

FeliCa Card RF Performance Certification Specification

Ver.1.4

April 15, 2019

**FeliCa Certification Section
Quality Management Department
FeliCa Business Division
Sony Imaging Products & Solutions Inc.**

Revision History

Ver. No.	Date issued	Description of Revisions
1.0	October 1, 2013	First edition
1.01	May 1, 2014	The testing organization and the testing laboratory information such as contact information were changed.
1.02	June 1, 2014	The following contact points, which had been the testing organization, were changed to the testing laboratory. <ul style="list-style-type: none"> - Submission of certification test applications - Submission of Notice of Added Product Model (form) - Submission of Application Form for Certified Product Listing on Sony's Website - Notifying party of test results - Inquiry The organization who determines the 0-degree direction of test samples was changed from the testing organization to the testing laboratory.
1.1	April 1, 2015	The basic performance test, the performance of communication with the M-class reader/writer, and the reference communication distance of the center were changed.
1.2	May 1, 2017	The Reader/Writer for testing is changed <ul style="list-style-type: none"> - RC-S462B is replaced to RC-S012B. - RC-S330 is replaced to RC-S380.
1.21	June 1, 2017	Section 3.3, 3.4 and 5.4 are changed. Attachment A, B, C and D are changed.
1.3	April 1, 2018	Section 6.7.1 is changed.
1.4	April 15, 2019	Section 4.1, 4.3, 5.3 and 6 are changed. Attachment A and Article 1, 2 and 5 of Attachment D are changed.

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Preface

This document outlines the FeliCa card RF performance certification test (abbreviated to certification test hereafter) that is conducted for FeliCa card products that support common area services.

The certification test verifies only the RF performance of the card products, and excludes protocols and other performance factors from testing.

The following chapters specify the contents, methodology, and evaluation criteria, as well as the test environment and test procedures, of the FeliCa card RF performance certification test.

1. Purpose of the Certification Test

The purpose of the certification test is to create an environment in which service providers and end users feel secure and have a positive experience with services that use FeliCa technology. To that end, we will use the certification process to establish shared RF communication performance standards for FeliCa products that support common area services to achieve better interconnectivity between FeliCa devices.

2. Positioning of the Certification Test

The standards defined for the certification test do not certify the interoperability of marketed FeliCa equipment.

The certification test verifies product samples submitted by manufacturers in a testing environment specified for the certification test to determine whether the samples meet the communication performance standards defined for the certification test.

Therefore, achieving passing results in the certification test does not mean that all of the products in the same product series have been tested and have passed the certification test.

Warranties on the products tested shall conform to the warranty conditions originally established by the individual manufacturers.

3. Products to Be Tested

3.1. Products Subject to Testing

This test is intended for FeliCa cards that support common area services.

3.2. Product Models to Be Tested

Applicants for product testing must submit each model of a product for the certification test.

3.3. Updated Products

A manufacturer must resubmit a product that has already passed the certification test if any modifications that might affect FeliCa RF communication performance have been made to the product.

3.4. Addition of Product Models

When a manufacturer adds a new product model to a product series whose models have already passed the certification test, the manufacturer need not submit the new model for certification testing if the manufacturer can guarantee that the new model has the same communication performance as the product that has already passed the certification test and the manufacturer can guarantee the fact. Instead, the manufacturer is only required to submit a Notice of Added Product Model form (see *Attachment B: Notice of Added Product Model*) for the new model.

For further details, see *4.6 Addition of Product Models*.

3.5. Certified-Product Listing on “FeliCa Interoperability Technology Information Site”

Your product can be added to a list of certified products on our website after passing the certification test. For further details, see *4.7 Certified-Product Listing on “FeliCa Interoperability Technology Information Site”*.

4. Application

When you apply for the FeliCa card RF performance certification test, please note the following information.

4.1. Application Details

Application deadline

At least four weeks before your desired certification test date (product samples must be submitted at the same time)

Materials to be submitted

- Application Form for FeliCa Card RF Performance Certification (see *Attachment A: Application Form for FeliCa Card RF Performance Certification*)
 - * Send the application by email, and then send the original paper by mail to the testing laboratory.
- Test samples: 40 units of the product to be tested (10 maximum-frequency samples, 20 standard-frequency samples, and 10 minimum-frequency samples)
 - * Send them to the testing laboratory.

Note:

- For the certification test, the testing laboratory arbitrarily selects three maximum-frequency samples, three standard-frequency samples, and three minimum-frequency samples.
- Of all the manufactured units of the product being tested, the maximum-frequency sample must be the sample of the product that has minimally the highest resonance frequency value, the minimum-frequency sample must be the sample of the product that has the lowest resonance frequency value, and the standard-frequency sample must be the sample of the product that has a resonance frequency value between the highest resonance frequency value and the lowest resonance frequency value.
- It is not necessary to submit resonance frequency data of certification test samples.

Testing organization

Sony Imaging Products & Solutions Inc.

FeliCa Certification Section, Quality Management Department, FeliCa Business Division

Certification Laboratory (Subcontract Laboratory of Sony IP&S)

Sony Global Manufacturing & Operations Corporation

Certification Test Team, Quality Assurance Department 1

Address: 8-4 Shiomi, Kisarazu-shi, Chiba Prefecture, 292-0834, JAPAN

Phone: +81-438-37-2404

E-mail: emcs-felica-kentei@jp.sony.com

Test fee

The fee is 800,000 yen (not including tax).

Pay the test fee to the specified account by the date specified by the testing laboratory.

A delay in payment may prevent the certification test from being conducted on the scheduled date.

If you have any questions, please contact the testing laboratory.

If you wish to retake the certification test on another sample of the same product, please submit a new certification test application.

4.2. Certification Test Start Date

After the application for the certification test is received, the testing laboratory will notify the applicant within three business days of the day the test is to start.

4.3. Test Period

If the test samples and other required materials are adequate and all measurement results meet pass-level requirements, the certification test will take 10 business days, excluding the day on which the test samples are received.

4.4. Notification of the Test Results

If the testing laboratory determines that any test results are below pass-level requirements, the testing laboratory will immediately report the test results to the applicant.

Regardless of the test results, the testing laboratory will email the Certification Test Results Report to the applicant within three business days following the last day of the test period.

For products that have passed the certification test, the testing laboratory will email the FeliCa Card RF Performance Certificate to the applicant about the seventh day following the last day of the test period.

4.5. Handling of Test Data and Submitted Product Samples

The testing organization and the testing laboratory will handle the test data and information that they obtain as a result of certification testing in accordance with the provisions of the FeliCa Card RF Performance Certification Test Agreement. (see *Attachment D: Terms and Conditions*)

The product samples used for testing will not be returned.

Submitted samples may be used as cards for the interoperability test of the FeliCa Card Performance Certification Test at the discretion of the testing organization.

4.6. Addition of Product Models

A manufacturer that adds a new product model to a product series whose models have already passed the certification test does not need to submit the new model for this test if (1) no modifications that might affect FeliCa RF communication performance have been made to the products since passed the test and (2) the manufacturer can guarantee that the new model has the same communication performance as the products that passed the test. If these conditions are met, the manufacturer need only submit a Notice of Added Product Model form (see *Attachment B: Notice of Added Product Model*) to add the new model.

Submit to:

Testing laboratory

* Send it by email. You do not have to send the original paper by mail.

Application fee

There is no application fee for adding product models.

4.7. Certified-Product Listing on “FeliCa Interoperability Technology Information Site”

If you want your product to be listed as a certified product on our website after passing the certification test, submit the Application Form for Certified-Product Listing on “FeliCa Interoperability Technology Information Site” (see *Attachment C: Application Form for Certified-Product Listing on “FeliCa Interoperability Technology Information Site”*).

Submit to:

Testing laboratory

* Send it by email. You do not have to send the original paper by mail.

Listing fee

There is no fee for listing your product on our website.

5. Test Method

5.1. Test Environment

This test will be conducted in the following test environment:

Temperature: 20°C to 30°C

Relative humidity: 25% to 70%

5.2. Equipment Used in the Test

The following figure shows the configuration of the equipment used in the certification test.

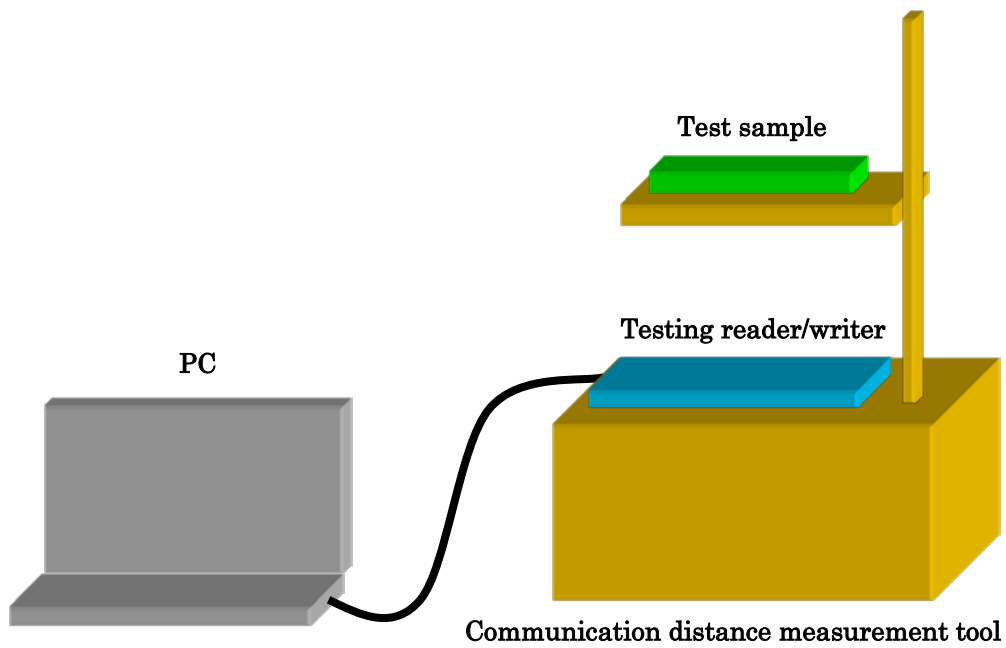
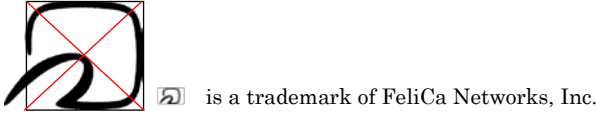


Figure 5-1 Equipment Configuration for the Test

5.3. Definitions of Terms Related to the Testing Method

The following table defines the terms related to the certification test.

Terms	Description
Measurement center point	<p>The measurement center point of the test sample is the center of the card product.</p> <p>The measurement center point of the reader/writer is described in <i>6.3 Measurement Center Point, X-Axis Direction, and Y-Axis Direction of the Reader/Writer</i>.</p> <p>For reader/writer other than above, the measurement center point of the reader/writer for the interoperability test is as follows:</p> <p>(1) The intersection of the diagonal lines of the square that overlaps the mobile contactless IC communication mark on the reader/writer used for the interoperability test (Figure 5-2)</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Figure 5-2 Measurement Center Point of the Test Sample</p> <p>(2) Center point in the figure illustrated to show the location to touch with the card</p> <p>Of the two points above, whichever is judged to be rational is used.</p>
Angle	<p>The 0-degree direction of each test sample is the longitudinal direction, and is determined arbitrarily by the testing laboratory.</p> <p>The 90-degree position is achieved by rotating the test sample 90 degrees clockwise from the 0-degree position.</p>
X axis, Y axis, Z axis	<p>The X axis is the axis that passes through the measurement center point and is parallel to the lines in the 0-degree direction. The positive direction of the X axis is the 0-degree direction. The Y axis is the axis that passes through the measurement center point and is perpendicular to the lines in the 0-degree direction.</p> <p>The Z axis is the axis that is perpendicular to the plane created by the X axis and the Y axis.</p> <p>The positive directions of the X and Y axes of the reader/writer used for the test are described in <i>6.3 Measurement Center Point, X-Axis Direction, and Y-Axis Direction of the Reader/Writer</i>.</p>
Center	<p>In centering, the communication distance measuring tool is used to align the measurement center point of the test sample with that of the testing reader/writer on the Z axis.</p>
Offset	<p>Offset refers to moving the test sample in the X-axis direction (or Y-axis direction) parallel to the X axis (or Y axis).</p>
Maximum communication distance	<p>When the test sample and the testing reader/writer are moved closer together during measurement, the maximum communication distance is the distance at which the specified success rate is first obtained.</p>
Communication hole	<p>A communication hole is an area whose success rate is less than the specified level at a distance from 0mm to the maximum communication distance.</p> <p>Communication holes do not include areas with a width of less than 1mm.</p> <p>With any reader/writer for certification test other than RC-S012B, however, even an area with a width of less than 1mm is regarded as a communication hole if the measured success rate is below the specified level at a distance of 0mm.</p>

Terms	Description
Success rate	The success rate is the ratio of successful communications to the number of Polling command executions. The success rate requirement specified for the certification test is at least 99% (communication must be successful at least 99 times while the Polling command is executed 100 times).

5.4. Communication Performance Measurement Procedure

Measurement conditions

To ensure stable measurement results, the test will begin 10 minutes after the reader/writer is turned on.

Also, the test will be conducted in an environment that eliminates effects caused by metallic objects, electrical interference, and other factors on FeliCa RF communication performance.

Measuring the communication distance and communication holes

- (1) The test sample will be placed stably on the measuring surface of the testing reader/writer in close contact with the surface while its measurement center point is aligned with that of the testing reader/writer. The distance of the card in this position will be treated as 0mm. If the card cannot be placed in close contact with the measuring surface of the reader/writer under test, position it on a plane that extends from the measuring surface of the reader/writer, creating the effect of close contact with the measuring surface.
- (2) The position of the test sample will be adjusted for centering, offset and rotation.
- (3) The communication distance measurement tool will be used to move the test sample to a position that exceeds the maximum communication distance.
- (4) The communication performance measurement software will be used to execute the Polling command from the testing reader/writer. Only 212 kbps communication is used in this certification test.
- (5) The communication distance measurement tool will be used to move the test sample downward in order to determine the maximum communication distance.
- (6) The test sample will be moved from the maximum communication distance to a distance of 0mm in 1mm steps to locate any communication holes.
- (7) Steps (2) to (6) will be repeated until measurement at all measurement points has been completed.

6. Test Items

6.1. Test Configuration

This certification test consists of a basic performance test and an interoperability test.

The test sample passes the test when it satisfies the performance standards for all test items.

6.2. Reader/Writer and Communication Performance Measurement Software for Testing

6.2.1. Reader/Writer for Basic Performance Test

No.	Test Type	Manufacturer/ model	Description	Transmission speed	Software for communication performance measurement
1	M-class reader/writer	Sony RC-S012B	Maximum, standard, and minimum resonance frequency reader/writers	212 kbps	Communication performance test software (for serial interface)

Notes:

- For how to purchase the reader/writers for the basic performance test, contact an exclusive Sony distributor of FeliCa products.
- The reader/writers for the basic performance test in the above table are products designed for use in Japan. Anyone who intends to use any of these products outside Japan must assume responsibility for compliance with the laws of the country where the product will be used.

6.2.2. Reader/Writer for Interoperability Test

A reader/writer for the interoperability test is a reader/writer that has passed the FeliCa reader/writer performance certification test or the FeliCa reader/writer RF performance certification test designated by the testing organization, and that has been registered as a product for the interoperability test.

A reader/writer having the standard resonance frequency is used.

Reader/writers used for the interoperability test are revised periodically. Please check the latest information when you plan to take the certification test.

6.3. Measurement Center Point, X-Axis Direction, and Y-Axis Direction of the Reader/Writer

This section describes the measurement center point, X-axis direction, and Y-axis direction of reader/writers.

6.3.1. RC-S012B Measurement Center Point, X-Axis Direction, and Y-Axis Direction

Measurement center point: The intersection of two diagonal lines traversing the RC-S012B's antenna board.

X-axis and Y-axis directions: Shown in Figure 6-1.

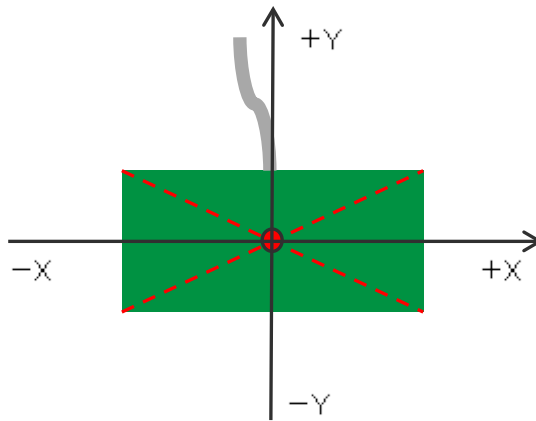


Figure 6-1 RC-012B X-Axis and Y-Axis Directions

6.3.2. RC-S380 Measurement Center Point, X-Axis Direction, and Y-Axis Direction

Measurement center point: Center of the circular section at the center of the RC-S380.

X-axis and Y-axis directions: Shown in Figure 6-2.

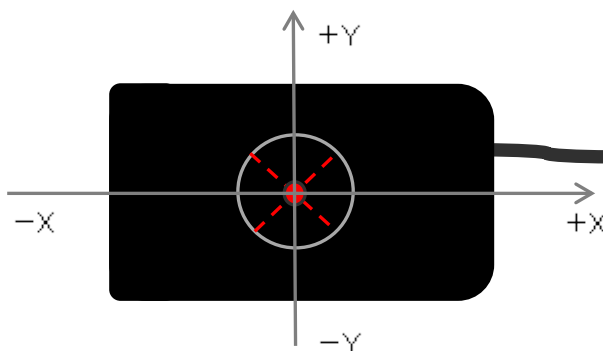


Figure 6-2 RC-S380 X-Axis and Y-Axis Directions

6.3.3. Measurement Center Point, X-Axis Direction, and Y-Axis Direction of the Edy Touch Operation Terminals

Measurement center point: Shown in Figure 6-3.

X-axis and Y-axis directions: Shown in Figure 6-4.

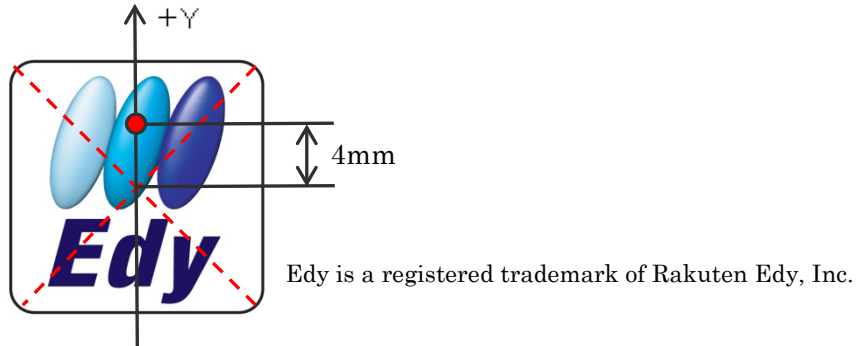


Figure 6-3 Measurement Center Point of the Edy Touch Operation Terminal

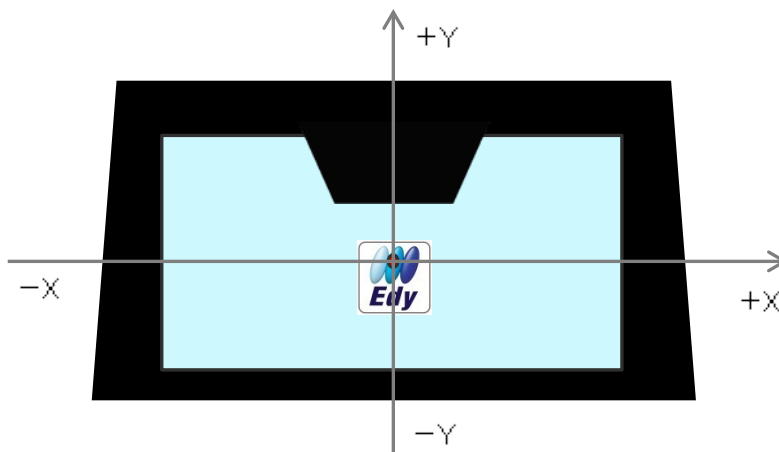


Figure 6-4 X-Axis and Y-Axis Directions of the Edy Touch Operation Terminal

6.3.4. Measurement Center Point of Edy Charging Machine Operation Terminal

Measurement center point:

(1) Card of ID-1 shape

The center point is the center of a card when the card is placed at the horizontal center of the touching area and the bottom of the card is placed on the stopper at the bottom of the touching area. (Figure 6-5)

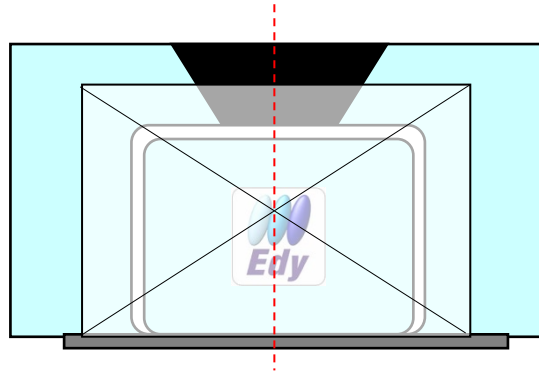


Figure 6-5 Measurement Center Point of Edy Charging Machine Operation Terminal

(2) Card of non-ID-1 shape

The same as the measurement center point of the Edy touch operation terminal. (Figure 6-3)

If you have any questions, please contact the testing laboratory.

6.4. Pass Criteria of Basic Performance Test

The table below shows the pass criteria of the basic performance test.

6.4.1. Communication Performance with M-class Reader/Writer

All test samples (three maximum-frequency samples, three standard-frequency samples, and three minimum-frequency samples) shall satisfy the following criteria in the measurement performed according to the measurement procedure of Section 5.4 *Communication Performance Measurement Procedure* using the M-class reader/writer for the basic performance test.

No.	Test Item	Pass criteria
1	Communication distance (Center, 0 degree)	The maximum communication distance shall be 33mm or more.
2	Number of communication holes (Center at 0 degree)	There must be no communication holes over 3mm wide within 0mm to 15mm of the reader/writer.

Combination of test samples and testing reader/writers (Yes: Performed, -: Not performed)

No.1 Communication distance

	Minimum-frequency reader/writer	Standard-frequency reader/writer	Maximum-frequency reader/writer
Maximum-frequency sample	-	Yes	-
Standard-frequency sample	-	Yes	-
Minimum-frequency sample	-	Yes	-

No.2 Number of communication holes

	Minimum-frequency reader/writer	Standard-frequency reader/writer	Maximum-frequency reader/writer
Maximum-frequency sample	Yes	-	Yes
Standard-frequency sample	-	Yes	-
Minimum-frequency sample	Yes	-	Yes

6.5. Pass Criteria of Interoperability Test

The table below shows the pass criteria of the interoperability test.

6.5.1. Communication Performance with M-class Reader/Writer

All test samples (three maximum-frequency samples, three standard-frequency samples, and three minimum-frequency samples) shall satisfy the following criteria in the measurement performed according to the measurement procedure of Section 5.4 *Communication Performance Measurement Procedure* using the M-class reader/writer for the interoperability test.

No.	Test Item	Pass criteria
1	Number of communication holes (Center at 0 degree)	There must be no communication holes over 3mm wide within 0mm to 15mm of the reader/writer.
2	Number of communication holes (Center and XY±10mm at 0 degree)	At 0mm, communication shall be possible at least three points out of five points at the center and XY ±10mm.

6.5.2. Communication Performance with S-class Reader/Writer

All test samples (three maximum-frequency samples, three standard-frequency samples, and three minimum-frequency samples) shall satisfy the following criteria in the measurement performed according to the measurement procedure of Section 5.4 *Communication Performance Measurement Procedure* using the S-class reader/writer for the interoperability test.

No.	Test Item	Pass criteria
1	Number of communication holes (Center and XY±10mm at 0 degree)	At 0mm, communication shall be possible at least three points out of five points at the center and XY ±10mm.

6.5.3. Performance of Communication with Edy Touch Operation Terminal

All test samples (three maximum-frequency samples, three standard-frequency samples, and three minimum-frequency samples) shall satisfy the following criteria in the measurement performed according to the measurement procedure of Section 5.4 *Communication Performance Measurement Procedure* using the Edy touch operation terminal.

No.	Test Item	Pass criteria
1	Number of communication holes (Center and XY±10mm at 0 degree)	Center: There must be no communication holes within 6mm to 15mm height of the reader/writer. However, any communication holes of less than 3mm are allowed. Center and offset *: There must be two or less communication holes point out of five points at center and XY±10mm at 0, 1, 2, 3, 4, 5mm height of the reader/writer.

* Communication holes at center and offsets are judged just at each measurement point by the success rate without taking their height into consideration.

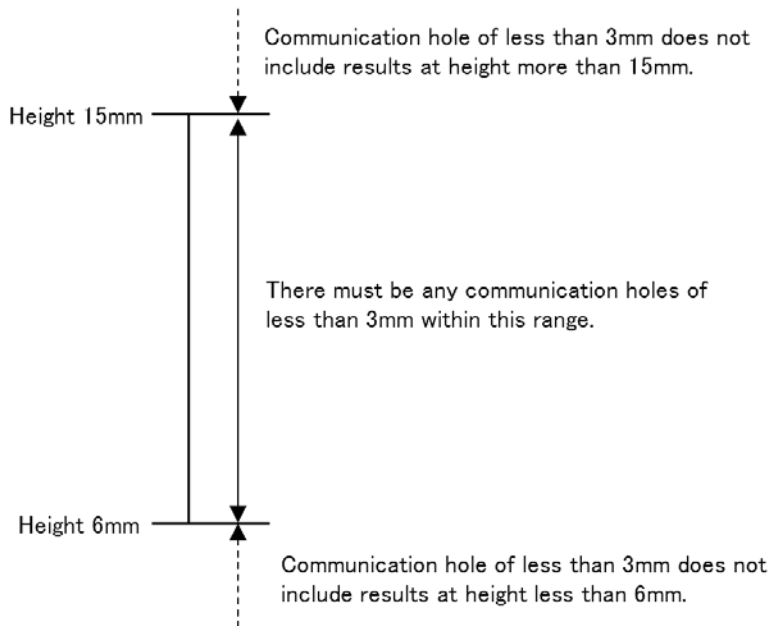


Figure 6-6 Example1: Pass/Fail Criteria for Center

Pass

Fail

Communication success: Success rate 99% or more
 Communication hole: Success rate less than 99%

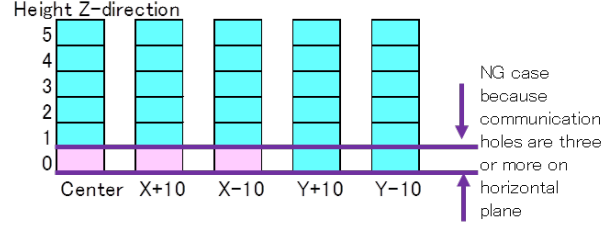
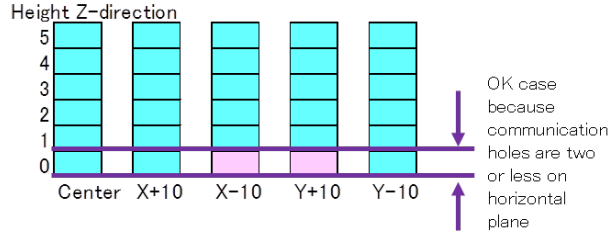
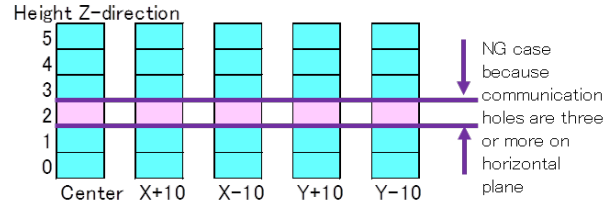
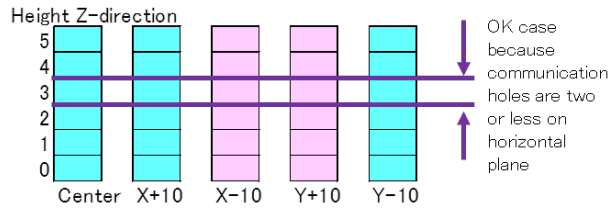


Figure 6-7 Example2: Pass/Fail Criteria for Center, Offset

6.5.4. Performance of Communication with Edy Charging Machine Operation Terminal

All test samples (three maximum-frequency samples, three standard-frequency samples, and three minimum-frequency samples) shall satisfy the following criteria in the measurement performed according to the measurement procedure of Section 5.4 *Communication Performance Measurement Procedure* using the Edy charging machine operation terminal.

No.	Test Item	Pass criteria
1	Number of communication holes (Center and XY±5mm, 10mm, and 15mm at 0 degree and 180 degree)	There must be no communication holes at 0mm height at all measurement points. Note that, at a height of 0mm, not even one communication hole with a width of less than 1mm is allowed.

Attachment A: Application Form for FeliCa Card RF Performance Certification

FeliCa Card RF Performance Certification Application

The company indicated below applies for the FeliCa card RF performance certification test. The company agrees to the terms set forth in the FeliCa Card RF Performance Certification Test Agreement attached to this document.

Date of application: _____

Applicant information

Company name: _____

Applicant

Applicant name: _____ Signature: _____ Email: _____

Department: _____

Address: _____

Phone: _____ Fax: _____

Authorization

Authorized by: _____ Signature: _____

Department: _____

Title: _____

Remarks: _____

Description of the product submitted for testing:

Model: _____

IC chip model name: _____

Inlay model name: _____

Antenna property: Full antenna Embossing Winding wire Others _____

Remarks: _____

Desired certification test period:

Planned product submission date: _____ Desired test end date: _____

Applied to (Sony IP&S's partner testing laboratory):

Sony Global Manufacturing & Operations Corporation

Certification Test Team, Quality Assurance Department 1

Address: 8-4 Shiomi, Kisarazu-shi, Chiba Prefecture, JAPAN

Phone: +81-438-37-2404

E-mail: emcs-felica-kentei@jp.sony.com

Attachment B: Notice of Added Product Model

Notice of Added Product Model for Mobile FeliCa RF Performance Certification

The company indicated below applies for the addition of the new product model indicated below to the product series that has already obtained FeliCa card RF performance certification. The company guarantees that the new product model has the same communication performance as the product that has already obtained said certification.

Date of application: _____

Applicant information

Company name: _____

Applicant

Applicant name: _____ Signature: _____ Email: _____

Department: _____

Address: _____

Phone: _____ Fax: _____

Authorization

Authorized by: _____ Signature: _____

Department: _____

Title: _____

Remarks: _____

Information regarding the product that has already obtained performance certification

Model: _____

Certification number: _____

Remarks: _____

Information regarding the product model to be added

Model: _____

Remarks: _____

Applied to (Sony IP&S's partner testing laboratory):

Sony Global Manufacturing & Operations Corporation
Certification Test Team, Quality Assurance Department 1
E-mail: emcs-felica-kentei@jp.sony.com

Attachment C: Application Form for Certified-Product Listing on “FeliCa Interoperability Technology Information Site”

Application Form for Certified-Product Listing on “FeliCa Interoperability Technology Information Site” for FeliCa Card RF Performance Certification

Date of application: _____

Applicant information

Company name: _____

Applicant

Applicant name: _____ Signature: _____ Email: _____

Department: _____

Address: _____

Phone: _____ Fax: _____

Authorization

Authorized by: _____ Signature: _____

Department: _____

Title: _____

Remarks: _____

Information regarding the product that will be added on the list

Model to be added on the list: _____

Model Type: Certified Product Added Product [Certified Product Model Name: _____]

Certification number: _____

Desired date of listing: _____

Remarks: _____

Applied to (Sony IP&S's partner testing laboratory):

Sony Global Manufacturing & Operations Corporation

Certification Test Team, Quality Assurance Department 1

E-mail: emcs-felica-kentei@jp.sony.com

Attachment D: Terms and Conditions

Terms and Conditions

The following terms and conditions (the “Terms and Conditions”) apply with respect to the Card Performance Certification Test of your Product (hereinafter defined) conducted by Sony Imaging Products & Solutions Inc. (“Sony”). The Terms and Conditions apply to individual applications for the Card Performance Certification Test submitted on the FeliCa Card RF Performance Certification Application to which these Terms and Conditions are attached. These Terms and Conditions become an agreement with respect to the Card Performance Certification Test (the “Agreement”) between you and Sony upon Sony’s acceptance of your application for the Card Performance Certification Test submitted in accordance with Section 2.01 hereof.

ARTICLE I. DEFINITIONS

The following terms as used in these Terms and Conditions shall have the meanings set forth below.

- (1) “FeliCa” shall mean the Contactless IC technology called “FeliCa” which includes “Command Standard” and Security Standard.
- (2) “FeliCa IC” shall mean a chip for contactless IC card which is manufactured based on FeliCa.
- (3) “Product” shall mean contactless IC cards and any other devices based on FeliCa which incorporate “FeliCa IC” provided by Sony. However, “Product” shall not include reader/writer or mobile phone. In this Section, (a) reader/writer shall mean reader/writer products (including module products) for contactless IC card system based on “FeliCa” and (b) “Mobile phone” shall mean a mobile device (i) of which primary function is communication call and (ii) which is sold, rented, leased or otherwise provided with the trademarks of Telecommunication Carriers (a provider of trans receiver functionalities via mobile communication system to users of mobile devices that are sold, rented, leased or otherwise provided to them with such providers’ trademarks.), third party or your company.
- (4) “Certification Specification” shall mean the specification designated by Sony which is called FeliCa Card RF Performance Certification Specification.
- (5) “Card Performance Certification Test” or “Test” shall mean ‘FeliCa Card RF Performance Certification Specification’ defined in Certification Specification.

ARTICLE II. CERTIFICATION TEST

2.01 An application for the Card Performance Certification Test shall be made for each model of your Product, in accordance with the provisions of the Certification Specification, by filling out the Application for Card Performance Certification Test to which these Terms and Conditions are attached. Your application is deemed to be accepted unless it is rejected by Sony with reasonable cause within five (5) business days (of Sony in Japan) from the date of submission of your application.

2.02 You must submit forty (40) samples (of which breakdown is hereinafter provided) of your Product and the data of your Product which is separately designated by Sony and ownership of such samples will be transferred to Sony, free of charge, when Sony receives them. After the completion of the Card Performance Certification, Sony may keep such samples to use for the FeliCa Reader/Writer RF Performance Certification and/or the Pre-test at Sony or testing laboratory which is a subcontractor of Sony pursuant to Section 12.3. Such forty (40) samples shall consist of 10 maximum-frequency samples, 20 standard-frequency samples, and 10 minimum-frequency samples (Of all the manufactured units of the Product being tested, the maximum-frequency sample must be the sample of the Product that has minimally the highest resonance frequency value, the minimum-frequency sample must be the sample of the Product that has the lowest

resonance frequency value, and the standard-frequency sample must be the sample of the Product that has a resonance frequency value between the highest resonance frequency value and the lowest resonance frequency value.)

2.03 Sony will, after the Agreement becomes effective and Sony receives the samples set forth in Section 2.02 above, promptly conduct the Card Performance Certification Test in accordance with the Certification Standards and notify you the results thereof. Upon passing of the Card Performance Certification Test, Sony will issue a pass certificate (the "Pass Certificate") with respect to the specific model of the Product for which the samples were provided.

2.04 If (a) you request to add a new Product model which has not yet passed the Test but has the same communication performance under the same measurement conditions as the Product which has passed the Test to a Product series whose models have already passed the Test, by the form separately designated by Sony, and (b) Sony approves such request by the form separately designated by Sony, then such a new Product model is deemed to have passed the Test without being Tested, provided that you warrant such sameness of the communication performance thereto.

2.05 The Pass Certificate shall be valid for ten (10) years from the date of issuance (the "Term"), unless invalidated by Sony pursuant to these Terms and Conditions. The Term will be indicated on the Pass Certificate. Provided that the Term of the Pass Certificate for a new Product model which has been added as set forth in the Section 2.05 (without being Tested) shall be the same period with the Term of the model of Products which has actually passed the Test.

ARTICLE III. EFFECT OF THE PASS CERTIFICATE

3.01 During the Term of the Pass Certificate, you may publicly announce or indicate that the applicable model of the Product has passed the Card Performance Certification Test. Such announcement or indication must include the name of the certification test, the version of the Certification Specification and the applicable model name of the Product, all exactly as set forth on the Pass Certificate.

3.02 Sony reserves the right to cancel the rights granted to you under Section 3.01 immediately if you fail to comply with the requirements set forth in Section 3.01.

3.03 In response to your request in writing, Sony will list on its Web site your name along with the model name and other information of your Product that has passed the Card Performance Certification Test.

3.04 Your announcement or indication permitted under Section 3.01 shall be made with respect to the model of the Product that has passed Card Performance Certification Test.

3.05 Upon expiration or termination of the Term of the Pass Certificate, you will no longer have the rights granted to you under Section 3.01.

ARTICLE IV. EXTENSION OF TERM

4.01 You may apply to extend the Term of the Pass Certificate by submitting to Sony the required data for the Product separately designated by Sony at least thirty (30) days prior to the expiration date of the Term of the Pass Certificate. Sony will evaluate the submitted data and will notify you the results thereof. If the submitted data meets the Certification Standards, and unless any of the events set forth in Section 6.02 has occurred, Sony will issue a Pass Certificate whose Term is extended for another five (5) years. Thereafter, the

Term may be re-extended in accordance with this Section 4.01.

4.02 If the data submitted pursuant to Section 4.01 does not meet the Certification Standards, you are no longer entitled to extend the Term of the Pass Certificate. Instead, you must re-apply for Card Performance Certification Test in accordance with the provisions of Sections 2.01 through 2.04.

ARTICLE V. FEES

5.01 In consideration for the completion of the Card Performance Certification Test, you shall pay to Sony the fees in the amount of eight hundred thousand (800,000) Japanese Yen (not including any applicable taxes respectively). The payment of the fees and any applicable taxes shall be made to Sony in Japanese Yen by means of wire transfer remittance into a bank account designated by Sony, at least one (1) week prior to the estimated date of sample submission in accordance with Section 2.02. Sony may withhold performance as set forth in Section 2.03 until receipt of such payment.

5.02 The fees for the extension of the Term of the Pass Certificate pursuant to Section 4.01 shall be fifty thousand (50,000) Japanese Yen (not including any applicable taxes). The payment of the fees and any applicable taxes shall be paid to Sony in Japanese Yen by wire transfer remittance into a bank account designated by Sony, within one (1) week after you have submitted to Sony the required data for the Product pursuant to Section 4.01. Sony may withhold performance as set forth in Section 4.01 until its receipt of such payment.

5.03 The fees paid to Sony hereunder are non-refundable.

ARTICLE VI. CHANGES AND INVALIDATION

6.01 The Pass Certificate is valid only with respect to the Product model that is identical to the sample Product model that passed the Card Performance Certification Test. To obtain the Pass Certificate for any other Product model, you must separately apply for and pass the Card Performance Certification Test with respect to such other Product model.

6.02 If you make modifications to the Product, such modified Product is not deemed to be passed the Test and the Pass Certificate is no longer valid for such modified Product even if the model of the Product is the same as the Product which has passed the Test and you need to apply for the Test for such modified Product. Notwithstanding above, if (i) you notify Sony of such modification in the form separately designated by Sony and (ii) Sony, at its sole discretion, determined and approved that such modification does not affect the RF communication performance, and (iii) you warrant the same communication performance under the same measurement conditions as the Product without such modification, then you do not need re-apply for the Test despite of the modification to the Product.

6.03 Sony may amend or update the Certification Standards at its discretion from time to time in part or in whole. In such event, Sony will update the version number of the Certification Specification, and you may, at your option, apply for the Card Performance Certification Test under the updated Certification Specification in order to obtain a Pass Certificate under the updated Certification Specification. However, any amendment or the update to the Certification Standards will not affect the validity of any Pass Certificate issued under previous version(s) of the Certification Specification.

6.04 If Sony finds that, as to any Product that has passed the Card Performance Certification Test, such Product made available in the market does not meet the Certification Standards applied at the time of the issuance of the relevant Pass Certificate, Sony may, at its option, invalidate such Pass Certificate.

6.05 Sony may reject any request for extension of the Term of the Pass Certificate pursuant to Section 4.01 if it has determined to terminate the offering of the Card Performance Certification Test.

6.06 If you make any public announcement or indication with respect to your Product pursuant to Section 3.01 (a) without having re-applied or passed the Card Performance Certification Test even though you have made one or more modifications to your Product that require re-application for the Card Performance Certification Test pursuant to Section 6.01, (b) without notifying Sony of modification to the Product or without receiving Sony's approval pursuant to Section 6.02 or (c) under any updated version of the Certification Specification when you have not passed the Card Performance Certification Test under such updated version of the Certification Specification, Sony may, at its option, immediately invalidate the relevant Pass Certificate.

ARTICLE VII. CONFIDENTIALITY

7.01 You and Sony (each, a "Party" and collectively, the "Parties") shall each maintain as confidential and shall not disclose to any third party any technical, business or other proprietary information of the other Party disclosed during the course of the Card Performance Certification Test (the "Confidential Information") without the prior written consent of such other Party, for three (3) years after such disclosure. Further, Sony will not use your Confidential Information for any purpose other than the purposes contemplated under these Terms and Conditions.

7.02 Notwithstanding the provisions of Section 7.01, such restrictions shall not apply to any portion of the Confidential Information which a Party can prove:

- (a) was part of the public domain at the time of disclosure;
- (b) was previously known to the receiving Party at the time of disclosure;
- (c) subsequently becomes part of the public domain through no fault of the receiving Party or its employees; or
- (d) is rightfully obtained by the receiving Party from a third party source without any restriction on disclosure or use; or
- (e) is independently ascertainable or developed by the receiving Party who have not had access to the Confidential Information.

7.03 Notwithstanding the provisions of Section 7.01, Sony may disclose the results of FeliCa Reader/Writer RF Performance Certification Test and Pre-Test using your sample cards set forth in the Section 2.02 to a third party without your prior written consent. Provided that if Sony discloses such a result before the Product become available on the market, Sony will not disclose the name of manufacturer and product model name to a third party until your Product become available on the market.

ARTICLE VIII . WARRANTIES AND LIMITATION OF LIABILITY

8.01 SONY MAKES NO REPRESENTATION OR WARRANTIES, EXPRESSLY OR BY IMPLICATION, STATUTORY OR OTHERWISE, IN CONNECTION WITH PASSING OF THE CARD PERFORMANCE CERTIFICATION TEST, INCLUDING BUT NOT LIMITED TO REPRESENTATIONS OR WARRANTIES OF QUALITY, FUNCTIONALITY, PERFORMANCE, SAFETY, UTILITY, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF YOUR PRODUCT.

8.02 IN NO EVENT SHALL SONY BE LIABLE TO YOU OR ANY THIRD PARTY FOR ANY DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OR LOSSES WHATSOEVER UNDER ANY CIRCUMSTANCES (INCLUDING BUT NOT LIMITED TO DAMAGES FOR LOSS OF

BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION OR OTHER PECUNIARY LOSS) THAT ARISE IN CONNECTION WITH THE PRODUCTS THAT HAVE PASSED THE CARD PERFORMANCE CERTIFICATION TEST, EVEN IF SONY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

ARTICLE IX. EXCLUSION OF UNSOCIAL SYNDICATE

9.01 Each of you and Sony represents to the other Party that at the time of the conclusion of this Agreement, the Party, its directors and corporate executive officers are not Antisocial Forces and warrants that they are not Antisocial Forces during the terms of this Agreement. Antisocial Forces hereinafter means that organized gangster crime groups defined in the Section 2.02 of Act on Prevention of Unjust Acts by Organized Crime Group Members (“Act”) and organized gangster crime groups members defined in the Section 2.06 of the Act, any crime syndicates or gangs, a quasi-member of any crime syndicates or gangs, individuals for whom left an organized gangster crime group within the past 5 years have not yet elapsed since leaving any crime syndicate or gang, quasi-members of any organized gangster crime groups (“boryokudan junkose-in”), an enterprises affiliated with organized gangster crime groups (“boryokudan kankei kigyō”) a crime syndicates or gangs. Corporate extortionists (“sokai-ya”) corporate swindler acting groups engaging in criminal activities under the pretext of conducting social movements or political activities (“shakai undou hyoubou goro”, “seiji katsudou hyoubou goro”), groups of individuals specialized in intellectual crimes (“tokushu chinou bouryoku shuudan”), individuals being in closely contact affiliated with to any organized gangster crime groups (“boryokudan missetsu-kankeisha”), crime syndicates or gangs, and any individual or a group of individuals being equivalent thereto.

9.02 Each of you and Sony also warrants that, in connection with this Agreement, it shall not, either by itself or by way of third parties, conduct any of the following acts: (i) violent demands, (ii) improper demands in excess of legal responsibilities, (iii) acts of violence or menacing statements in relation to a transaction, (iv) spreading of rumors, use of fraudulent means or use of obstruction to harm the reputation of the other party, or to obstruct the business of the other party; or (v) any other act equivalent to any of the previous items.

9.03 Each of you and Sony may terminate, in whole or in any part, of the Agreement without any demands or notice, if (a) the other Party breaches the representations and warranties above, or (b) you or Sony determines that performance of this Agreement helps or otherwise promote the activities of such Antisocial Forces.

9.04 Each of Sony and you shall not be liable to the other party for any damage arising out of termination of this Agreement in accordance with Section 9.03.

9.05 In the event that any of items set forth in Section 9.02 applies to Sony or you, the applicable party shall, upon the other party’s request, lose the benefit of time relating to any debt against such other party and immediately pay such debt.

ARTICLE X. TERMINATION

10.01 Each Party reserves the right to terminate the Agreement immediately without any notice or demand in the event that:

- (a) the other Party is adjudicated a bankrupt, makes assignment for the benefit of its creditors; takes advantage of any insolvency act; or is the subject of a case for its liquidation or reorganization under any law;
- (b) the other Party breaches any provision of these Terms and Conditions and does not cure such breach within thirty (30) days after receipt of notice thereof;
- (c) the other Party ceases to function as a going concern or to conduct its operations in the normal course of

business;

(d) the other Party uses Card Performance Certification Test and/or Product in an illegal or unlawful way.

10.02 Sony reserves the right to invalidate the Pass Certificate issued to you hereunder immediately without notice or demand in the event that you:

- (a) fail to make any payment required under the Agreement for more than two (2) months from the due date;
- (b) harm Sony or any third party designated by Sony in any way (including but not limited to damage to reputation and business obstruction);
- (c) destroy or damage (or cause to destroy or damage) any building or storage of Sony or any third party designated by Sony.

10.03 In the event that the Agreement becomes terminable by Sony under this Article X, all of your obligations under the Agreement shall immediately accelerate.

ARTICLE XI. NO ASSIGNMENT

11.01 You may not assign, transfer or mortgage any of your rights and obligations hereunder without the prior written consent of Sony.

ARTICLE XII. MISCELLANEOUS

12.01 Sony may, at any time with prior notice to you, cease to conduct the Card Performance Certification Test or assign or transfer its rights and obligations hereunder with respect to the Card Performance Certification Test to a third party in part or in whole, and you shall not object to any of such assignment or transfer.

12.02 You must observe and comply with all relevant laws, ordinances, rules and regulations of relevant countries in performing your obligations and exercising your rights hereunder.

12.03 Sony may use subcontractors to conduct the Test provided that in such case, Sony shall cause such subcontractors to be bound by the confidentiality obligation as set forth Article VII of the Agreement.

12.04 These Terms and Conditions and the Agreement shall be construed under and governed by the laws of Japan. If any provision of these Terms and Conditions is held by a court or other tribunal of competent jurisdiction to be invalid or unenforceable, that provision of these Terms and Conditions shall be enforced to the maximum extent permissible so as to effect the intent of the parties hereto, and the remainder of these Terms and Conditions shall continue in full force and effect.

12.05 In the event of any dispute arising out of or in connection with these Terms and Conditions or the Agreement, which cannot be amicably settled by the Parties, the Parties shall submit any such disputes to the Tokyo District Court in Japan as the court of first instance. Any counter-claim shall be filed with the court with which the original action is filed. The Parties agree that the judgment, decree or order rendered by a court of last resort or a court of lower jurisdiction from which no appeal has been taken in Japan shall be final and binding upon both Parties.

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