# EMC

## TEST REPORT

REPORT NO. : F88081005
MODEL NO. : ADS-380
DATE OF TEST : Aug. 13, 1999

PREPARED FOR: ROYAL INFORMATION ELECTRONICS CO., LTD.

ADDRESS : NO. 3, LANE 11, TZU-CHANG ST., TU-CHENG IND.
DISTRICT TAIPEI HSIEN, TAIWAN,R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP®
Accredited Laboratory

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# 1. CERTIFICATION

Issue Date: Aug. 18, 1999

| | | |
|---|---|---|
| Product | : | USB SPEAKER |
| Trade Name | : | RIC |
| Model No. | : | ADS-380 |
| Applicant | : | ROYAL INFORMATION ELECTRONICS CO., LTD. |
| Standard | : | FCC Part 15, Subpart B, Class B |
| | | ANSI C63.4-1992 |
| | | CISPR 22: 1993+A1: 1995+A2: 1996, Class B |

We hereby certify that one sample of the designation has been tested in our facility on Aug. 13, 1999. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards.

TESTED BY : Kenny Meng , DATE: 8/18/99
( Kenny Meng )

CHECKED BY : Yemmy , DATE: 8/18/99
( Yemmy Soong )

APPROVED BY : Mike Su , DATE: 8/18/99.
( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION**

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# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| Product | : | USB SPEAKER |
| Model No. | : | ADS-380 |
| Power Supply Type: | | Linear |
| Power Cord | : | Nonshielded (1.8m) |
| Data Cable | : | Nonshielded (1.5m) (from woofer to PC)<br>Nonshielded (2.8m) (from right & left speakers to woofer) |

Note: The EUT are speakers with amplifier to be used in a multimedia computer system.

The EUT set consists of right and left speakers and a woofer which has one port for earphone.

The EUT was pre-tested with four modes:

- ♦ EUT connected to USB port of PC (With headphone)
- ♦ EUT connected to USB port of PC (Without headphone)
- ♦ EUT connected to line-in port of PC (With headphone)
- ♦ EUT connected to line-in port of PC (Without headphone)

The worst emission level was found when the EUT was connected to line-in port of PC (without headphone). Therefore, the test data of this mode is recorded in this report.

For more detailed features description, please refer to Manufacturer’ s Specification or User's Manual.

## 2.2 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 are used to form representative test configuration during the tests.

| No. | Product | Brand | Model No. | FCC ID | I/O Cable |
|---|---|---|---|---|---|
| 1 | PERSONAL COMPUTER | NTI | PII-450T | FCC DoC Approved | Nonshielded Power (1.8m) |
| 2 | MONITOR | HP | D2846 | FCC DoC Approved | Shielded Signal (1.5m)<br>Nonshielded Power (1.8m) |
| 3 | KEYBOARD | FORWARD | FDA-104GA | F4ZDA-104G | Shielded signal (1.4m) |
| 4 | PRINTER | HP | 2225C+ | DSI6XU2225 | Shielded Signal (1.2m)<br>Nonshielded Power (1.2m) |
| 5 | MODEM | ACEEX | 1414 | IFAXDM1414 | Shielded signal (1.2m)<br>Nonshielded Power (1.2m) |
| 6 | MOUSE | DEXIN | A2P800A | NIYA2P800A | Shielded signal (1.5m) |
| 7 | VGA CARD | CARDEX | CD-GX2A44T | ICUVGA-GW710 | NA |
| 8 | SOUND CARD | YA HSIN | AUDIO 1869 | NA | NA |

## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site.

Please refer to the photos of test configuration in Item 5.

# 3. TEST INSTRUMENTS

## 3.1 TEST INSTRUMENTS (EMISSION)

**CONDUCTED EMISSION MEASUREMENT**

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|---|---|---|---|
| ROHDE & SCHWARZ Test Receiver | ESHS30 | 828765/002 | Aug. 2, 2000 |
| ROHDE & SCHWARZ Artificial Mains Network | ESH2-Z5 | 828075/003 | July 21, 2000 |
| EMCO-L.I.S.N. | 3825/2 | 90031627 | July 21, 2000 |
| Shielded Room | Site 5 | ADT-C05 | NA |

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS document NIS81.

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

**RADIATED EMISSION MEASUREMENT**

| Description & Manufacturer | Model No. | Serial No. | Calibrated Until |
|---|---|---|---|
| HP Spectrum Analyzer | 8590L | 3544A01176 | April 22, 2000 |
| HP Preamplifier | 8447D | 2944A08485 | April 21, 2000 |
| HP Preamplifier | 8347A | 3307A01088 | Sept. 9, 1999 |
| ROHDE & SCHWARZ TEST RECEIVER | ESMI | 839013/007<br>839379/002 | Aug. 27, 1999 |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103<br>UHA 9105 | E101051<br>E101055 | Nov. 25, 1999 |
| CHASE BILOG Antenna | CBL6112A | 2221 | Aug. 4, 2000 |
| EMCO Turn Table | 1060 | 1115 | NA |
| SHOSHIN Tower | AP-4701 | A6Y005 | NA |
| Open Field Test Site | Site 5 | ADT-R05 | July 30, 2000 |

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMAS document NIS81.

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

## 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

### LIMIT OF RADIATED EMISSION OF CISPR 22

| FREQUENCY (MHz) | Class A (at 10m) * dBuV/m | Class B (at 10m) * dBuV/m |
|---|---|---|
| 30 - 230 | 40 | 30 |
| 230 - 1000 | 47 | 37 |

* Detector Function: Quasi-Peak

### LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

| FREQUENCY (MHz) | Class A (dBuV/m) (at 3m) | | Class B (dBuV/m) (at 3m) | |
|---|---|---|---|---|
| | Peak | Average | Peak | Average |
| Above 1000 | 80.0 | 60.0 | 74.0 | 54.0 |

Note: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
(3) All emanation 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.

### LIMIT OF CONDUCTED EMISSION OF CISPR 22

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | |
|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

Note: (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz
(3) All emanation 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. TEST RESULTS (EMISSION)

## 4.1 RADIO DISTURBANCE

| | | |
|---|---|---|
| Frequency Range | : | 0.15 - 30 MHz (Conducted Emission)<br>30 - 1000 MHz (Radiated Emission) |
| Input Voltage | : | 120 Vac, 60 Hz |
| Temperature | : | 28 degree C |
| Humidity | : | 52 % |
| Atmospheric Pressure | : | 993 mbar |

| TEST RESULT | Remarks |
|---|---|
| PASS | Minimum passing margin of conducted emission: -17.9 dB at 3.652 MHz<br>Minimum passing margin of radiated emission: -2.3 dB at 480.01 MHz |

## 4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. PC runs a test program to enable all function.
3. Adjust speakers output to 1/8 load.
4. PC sends 1 kHz audio sine wave to right & left speakers (EUT).
5. PC sends 100 Hz audio sine wave to woofer (EUT).
6. PC sends "H" messages to monitor and monitor display "H" patterns on screen.
7. PC sends "H" messages to modem.
8. PC sends "H" messages to printer, and the printer prints them on paper.
9. Repeat steps 4-9.

## 4.3 TEST DATA OF CONDUCTED EMISSION

EUT: **USB SPEAKER** MODEL: **ADS-380**

6 dB Bandwidth: 10 kHz PHASE: LINE (L)

| Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.276 | 0.2 | 15.6 | - | 15.8 | - | 60.9 | 50.9 | -45.1 | - |
| 0.345 | 0.2 | 15.8 | - | 16.0 | - | 59.1 | 49.1 | -43.1 | - |
| 1.385 | 0.3 | 28.2 | - | 28.5 | - | 56.0 | 46.0 | -27.5 | - |
| 3.652 | 0.5 | 37.3 | - | 37.8 | - | 56.0 | 46.0 | -18.2 | - |
| 7.542 | 0.8 | 27.2 | - | 28.0 | - | 60.0 | 50.0 | -32.0 | - |
| 20.564 | 1.3 | 36.3 | - | 37.6 | - | 60.0 | 50.0 | -22.4 | - |

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

# TEST DATA OF CONDUCTED EMISSION

EUT: **USB SPEAKER** MODEL: **ADS-380**

6 dB Bandwidth: 10 kHz PHASE: LINE (L)

| Freq. [MHz] | Corr. Factor (dB) | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.276 | 0.2 | 25.6 | - | 25.8 | - | 60.9 | 50.9 | -35.1 | - |
| 0.345 | 0.2 | 27.9 | - | 28.1 | - | 59.1 | 49.1 | -31.0 | - |
| 1.385 | 0.3 | 33.4 | - | 33.7 | - | 56.0 | 46.0 | -22.3 | - |
| 3.652 | 0.4 | 37.7 | - | 38.1 | - | 56.0 | 46.0 | -17.9 | - |
| 7.542 | 0.7 | 30.9 | - | 31.6 | - | 60.0 | 50.0 | -28.4 | - |
| 20.564 | 1.1 | 38.3 | - | 39.4 | - | 60.0 | 50.0 | -20.6 | - |

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

## 4.4 TEST DATA OF RADIATED EMISSION

EUT: **USB SPEAKER** MODEL: **ADS-380**

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

| Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) |
|---|---|---|---|---|---|---|---|
| 179.77 | 11.1 | 15.5 | 26.6 | 30.0 | -3.4 | 100 | 27 |
| 384.02 | 17.9 | 11.4 | 29.3 | 37.0 | -7.7 | 218 | 311 |
| 480.01 | 20.3 | 14.4 | 34.7 | 37.0 | -2.3 | 166 | 167 |
| 576.01 | 23.0 | 11.6 | 34.6 | 37.0 | -2.4 | 156 | 346 |
| 623.99 | 23.0 | 11.5 | 34.5 | 37.0 | -2.5 | 158 | 357 |
| 672.01 | 23.7 | 10.2 | 33.9 | 37.0 | -3.1 | 164 | 34 |
| 768.00 | 26.1 | 7.6 | 33.7 | 37.0 | -3.3 | 129 | 236 |
| 815.99 | 26.4 | 4.8 | 31.2 | 37.0 | -5.8 | 100 | 246 |
| 863.98 | 27.0 | 5.3 | 32.3 | 37.0 | -4.7 | 123 | 301 |

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

## TEST DATA OF RADIATED EMISSION

EUT: **USB SPEAKER** MODEL: **ADS-380**

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

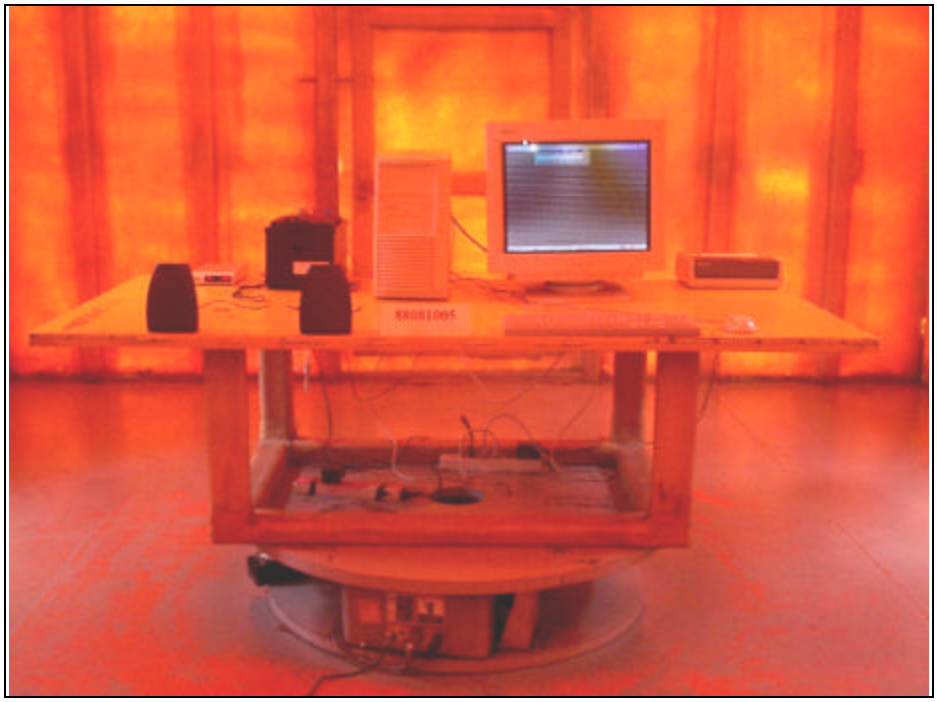
| Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (cm) | Table Angle (Degree) |
|---|---|---|---|---|---|---|---|
| 179.78 | 11.1 | 13.5 | 24.6 | 30.0 | -5.4 | 100 | 352 |
| 384.02 | 17.9 | 12.1 | 30.0 | 37.0 | -7.0 | 103 | 5 |
| 480.00 | 20.3 | 11.4 | 31.7 | 37.0 | -5.3 | 319 | 162 |
| 576.02 | 23.0 | 7.4 | 30.4 | 37.0 | -6.6 | 276 | 356 |
| 624.00 | 23.0 | 8.6 | 31.6 | 37.0 | -5.4 | 250 | 1 |
| 672.01 | 23.7 | 8.1 | 31.8 | 37.0 | -5.2 | 229 | 275 |
| 720.00 | 24.8 | 7.3 | 32.1 | 37.0 | -4.9 | 215 | 280 |
| 768.00 | 26.1 | 5.9 | 32.0 | 37.0 | -5.0 | 180 | 0 |
| 815.99 | 26.4 | 5.5 | 31.9 | 37.0 | -5.1 | 165 | 192 |
| 864.00 | 27.0 | 4.3 | 31.3 | 37.0 | -5.7 | 169 | 319 |

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

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

**CONDUCTED EMISSION TEST**

## RADIATED EMISSION TEST



# 6. APPENDIX - INFORMATION OF THE TESTING LABORATORY

## Information of the testing laboratory

We, ADT Corp., are founded in 1988, to provide our best service in EMC and Safety consultation. Our laboratory is accredited by the following approval agencies according to ISO/IEC Guide 25 or EN 45001:

| | |
|---|---|
| • USA | FCC, UL, NVLAP |
| • Germany | TUV Rheinland |
| | TUV Product Service |
| • Japan | VCCI |
| • New Zealand | RFS |
| • Norway | NEMKO, DNV |
| • U.K. | INCHCAPE |
| • R.O.C. | BSMI |

Enclosed please find some certificates of our laboratory obtained from approval agencies. If you have any comments, please feel free to contact us with the following:

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**Hsin Chu EMC Lab**:
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