



EMI TEST REPORT

Test Report No.: 13382555S-B

Applicant : FUJIFILM Corporation
Type of EUT : Reader/Writer
Model Number of EUT : ICT-3404U-A
Test regulation : FCC Part 15 Subpart B: 2020, Class B
Test result : Complied (Refer to Section 3.2)

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8. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
9. The information provided from the customer for this report is identified in Section 1.

Date of test: July 3, 2020

Representative test engineer:

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REVISION HISTORY

Original Test Report No.: 13382555S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13382555S-B	July 31, 2020	-	-

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Reference: Abbreviations (Including words undescribed in this report)

AAN	Asymmetric Artificial Network	ILAC	International Laboratory Accreditation Conference
AC	Alternating Current	ISED	Innovation, Science and Economic Development Canada
AM	Amplitude Modulation	ISN	Impedance Stabilization Network
AMN	Artificial Mains Network	ISO	International Organization for Standardization
Amp, AMP	Amplifier	JAB	Japan Accreditation Board
ANSI	American National Standards Institute	LAN	Local Area Network
Ant, ANT	Antenna	LCL	Longitudinal Conversion Loss
AP	Access Point	LIMS	Laboratory Information Management System
ASK	Amplitude Shift Keying	LISN	Line Impedance Stabilization Network
Atten., ATT	Attenuator	MRA	Mutual Recognition Arrangement
AV	Average	N/A	Not Applicable
BPSK	Binary Phase-Shift Keying	NIST	National Institute of Standards and Technology
BR	Bluetooth Basic Rate	NS	No signal detect.
BT	Bluetooth	NSA	Normalized Site Attenuation
BT LE	Bluetooth Low Energy	NVLAP	National Voluntary Laboratory Accreditation Program
BW	BandWidth	OBW	Occupied Band Width
C.F	Correction Factor	OFDM	Orthogonal Frequency Division Multiplexing
Cal Int	Calibration Interval	PK	Peak
CAV	CISPR AV	P _{LT}	long-term flicker severity
CCK	Complementary Code Keying	POHC(A)	Partial Odd Harmonic Current
CDN	Coupling Decoupling Network	Pol., Pola.	Polarization
Ch., CH	Channel	PR-ASK	Phase Reversal ASK
CISPR	Comite International Special des Perturbations Radioelectriques	P _{ST}	short-term flicker severity
Corr.	Correction	QAM	Quadrature Amplitude Modulation
CPE	Customer premise equipment	QP	Quasi-Peak
CW	Continuous Wave	QPSK	Quadri-Phase Shift Keying
DBPSK	Differential BPSK	r.m.s., RMS	Root Mean Square
DC	Direct Current	RBW	Resolution Band Width
DET	Detector	RE	Radio Equipment
D-factor	Distance factor	REV	Reverse
Dmax	maximum absolute voltage change during an observation period	RF	Radio Frequency
DQPSK	Differential QPSK	RFID	Radio Frequency Identifier
DSSS	Direct Sequence Spread Spectrum	RSS	Radio Standards Specifications
EDR	Enhanced Data Rate	Rx	Receiving
e.i.r.p., EIRP	Equivalent Isotropically Radiated Power	SINAD	Ratio of (Signal + Noise + Distortion) to (Noise + Distortion)
EM clamp	Electromagnetic clamp	S/N	Signal to Noise ratio
EMC	ElectroMagnetic Compatibility	SA, S/A	Spectrum Analyzer
EMI	ElectroMagnetic Interference	SG	Signal Generator
EMS	ElectroMagnetic Susceptibility	SVSWR	Site-Voltage Standing Wave Ratio
EN	European Norm	THC(A)	Total Harmonic Current
e.r.p., ERP	Effective Radiated Power	THD(%)	Total Harmonic Distortion
EU	European Union	TR	Test Receiver
EUT	Equipment Under Test	Tx	Transmitting
Fac.	Factor	VBW	Video BandWidth
FCC	Federal Communications Commission	Vert.	Vertical
FHSS	Frequency Hopping Spread Spectrum	WLAN	Wireless LAN
FM	Frequency Modulation	xDSL	Generic term for all types of DSL technology (DSL: Digital Subscriber Line)
Freq.	Frequency		
FSK	Frequency Shift Keying		
Fund	Fundamental		
FWD	Forward		
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
ICES	Interference-Causing Equipment Standard		
I/O	Input/Output		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers		
IF	Intermediate Frequency		

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Section 1 : Customer information

Company Name : FUJIFILM Corporation
Address : 7-3, Akasaka 9-chome, Minato-ku, Tokyo 107-0052, Japan
Telephone Number : +81-3-6271-1654
Facsimile Number : +81-3-6271-1189
Contact Person : Takao Ozaki

The information provided from the customer is as follows:

- Applicant, Type of Equipment, Model No. on the cover page and other relevant pages
 - Operating/Test Mode(s) (Mode(s)) on all the relevant pages
 - Section 1: Customer information
 - Section 2: Equipment under test (E.U.T.)
 - Section 4: Operation of E.U.T. during testing
- * The laboratory is exempted from liability of any test results affected from the information in Section 2 and 4.

Section 2 : Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Reader/Writer
Model Number : ICT-3404U-A
Serial Number : Refer to 4.2.
Rating : DC 5 V
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : June 29, 2020
(Information from test lab.)
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: ICT-3404U-A (referred to as the EUT in this report) is a Reader/Writer.

The clock frequencies used in the EUT: USB 2.0 Full Speed: 12 MHz
 Xtal: 16 MHz, 27.12 MHz
 MCU Clock: 96 MHz

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Section 3 : Test specification, procedures and results

3.1 Test specification

Test Specification : FCC Part 15 Subpart B
FCC Part 15 final revised on May 26, 2020 and effective July 27, 2020 except 15.258
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart B Unintentional Radiators

* The revision does not affect the test result conducted before its effective date.

3.2 Procedures & results

Item	Test procedure	Limits	Deviation	Worst margin	Result
Conducted emission	ANSI C63.4:2014+A1:2017 7. AC powerline conducted emission measurements	Class B	N/A	17.9 dB Freq.: 0.25475 MHz Detector: Quase-Peak Phase: L1	Complied a)
Radiated emission	ANSI C63.4:2014+A1:2017 8. Radiated emission measurements	Class B	N/A *1)	7.0 dB Freq.: 82.812 MHz Detector: Quasi-Peak Polarization: Horizontal	Complied b)
Note: UL Japan's EMI work procedure No. 13-EM-W0420					
*1) Measurements has been performed up to 1 GHz since the highest frequency of internal source of the EUT is less than 108 MHz.					
Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

- a) Refer to Appendix 2 (data of Conducted emission)
b) Refer to Appendix 2 (data of Radiated emission)

3.3 Deviation from standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Confirmation

UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications
FCC Part 15 Subpart B: 2020, Class B.

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3.5 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) AMN/LISN	150 kHz-30 MHz	2.6 dB	2.6 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.0 dB
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

3.6 Test location

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JAB Accreditation No. : RTL02610

(FCC Test Firm Registration Number: 839876, ISED Lab Company Number: 2973D)

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10 m	No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10 m	No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5 m	No.3 shielded room	6.3 x 4.7 x 2.7
No.4 Semi-anechoic chamber	8.1 x 5.1 x 3.55	No.4 Shielded room	4.4 x 4.7 x 2.7
		No.5 Shielded room	7.8 x 6.4 x 2.7
		No.6 Shielded room	7.8 x 6.4 x 2.7
		No.7 Shielded room	2.76 x 3.76 x 2.4
		No.8 Shielded room	3.45 x 5.5 x 2.4
		No.1 Measurement room	2.55 x 4.1 x 2.5

3.7 Test setup, Data of EMC & Test instruments

Refer to Appendix 1 to 3.

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Section 4 : Operation of E.U.T. during testing

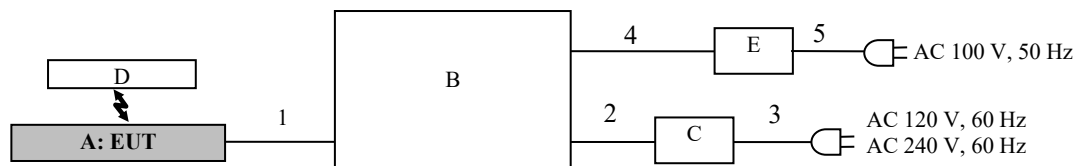
4.1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used : NFC Communication
Software : ICT-3404 Mod Test Version 1.0.2.2

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
As a result of comparing AC 120 V and AC 240 V at pre-check, conducted emission test was performed with AC 120 V of the worst voltage as representative.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Reader/Writer	ICT-3404U-A	TE2006B032	FUJIFILM Imaging Systems	EUT
B	Laptop PC	PCG-5Q2N	VBN-G3AANS	Sony Corporation	-
C	AC Adapter	VGP-AC16V11	0907G	Sony Corporation	-
D	Type A Tag	-	A01	FUJIFILM Imaging Systems	-
E	Switching HUB	EHC-G05MN-HJW	6AL829502975A	ELECOM	-

List of cables used

No.	Name	Length (m)	Shield- Cable	Shield- Connector	Remarks
1	USB	1.0	Shielded	Shielded	-
2	DC	1.8	Unshielded	Unshielded	-
3	AC	0.8	Unshielded	Unshielded	-
4	LAN	1.0	Unshielded	Unshielded	Cat5e
5	AC	1.0	Unshielded	Unshielded	-

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Section 5 : Conducted emission

5.1 Operating environment

Test room : Refer to data
Temperature : Refer to data
Humidity : Refer to data

5.2 Test configuration

The EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. The EUT was located 0.8 m from Line Impedance Stabilization Network (LISN). Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through an LISN to the input power source. Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 0.15 MHz - 30 MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT in shielded room. The EUT was connected to a LISN. An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, with a CISPR average detector (CAV).

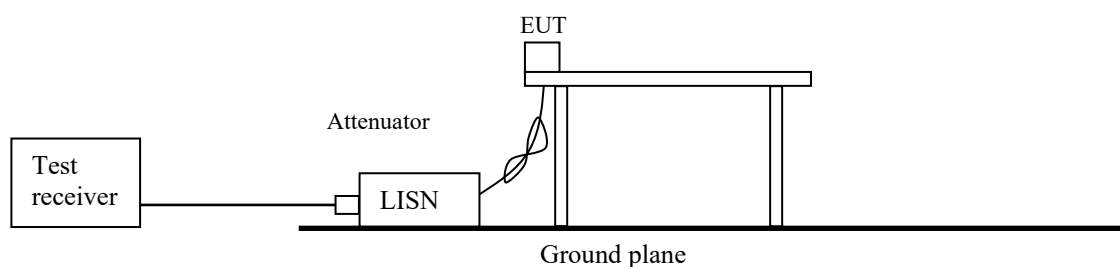
The conducted emission measurements were made with the following detector function of the test receiver.

Detector Type : QP / CAV
IF Bandwidth : 9 kHz / 9 kHz

5.5 Results

Summary of the test results : Pass

Figure 1. Test setup



Section 6 : Radiated emission

6.1 Operating environment

Test room : Refer to data
Temperature : Refer to data
Humidity : Refer to data

6.2 Test configuration

The EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of expanded polystyrol and expanded polypropylene and the table top is covered with polycarbonate. That has very low permittivity. The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. Photographs of the set up are shown in Appendix 1.

6.3 Test conditions

Frequency range : 30 MHz - 1 GHz
EUT position : Table top

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a Semi-Anechoic Chamber with a ground plane at a distance of 3 m.

* Measuring distance

The boundary of the EUT is defined by an imaginary circular periphery.

The measuring antenna height was varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detector function.

Detector Type : QP
IF Band width : 120 kHz

The noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

6.5 Results

Summary of the test results : Pass

Figure 2. Antenna angle

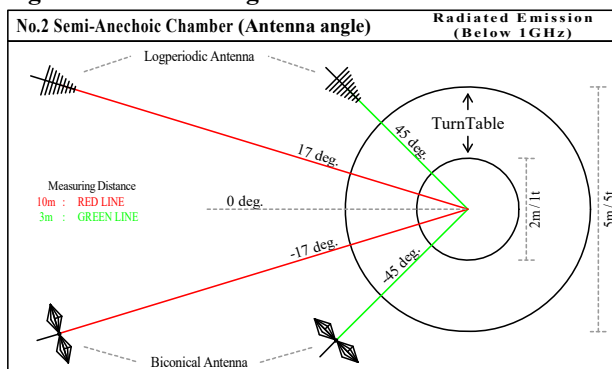
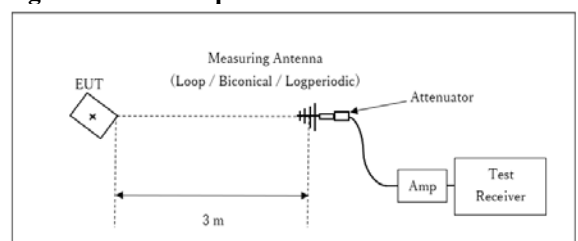


Figure 3. Test setup



Test Distance: 3 m

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