ORIGINAL

AKZO NOBEL

TEST REPORT

REPORT NUMBER	:	AKL-299090
APPLICANT	:	FUJI PHOTO FILM CO.,LTD.
MODEL NUMBER	:	SM-R2
FCC ID	:	F5GSM-R2
REGULATION	:	FCC Part15B Class B Canada ICES-003 Class B

Conducted Emission Test
Radiated Emission Test

NVLAP®
LAB CODE 100290-2

NVLAP accreditation is valid only FCC Part15(Digital Devices), CISPR22, and AS/NZS 3548 test reports.

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ABBREVIATIONS

LISN = Line Impedance Stabilization Network

AMN = Artificial Mains Network

ANT = Antenna

BBA = Broad-band Antenna

DIP = Dipole Antenna

AMP = Amplifier

ATT = Attenuator

EUT = Equipment Under Test

Q–P = Quasi-peak

AVG = Average

SECTION 1. TEST CERTIFICATION

APPLICANT INFORMATION

Company	:	FUJI PHOTO FILM CO.,LTD.
Address	:	13-45, Senzui 3-Chome, Asaka-shi, Saitama-ken, 351-8585 Japan
Telephone number	:	+81 48 462 6908
Fax number	:	+81 48 462 6996

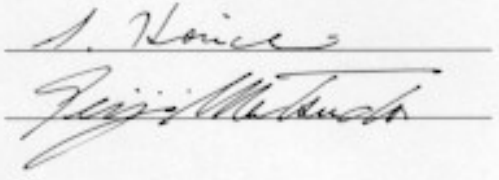
DESCRIPTION OF TEST ITEM

Kind of equipment	:	SmartMedia Reader / Writer
Condition of equipment	:	Prototype
Type	:	Table-Top type
Trademark	:	FUJIFILM
FCC ID	:	F5GSM-R2
Model number	:	SM-R2
Serial number	:	99090001

TEST PERFORMED

Location	:	Kakegawa No. 1 Test Site (FCC File No. : 31040/SIT)
EUT received	:	October, 13, 1999
Test started	:	October, 13, 1999
Test completed	:	October, 13, 1999
Purpose of test	:	FCC Docket 87-389 and Canadian Interference-Causing Equipment Regulations
Regulation	:	FCC Part15B Class B and Canada ICES-003 Class B Unintentional Radiators
Test setup	:	ANSI C63.4-1992

Report file number	:	AKL-299090
Report issue date	:	October, 28, 1999
Test engineer	:	Sachiya Horiuchi
Report approved by	:	Seiji Matsuda [Site Manager]



This equipment complies with above standard or regulation under the test condition or test configuration shown on this test report.

SECTION 2. CONCLUSION

This test report clearly shows that the EUT is in compliance with the FCC Part 15B Class B specification and the Canada ICES-003 Class B specification.

Traceability to national standards of test result is achieved by means of calibration traceability to national standards.

The minimum margins to the limits are as follows:

Conduction measurement			
Read / Write mode	13.7 dB	at	12.3700 MHz 17.1780 MHz
Radiation measurement			
Read / Write mode	4.0 dB	at	456.55 MHz

Note : See Section 9 for details.

SECTION 3. EQUIPMENT UNDER TEST

The equipment under test (EUT) consisted of the following equipment.
Indication in the following left side column corresponds to Section 6.

Symbol	Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
A)	SmartMedia Reader / Writer	SM-R2	99090001	F5GSM-R2	TIETECH CO.,LTD.	EUT

Power ratings of EUT : DC 5V, 100mA

3.1 Port(s)/Connector(s) :

Port name	Connector type	Connector pin	Remarks
USB	USB B type	4 pin	

3.2 Oscillator(s)/Crystal(s) :

Oscillator	Operating frequency	Board name	Remarks
12 MHz	48 MHz	SM-R2	

SECTION 4. SUPPORT EQUIPMENT USED

The EUT was supported by the following equipment during the test.
Indication in the following left side column corresponds to Section 6.

Symbol	Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
B)	Computer	2635-HGJ	97-01D9K	DoC	IBM	
C)	AC Adapter	2635-HYJ(98)	J14HC5031HV	N.A.	IBM	
D)	Serial Mouse	155086-01	3476343	ITEUEC 19604966	ARTEC	

DoC : Device was tested and authorized under a Declaration of Conformity to the applicable FCC rules.

SECTION 5. CABLE (S) USED

The following cable(s) was used for the test.
Indication number in the following left side column corresponds to Section 6.

Number	Name	Length	Shield	Connector
1)	USB cable	1.00 m	Yes	Metal
2)	Serial Mouse cable	1.40 m	None	
3)	Power cord for Computer	1.80 m	None	
4)	Power cord for AC Adapter	1.00 m	None	

Note :

a. One removable ferrite core is attached to USB cable.
The applicant supplies this cable with EUT.

b. One ferrite core is permanently attached to Power cord for Computer .

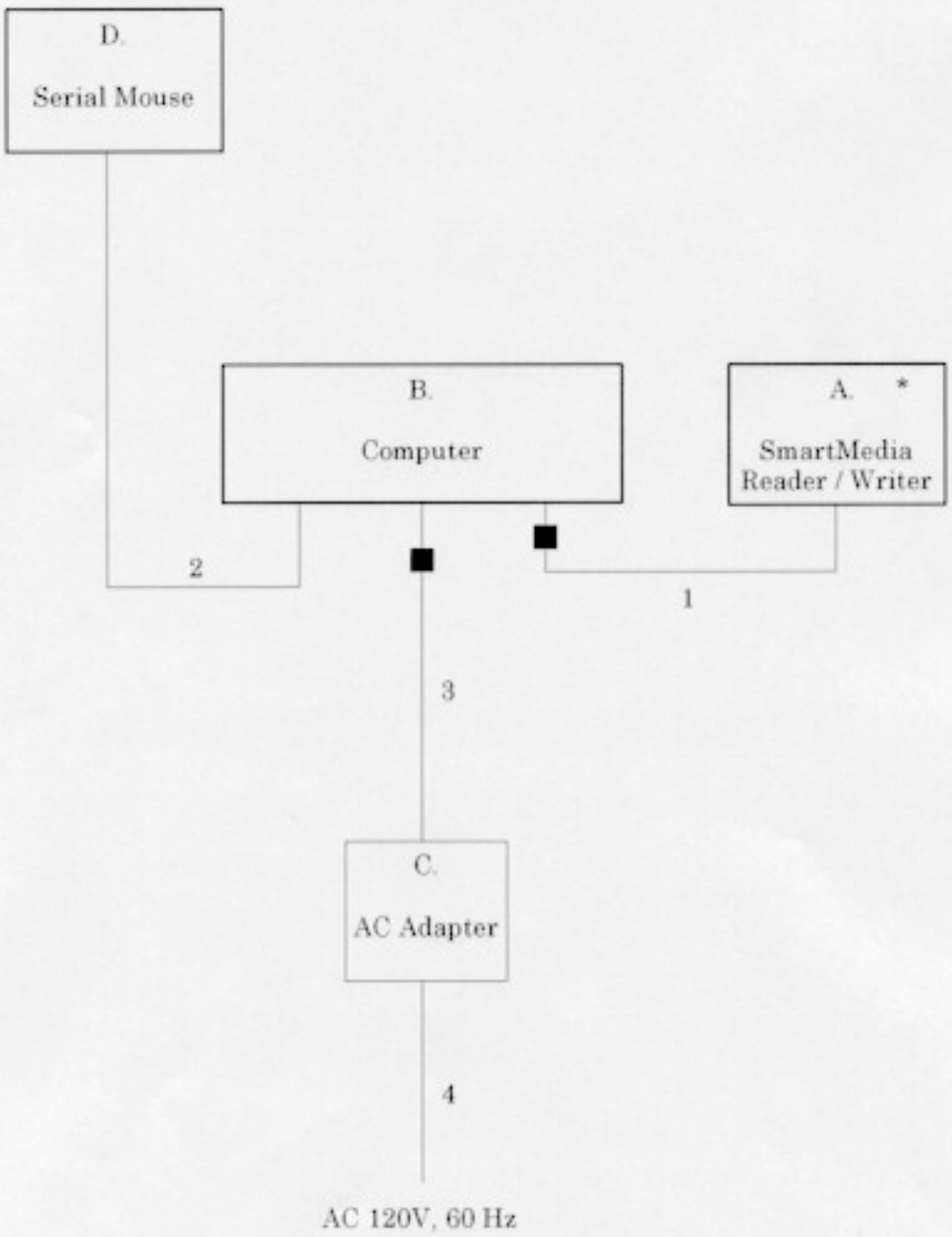
SECTION 6. CONSTRUCTION OF EQUIPMENT

The construction of EUT during the test was as follows.

Read / Write mode

System configuration

* : EUT
■ : Ferrite core



Symbols or numbers assigned to equipment or cables on this diagram are corresponded to the symbols or numbers assigned to equipment or cables on tables in Sections 3 to 5.

SECTION 7. OPERATING CONDITIONS

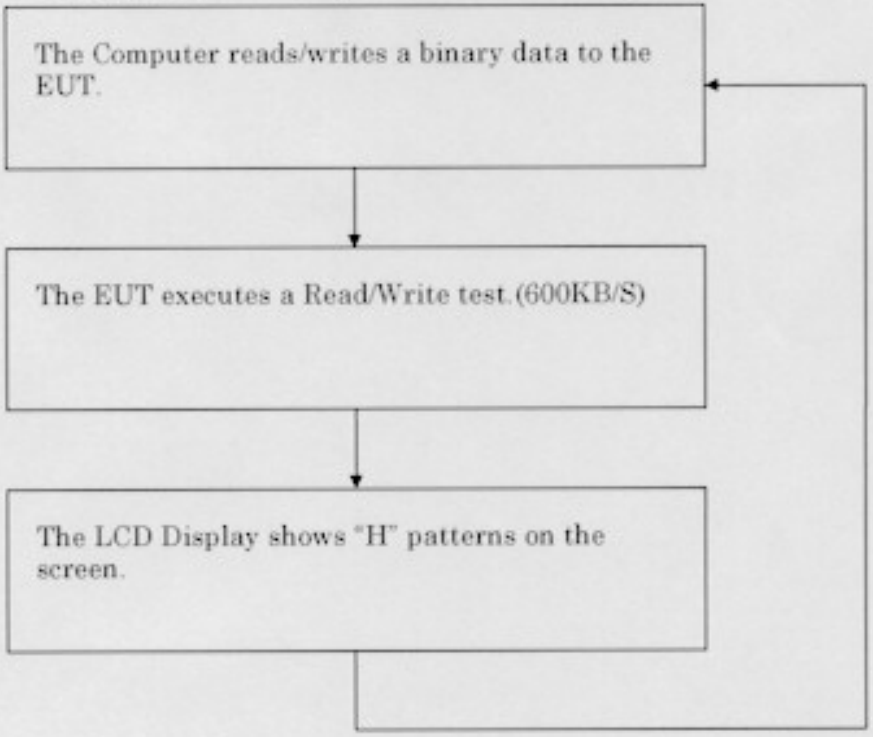
The EUT was operated under the following conditions during the test.

7.1 Operating condition

The test was carried out under Read / Write mode.
EUT was examined in the operating conditions that had maximum emissions.

7.2 Operating flow [Read / Write mode]

Following operations were performed continuously.

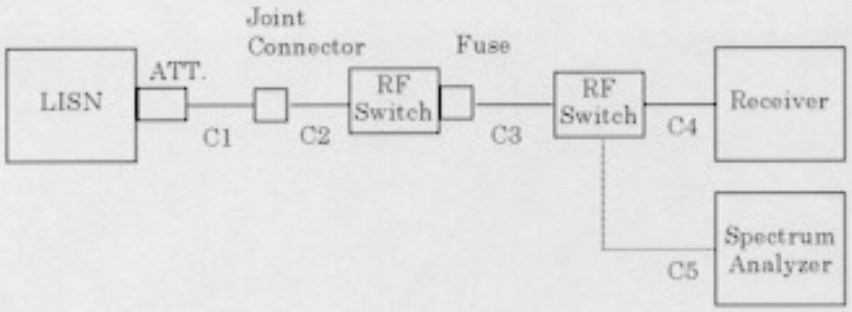


SECTION 8. TEST PROCEDURE(S)

Test was carried out under the following conditions.
Test was carried out with no deviations from standards and test methods.

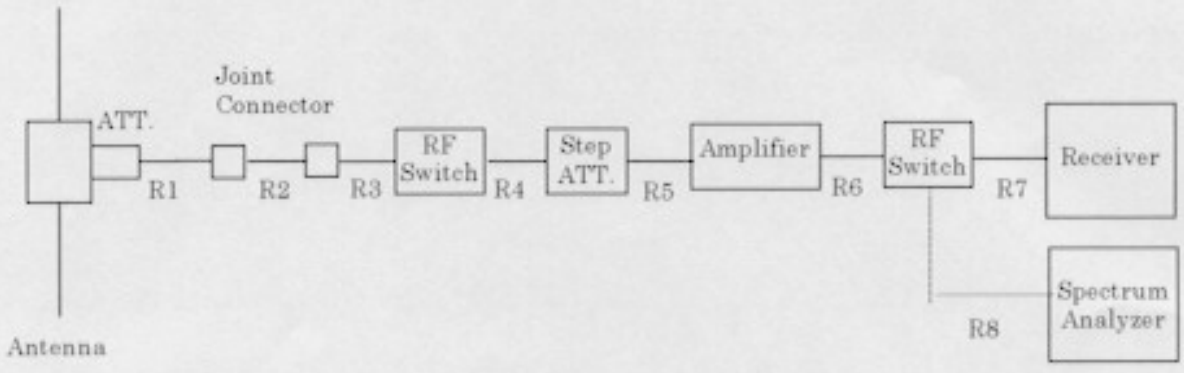
Subject	Test procedure	Scan frequency
Conducted Emission	Akzo Kashima Document number : 03-10-004	0.45 - 30 MHz
Radiated Emission	Akzo Kashima Document number : 03-10-003	30 - 1000 MHz

Schema for the conducted measurement



Abbreviations : LISN = Line Impedance Stabilization Network
Line Impedance Stabilization Network(LISN) = Artificial Mains Network(A.M.N.)

Schema for the radiated measurement



Abbreviations : ATT. = Attenuator

Summary ;

8.1 Conducted Emission Test

8.1.1 Equipment Setup

System configuration and Equipment setup are shown on Section 6 and Section 10.

8.1.1.1 Table-Top Equipment

EUT is placed on the wooden table raised 0.8meter above the metal ground plane.

8.1.1.2 Interconnecting Cables

Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane is folded back and forth forming bundle 30 to 40 cm long, hanging approx, in the middle between ground plane and table.

8.1.1.3 AC Power Cord

AC power cord for EUT is connected to one LISN which is placed on top of ground plane. The LISN is placed in 80 cm from the nearest part of EUT chassis.
The excess power cable is bundled in the center, or shortened to appropriate length.

8.1.2 Measuring Instruments

Measuring instruments list and calibration schedule are shown on Section 11, and brief description are as follows;

8.1.2.1 Spectrum Analyzer

The Spectrum analyzer is used for preliminary measurement.

8.1.2.2 EMI Test Receiver

The Quasi-peak detector(Resolution bandwidth : 10 kHz) and average detector (Resolution bandwidth : 10 kHz) built in test receiver is used for final measurement.
The test receiver is complied with the specification of the CISPR publication 16.

8.1.2.3 LISN

The 50μH/50Ω LISN is used. The chassis of the LISN is bonded to the ground plane by the copper blade.
The lead to be tested is selectable by switch.

8.1.3 Test Procedure

8.1.3.1 Preliminary Measurement

EUT is tested on all operating conditions.
The spectrum analyzer is controlled by the computer program to sweep regulation frequency, then spectrum chart are plotted out to detect the worst conditions in operating mode and/or configuration for the final test.
All leads other than safety ground are tested.

8.1.3.2 Final Measurement

The EUT is operated in the worst condition where maximum emission is detected by the preliminary test. The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.
The each spectrum to be tested are measured in quasi-peak using the test receiver. When the value in the quasi-peak mode is higher than the limit in the standard, the measurement in the average mode is done to compare to the value in the quasi-peak mode. If the value in the quasi-peak mode exceeds the value in the average mode by more than 6 dB, the value reducing 13 dB from the value in the quasi mode is used to compare to the limit.

8.2 Radiated Emission Test

8.2.1 Equipment Setup

System configuration and Equipment setup are shown on Section 6 and Section 10.

8.2.1.1 Table-Top Equipment

EUT is placed on the wooden table raised 0.8meter above the metal ground plane(turntable).

8.2.1.2 Interconnecting Cables

Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane is folded back and forth forming bundle 30 to 40 cm long, hanging approx, in the middle between ground plane and table.

8.2.2 Measuring Instruments

Measuring instruments list and calibration schedule are shown on Section 11, and brief description are as follows;

8.2.2.1 Antennas

The broadband Bi-cog antenna is used for measurement on the frequency range 30 – 1000 MHz.
If uncertain result was obtained, the broadband antenna is replaced by the half wave length dipole, then measurement is carried out over again.

8.2.2.2 Pre-amplifier

The broadband pre-amplifier is used for radiated emission measurement.
The signal to noise ratio is improved by using pre-amplifier.

8.2.2.3 Spectrum Analyzer

The spectrum analyzer is used for preliminary measurement of frequency range 30 – 1000 MHz.

8.2.2.4 EMI Test Receiver

The Quasi-peak detector(Resolution bandwidth : 120 kHz) built in test receiver is used for final measurement of the frequency 30 – 1000 MHz.
The test receiver is complied with the specification of the CISPR publication 16.

8.2.2.5 Turntable

The turntable is capable for EUT weight and rotatable 0 to 360 degree horizontally by remote control in the test room.

8.2.2.6 Antenna Mast

The antenna mast is attachable to all antennas described on clause 8.2.2.1 and antenna height is adjustable 1 to 4 meters continuously by remote control at the test room, and antenna polarization is also changed by the remote control.

8.2.3 Test Procedure

8.2.3.1 Preliminary Measurement

EUT is tested on all operating conditions.
The spectrum analyzer is set max-hold mode and swept during turntable was rotated 0 to 360 degree. Then spectrum chart are plotted out to detect the worst conditions in configuration, operating mode, or ambient noise notation.

8.2.3.2 Final Measurement

The EUT operated in the condition where maximum emission is detected in the preliminary test.
The turntable azimuth(EUT direction) and antenna height are adjusted the position so that maximum field strength is obtained for each frequency spectrum to be measured. The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.
When the uncertain result was obtained, the measurement is retried by using the half wave dipole antenna instead of the broadband antenna.