

ORIGINAL



TEST REPORT

REPORT NUMBER : AKL-398074
APPLICANT : FUJITSU LIMITED
MODEL NUMBER : N860-8728-T001
FCC ID : C9SKB8720
REGULATION : FCC Part15B Class B
Canada ICES-003 Class B

Conducted Emission Test
Radiated Emission Test

Akzo Kashima Limited
EMC Division
Nagano Site



3226, Yokokawa, Tatsuno-machi, Kamiina-gun
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TABLE OF CONTENTS

	Page
SECTION 1. TEST CERTIFICATION.....	3
SECTION 2. EQUIPMENT UNDER TEST.....	4
SECTION 3. SUPPORT EQUIPMENT USED.....	5
SECTION 4. CABLE (S) USED	6
SECTION 5. CONSTRUCTION OF EQUIPMENT	7
SECTION 6. OPERATING CONDITIONS.....	8
SECTION 7. TEST PROCEDURE(S)	9
SECTION 8. EVALUATION OF TEST RESULTS	10
SECTION 9. PHOTOGRAPHS OF TEST SET-UP	14
SECTION 10. INSTRUMENTS USED FOR TEST.....	15
SECTION 11. UNCERTAINTY OF MEASUREMENT	16
SECTION 12. VALIDITY OF TEST REPORT	17
SECTION 13. DESCRIPTION OF TEST LABORATORY.....	18

SECTION 1. TEST CERTIFICATION

APPLICANT INFORMATION

Company : FUJITSU LIMITED
Address : 1174, Oaza-Suzaka, Suzaka-shi, Nagano 382-0076
Japan
Telephone number : +81 26 248 7985
Fax number : +81 26 248 2840

DESCRIPTION OF TEST ITEM

Kind of equipment : Keyboard
Shape : Table-top type
Trademark : FUJITSU
FCC ID : C9SKB8720
Model number : N860-8728-T001
Serial number : 123347

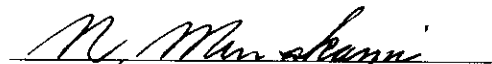
TEST PERFORMED

Location : Nagano No. 2 Test Site (FCC File No. : 31040/SIT)
Test started : May 25, 1998
Test completed : May 26, 1998
Purpose of test : FCC Docket 87-389
and Canadian Interference-Causing Equipment Regulations
Regulation : FCC Part 15B Class B and Canada ICES-003 Class B
Unintentional Radiators
Test setup : ANSI C63.4-1992

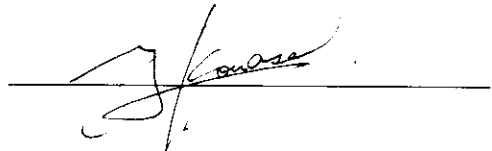
Report file number : AKL-398074

Report issue date : June 1, 1998

Test engineer : Naohei Murakami



Report approved by : Yoshio Kowase
[Site Manager]



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

SECTION 2. EQUIPMENT UNDER TEST

The equipment under test (EUT) consists of the following equipment.
Indication in the following left side column corresponds to section 5.

Symbol	Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
A)	Keyboard	N860-8728-T001	123347	C9SKB8720	Fujitsu Limited	

Power ratings of EUT : DC 5V (Power for computer AC120V,60 Hz)

DoC : Device for Declaration of Conformity

2.1 Port(s)/Connector(s) :

Port name	Connector type	Connector pin	Remarks
Keyboard	AT-Compatible	6 pin	Mini DIN

2.2 Oscillator(s)/Crystal(s) :

Oscillator	Operating frequency	Board name	Remarks
4 MHz	4 MHz	N86D-8728-R101/02	

2.3 Variation of model(s)

Model	Remarks
N860-8728-T001 N860-8728-TXXX	Tested model

Note 1: Model N860-8728-TXXX, where X may be any digit 0 through 9.

Note 2: X is decided by the following differences of specification;

1) Differences of case color, key top letter.

SECTION 3. SUPPORT EQUIPMENT USED

The EUT has been supported by the following equipment during these tests.
Indication in the following left side column corresponds to section 5.

Symbol Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
B) Computer	8550-031	90-5012094	ANO9SA8550-S	IBM	
C) CRT Display	8512-001	72-1134046	C5F7NF13CM14	IBM	
D) Printer	P850A	1YLY193767	BKMP850A	EPSON	
E) Modem	C202A	010948	BKM552C202A	EPSON	
F) AC Adapter	HOOC AA	020108	N.A.	EPSON	

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

SECTION 4. CABLE (S) USED

The following cable(s) was used for testing.

Indication number in the following left side column corresponds to section 5.

Number	Name	Length	Shield	Connector
1)	Keyboard cable	1.70 m	Yes	Metal
2)	Video cable	1.70 m	Yes	Metal
3)	Centronics cable	2.40 m	Yes	Metal
4)	RS-232C cable	2.40 m	Yes	Metal
5)	Power cord for Computer	1.80 m	None	
6)	Power cord for CRT Display	1.90 m	None	
7)	Power cord for Printer	1.80 m	None	
8)	Power cord for Modem	1.80 m	None	

Note :

- a. One ferrite core is permanently attached to Keyboard cable.
The applicant supplies this cable with EUT.

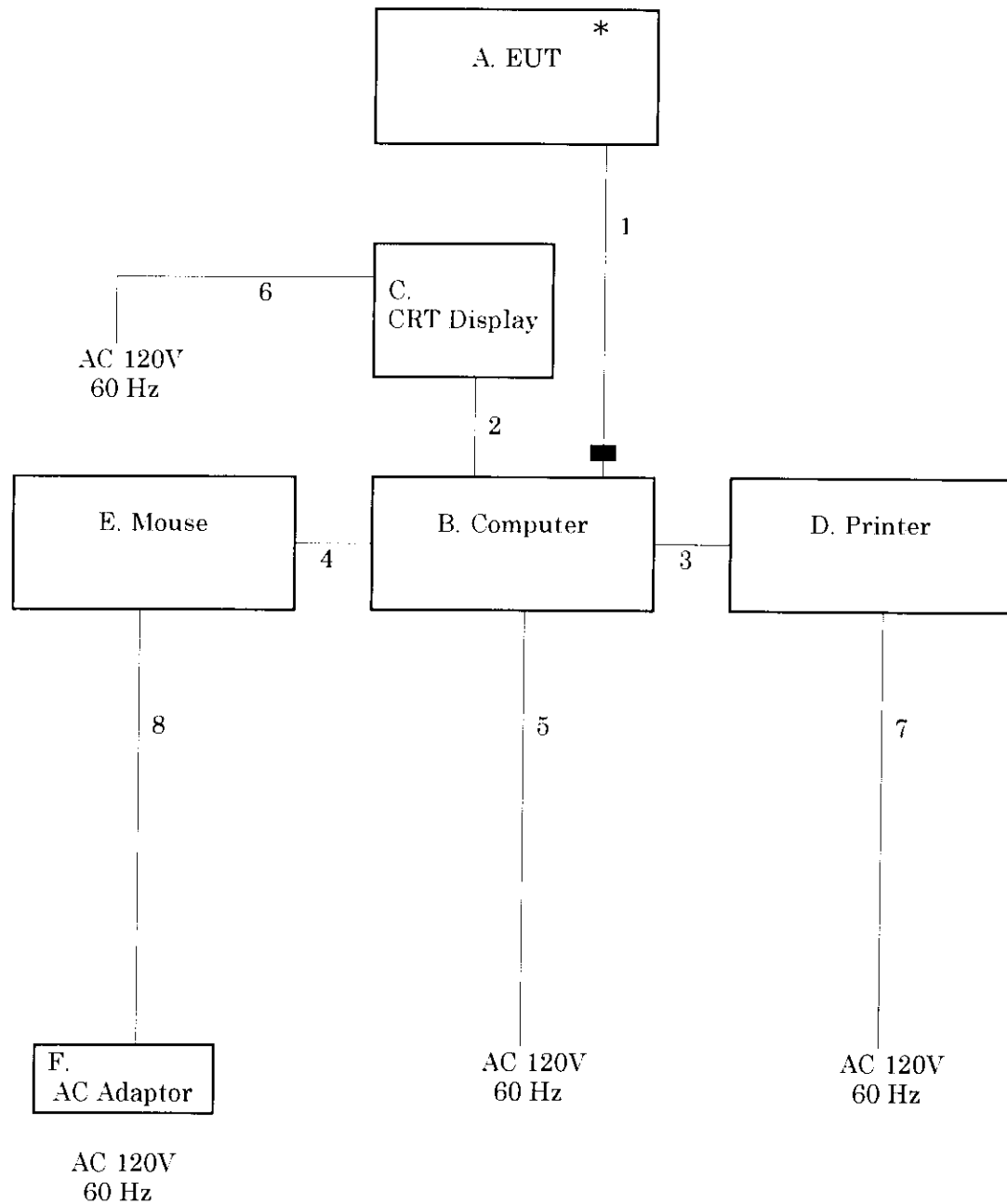
SECTION 5. CONSTRUCTION OF EQUIPMENT

The construction of EUT during testing is as follows.

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 2 to 4.

SECTION 6. OPERATING CONDITIONS

The EUT has been operated under the following conditions during the tests.

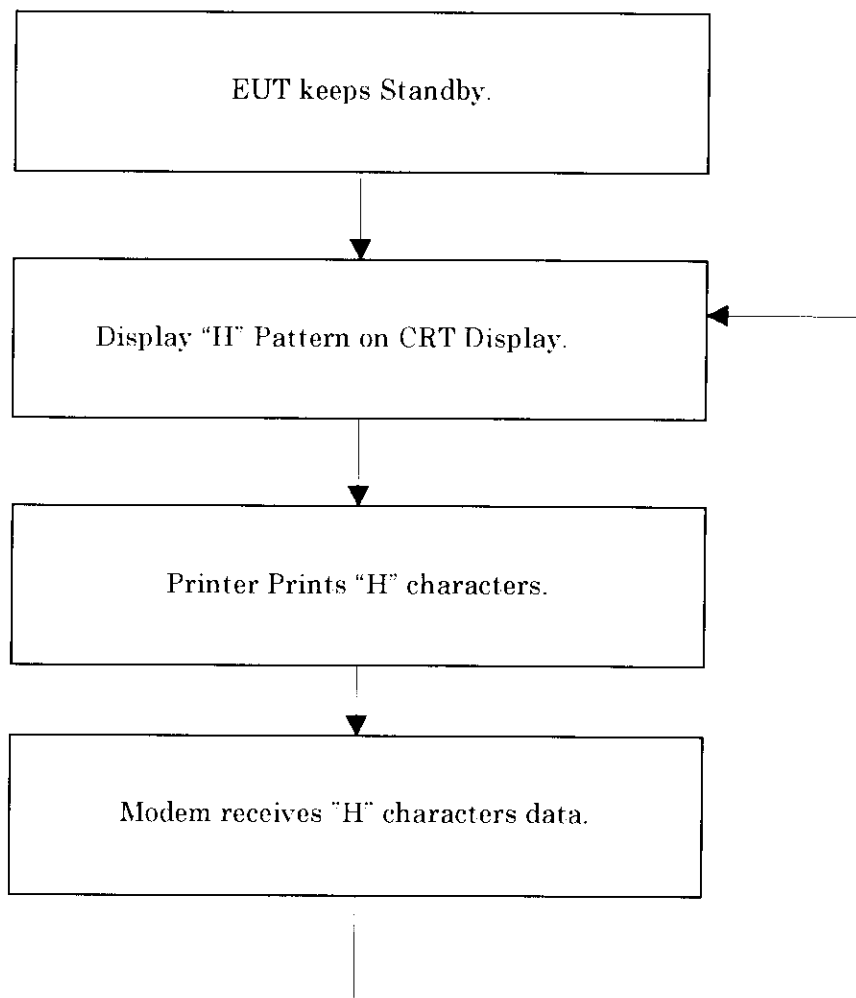
6.1 Operating condition

The tests have been carried out under Standby mode.

EUT was examined in the operating conditions that had maximum emissions.

6.2 Operating flow

Performed following operations continuously



SECTION 7. TEST PROCEDURE(S)

Tests have been carried out with the test procedure(s) drawn up by our laboratory which is in accordance with the following test procedure(s).

Test item	Test procedure used	Scanned frequency range
Conducted Emission	ANSI C63.4-1992	0.45 - 30 MHz
Radiated Emission	ANSI C63.4-1992	30 - 1000 MHz

SECTION 8. EVALUATION OF TEST RESULTS

8.1 Conducted Emission Test

No	FREQ [MHz]	NEUTRAL		LINE 1		FACTOR		EMISSION		LIMIT		MARGIN	
		QP	AV	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
1	.7263	34.2	-	35.7	-	.6	36.3	-	48.0	-	11.7	-	-
2	.8305	34.4	-	35.1	-	.5	35.6	-	48.0	-	12.4	-	-
3	1.2450	31.6	-	34.1	-	.5	34.6	-	48.0	-	13.4	-	-
4	3.7349	25.4	-	31.3	-	.5	31.8	-	48.0	-	16.2	-	-
5	16.1303	26.8	-	27.3	-	1.3	28.6	-	48.0	-	19.4	-	-
6	24.1647	27.0	-	27.2	-	1.7	28.9	-	48.0	-	19.1	-	-

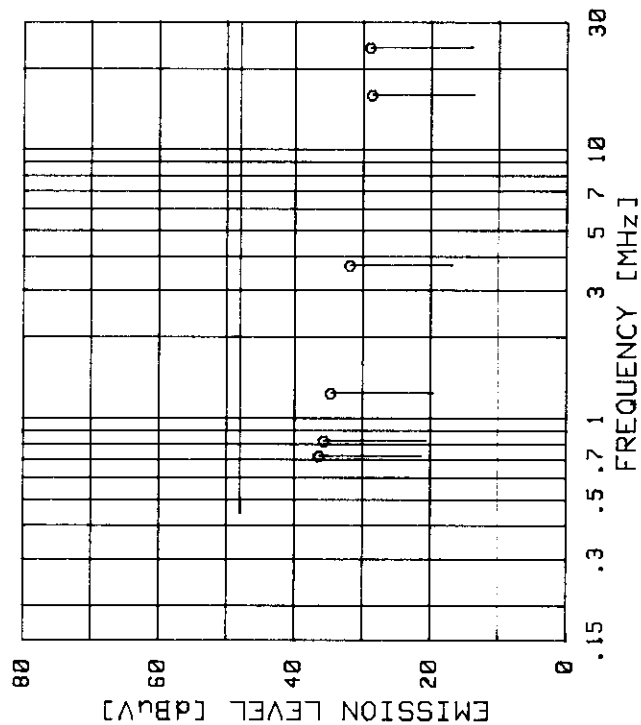
OTHER FREQUENCIES : MORE THAN 10dB BELOW THE FCC Part15B CLASS B LIMIT

EMISSION LEVEL = READING LEVEL + FACTOR (LIN FACTOR + CABLE LOSS)

AKZO KASHIMA
NAGANO No.2 SITE
INTERFERENCE VOLTAGE TEST

APPLICANT : FUJITSU LIMITED
MODEL NUMBER : N860-8728-T001
SERIAL NUMBER : 123347
POWER SOURCE : DC 5V (AC120V/60Hz)
DESCRIPTION :
DATE TESTED : 05/26/1998
FILE NUMBER : AKL-398074
REGULATION : FCC Part15B CLASS B
according to : ANSI C63.4-1992

ENGINEER :


NAOHEI.MURAKAMI

8.2 Radiated Emission Test

No.	FREQ. [MHz]	ANT.	READING		ANT FACTOR		CABLE LOSS [dB]	AMP GAIN [dB]	EMISSION LEVEL		MARGIN
			Hor	Ver	Hor	Ver			[dBuV/m]	[dB]	
1	42.39	BB	-	35.90	15.60	15.60	1.48	27.52	31.46	40.00	8.54
2	68.46	BB	38.70	-	8.06	8.06	1.08	27.47	27.17	40.00	12.83
3	72.49	BB	40.20	-	7.10	7.10	1.94	27.45	27.79	40.00	12.21
4	91.25	BB	44.80	49.30	8.47	8.47	2.34	27.41	38.70	43.50	4.80
5	100.00	BB	45.40	-	9.50	9.50	2.46	27.38	35.98	43.50	7.52
6	106.97	BB	-	45.60	10.47	10.47	2.53	27.37	37.23	43.50	6.27
7	160.00	BB	48.00	-	8.10	8.10	3.11	27.10	38.83	43.50	4.67
8	200.00	BB	39.30	42.50	9.70	9.70	3.59	26.98	34.81	43.50	8.69
9	259.95	BB	38.70	-	12.14	12.14	4.05	26.73	34.16	46.00	11.84
10	283.22	BB	40.60	-	12.49	12.49	4.21	26.69	36.61	46.00	9.39
11	346.16	BB	41.50	-	14.00	14.00	4.68	26.93	39.25	46.00	6.75
12	467.31	BB	37.20	-	16.57	16.57	5.46	27.74	37.49	46.00	8.51

OTHER FREQUENCIES : MORE THAN 10dB BELOW THE FCC Part15B CLASS B LIMIT

EMISSION LEVEL = READING LEVEL + ANTENNA FACTOR + CABLE LOSS

- AMP GAIN + ANTENNA PAD

ANT. : USED ANTENNA

DP = DIPOLE ANTENNA

BC = BICONICAL ANTENNA

LP = LOGPERIODIC ANTENNA

BB = BROADBAND ANTENNA

Ver. 1.16

AKZO KASHIMA

NAGANO No.2 SITE

INTERFERENCE RADIATION TEST

APPLICANT : FUJITSU LIMITED

MODEL NUMBER : N860-8728-T001

SERIAL NUMBER : 123347

POWER SOURCE : DC 5V (AC120V/60Hz)

DESCRIPTION :

DATE TESTED : 05/25/1998

FILE NUMBER : AKL-398074

REGULATION : FCC Part15B CLASS B

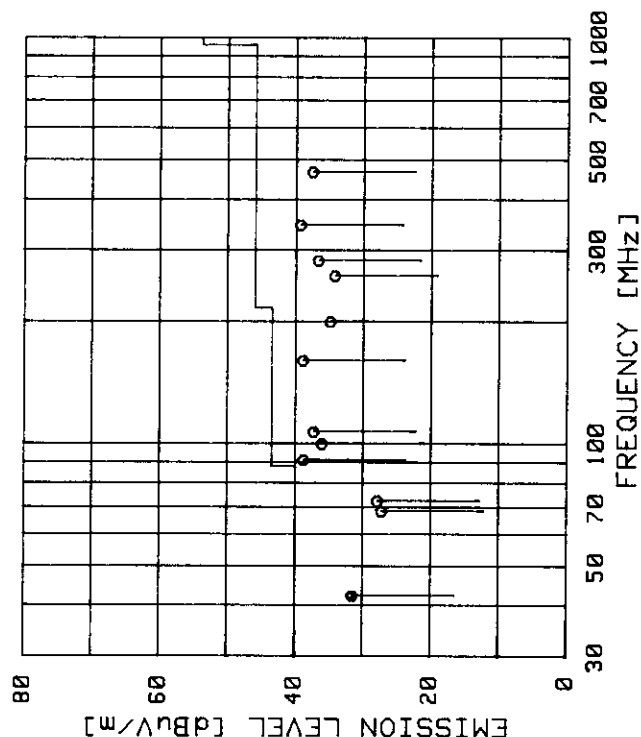
according to : ANSI C63.4-1992

ANT.PAD [dB] : 6.0 TEMP. : 21 °C

DISTANCE [m] : 3.0 HUMI. : 47 %

ENGINEER :



NAOHEI. MURAKAMI


8.3 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.

The minimum margins to the limits are as follows:

Conduction measurement	11.7 dB	at	0.7263 MHz
Radiation measurement	4.67 dB	at	160.00 MHz

8.4 Sample Calculations

8.4.1 Conducted Emission

Example @ 0.7263 MHz

$$\begin{array}{rcl} \text{Emission Level} & = & \text{Meter Reading} \quad 35.7 \text{ dBuV} \\ & + & \text{Factor} \quad + \underline{0.6 \text{ dB}} \\ & & = 36.3 \text{ dBuV} \end{array}$$

$$\begin{array}{rcl} \text{Margin} & = & \text{Limit} \quad 48.0 \text{ dBuV} \\ & - & \text{Emission Level} \quad - \underline{36.3 \text{ dBuV}} \\ & & = 11.7 \text{ dB} \end{array}$$

Factor = A.M.N. Factor + Cable Loss

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

8.4.2 Radiated Emission

Example @ 160.00 MHz

$$\begin{array}{rcl} \text{Emission Level} & = & \text{Meter Reading} \quad 48.80 \text{ dBuV} \\ & + & \text{Antenna Factor} \quad + \quad 8.10 \text{ dB} \\ & + & \text{Cable Loss} \quad + \quad 3.11 \text{ dB} \\ & - & \text{Amplifier Gain} \quad - \quad 27.18 \text{ dB} \\ & + & \text{Pad Loss} \quad + \underline{6.00 \text{ dB}} \\ & & = 38.83 \text{ dBuV/m} \end{array}$$

$$\begin{array}{rcl} \text{Margin} & = & \text{Limit} \quad 43.50 \text{ dBuV/m} \\ & - & \text{Emission Level} \quad - \underline{38.83 \text{ dBuV/m}} \\ & & = 4.67 \text{ dB} \end{array}$$

SECTION 10. INSTRUMENTS USED FOR TEST

Instrument	Model No.	Serial No.	Manufacturer	Last cal. date	Period
Spectrum analyzer (RF unit)	8567A/85670A	2841A00552	HEWLETT PACKARD	1/98	1 Year
(Display unit)	8567A/85662A	2816A16802	HEWLETT PACKARD	1/98	1 Year
Amplifier	8447D	2727A05048	HEWLETT PACKARD	1/98	1 Year
Test receiver	ESS	845637/008	ROHDE & SCHWARZ	10/97	1 Year
Broad Band antenna	LPB-2513/A	1091	A.R.A.	5/97	1 Year
Artificial mains network (AMN) = Line impedance stabilization network (LISN)					
	ESH2-Z5	843890/007	ROHDE & SCHWARZ	10/97	1 Year
	KNW-242	8-851-26	Kyoritsu	8/97	1 Year

Note : Test instruments are calibrated according to Quality Manual and Calibration Manual of EMC division.

SECTION 11. UNCERTAINTY OF MEASUREMENT

Uncertainty of measurement

The uncertainty of the measurements performed for this report lies:

Radiated emission at 3m	± 3.6 dB
Radiated emission at 10m	± 3.7 dB
Conducted emission	± 1.8 dB

These figures indicate the uncertainty of the measurements when the same staff performs the test with the same testing equipment and facility.

The uncertainty of the measurements when a different staff with different equipment and facility are under study.

Please note that these uncertainty are not reflected to the compliance judgement of the test results in this report.

SECTION 12. VALIDITY OF TEST REPORT

12.1 The test result of this report is effective for equipment under test itself and under the test configuration described on the report.

12.2 This test report does not assure that whether the test result taken in other testing laboratory is compatible or reproducible to the test result on this report or not.

12.3 Copying of this report without permission is prohibited.

SECTION 13. DESCRIPTION OF TEST LABORATORY

13.1 Outline of Akzo Kashima Limited, EMC Division

Akzo Kashima Ltd. was established in 1975 for manufacturing specialty chemicals. The shares are owned by Akzo Nobel KK (70%), the country organization in Japan for Akzo Novel nv., and TOSOH Corporation (30%), one of the leading petrochemical manufacturers in Japan. Akzo Nobel, headquartered in the Netherlands, is one of the world's leading companies in selected areas of chemicals, coatings, healthcare products and fibers with work force of approximately 70,000 people in over 50 countries.

In 1984, in order to respond to the growing testing demand, in particular, for FCC filing, Akzo Kashima started EMI testing business, installing the first open air test site in Kashima, Ibaraki prefecture. Further the business has been expanded by installing additional testing facilities not only in Kashima but also in other areas such as Shizuoka, Nagano, Kanagawa and Tochigi. As results, Akzo Kashima has now 16 open air test sites and 4 anechoic chambers for EMI/EMC testing. As the largest EMC testing laboratory in number of testing facilities and staffs, EMC Division has been organized separately in the company and independently operated in conformity with the requirements of ISO Guide 25 (EN 45000) for its competency as a testing laboratory.

Akzo Kashima EMC Division is the first foreign private laboratory accredited by NVLAP, National Voluntary Laboratory Accreditation Program-NIST, USA. The division has been certified, authorized and/or filed as a competent testing laboratory by various testing organizations/authorities as described below.

13.2 Filing, certification, authorization and accreditation list

<u>EMI/EMC testing</u>		<u>Telecommunications terminal testing</u>	
FCC	(USA)	FCC	(USA)
NVLAP	(USA)	NVLAP	(USA)
AUSTEL	(Australia)	AUSTEL	(Australia)
NEMKO	(Norway)	IC	(Canada)
VCCI	(Japan)		
NMi	(The Netherlands)		
TÜV PRODUCT SERVICE	(Germany)		

Note : NVLAP accreditation does not constitute any product endorsement by NVLAP or any agent of the U.S. Government.

A

B

C

D

A

B

C

D

E

		A08	A09					1
								2
F02	F03	F08	F07	F06	F05	F04	F00	3
E16	F14	E18	B20	E17	A07	C00	E15	4
F09	F10	F16	F15	F13	F12	F11	D10	5
E09	E10	D09	D08	E13	E12	E11	E08	6
E01	E02	E07	E06	E05	E04	E03	E00	7
D01	D02	D07	D06	D05	D04	D03	D00	8
C10	C11		C19	C18	C17	C12	C09	9
D12	D13		E19	D19	D18	D17	D11	10
		E14	D16	D15	D14			11
	B00					B11		12
C12'	B00'			E12'	B10'	A02	A01	13
A15	A16					B15	A14	14
B02	B03	B08	B07	B06	B05	B04	B01	15
		E20						16
		D20						17
B10	A05	B19	B18	B17	A19	A17	B09	18
				A12			A00	19
C02	C03	C08	C07	C06	C05	C04	C01	20
							electrode A 電極A	21
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CN3

Lower Sheet

CN2 Upper Sheet

注記 CN3 の9 と17, 10と16, 11と13はプリント板上で結線する。

DOS/V用

C95KB8720

元 理 管 図 原

日付

名称

回路図 Membrane Circuit

図番

N86C-8720-0002-E

提出先

現在配付

1998. 4. 1

富士通株式会社
印刷部

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B

C

D

				A10			A00'	
	F02	F03	F08	F07	F06	F05	F04	F00
	E16	F14	E18	B20	E17	A07	C00	E15
	F09	F10	F16	F15	F13	F12	F11	D10
	E09	E10	D09	D08	E13	E12	E11	E08
	E01	E02	E07	²⁾ D05 D06	E05	D04	E03	E00
	D01	D02	D07	D06	E06	E04	D03	D00
	C10	C11		C19	C18	C17	C12	C09
	D12	²⁾ D13		E19	D19	D18	D17	D11
			E14	D16	D15	D14		
		B00					B11	
	C12'	A06	A09	B10'	E12'	A11	A03	A02
	A15	A16					B15	A14
	D02	D03	D08	D07	B06	B05	B04	D01
			E20					
			D20					
	B10	A05	B19	B18	B17	A19	A17	B09
					A12			A00
	C02	C03	C08	C07	C06	C05	C04	C01

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CN3
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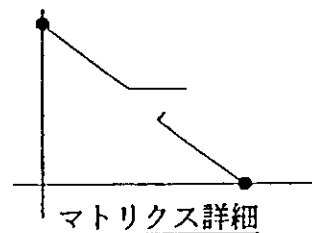
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N.C

1 2 3 4 5 6 7 8

CN2 Upper Sheet

注記 1) CN3の9 と17, 10 と16, 11 と14はプリント板上で結線する。
2) A00':L-Win, A10:R-Win, A11:appr.



マトリクス詳細

WIN' 95-DOS/V

元
理
管
図
原

日付

名称

フロッピー 回路図 Membrane circuit

図番

N86C-8728-000/-E

提出先