

Application for FCC Certification
On behalf of
Atmel Asia Limited Shanghai Liaison Office
Smart Card Reader

Model No.: ARUSB2000
FCC ID: OBPARUSB2000

Prepared For : Atmel Asia Limited Shanghai Liaison Office
4th Fl Block A, 586 Fan Yu Road, Shanghai, China

Prepared By : AUDIX Technology (Shanghai) Co., Ltd.
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Report No. : ACI-F01002
Date of Test : Jan 09, 2001
Date of Report : Jan 10, 2001

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TEST REPORT FOR FCC CERTIFICATION

Applicant : Atmel Asia Limited Shanghai Liaison Office
4th Fl Block A, 586 Fan Yu Road, Shanghai, China

Manufacturer : Atmel Asia Limited Shanghai Liaison Office
4th Fl Block A, 586 Fan Yu Road, Shanghai, China

EUT Description : Smart Card Reader
(A) Model No. : ARUSBR2000
(B) Serial No. : Atmel2000-001
(C) Power Supply : AC 120V/60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 1998
AND ANSI C63.4:1992*

The device described above is tested by AUDIX Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B (Class B) limits both radiated and conducted emissions.

The measurement results are contained in this test report and AUDIX Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology (Shanghai) Co., Ltd.

Date of Test : Jan 09, 2001

Prepared by : 
(LOUISE LU)

Test Engineer : 
For and on behalf of (HAILI WANG))
AUDIX TECHNOLOGY (SHANGHAI) CO., LTD.

Reviewer : 
(JIM HSU)

Approved Signatory: 
(JEREMY GENG)
Authorized Signature(s)

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test

| | | |
|--------------|---|-----------------------------------------------------------------------------------------------------------------------|
| Description | : | Smart Card Reader |
| Type of EUT | : | <input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-product <input type="checkbox"/> Pro-type |
| Model Number | : | ARUSB R 2000 |
| Serial No. | : | Atmel2000-001 |
| FCC ID | : | OBP AR USB R 2000 |
| Applicant | : | Atmel Asia Limited Shanghai Liaison Office 4 th Fl Block A, 586 Fan Yu Road, Shanghai, China |
| Manufacturer | : | Atmel Asia Limited Shanghai Liaison Office 4 th Fl Block A, 586 Fan Yu Road, Shanghai, China |
| Power Cord | : | Unshielded, Nondetachable, 2.20m |

1.2 Tested System Details

1.2.1 PERSONAL COMPUTER

| | | |
|------------------------|---|----------------------------------------------|
| Model Number | : | P2L97 |
| Serial Number | : | T02 |
| FCC ID | : | N/A (DOC) |
| Manufacturer | : | Asus Computer International Co. |
| Switching Power Supply | : | Model FSP300-60GT Sparkle Power Int. Ltd. |
| Floppy Driver | : | Teac Corp. Model FC-235HF |
| Hard Disk Driver | : | Seagate Model ST3322A |
| Disk Ctrl Card | : | Within Mother Board |
| Serial / Parallel Card | : | Within Mother Board |
| Power Cord | : | Unshielded, Detachable, 1.8m |

1.2.2 VGA CARD

| | | |
|---------------|---|---------------------------------|
| Manufacturer | : | Asus Computer International Co. |
| Model Number | : | 3DP-V375DX |
| Serial Number | : | 85C7E05379 |
| FCC ID | : | LUT-CP765 |

1.2.3 MONITOR

| | | |
|---------------|---|------------------------------|
| Model Number | : | 14B1320W |
| Serial Number | : | BE0098026075854 |
| FCC ID | : | A3KM064 |
| Manufacturer | : | PHILIPS |
| Data Cable | : | Shielded, Detachable, 1.7m |
| Power Cord | : | Unshielded, Detachable, 1.8m |

1.2.4 KEYBOARD

| | | |
|---------------|---|-------------------------------|
| Model Number | : | KFK-EA4XA |
| Serial Number | : | N/A |
| FCC ID | : | CMYKFK7741 |
| Manufacturer | : | MITSUMI |
| Data Cable | : | Shielded, Nondetachable, 1.5m |

1.2.5 MOUSE

| | | |
|---------------|---|---------------------------------|
| Model Number | : | M-S34 |
| Serial Number | : | 850447-0000 |
| FCC ID | : | DZL211029 |
| Manufacturer | : | COMPAQ |
| Data Cable | : | Unshielded, Nondetachable, 1.4m |

1.2.6 PRINTER

| | | |
|---------------|---|-------------------------------|
| Model Number | : | C3990A |
| Serial Number | : | JPEX020487 |
| FCC ID | : | N/A |
| Manufacturer | : | HP |
| Power Cord | : | Unshielded, Detachable, 1.95m |
| Data Cable | : | Shielded, Detachable, 1.2m |

1.2.7 IC CARD

| | | |
|--------------|---|-----------------|
| Manufacturer | : | ATMEL Asia Ltd. |
|--------------|---|-----------------|

1.3 Description of Test Facility

| | | |
|---------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Site Description (Semi-Anechoic Chamber) | : | Sept. 17, 1998 file on Federal Communications Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, USA |
| Name of Firm | : | AUDIX Technology (Shanghai) Co., Ltd. |
| Site Location | : | 3 F., 34 Bldg., 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai, China |

1.4 Measurement Uncertainty

| | | |
|--------------------------------|---|----------|
| Conducted Emission Uncertainty | : | U=2.66dB |
| Radiated Emission Uncertainty | : | U=3.90dB |

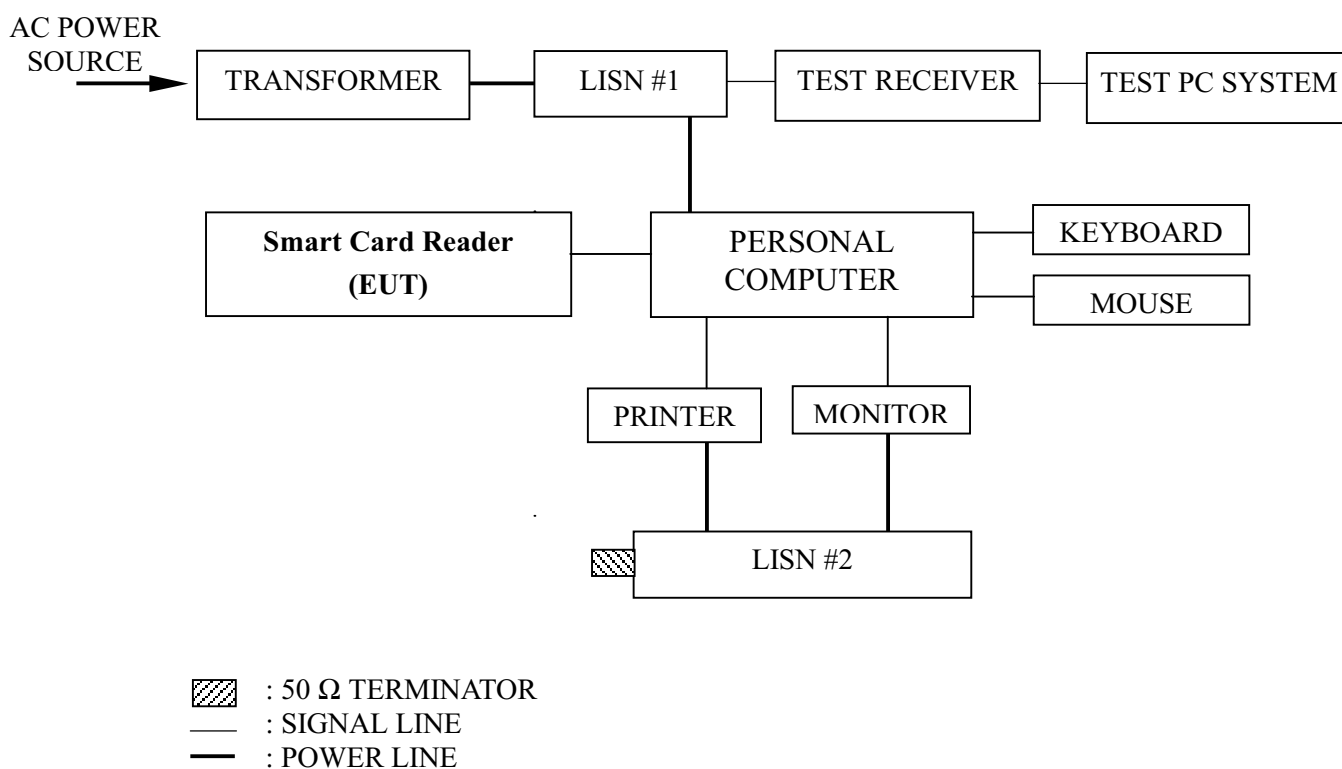
2 CONDUCTED EMISSION TEST

2.1 Test Equipment

The following test equipment are used during the conducted emission test in a shielded room:

| Item | Type | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|------------------------------------------------|-----------------|-----------|------------|--------------|---------------|
| 1. | Test Receiver | Rohde & Schwarz | ESHS10 | 844077/020 | May 20, 2000 | 1 Year |
| 2. | Line Impedance Stabilization Network (LISN) #1 | Kyoritsu | KNW-407 | 8-1280-4 | Jun 02, 2000 | 1 Year |
| 3. | LISN #2 | Kyoritsu | KNW-407 | 8-1280-5 | Apr 15, 2000 | 1 Year |

2.2 Block Diagram of Test Setup



2.3 Conducted Emission Limit

| Frequency (MHz) | Maximum RF Line Voltage | |
|---------------------------------------------------------------------------|-------------------------|--------------|
| | (μ V) | dB(μ V) |
| 0.45 ~ 30 | 250 | 48 |
| NOTE 1 – RF Line Voltage dB(μ V) = 20 log RF Line Voltage (μ V) | | |

2.4 Test Configuration

The EUT (listed in Sec. 1.1) and the supported simulator (listed in Sec 1.2) were installed to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

2.5 Operating Condition of EUT

The EUT was connected to the power mains through PC system connected with a Line Impedance Stabilization Network (LISN #1). The other supported simulated device power cords was connected to the power mains through LISN #2. This provided a 50 Ω coupling impedance for the measuring equipment.

Both sides of AC line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to ANSI C63.4-1992 during conducted emission test.

The bandwidth of Test Receiver ESHS10 was set at 10 kHz.

The frequency range from 450 kHz to 30 MHz was checked. The test mode (Reading) was done on conducted emission test and all the test results are listed in Sec. 2.7.

2.6 Test Procedure

2.6.1 Setup the EUT and the simulator as shown in section 2.2.

2.6.2 Turn on the power of all equipment.

2.6.3 The EUT was in Reading mode;

2.6.4 The EUT will be operated normally.

2.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

EUT : Smart Card Reader Temperature : 20.8°C

Model No. : ARUSBR2000 Humidity : 44%

Test Mode : Reading Date of Test : Jan 09, 2001

| Test Line | Frequency (MHz) | Factor (dB) | Meter Reading dB(μV) | Emission Level dB(μV) | Limits dB(μV) | Margin (dB) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|----------------------|-----------------------|---------------|-------------|
| VA | 0.465 | 0.32 | 43.98 | 44.30 | 48.00 | 3.70 |
| | 0.589 | 0.30 | 43.97 | 44.27 | 48.00 | 3.73 |
| | 0.717 | 0.29 | 41.78 | 42.07 | 48.00 | 5.93 |
| | 0.911 | 0.28 | 43.82 | 44.10 | 48.00 | 3.90 |
| | 1.302 | 0.27 | 43.59 | 43.86 | 48.00 | 4.14 |
| | 1.580 | 0.27 | 41.33 | 41.60 | 48.00 | 6.40 |
| VB | 0.450 | 0.33 | 42.02 | 42.35 | 48.00 | 5.65 |
| | 0.599 | 0.30 | 44.05 | 44.35 | 48.00 | 3.65 |
| | 0.717 | 0.29 | 43.55 | 43.84 | 48.00 | 4.16 |
| | 0.900 | 0.28 | 42.92 | 43.20 | 48.00 | 4.80 |
| | 1.308 | 0.26 | 44.17 | 44.43 | 48.00 | 3.57 |
| | 1.573 | 0.25 | 42.65 | 42.90 | 48.00 | 5.10 |
| <p>Note 1. Emission Level = Meter Reading + Factor Note 2. Factor = Insertion Loss + Cable Loss Note 3. All reading are Quasi-Peak Values. Note 4. The worst emission is detected at 1.308 MHz with corrected signal level of 44.43dB(μV) (limit is 48.00 dB(μV)), when the VB of the EUT is connected to LISN.</p> | | | | | | |

TEST ENGINEER:

(HALL WANG)

3 RADIATED EMISSION TEST

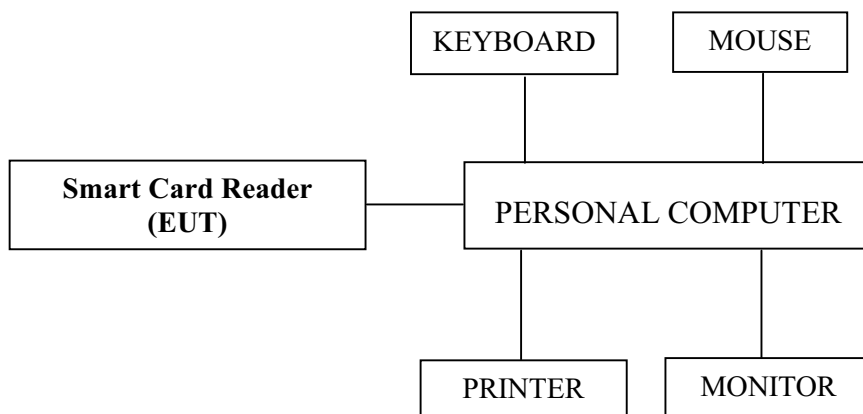
3.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

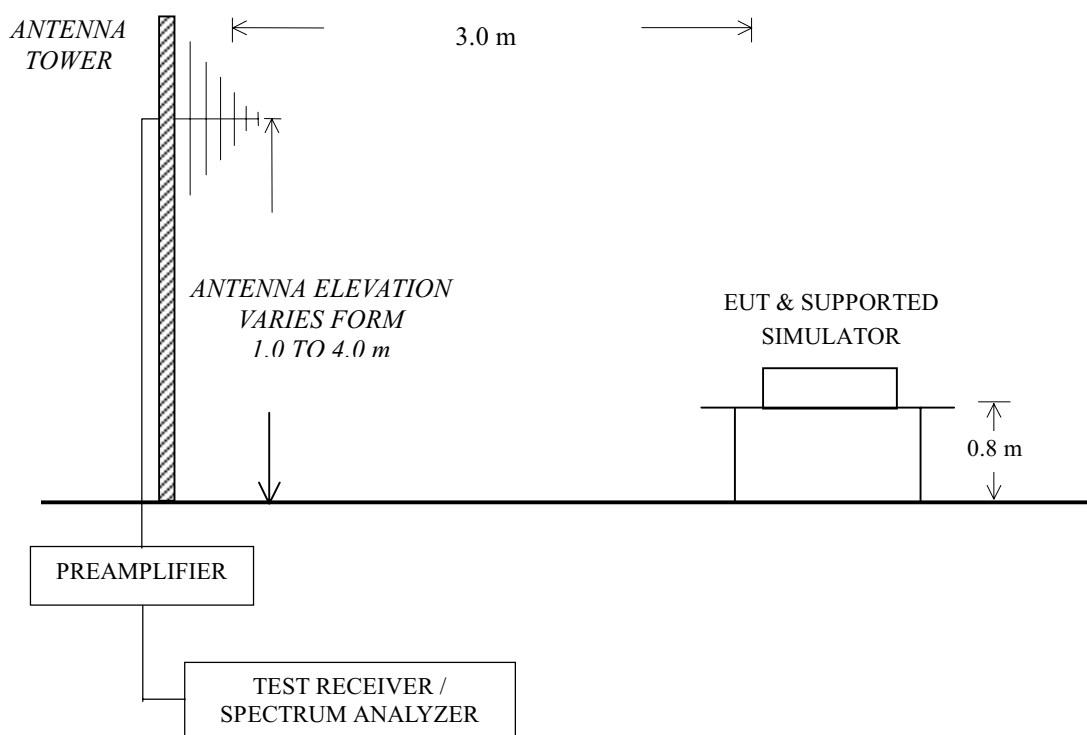
| Item | Type | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-------------------|-----------------|-----------|------------|---------------|---------------|
| 1. | Spectrum Analyzer | HP | 85422E | 3617A00167 | Set 15,2000 | 1 Year |
| 2. | Preamplifier | HP | 8447D | 2944A06849 | June 03, 2000 | 1/2 Year |
| 3. | Bilog Antenna | Chase | CBL6111 | 1146 | Dec 10, 2001 | 1/2 Year |
| 4. | Test Receiver | Rohde & Schwarz | ESVS10 | 844594/001 | May 20,2000 | 1 Year |

3.2 Block Diagram of Test Setup

3.2.1 EUT and supported simulator



3.2.2 Radiated emission test setup



3.3 Radiated Emission Limit

| Frequency (MHz) | Distance (m) | Field strength limits | |
|--------------------|-----------------|-----------------------|----------------------------|
| | | ($\mu\text{V/m}$) | $\text{dB}(\mu\text{V/m})$ |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| Above 960 | 3 | 500 | 54.0 |

NOTE 1 - Emission Level $\text{dB}(\mu\text{V/m}) = 20 \log \text{Emission Level } (\mu\text{V/m})$
 NOTE 2 - The tighter limit applies at the band edges.
 NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4 Test Configuration

The configuration of the EUT and simulators are same as those used in conducted test.

Please refer to Sec. 2.4.

3.5 Operating Condition of EUT

Same as conducted test which is listed in Sec. 2.5, except the test set up replaced by Sec. 3.2.

3.6 Test Procedure

The EUT and simulator were placed on a turn table which is 0.8 meter above ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or dipole antenna were used as receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C 63.4-1992 requirements during radiated emission test.

The bandwidth setting on Test Receiver ESVS10 was 120 kHz.

The frequency range from 30 MHz to 1000 MHz was checked. The test mode (Reading) was done on radiated emission test and all the test results are listed in Sec. 3.7.

3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

EUT : Smart Card Reader Temperature : 21°C

Model No. : ARUSBR2000 Humidity : 64%

Test Mode : Reading Date of Test : Jan 09, 2001

| Polarization | Frequency (MHz) | Antenna Factor (dB/m) | Preamp Factor (dB) | Cable Loss (dB) | Meter Reading dB(μV) | Emission Level dB(μV/m) | Limits dB(μV/m) | Margin (dB) |
|--------------|-----------------|-----------------------|--------------------|-----------------|----------------------|-------------------------|-----------------|-------------|
| Horizontal | 48.430 | 9.05 | 25.38 | 0.87 | 50.57 | 34.24 | 40.00 | 5.76 |
| | 67.830 | 6.73 | 25.25 | 1.02 | 53.74 | 35.22 | 40.00 | 4.78 |
| | 121.180 | 12.85 | 25.10 | 1.41 | 49.98 | 37.73 | 43.50 | 5.77 |
| | 201.690 | 9.49 | 25.10 | 2.02 | 54.85 | 39.24 | 43.50 | 4.26 |
| | 359.800 | 15.78 | 25.68 | 2.85 | 50.77 | 40.87 | 46.00 | 5.13 |
| | 469.410 | 18.86 | 26.50 | 3.37 | 48.87 | 41.23 | 46.00 | 4.77 |
| Vertical | 48.430 | 9.05 | 25.38 | 0.87 | 51.78 | 35.45 | 40.00 | 4.55 |
| | 66.860 | 6.59 | 25.25 | 1.01 | 53.80 | 35.14 | 40.00 | 4.86 |
| | 140.580 | 11.53 | 25.10 | 1.59 | 51.22 | 37.65 | 43.50 | 5.85 |
| | 201.690 | 9.49 | 25.10 | 2.02 | 54.50 | 38.89 | 43.50 | 4.61 |
| | 468.440 | 18.86 | 26.50 | 3.37 | 48.68 | 41.04 | 46.00 | 4.96 |
| | 536.340 | 20.08 | 26.70 | 3.63 | 46.81 | 40.19 | 46.00 | 5.81 |

Note 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Preamp Factor

Note 2. All reading are Quasi-Peak values.

Note 3. The worst emission at horizontal polarization was detected at 201.690 MHz with corrected signal level of 39.24 dB(μV/m) (limit is 43.50 dB(μV/m)), when the antenna was 1.80m height and the turn table was at 308°.

Note 4. The worst emission at vertical polarization was detected at 48.430 MHz with corrected signal level of 35.45 dB(μV/m) (limit is 40.00 dB(μV/m)), when the antenna was 1.50m height and the turn table was at 316°.

Note 5. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

TEST ENGINEER:


(HALL WANG)