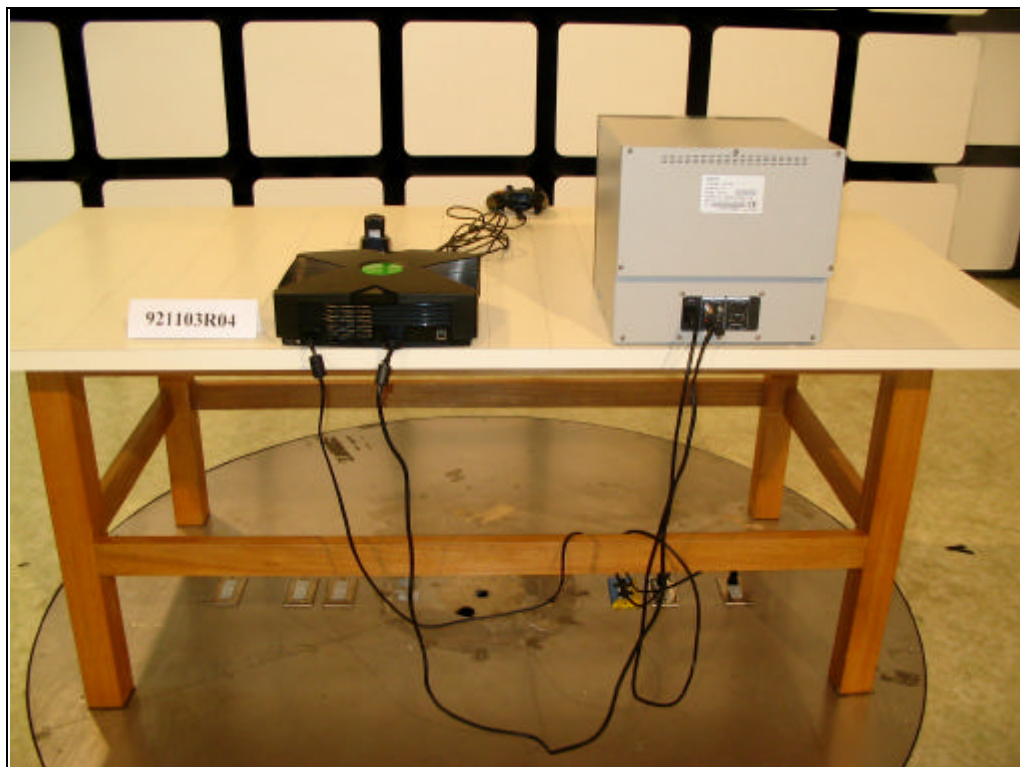


## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST



## 6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC 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      |
| <b>Germany</b>     | TUV Rheinland   |
| <b>Japan</b>       | VCCI            |
| <b>New Zealand</b> | MoC             |
| <b>Norway</b>      | NEMKO           |
| <b>R.O.C.</b>      | BSMI, DGT, CNLA |

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.