

**Compatibility Verification Testing**  
**for Basic Resident Registration Cards (BRRC : Juki Cards)**  
**and Proximity Coupling Devices**  
**Testing Specifications (Version 1.0)**

June 16, 2003

New Media Development Association

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# Table of Contents

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1	<a href="#">Objectives and Background</a>	3
2	<a href="#">Reference Specifications and Other Documents</a>	3
3	<a href="#">Test Targets</a>	3
3.1	<a href="#">Vendors</a>	3
3.2	<a href="#">IC Cards</a>	3
3.3	<a href="#">Proximity Coupling Devices</a>	3
4	<a href="#">Testing Environments</a>	4
4.1	<a href="#">Test PC</a>	4
4.2	<a href="#">PC Operating System</a>	4
4.3	<a href="#">Proximity Coupling Device to Be Tested</a>	4
4.4	<a href="#">Others</a>	4
5	<a href="#">Testing Specifications and Requirements</a>	5
5.1	<a href="#">Overview of Tests</a>	5
5.2	<a href="#">Cross Tests</a>	5
5.3	<a href="#">Direction of Card Insertion</a>	6
5.4	<a href="#">Common Testing Specifications</a>	6
5.5	<a href="#">Details of Tests and Judging Criteria</a>	6
5.6	<a href="#">C3 Test Commands</a>	8
5.7	<a href="#">Submission of IC Cards for Testing</a>	8
5.8	<a href="#">Submission of Proximity Coupling Devices for Testing</a>	8
5.9	<a href="#">Measures Taken When the Matching Has Failed the Test</a>	8
6	<a href="#">Testing Software Specifications</a>	9
6.1	<a href="#">Software Configuration</a>	9
6.2	<a href="#">Processing Flow</a>	10
6.3	<a href="#">Result Sheet Format</a>	14
7	<a href="#">Conditions for Testing Software Development and Use</a>	15
7.1	<a href="#">Hardware</a>	15
7.2	<a href="#">Software Development Environment</a>	15
8	<a href="#">Compatibility Function Testing Work</a>	15
8.1	<a href="#">Testing Work Procedures</a>	15
8.2	<a href="#">Compatibility Testing Site</a>	15

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## 1 Objectives and Background

- To clarify details, methods, criteria, environments and procedures for compatibility verification tests aimed at verifying the compatibility of different types of contactless IC cards and proximity coupling devices from different vendors that will be provided for the Basic Resident Registration Network System (the Juki System)
- To prepare a report on the compatibility of IC cards and proximity coupling devices based on the results of tests using compatibility testing software

## 2 Reference Specifications and Other Documents

Juki Card Specifications : “Basic Resident Registration Card Specifications (Type I) for the Basic Resident Registration Network System, Version 2.2” LASDEC, January 20, 2003

Proximity Coupling Device Specifications: “IC Card Proximity Coupling Device Procurement Specifications for the Basic Resident Registration Network System, Version 1.0” LASDEC, August 1, 2001

NMDA Implementation Specifications: “Proximity Communications Interface Implementation Specifications, Version 1.1” NMDA, July 2001

## 3 Test Targets

### 3.1 Vendors

- Tests shall be conducted for those of the vendors who plan to provide IC cards and proximity coupling devices for the Basic Resident Registration Network System and also wish to undergo compatibility verification tests.

### 3.2 IC Cards

- Tests shall be conducted for Type I Juki cards.
- IC card vendors shall provide one or more types of IC cards they want to be tested.
- For each type of IC card, three units shall be tested taking into consideration possible variance in their characteristics and other features.

### 3.3 Proximity Coupling Devices

- Tests shall be conducted for proximity coupling devices for Juki cards and those for operators.
- Proximity coupling device vendors shall provide one or more types of proximity coupling device they want to be tested.
- For each type of proximity coupling device, two units shall be tested taking into consideration possible variance in their characteristics and other features.
- RS232C or USB shall be used for interface with PC.
- For proximity coupling devices that have two types of interface, RS232C and USB, tests shall be conducted using either of the two types of interface designated by the vendor.

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## 4 Testing Environments

### 4.1 Test PC

- A Windows model provided by the New Media Development Association will be used for testing.
- For interface, RS232C (DSUB 9pin) and USB (Ver. 2.0) will be used.

### 4.2 PC Operating System

- Windows 2000 SP3 operating system will be used.

### 4.3 Proximity Coupling Device to Be Tested

- No more than one proximity coupling devices shall be connected to a single PC.
- The proximity coupling device driver for a proximity coupling device that has undergone a test will not particularly be deleted even when other types of proximity coupling devices are tested.

### 4.4 Others

- For the surrounding environment, the ordinary office environment shall be used.

## 5 Testing Specifications and Requirements

### 5.1 Overview of Tests

The following is a list of tests to be conducted in this compatibility verification testing.

**Table 5-1 List of Tests**

Test number	Test name	Description	Remarks
C1	Request/attribute test	This test is conducted to confirm whether transition to the active state occurs after the IC card is inserted into the proximity coupling device.	
C2	Transmission protocol test	This test is conducted to confirm whether the ISO/IEC14443-4 transmission protocol is operating properly.	Proper operation is confirmed within the range of the C3 command transmission and reception test.
C3	Command transmission and reception test	This test is conducted to confirm whether the card command is operating properly.	
C4	Chip temperature confirmation test	This test measures the surface temperature around the IC chip after the IC card is left in the proximity coupling device for a certain period of time.	

### 5.2 Cross Tests

- Cross tests shall be conducted for all types of proximity coupling devices and all types of IC cards.
- A cross test shall be conducted by inserting one IC card into one proximity coupling device.
- For each test, proximity coupling devices and IC cards shall be matched according to the table below.

**Table 5-2 Matching of Proximity Coupling Devices and IC Cards**

Test number	Test name	Matching of proximity coupling devices and IC cards to be tested	Remarks
C1	Request/attribute test	Cross tests shall be conducted for all cases of matching involving all proximity coupling devices and IC cards.	
C2	Transmission protocol test	Cross tests shall be conducted for all cases of matching involving all proximity coupling devices and IC cards that have passed the C1 test.	
C3	Command transmission and reception test	(Same as above)	
C4	Chip temperature confirmation test	A single proximity coupling device and a single IC card shall be chosen and tested.	Each shall be chosen randomly since it is considered that this test does not greatly affect the characteristics of individual products

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### 5.3 Direction of Card Insertion

- Tests shall be conducted by inserting an IC card into a proximity coupling device in four different directions.  
The card shall be inserted in two different directions with its front face up and in two different directions with its front face down.

### 5.4 Common Testing Specifications

- Tests shall begin 30 minutes after the power of the proximity coupling device is turned on. This is to avoid unstable operation of the proximity coupling device immediately after its power is turned on.
- If a test fails, the status of the card involved shall be examined and recorded accurately so that data thus obtained can be used to analyze the cause of failure.
- Parameters that may affect the characteristics of communications between the PC and proximity coupling device and between the proximity coupling device and IC card shall be used at their default value set for the matching of the proximity coupling device to be tested and its driver (proximity coupling device driver), and no particular change shall be made to them during the test.

### 5.5 Details of Tests and Judging Criteria

#### (1) C1 Test

- The C1 test uses the Request B and Attribute functions of the proximity coupling device driver API and involves initialization, collision avoidance and ATT reception based on ISO/IEC14443-3 Type-B standards.
- One IC card shall be inserted into the device ten times in one direction for a total of 40 times for four different directions.
- The judging criteria for the C1 test are described in the table below.

**Table 5-3 Judging Criteria for the C1 Test**

Judgment	Criterion	Remarks
Pass	If the IC card has been successfully inserted into the device nine times or more in each of the four directions	
Fail	In cases other than that described above	

#### (2) C2/C3 Tests

- The ISO/IEC14443-4 transmission protocol test (C2 test) and command transmission/reception test (C3 test) will be conducted.
- One IC card shall be inserted into the device ten times in one direction for a total of 40 times for four different directions.
- The C2 test will not be conducted independently with final judgment made based on the results of the C3 test.
- The judging criteria for the C2 test based on the results of the C3 test (command transmission/reception test) are described in the table below.

**Table 5-4 Judging Criteria for the C2 Test**

Judgment	Criterion	Remarks
Pass	If, at least for one command, the IC card has been successfully inserted into the device nine times or more in each of the four directions	
Fail	In cases other than that described above	

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- The judging criteria for the C3 test based on the results of executing transmission/reception of commands specified in “5.6 C3 Test Commands” are described in the table below.

**Table 5-5 Judging Criteria for the C3 Test**

Judgment	Criterion	Remarks
Pass	If, for all commands, the IC card has been successfully inserted into the device nine times or more in each of the four directions	
Fail	In cases other than that described above	

**(3) C4 Test**

- The C4 test involves measurement of the temperature on the IC card surface after it is left in the proximity coupling device for a certain period of time.
- After the IC card is inserted into the device and left there for five minutes with the RF turned on using the power supply control function of the device’s API, it shall be taken out of the device to measure the temperature on its surface.
- In the case of an IC card with a terminal, temperature shall be measured on the contact terminal and its back side, and in the case of an IC card without a terminal, temperature shall be measured on its front and back sides around the IC chip. Temperature shall be measured at several locations and the highest temperature measured shall be recorded.
- Surface temperature shall be measured immediately after the IC card is removed from the device (within five to ten seconds after removal).
- This test shall be conducted for one proximity coupling device and one IC card matched randomly.
- The IC card shall be inserted into the device with its front face up and in two different directions: the end of the card where the contact terminal (IC chip if the card does not have such a terminal) is located is inserted first or vice versa.
- In this test, no judgment shall be made. The purpose is to record the temperature measured.

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## 5.6 C3 Test Commands

- IC card commands shall be transmitted and received using IC card command transmission (ICRW\_ICCmd) and IC card response reception (ICRW\_ICResp) for the IC card proximity coupling device driver API.
- As automatic judgment shall be made using the test program, the IC card shall be considered to have responded properly to each command APDU when the SW1SW2=9000h is returned.
- For the tests, the following IC card commands shall be used:

**Table 5-6 C3 Test Commands**

Command name		Descriptions	Remarks
1	SELECT FILE	Platform command	Refer to the Juki card specifications.
2	GET DATA	(Same as above)	Refer to the Juki card specifications.
3	INTERNAL AUTHENTICATE	(Same as above)	Refer to the Juki card specifications.
4	High power command	Command that consumes the largest amount of electric power	Declared by the vendor

- If the scenario for the ISO/IEC14443-4 transmission protocol is not included in the IC card proximity coupling device driver, one that is based on the proximity coupling device transmission control matrix described in the NMDA implementation specifications that is incorporated into the test program shall be used. In this case, the number of retries will be N=3.

## 5.7 Submission of IC Cards for Testing

- IC card vendors should provide to the New Media Development Association the following:
  - (1) IC cards issued for testing, which are in a condition in which they can undergo testing
  - (2) Materials in which command APDU and normal response APDU are described
  - (3) In the case of IC cards without a terminal, information on where the IC chip is located for C4 measurement will be provided.
- Other requirements
  - (1) Information on matters to be noted when IC cards are handled because of their possible effects on the results of verification will be provided prior to testing.

## 5.8 Submission of Proximity Coupling Devices for Testing

- Proximity coupling device vendors should submit to the New Media Development Association the following:
  - (1) Proximity coupling devices to be tested, including communication cables, power supply cables and conversion connectors
  - (2) Proximity coupling device driver based on proximity coupling device specifications that run on the operating system specified in “4.2 PC Operating System”
- Other requirements
  - (1) If the proximity coupling device has both types of interface, USB and RS232C, the proximity coupling device vendor will have to designate the type of interface to be used.
  - (2) Information on matters to be noted when proximity coupling devices are handled because of their possible effects on the results of verification will be provided prior to testing.

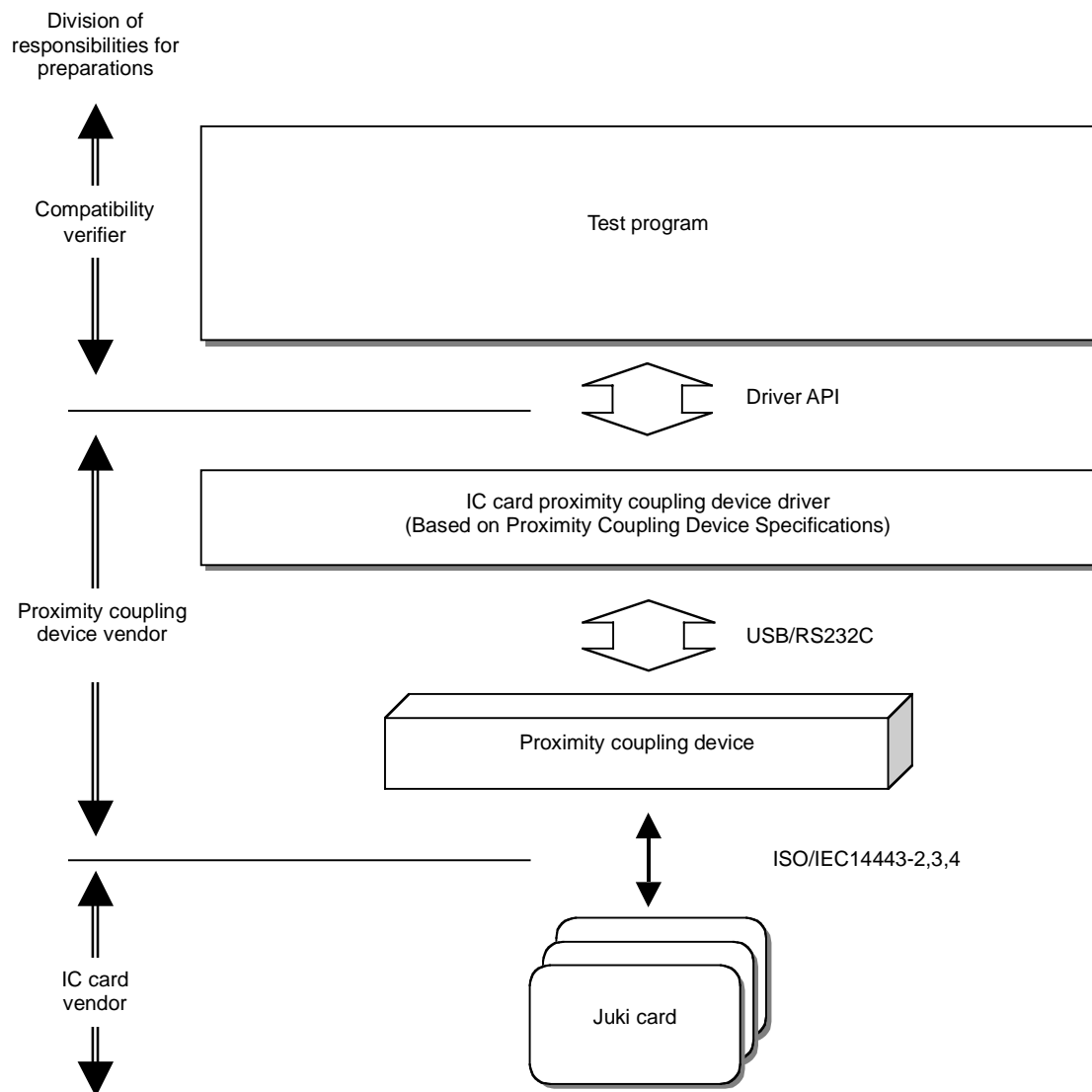
## 5.9 Measures Taken When the Matching Has Failed the Test

- If a certain case of matching of an IC card and a proximity coupling device has failed the test, the parties concerned (IC card vendor, proximity coupling device vendor, NMDA and verification tester) will make the final judgment after taking the following steps:
  - Confirmation of the state of affairs
  - Analysis of the cause of failure
  - Discussion for judging whether the matching has truly failed the test
  - Final decision on success or failure



## 6 Testing Software Specifications

### 6.1 Software Configuration

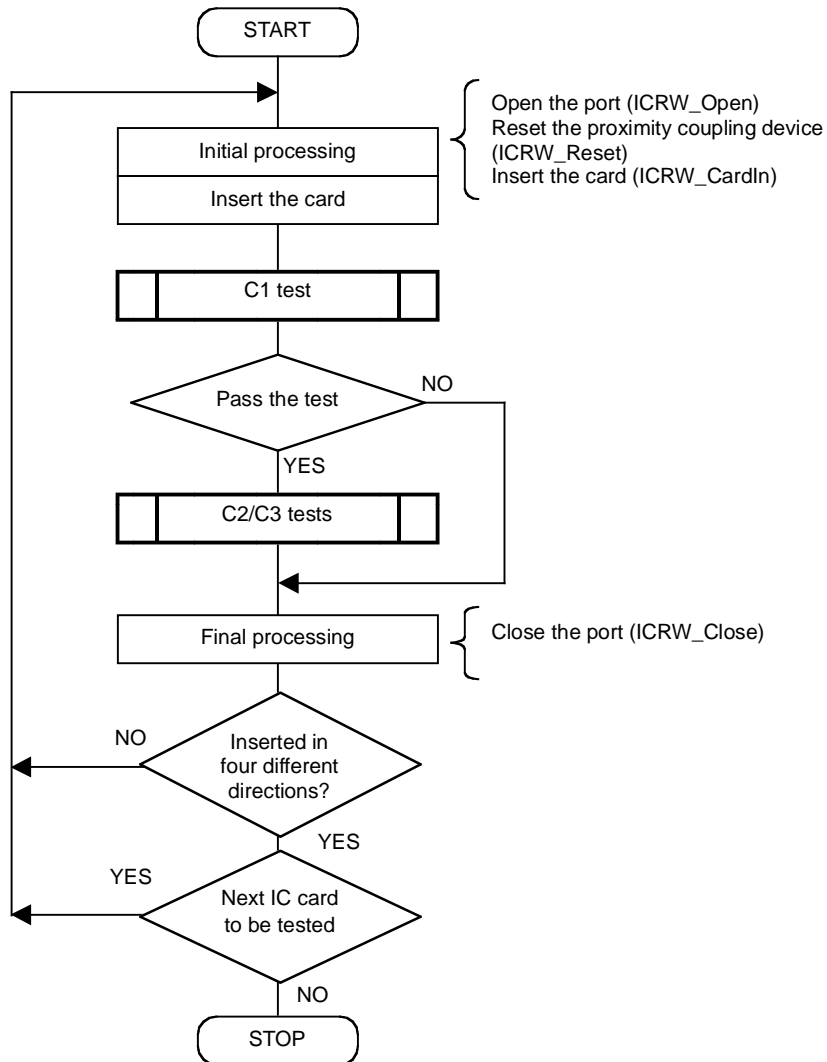


**Figure 6.1 Software Configuration**

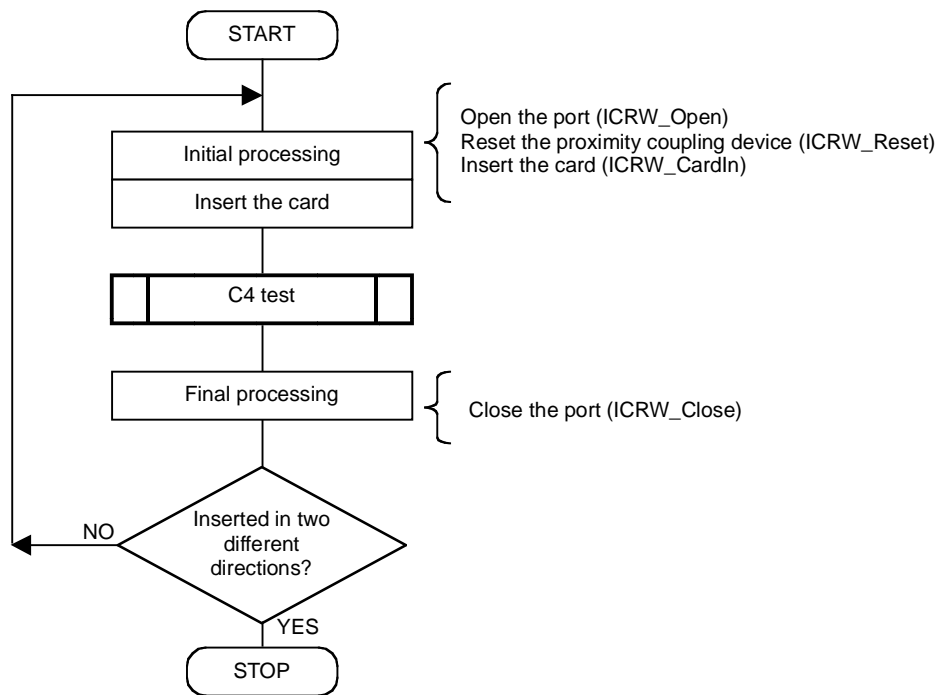
## 6.2 Processing Flow

### (1) Basic Test Flow

The following is the basic test flow for one proximity coupling device. The C4 test shall be conducted independently from other tests.



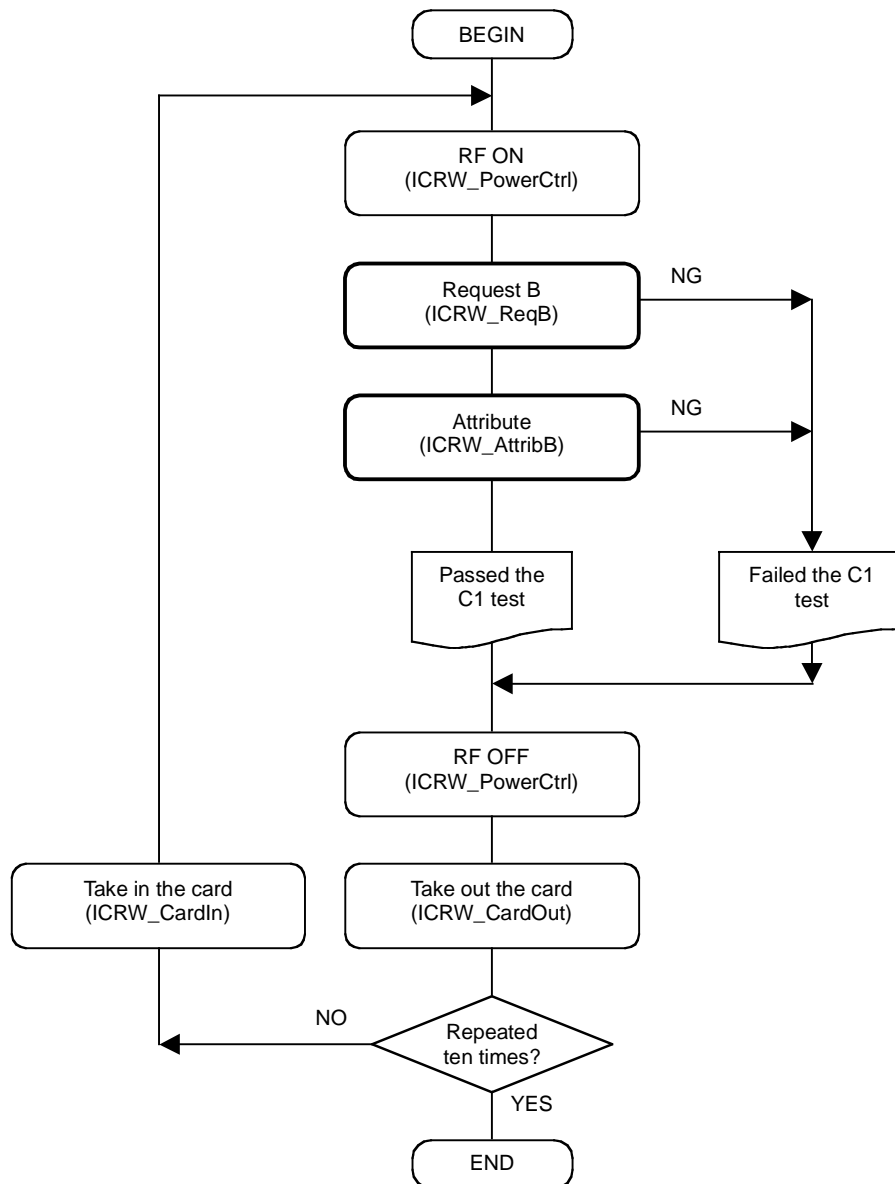
**Figure 6.2 Basic Processing Flow (1/2)**



**Figure 6.3 Basic Processing Flow (2/2)**

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(2) C1 Test Processing Flow



**Figure 6.4 C1 Test Processing Flow**

### (3) C2/C3 Tests

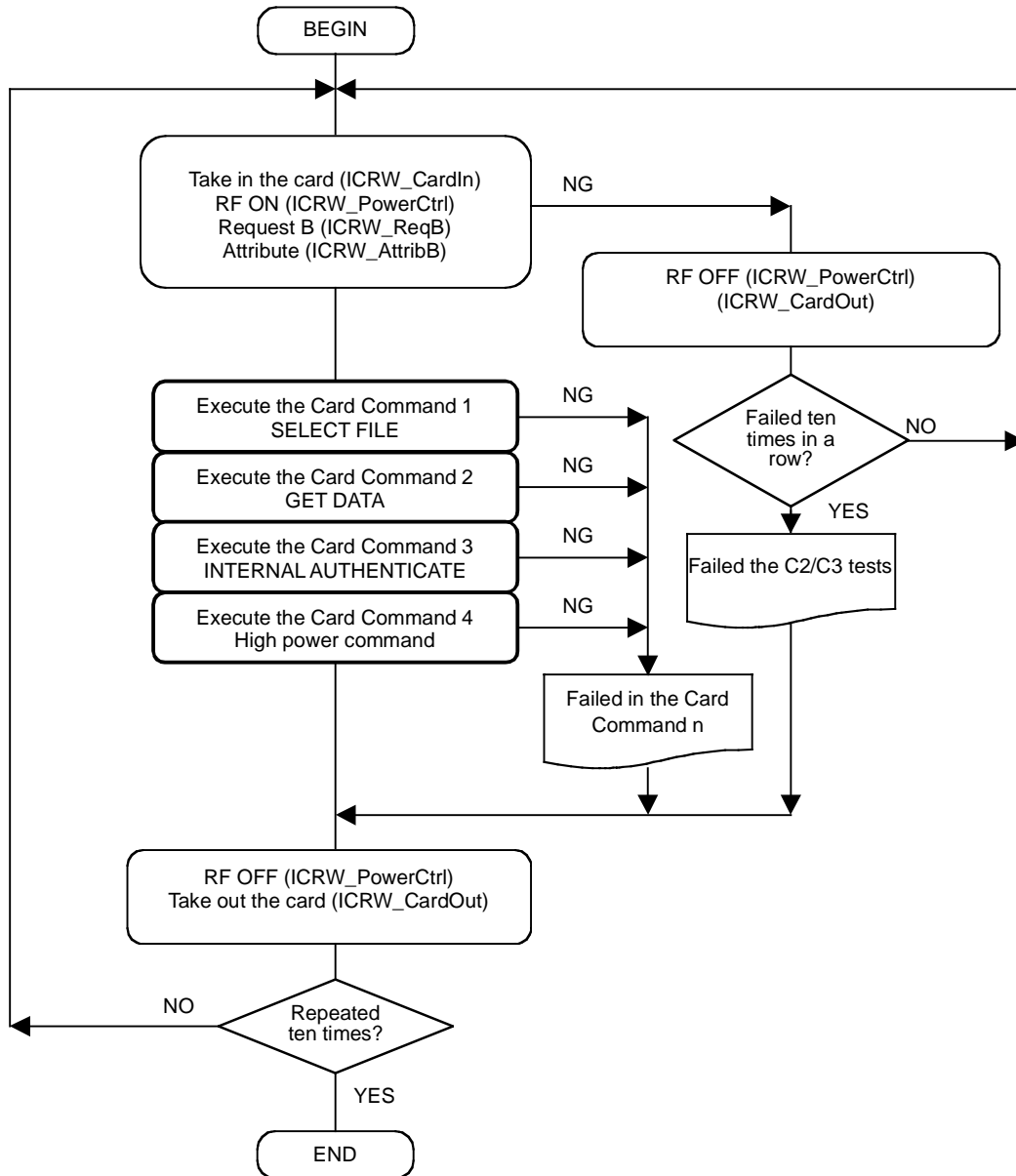
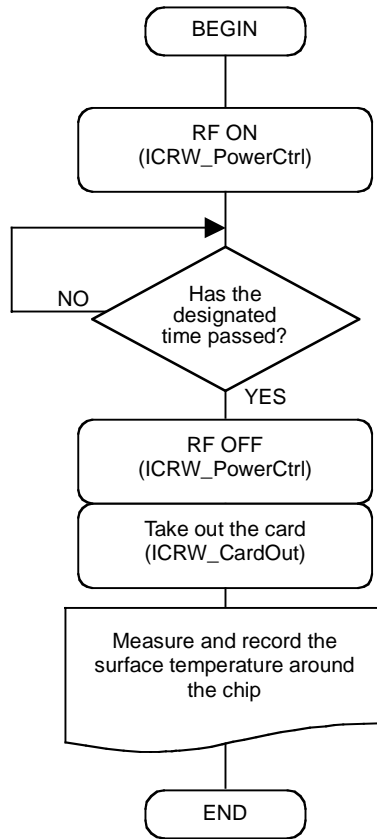


Figure 6.5 C2/C3 Test Processing Flow

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(4) C4 Test Processing Flow



**Figure 6.6 C4 Test Processing Flow**

### 6.3 Result Sheet Format

To be determined separately.

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## 7 Conditions for Testing Software Development and Use

### 7.1 Hardware

#### (1) RS232C Connection

- Windows 2000-compatible DOS machine
- DSUB 9pin

#### (2) USB Connection

- Windows 2000-compatible DOS machine
- USB1.1 connector
- The maximum amount of electric power supplied on the PC side is 500 mA (initial: 100 mA).

### 7.2 Software Development Environment

- VC++ Ver.6.0

## 8 Compatibility Function Testing Work

### 8.1 Testing Work Procedures

#### (1) Testing Procedure

- Proximity coupling device vendors shall bring or send their proximity coupling devices and driver software to the testing site beforehand.
- IC card vendors shall bring or send their IC cards to the testing site beforehand.
- If possible, drivers and other types of software shall be installed by testers to confirm whether they work properly.
- Testers shall use test software to conduct tests for all proximity coupling devices and IC cards.
- Vendors shall not be present during the testing work.
- Vendors shall help solve problems arising during the preparatory work, including installation, and during the testing.

#### (2) Number of Times Compatibility Tests Are Conducted

- Compatibility test shall be conducted once.
- If a second test is required, for example, because there is a problem with the results of testing, a separate decision shall be made on the period when such a test shall be conducted and other requirements.

#### (3) Test Duration

- In principle, tests shall be conducted between 10:00 a.m. and 6:00 p.m.
- If a problem or other situations arise during the test, a decision shall be made on what measures will be taken every time such situations arise.

### 8.2 Compatibility Testing Site

#### (1) Location

- New Media Development Association :  
Mita Kokusai Bldg. 24F, 1-4-28 Mita, Minato-ku, Tokyo
- Testing environment: Ordinary office environment

#### (2) Contact

- New Media Development Association :  
TEL: 03-3457-0672 (pilot number), FAX: 03-3451-9604