

**ST Microelectronics, Inc.**

Application  
For  
Certification  
**(FCC ID: O725346V)**

Smart Card Reader

WO# 0205399  
WL/Sandy  
August 13, 2002

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# INTERTEK TESTING SERVICES

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## MEASUREMENT/TECHNICAL REPORT

**ST Microelectronics, Inc.**  
**MODEL: BioSIMKey ADT60**  
**BioSIMKey TCRA1A**

**FCC ID: O725346V**

**August 13, 2002**

This report concerns (check one):      Original Grant       Class II Change \_\_\_\_\_

Equipment Type: Computer Peripheral (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?      Yes       No

If yes, defer until: \_\_\_\_\_  
date

Company Name agrees to notify the Commission by: \_\_\_\_\_  
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37?      Yes       No

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [12-18-01 Edition] provision.

Report prepared by:      Wilson Loke  
Intertek Testing Services  
2/F., Garment Center,  
576, Castle Peak Road,  
HONG KONG  
Phone: 852-2173-8575  
Fax: 852-2371-0521

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### List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission	radiated photos.doc
Test Setup Photo	Conducted Emission	conducted photos.doc
Test Report	Conducted Emission Test Result	conducted.pdf
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf

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**EXHIBIT 1**

**GENERAL DESCRIPTION**

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### 1.0 General Description

#### 1.1 Product Description

The Equipment Under Test (EUT) is a smart card and fingerprint reader used with computer. It comprises the highly successful silicon fingerprint sensor and a plug-in card reader for ultra-secure authentication. The multi-factor authentication approach of the reader-verifying “something you have” as well as “something you are” - provide a secure and convenient solution for authenticating the true identity of a person. Also, it is a compact USB device that can scan fingerprint and accept plug-in smart cards.

The Model: BioSIMKey ADT60 is the same as the Model: BioMISKey TCRA1A in hardware aspect. The difference in model number serves as marketing strategy.

For electronic filing, the brief circuit description is saved with filename: descri.pdf

#### 1.2 Related Submittal(s) Grants

This is a single application for certification of a computer peripheral.

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### 1.3 Test Methodology

Radiated emission and line conducted emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

### 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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**EXHIBIT 2**

**SYSTEM TEST CONFIGURATION**

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### 2.0 System Test Configuration

#### 2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (1992).

The EUT was powered by computer through USB cable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

The download mode is applied during test.

The frequency range from 9 kHz to 1 GHz was searched for spurious emissions from the device. Only those emissions reported were detected. All other emissions were at least 20 dB below the applicable limits.

#### 2.2 EUT Exercising Software

A “EMC.exe” Program was installed for downloading the data from the card reader to computer.

#### 2.3 Special Accessories

There was no special accessory for the compliance.

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### 2.4 Equipment Modification

Any modifications installed previous to testing by Intertek Testing Services will be incorporated in each production model sold/leased in the United States.

### 2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

### 2.6 Support Equipment List and Description

This product was tested with a computer system.

Refer List: 1. Acer Notebook : Model : 720 S/N : 9142C0160390500026M

2. Adaptor : Model: Delta Electronics Inc. ADP-60XB  
Input: AC100-240V~1.5A 50-60Hz, Output : 19V — 3.16A

3. HP Printer : Model : C2642A  
S/N : SG67B131RY, FCCID : B94B2642X

4. Modem : Model : 6800CN, FCCID : BFJ9D907-00038

5. Software: EMC.exe, Supply by Client

6. Smart Card: ACOS1, Supply by Client

7. 1 x USB cable with 30cm long

8. 2 x 1m telephone with termination

9. 1 x serial cable with 1m long

10. 1 x parallel cable with 1m long

11. 1 x 1m LAN cable with termination

12. 2 x 1m audio signal line with termination

*Confirmed by:*

*Wilson Loke*  
*Manager*  
*Intertek Testing Services Hong Kong Ltd.*  
*Agent for ST Microelectronics, Inc.*



Signature

August 13, 2002 Date

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**EXHIBIT 3**

**EMISSION RESULTS**

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### 3.0 Emission Results

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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### 3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

where FS = Field Strength in dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

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### 3.1 Field Strength Calculation (cont'd)

#### Example

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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### **3.2 Radiated Emission Configuration Photograph**

**Worst Case Radiated Emission  
at  
192.010 MHz**

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos.doc

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### 3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 5.5 dB

#### **TEST PERSONNEL:**



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*Signature*

Ben W. K. Ho, Compliance Engineer  
*Typed/Printed Name*

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August 13, 2002

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*Date*

## INTERTEK TESTING SERVICES

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Company: ST Microelectronics, Inc.  
Model: BioSIMKey ADT60

Date of Test: May 2, 2002

Table 1

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	64.007	32.4	9.9	16	26.3	40.0	-13.7
V	76.003	31.3	6.3	16	21.6	40.0	-18.4
H	84.010	37.7	6.7	16	28.4	40.0	-11.6
H	108.010	35.8	12.2	16	32.0	43.5	-11.5
H	120.010	32.5	12.8	16	29.3	43.5	-14.2
H	124.010	34.8	12.8	16	31.6	43.5	-11.9
H	132.010	35.7	12.3	16	32.0	43.5	-11.5
H	144.000	40.9	11.7	16	36.6	43.5	-6.9
H	148.000	39.8	11.6	16	35.4	43.5	-8.1
H	156.010	38.7	12.4	16	35.1	43.5	-8.4
H	160.000	37.2	13.1	16	34.3	43.5	-9.2
H	168.010	35.4	13.8	16	33.2	43.5	-10.3
H	180.010	33.8	16.2	16	34.0	43.5	-9.5
H	188.003	31.6	16.7	16	32.3	43.5	-11.2
H	192.010	36.9	17.1	16	38.0	43.5	-5.5
H	196.000	33.3	17.3	16	34.6	43.5	-8.9
H	204.000	28.9	11.8	16	24.7	43.5	-18.8
H	208.000	31.2	11.8	16	27.0	43.5	-16.5
H	220.003	28.9	11.8	16	24.7	46.0	-21.3
H	228.000	28.6	11.4	16	24.0	46.0	-22.0

Notes:

1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.

Test Engineer: Ben W. K. Ho

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### **3.4 Line Conducted Configuration Photograph**

**Worst Case Line-Conducted Configuration**

**5.465 MHz**

For electronic filing, test configuration photographs are saved with filename: conducted photos.doc.

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### 3.5 Line Conducted Emission Configuration Data

The data saved with filename: conducted.pdf, lists the significant emission frequencies, the limit, and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 13.3 dB

#### **TEST PERSONNEL:**



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*Tester Signature*

Ben W. K. Ho, Electronics Engineer

*Typed/Printed Name*

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August 13, 2002

*Date*

## **INTERTEK TESTING SERVICES**

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Company: ST Microelectronics, Inc.  
Model: BioSIMKey ADT60

Date of Test: August 13, 2002

Graph 1

**Conducted Emissions  
Section 15.107 Requirements**

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Company: ST Microelectronics, Inc.  
Model: BioSIMKey ADT60

Date of Test: August 13, 2002

Table 2

**Conducted Emissions  
Section 15.107 Requirements**

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**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

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### 4.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.doc & internal photos.doc

**EXHIBIT 5**

**PRODUCT LABELLING**

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### 5.0 Product Labelling

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf

**EXHIBIT 6**

**TECHNICAL SPECIFICATIONS**

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### 6.0 Technical Specifications

For electronic filing, the block diagram and schematics of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

**EXHIBIT 7**

**INSTRUCTION MANUAL**

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### 7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

This manual will be provided to the end-user with each unit sold/leased in the United States.

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**EXHIBIT 8**

**MISCELLANEOUS INFORMATION**

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### 8.0 Miscellaneous Information

This miscellaneous information includes emission measuring procedure.

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### 8.1 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of digital camera operating under Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 1992.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 450 kHz to 30 MHz.

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### 8.1 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.4 - 1992.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.2). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.