

TEST REPORT

Report number : Z01C-06296

Issue date : August 22, 2006

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

FCC Part15 Subpart B

Canada ICES-003

The EUT complies with section 15.37 "Transition provision for compliance with the rules".

The test results are traceable to the international or national standards.

Applicant	: FUJITSU ISOTEC LIMITED 135, Higashinozaki, Hobara-machi, Date-shi, Fukushima 960-0695 Japan Phone: +81-24-575-2214 Fax: +81-24-574-2277
Equipment under test (EUT)	: Dot Matrix Printer
FCC ID	: KHZ015M33324A
Trade name	: FUJITSU ISOTEC
Model number	: M33324A
Serial number	: N/A
EUT condition	: Pre-production

Date of test : June 16, 30, August 2, 2006

Test place : OATS

ZACTA Technology Corporation Yonezawa Testing Center
4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata 992-1128 Japan
Phone:+81-238-28-2880 Fax:+81-238-28-2888

Test results : Complied

[EUT complies with Canadian Interference-Causing Equipment Standard ICES-003.]

Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits, that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21U.S.C. 853(a).

The results in this report are applicable only to the samples tested.

This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

Authorized by: Jun Shimanuki
General Manager of EMC Technical Division



NVLAP[®]

NVLAP LAB CODE 200306-0

FCC ID: KHZ015M33324A

Table of contents

	Page
1. Summary of Test.....	3
1.1 Purpose of test.....	3
1.2 Standards.....	3
1.3 Emission measurement	3
1.4 Deviation from the standard.....	3
2. Equipment Under Test	4
2.1 EUT information	4
2.2 Operating mode	4
3. Configuration of equipment.....	5
3.1 Peripheral(s) used [EUT #1 Centronics I/F mode]	5
3.2 Cable(s) used [EUT #1 Centronics I/F mode].....	5
3.3 System configuration [EUT #1 Centronics mode]	6
3.4 Peripheral(s) used [EUT #1 Serial I/F mode].....	7
3.5 Cable(s) used [EUT #1 Serial I/F mode].....	7
3.6 System configuration [EUT #1 Serial mode].....	8
3.7 Peripheral(s) used [EUT #2 USB I/F mode]	9
3.8 Cable(s) used [EUT #2 USB I/F mode]	9
3.9 System configuration [EUT #2 USB mode]	10
3.10 Peripheral(s) used [EUT #2 LAN I/F mode]	11
3.11 Cable(s) used [EUT #2 LAN I/F mode].....	11
3.12 System configuration [EUT #2 LAN mode].....	12
4. Conducted emission at mains port test information.....	13
4.1 Measurement procedure.....	13
4.2 Test equipment for Conducted emission at mains port.....	14
4.3 Sample calculation	14
4.4 Test data	15
5. Radiated emission test information.....	19
5.1 Measurement procedure.....	19
5.2 Test equipment for Radiated emission.....	20
5.3 Sample calculation	20
5.4 Test data	21
6. Uncertainty of measurement	25
7. Laboratory description	25
8. Configuration photographs.....	26
Conducted emission at mains port [Centronics I/F mode]	26
Radiated emission [Centronics I/F mode]	26
Conducted emission at mains port [Serial I/F mode].....	27
Radiated emission [Serial I/F mode]	27
Conducted emission at mains port [USB I/F mode].....	28
Radiated emission [USB I/F mode].....	28
Conducted emission at mains port [LAN I/F mode].....	29
Radiated emission [LAN I/F mode]	29

1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 15 Subpart B.

1.2 Standards

CFR47 FCC Part 15 Subpart B

1.3 Emission measurement

Test item	Test method	Classification of EUT	Test
Conducted emission at mains port	ANSI C63.4-2003	Class B	Applied
Radiated emission	ANSI C63.4-2003	Class B	Applied

Note : None.

1.4 Deviation from the standard

None

2. Equipment Under Test

2.1 EUT information

No.	EUT	Company	Model No.	Serial No.	DoC / FCC ID	Comment
1	Dot Matrix Printer	FUJITSU ISOTEC LIMITED	M33324A	N/A	KHZ 015M33324A	#1 #2
2	Front Cut Sheet Feeder	FUJITSU ISOTEC LIMITED	KA02027-D750	N/A	N/A	Option
3	Rear Cut Sheet Feeder	FUJITSU ISOTEC LIMITED	KA02027-D750	N/A	N/A	Option
4	LAN card	FUJITSU ISOTEC LIMITED	KA02012-C103	N/A	N/A	Option #3

#1: Centronics, Serial I/F

#2: Centronics, USB, LAN I/F

#3: Option of M33324A #2

Max. frequency : Oscillator : 20MHz (for Main)/6.0MHz (for USB)/4.125MHz, 25MHz (for LAN)
Processor clock : 10MHz (for Main)/12MHz (for USB)/33MHz, 25MHz (for LAN)

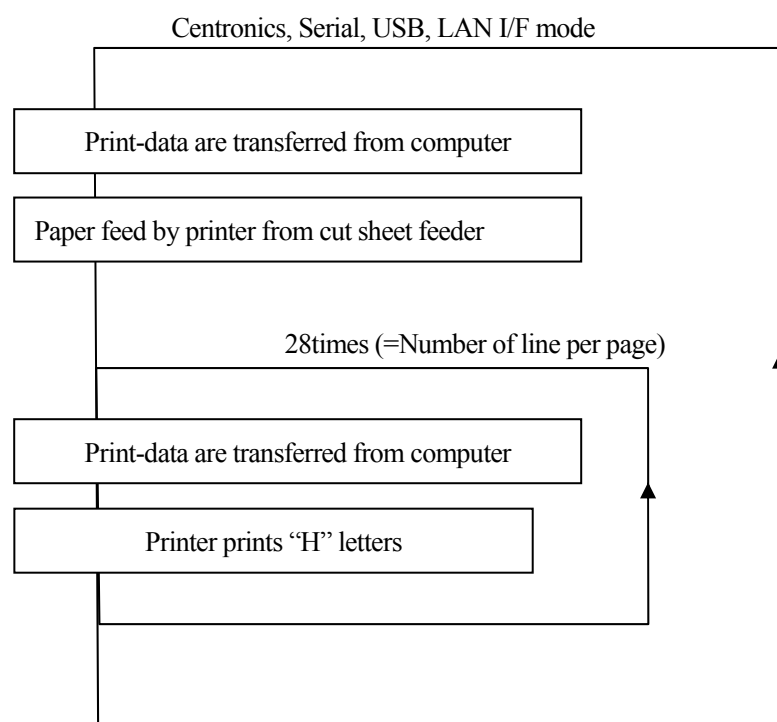
Power ratings : AC 100-120V 50/60Hz
[Power supply for EUT in testing was AC 120V 60Hz.]

Port(s) : Centronics
Serial
USB
LAN

Size : (W)600 × (D)350 × (H)290 mm

Variation of model(s) : Not applicable

2.2 Operating mode



3. Configuration of equipment

3.1 Peripheral(s) used [EUT #1 Centronics I/F mode]

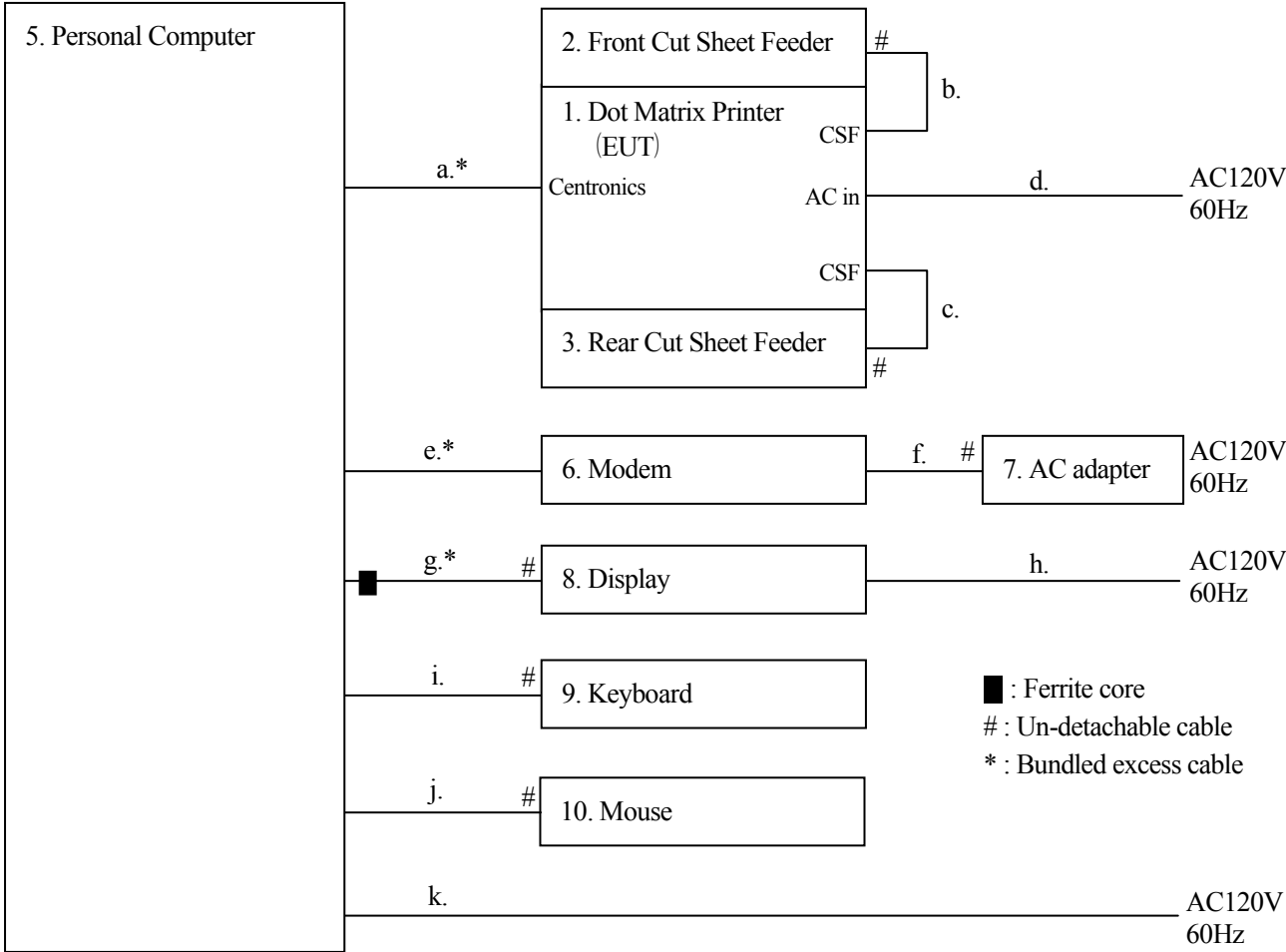
No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
5	Personal Computer	DELL	MCM	XTT3B	DoC	-
6	Modem	US. Robotics	Sport_Ster 33.6Kbps	000839032BK6YV4J	DoC	-
7	AC adapter	US. Robotics	N/A	N/A	N/A	-
8	Display	DELL	E551	MY-044NEK-46632- 0CB-9122	DoC	-
9	Keyboard	DELL	SK-1000REW	N/A	DoC	-
10	Mouse	Logotech	M-S34	LNA10500394	DZL211029	-

3.2 Cable(s) used [EUT #1 Centronics I/F mode]

No.	Cable	Length[m]	Shield	Connector	From	To	Comment
a	Centronics cable	1.5	Shielded	Metal	EUT	PC	-
b	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Front CSF	-
c	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Rear CSF	-
d	AC power cord for EUT	3.0	Unshielded	Plastic	EUT	AC outlet	Accessory
e	Serial cable	1.5	Shielded	Metal	PC	Modem	-
f	DC cable for Modem	1.7	Unshielded	Plastic	Modem	AC adapter	-
g	RGB cable	1.7	Shielded	Metal	PC	Display	-
h	AC Power cord for Display	2.0	Unshielded	Plastic	Display	AC outlet	-
i	Keyboard cable	1.9	Unshielded	Metal	PC	Keyboard	-
j	Mouse cable	1.8	Unshielded	Metal	PC	Mouse	-
k	AC power cord for PC	3.0	Unshielded	Plastic	PC	AC outlet	-

CSF: Cut Sheet Feeder

3.3 System configuration [EUT #1 Centronics mode]



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “2.1 EUT information”, “3.1 Peripheral(s) used” and “3.2 Cable(s) used”.

Note2: RGB cable(No.g) with one ferrite core is accessory for Display(No.8).

3.4 Peripheral(s) used [EUT #1 Serial I/F mode]

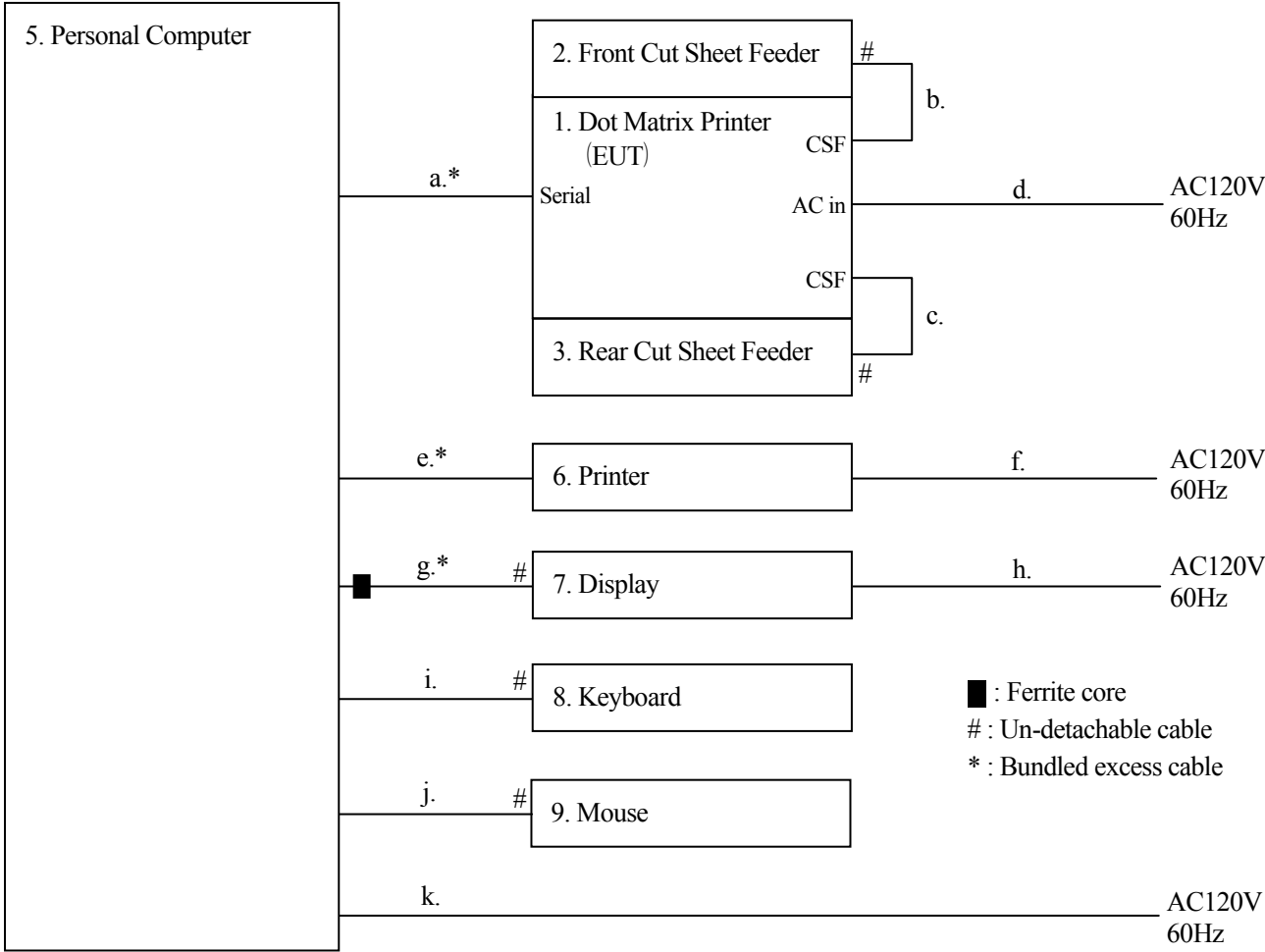
No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
5	Personal Computer	DELL	MCM	XTT3B	DoC	-
6	Printer	HP	C4555A	US6BC212N	B94C4555X	-
7	Display	DELL	E551	MY-044NEK-46632-0CB-9122	DoC	-
8	Keyboard	DELL	SK-1000REW	N/A	DoC	-
9	Mouse	Logotech	M-S34	LNA10500394	DZL211029	-

3.5 Cable(s) used [EUT #1 Serial I/F mode]

No.	Cable	Length[m]	Shield	Connector	From	To	Comment
a	Serial cable	1.5	Shielded	Metal	EUT	PC	-
b	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Front CSF	-
c	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Rear CSF	-
d	AC power cord for EUT	3.0	Unshielded	Plastic	EUT	AC outlet	Accessory
e	Parallel cable	1.2	Shielded	Metal	PC	Printer	-
f	AC power cord for Printer	2.7	Unshielded	Plastic	Printer	AC outlet	-
g	RGB cable	1.7	Shielded	Metal	PC	Display	-
h	AC Power cord for Display	2.0	Unshielded	Plastic	Display	AC outlet	-
i	Keyboard cable	1.9	Unshielded	Metal	PC	Keyboard	-
j	Mouse cable	1.8	Unshielded	Metal	PC	Mouse	-
k	AC power cord for PC	3.0	Unshielded	Plastic	PC	AC outlet	-

CSF: Cut Sheet Feeder

3.6 System configuration [EUT #1 Serial mode]



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “2.1 EUT information”, “3.4 Peripheral(s) used” and “3.5 Cable(s) used”.

Note2: RGB cable(No.g) with one ferrite core is accessory for Display(No.7).

3.7 Peripheral(s) used [EUT #2 USB I/F mode]

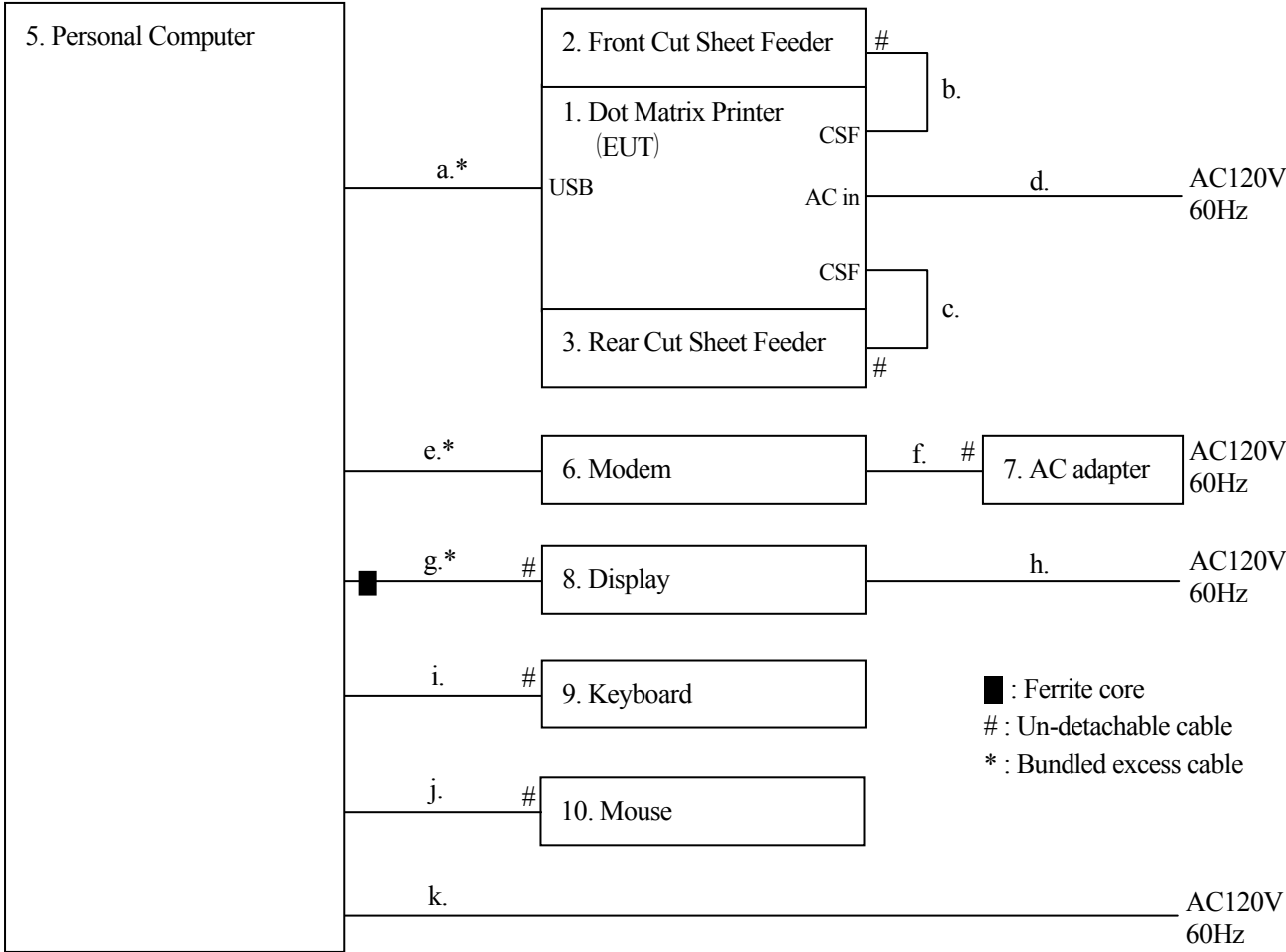
No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
5	Personal Computer	DELL	MCM	XTT3B	DoC	-
6	Modem	US. Robotics	Sport_Ster 33.6Kbps	000839032BK6YV4J	DoC	-
7	AC adapter	US. Robotics	N/A	N/A	N/A	-
8	Display	DELL	E551	MY-044NEK-46632- 0CB-9122	DoC	-
9	Keyboard	DELL	SK-1000REW	N/A	DoC	-
10	Mouse	Logotech	M-S34	LNA10500394	DZL211029	-

3.8 Cable(s) used [EUT #2 USB I/F mode]

No.	Cable	Length[m]	Shield	Connector	From	To	Comment
a	USB cable	1.5	Shielded	Metal	EUT	PC	-
b	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Front CSF	-
c	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Rear CSF	-
d	AC power cord for EUT	3.0	Unshielded	Plastic	EUT	AC outlet	Accessory
e	Serial cable	1.5	Shielded	Metal	PC	Modem	-
f	DC cable for Modem	1.7	Unshielded	Plastic	Modem	AC adapter	-
g	RGB cable	1.7	Shielded	Metal	PC	Display	-
h	AC Power cord for Display	2.0	Unshielded	Plastic	Display	AC outlet	-
i	Keyboard cable	1.9	Unshielded	Metal	PC	Keyboard	-
j	Mouse cable	1.8	Unshielded	Metal	PC	Mouse	-
k	AC power cord for PC	3.0	Unshielded	Plastic	PC	AC outlet	-

CSF: Cut Sheet Feeder

3.9 System configuration [EUT #2 USB mode]



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “2.1 EUT information”, “3.7 Peripheral(s) used” and “3.8 Cable(s) used”.

Note2: RGB cable(No.g) with one ferrite core is accessory for Display(No.8).

3.10 Peripheral(s) used [EUT #2 LAN I/F mode]

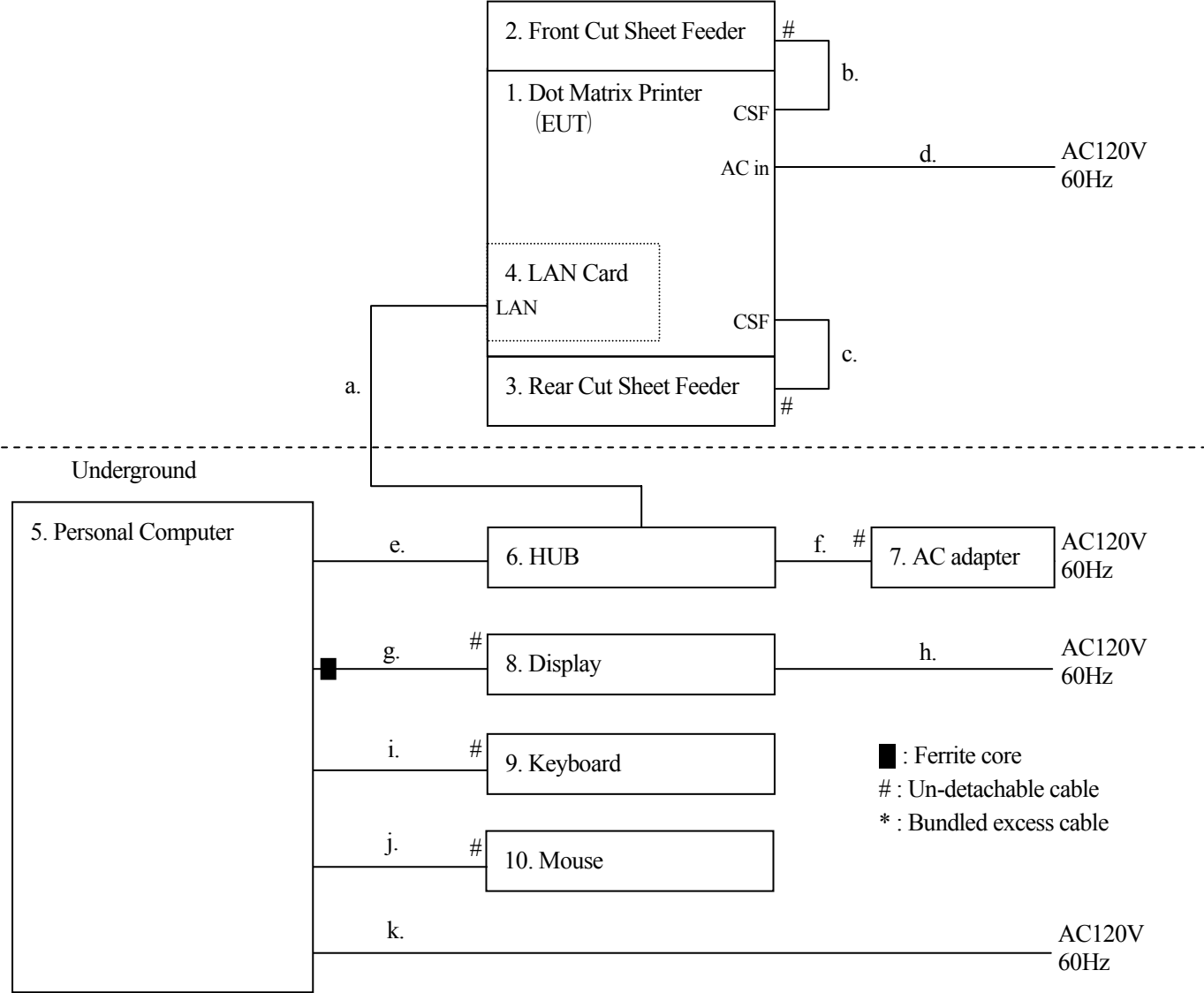
No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
5	Personal Computer	DELL	DCM	SBSMV	E2KZERM	-
6	HUB	BUFFALO	LSW-TX-SEP	16481435017299	DoC	-
7	AC Adapter for HUB	BUFFALO	US100320	309-013708	N/A	-
8	Display	ACER	AF715	EU.F0108.00742 00008FPK01	DoC	-
9	Keyboard	DELL	SK-1000REW	M970312886	GYUR36SK	-
10	Mouse	Microsoft	Mouse Port Compatible Mouse2.1A	855729	C3KKMP3	-

3.11 Cable(s) used [EUT #2 LAN I/F mode]

No.	Cable	Length[m]	Shield	Connector	From	To	Comment
a	LAN cable	5.0	Unshielded	Metal	EUT	HUB	-
b	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Front CSF	-
c	Cut Sheet Feeder cable	0.1	Shielded	Metal	EUT	Rear CSF	-
d	AC power cord for EUT	3.0	Unshielded	Plastic	EUT	AC outlet	Accessory
e	LAN cable	1.0	Unshielded	Plastic	PC	HUB	-
f	DC cable for HUB	1.2	Unshielded	Plastic	HUB	AC adapter	-
g	RGB cable	2.2	Shielded	Metal	PC	Display	-
h	AC Power cord for Display	1.8	Unshielded	Plastic	Display	AC outlet	-
i	Keyboard cable	1.9	Unshielded	Metal	PC	Keyboard	-
j	Mouse cable	1.8	Unshielded	Metal	PC	Mouse	-
k	AC power cord for PC	1.8	Unshielded	Plastic	PC	AC outlet	-

CSF: Cut Sheet Feeder

3.12 System configuration [EUT #2 LAN mode]



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “2.1 EUT information”, “3.10 Peripheral(s) used” and “3.11 Cable(s) used”.

Note2: RGB cable(No.g) with one ferrite core is accessory for Display(No.8).

4. Conducted emission at mains port test information

4.1 Measurement procedure

- Frequency range: 0.15MHz to 30MHz
- Test receiver setting
 - Detector: Quasi-peak, Average
 - Bandwidth: 9 kHz

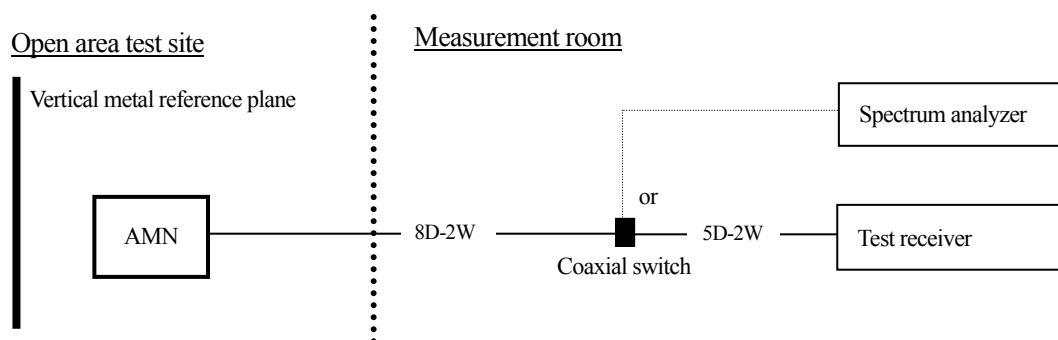
- Test procedure

Conducted emission at AC mains port measurements are performed at open area test site according to ANSI C63.4 section 7.

EUT is placed on wooden table of 2.3m(W) × 1.0m(D) × 0.8m(H) in size. EUT is connected to 50Ω/50μH Artificial Mains Network (AMN) which is placed on reference ground plane, and was placed 80cm away from EUT. Excess of AC power cable is bundled in center. Vertical Metal Reference Plane 2.4m (W) × 2.7m (H) in size is placed 0.4m away from EUT. AMN for peripheral is terminated in 50Ω.

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, support equipment, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, support equipment and test equipment are provided in order for them to warm up to their normal operating condition.

- Test configuration for Conducted emission at mains port



4.2 Test equipment for Conducted emission at mains port

Equipment	Company	Model No.	Serial No.	Cal. due
Spectrum analyzer	Agilent Technologies	8568B 85662A	2634A03228 2648A14093	Nov.2006
Test receiver	ROHDE&SCHWARZ	ESHS10	835499/012	Apr.2007
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407	8-693-20	Mar.2007
Line impedance stabilization network for peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-1094-5	Mar.2007
Coaxial cable	FUJIKURA	8D-2W/15m	YTCRFC#3C	Jul.2007
Coaxial cable	FUJIKURA	5D-2W/1m	YTCRFC#3R,3C-001	Jul.2007
Coaxial switch	ANRITSU	MP59B	6200331883	Jun.2007
50Ω terminator	HRS	UG-88/U	N/A	Mar.2007

4.3 Sample calculation

Conducted emission at mains port [Sample calculation]

Frequency	Class B limit		Sample of field strength calculation
	QP(dBμV)	AV(dBμV)	
0.15MHz to 0.5MHz	66 to 56*	56 to 46*	$\text{dB}\mu\text{V} = 20\log_{10}(\mu\text{V})$ Limit @ 6.770MHz : 60.0dBμV(Quasi-peak) : 50.0dBμV(Average) (Quasi peak) Reading = 51.2dBμV Cable loss + AMN factor = 0.3dB Total = 51.2 + 0.3 = 51.5dBμV Margin = 60.0 – 51.5 = 8.5dB (Average) Reading = 45.0dBμV Cable loss + AMN factor = 0.3dB Total = 45.0 + 0.3 = 45.3dBμV Margin = 50.0 – 45.3 = 4.7dB
0.5MHz to 5MHz	56	46	
5MHz to 30MHz	60	50	

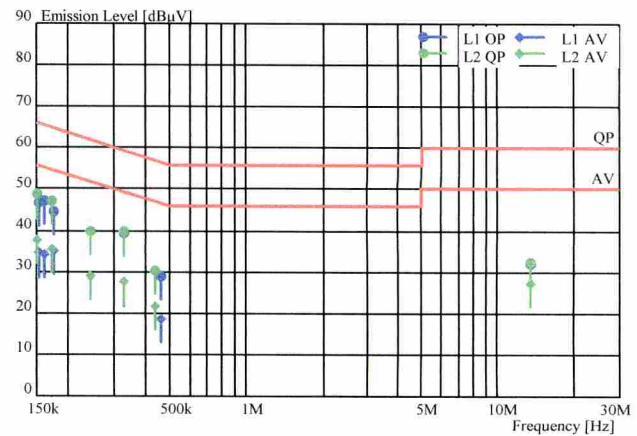
*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

4.4 Test data

***** CONDUCTED EMISSION at MAINS PORT *****

Sheet number : 1

Standard : FCC Part 15 Subpart B
Class : B
Terminal : Mains
Date of test : 2006/8/2
Test site : 3
Temperature [° C] : 27.3
Humidity [%] : 46.8
Operator : Y.Shindo
Signature : *Y. Shindo*
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33324A
Serial number : N/A
Test mode : Centronics mode
Comment :



Phase	Frequency [MHz]	Reading		Factor	Emission level		Limit		Margin		Comment
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
L1	0.151	45.4	33.2	1.3	46.7	34.5	65.9	55.9	19.2	21.4	
L1	0.159	45.8	32.9	1.3	47.1	34.2	65.5	55.5	18.4	21.3	
L1	0.174	43.3	33.8	1.3	44.6	35.1	64.8	54.8	20.2	19.7	
L1	0.329	38.9	27.1	0.5	39.4	27.6	59.5	49.5	20.1	21.9	
L1	0.457	28.6	18.2	0.4	29.0	18.6	56.7	46.7	27.7	28.1	
L1	13.578	31.4	26.7	0.6	32.0	27.3	60.0	50.0	28.0	22.7	
L2	0.150	47.5	36.3	1.3	48.8	37.6	66.0	56.0	17.2	18.4	*
L2	0.172	45.9	34.2	1.3	47.2	35.5	64.9	54.9	17.7	19.4	
L2	0.244	39.2	28.3	0.8	40.0	29.1	62.0	52.0	22.0	22.9	
L2	0.330	39.1	27.2	0.5	39.6	27.7	59.5	49.5	19.9	21.8	
L2	0.438	30.1	21.4	0.4	30.5	21.8	57.1	47.1	26.6	25.3	
L2	13.547	32.0	26.6	0.6	32.6	27.2	60.0	50.0	27.4	22.8	

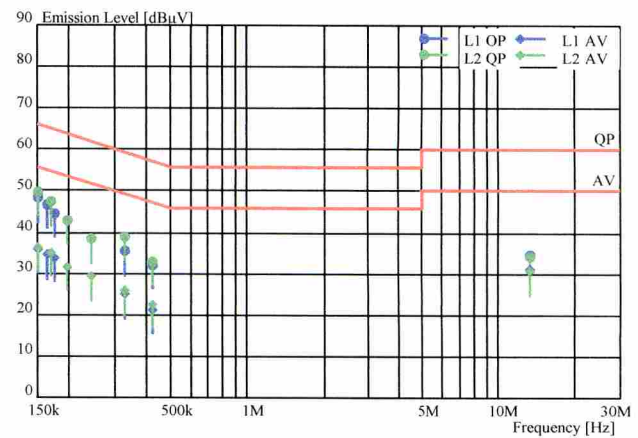
* : The worst emission Factor : LISN Factor + Cable Loss

Ver.2.80 F3#023

***** CONDUCTED EMISSION at MAINS PORT *****

Sheet number : 2

Standard : FCC Part 15 Subpart B
 Class : B
 Terminal : Mains
 Date of test : 2006/8/2
 Test site : 3
 Temperature [° C] : 27.3
 Humidity [%] : 46.8
 Operator : Y.Shindo
 Signature : *Y. Shindo*
 Company name : FUJITSU ISOTEC LIMITED
 EUT : Dot Matrix Printer
 Model number : M33324A
 Serial number : N/A
 Test mode : Serial mode
 Comment :



Phase	Frequency [MHz]	Reading		Factor	Emission level		Limit		Margin		Comment
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
L1	0.150	47.0	34.6	1.3	48.3	35.9	66.0	56.0	17.7	20.1	
L1	0.162	45.5	33.2	1.3	46.8	34.5	65.4	55.4	18.6	20.9	
L1	0.174	43.2	32.5	1.3	44.5	33.8	64.8	54.8	20.3	21.0	
L1	0.329	34.8	24.5	0.5	35.3	25.0	59.5	49.5	24.2	24.5	
L1	0.425	31.8	20.8	0.4	32.2	21.2	57.3	47.3	25.1	26.1	
L1	13.295	33.9	30.4	0.6	34.5	31.0	60.0	50.0	25.5	19.0	
L2	0.150	48.5	35.0	1.3	49.8	36.3	66.0	56.0	16.2	19.7	*
L2	0.169	46.2	33.9	1.3	47.5	35.2	65.0	55.0	17.5	19.8	
L2	0.195	41.5	30.5	1.3	42.8	31.8	63.8	53.8	21.0	22.0	
L2	0.243	37.5	28.5	0.8	38.3	29.3	62.0	52.0	23.7	22.7	
L2	0.330	38.4	25.3	0.5	38.9	25.8	59.5	49.5	20.6	23.7	
L2	0.425	32.7	22.2	0.4	33.1	22.6	57.3	47.3	24.2	24.7	
L2	13.325	33.7	30.0	0.6	34.3	30.6	60.0	50.0	25.7	19.4	

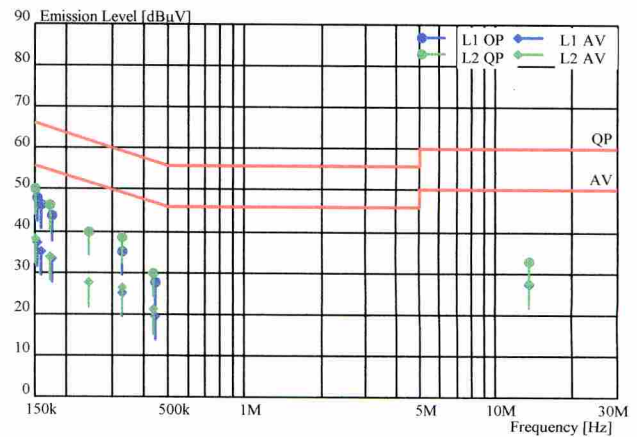
* : The worst emission Factor : LISN Factor + Cable Loss

Ver.2.80 F3#023

***** CONDUCTED EMISSION at MAINS PORT *****

Sheet number : 3

Standard : FCC Part 15 Subpart B
Class : B
Terminal : Mains
Date of test : 2006/8/2
Test site : 3
Temperature [° C] : 27.3
Humidity [%] : 46.8
Operator : Y. Shindo
Signature : *Y. Shindo*
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33324A
Serial number : N/A
Test mode : USB mode
Comment :



Phase	Frequency [MHz]	Reading		Factor	Emission level		Limit		Margin		Comment
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
L1	0.151	46.7	35.9	1.3	48.0	37.2	65.9	55.9	17.9	18.7	
L1	0.157	45.2	33.7	1.3	46.5	35.0	65.6	55.6	19.1	20.6	
L1	0.174	42.2	32.1	1.3	43.5	33.4	64.8	54.8	21.3	21.4	
L1	0.329	34.7	24.6	0.5	35.2	25.1	59.5	49.5	24.3	24.4	
L1	0.445	27.3	19.0	0.4	27.7	19.4	57.0	47.0	29.3	27.6	
L1	13.513	32.4	26.7	0.6	33.0	27.3	60.0	50.0	27.0	22.7	
L2	0.150	48.7	36.9	1.3	50.0	38.2	66.0	56.0	16.0	17.8	*
L2	0.170	44.8	32.5	1.3	46.1	33.8	65.0	55.0	18.9	21.2	
L2	0.244	39.1	26.7	0.8	39.9	27.5	62.0	52.0	22.1	24.5	
L2	0.330	37.8	25.7	0.5	38.3	26.2	59.5	49.5	21.2	23.3	
L2	0.438	29.4	20.6	0.4	29.8	21.0	57.1	47.1	27.3	26.1	
L2	13.547	32.4	27.0	0.6	33.0	27.6	60.0	50.0	27.0	22.4	

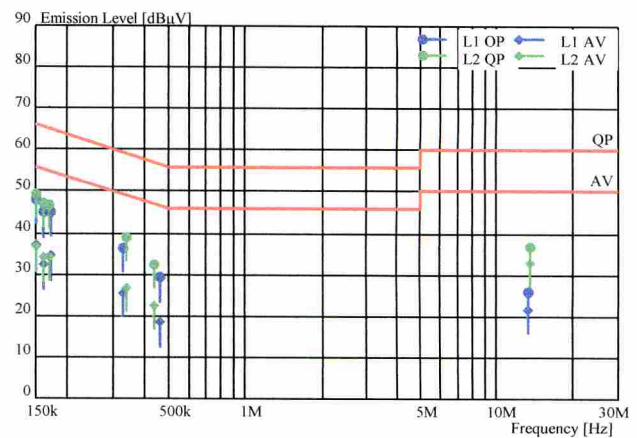
* : The worst emission Factor : LISN Factor + Cable Loss

Ver.2.80 F3#023

***** CONDUCTED EMISSION at MAINS PORT *****

Sheet number : 4

Standard : FCC Part 15 Subpart B
Class : B
Terminal : Mains
Date of test : 2006/8/2
Test site : 3
Temperature [° C] : 27.3
Humidity [%] : 46.8
Operator : Y.Shindo
Signature : *Y. Shindo*
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33324A
Serial number : N/A
Test mode : LAN mode
Comment :



Phase	Frequency [MHz]	Reading		Factor	Emission level		Limit		Margin		Comment
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
L1	0.150	46.8	35.9	1.3	48.1	37.2	66.0	56.0	17.9	18.8	
L1	0.159	43.6	31.0	1.3	44.9	32.3	65.5	55.5	20.6	23.2	
L1	0.171	43.7	33.2	1.3	45.0	34.5	64.9	54.9	19.9	20.4	
L1	0.329	35.8	25.2	0.5	36.3	25.7	59.5	49.5	23.2	23.8	
L1	0.459	28.9	18.0	0.4	29.3	18.4	56.7	46.7	27.4	28.3	
L1	13.295	25.2	21.1	0.6	25.8	21.7	60.0	50.0	34.2	28.3	
L2	0.150	48.0	35.4	1.3	49.3	36.7	66.0	56.0	16.7	19.3	*
L2	0.159	45.9	32.8	1.3	47.2	34.1	65.5	55.5	18.3	21.4	
L2	0.169	45.5	33.0	1.3	46.8	34.3	65.0	55.0	18.2	20.7	
L2	0.337	38.6	26.4	0.5	39.1	26.9	59.3	49.3	20.2	22.4	
L2	0.438	32.2	22.1	0.4	32.6	22.5	57.1	47.1	24.5	24.6	
L2	13.547	36.2	32.5	0.6	36.8	33.1	60.0	50.0	23.2	16.9	

* : The worst emission Factor : LISN Factor + Cable Loss

Ver.2.80 F3#023

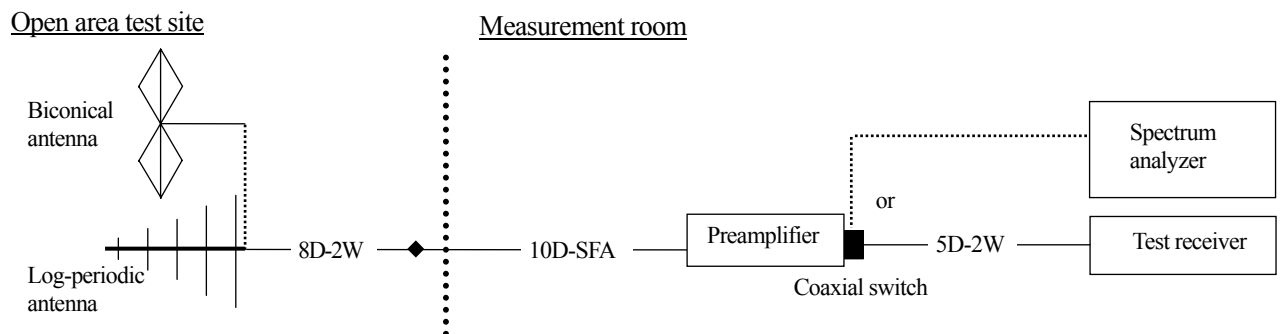
5. Radiated emission test information

5.1 Measurement procedure

- Frequency range: 30MHz to 1000MHz
- Test receiver setting
 - Detector: Quasi-peak
 - Bandwidth: 120 kHz
- Test procedure

Radiated emission measurements are performed at open area test site according to ANSI C63.4 section 8. EUT is placed on wooden table of 2.3m(W) × 1.0m(D) × 0.8m(H) in size. Distance from antenna to EUT is 3m. EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Then, emission measurements up to 1000MHz were performed with test receiver in above setting. In order to find the maximum emissions, antenna is adjusted between 1m and 4m in height and varied its polarization (horizontal and vertical), and EUT azimuth was also varied by rotating turntable 0 to 360 degrees. Sufficient time for EUT, support equipment and test equipment is provided in order for them to warm up to their normal operating condition.

- Test configuration for Radiated emission



5.2 Test equipment for Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. due
Spectrum analyzer	Agilent Technologies	8568B 85662A	2634A03228 2648A14093	Nov. 2006
Test receiver	Kyoritsu Electrical Works, Ltd.	KNM-5002	4N-200-5	Dec. 2006
Test receiver	Kyoritsu Electrical Works, Ltd.	KCV-6002	4-288-2	Dec. 2006
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	1488	Jun. 2007
Log periodic antenna	Schwarzbeck	UHALP9108A	0398	Jun. 2007
Coaxial cable	FUJIKURA	8D-SFA/15m	YTCRFC#3R-001	Jul. 2007
Coaxial cable	FUJIKURA	8D-SFA/15m	YTCRFC#3R-002	Jul. 2007
Coaxial cable	FUJIKURA	8D-2W/8m	YTCRFC#3R-003	Jul. 2007
Coaxial cable	FUJIKURA	5D-2W/1m	YTCRFC#3R,3C-001	Jul. 2007
Preamplifier	NOGAWA	5331	060110	Jul. 2007
Coaxial switch	ANRITSU	MP59B	6200331883	Jun. 2007
Site attenuation	ZACTA Technology Corp.	N/A	N/A	Jul. 2007

5.3 Sample calculation

Radiated emission [Sample calculation]

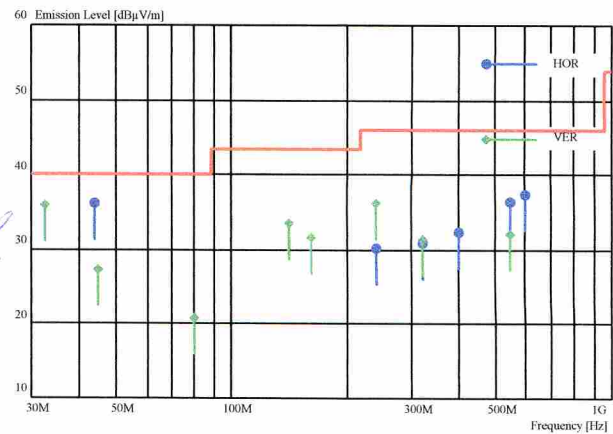
Frequency	Class B limit	Sample of field strength calculation
	(dBμV/m)	
30MHz to 88MHz	40.0	$\text{dB}\mu\text{V}/\text{m} = 20\log_{10}(\mu\text{V}/\text{m})$ Limit @ 147.6MHz : 43.5dBμV/m Reading = 42.8dBμV Ant.factor + Cable loss – Amp. Gain= 14.2 + 3.0 – 30.0= 12.8dB/m Total = 42.8 – 12.8 = 30.0dBμV/m Margin = 43.5 – 30.0 = 13.5dB
88MHz to 216MHz	43.5	
216MHz to 960MHz	46.0	
Above 960MHz	54.0	

5.4 Test data

***** RADIATED EMISSION *****

Sheet number : 1

Standard : FCC Part 15 Subpart B
Class : B
Distance [m] : 3
Date of test : 2006/6/16
Test site : 3
Temperature [°C] : 21.3
Humidity [%] : 69.5
Operator : Y. Takahashi
Signature : *Yoshinori Takahashi*
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33324A
Serial number : N/A
Test mode : Centronics I/F
Comment :



Antenna Pol.	Height	Table Radian	Reading Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Comment
HOR/VER	[m]	[Deg.]	[MHz]	[dBμV]	[dB/m]	[dBμV/m]	[dBμV/m]	[dB]	
VER	1.0	225	80.02	44.1	-23.4	20.7	40.0	19.3	
VER	1.0	280	32.14	48.1	-12.2	35.9	40.0	4.1	
HOR	4.0	95	43.67	52.3	-16.2	36.1	40.0	3.9	*
VER	1.0	270	44.70	43.9	-16.6	27.3	40.0	12.7	
VER	1.0	80	140.05	48.2	-14.7	33.5	43.5	10.0	
VER	1.0	260	160.01	45.4	-13.8	31.6	43.5	11.9	
VER	1.0	180	240.00	46.8	-10.6	36.2	46.0	9.8	
HOR	4.0	65	240.02	40.9	-10.6	30.3	46.0	15.7	
HOR	1.1	190	320.13	44.8	-13.8	31.0	46.0	15.0	
VER	1.7	285	320.14	45.1	-13.8	31.3	46.0	14.7	
HOR	1.1	215	400.03	43.7	-11.4	32.3	46.0	13.7	
HOR	2.3	200	550.02	44.7	-8.3	36.4	46.0	9.6	
VER	1.8	10	550.02	40.5	-8.3	32.2	46.0	13.8	
HOR	2.0	210	600.02	44.7	-7.2	37.5	46.0	8.5	

* : The worst emission.

Factor : Antenna Factor + Cable Loss - Amp Gain

Ver.2.80 F3#022

***** RADIATED EMISSION *****

Sheet number : 2

Standard : FCC Part 15 Subpart B

Class : B

Distance [m] : 3

Date of test : 2006/8/2

Test site : 3

Temperature [°C] : 26.7

Humidity [%] : 53.8

Operator : Y. Shindo

Signature : *Yuki Shindo*

Company name : FUJITSU ISOTEC LIMITED

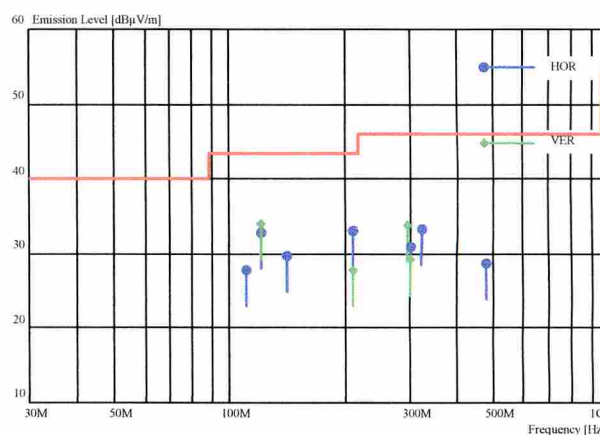
EUT : Dot Matrix Printer

Model number : M33324A

Serial number : N/A

Test mode : Serial mode

Comment :



Antenna		Table	Reading		Factor	Emission	Limit	Margin	Comment
Pol.	Height	Radian	Frequency	Level		Level			
HOR/VER	[m]	[Deg.]	[MHz]	[dBμV]	[dB/m]	[dBμV/m]	[dBμV/m]	[dB]	
HOR	3.7	140	110.06	45.2	-17.3	27.9	43.5	15.6	
HOR	3.9	300	120.05	48.8	-15.9	32.9	43.5	10.6	
VER	1.0	55	120.07	50.0	-15.9	34.1	43.5	9.4	*
HOR	2.4	190	140.11	44.3	-14.7	29.6	43.5	13.9	
HOR	1.5	155	210.15	44.7	-11.7	33.0	43.5	10.5	
VER	1.0	105	210.15	39.6	-11.7	27.9	43.5	15.6	
VER	1.0	115	294.24	42.6	-8.7	33.9	46.0	12.1	
HOR	1.0	115	300.15	45.1	-14.3	30.8	46.0	15.2	
VER	1.8	210	300.15	43.5	-14.3	29.2	46.0	16.8	
HOR	1.0	160	320.18	47.2	-13.8	33.4	46.0	12.6	
HOR	1.0	225	480.07	38.1	-9.4	28.7	46.0	17.3	

* : The worst emission.

Factor : Antenna Factor + Cable Loss - Amp Gain

Ver.2.80 F3#023

***** RADIATED EMISSION *****

Sheet number : 3

Standard : FCC Part 15 Subpart B

Class : B

Distance [m] : 3

Date of test : 2006/8/2

Test site : 3

Temperature [°C] : 26.7

Humidity [%] : 53.8

Operator : Y. Shindo

Signature : *Yuki Shindo*

Company name : FUJITSU ISOTEC LIMITED

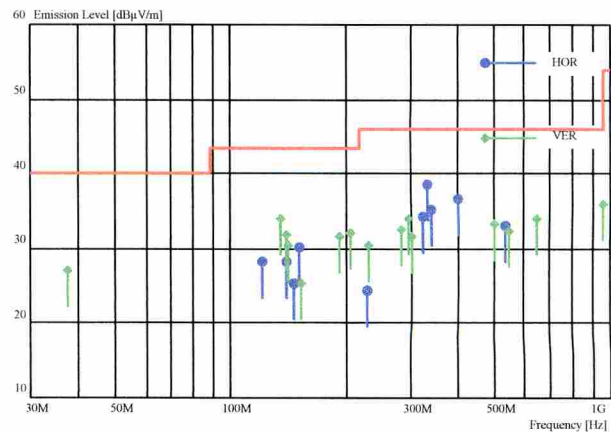
EUT : Dot Matrix Printer

Model number : M33324A

Serial number : N/A

Test mode : USB mode

Comment :



Antenna		Table	Reading		Factor	Emission	Limit	Margin	Comment
Pol.	Height	Radian	Frequency	Level		Level			
HOR/VER	[m]	[Deg.]	[MHz]	[dBμV]	[dB/m]	[dBμV/m]	[dBμV/m]	[dB]	
VER	1.0	175	37.42	41.1	-14.0	27.1	40.0	12.9	
HOR	2.7	235	120.09	44.2	-15.9	28.3	43.5	15.2	
VER	1.0	215	135.07	49.0	-15.0	34.0	43.5	9.5	
HOR	2.5	335	138.77	43.0	-14.8	28.2	43.5	15.3	
VER	1.0	195	138.82	46.6	-14.8	31.8	43.5	11.7	
VER	1.0	325	140.03	45.2	-14.7	30.5	43.5	13.0	
HOR	2.0	240	145.72	39.9	-14.5	25.4	43.5	18.1	
HOR	2.2	165	150.06	44.6	-14.3	30.3	43.5	13.2	
VER	1.0	310	152.25	39.5	-14.2	25.3	43.5	18.2	
VER	1.0	280	192.29	43.9	-12.2	31.7	43.5	11.8	
VER	1.0	215	205.94	43.8	-11.8	32.0	43.5	11.5	
HOR	2.0	320	227.08	35.5	-11.1	24.4	46.0	21.6	
VER	1.0	300	230.08	41.7	-11.2	30.5	46.0	15.5	
VER	1.0	275	280.16	41.9	-9.2	32.7	46.0	13.3	
VER	1.0	115	294.20	42.8	-8.7	34.1	46.0	11.9	
VER	2.2	155	300.15	46.0	-14.3	31.7	46.0	14.3	
HOR	1.0	60	320.14	48.1	-13.8	34.3	46.0	11.7	
HOR	1.3	115	330.20	52.1	-13.6	38.5	46.0	7.5	*
HOR	1.0	110	337.66	48.7	-13.4	35.3	46.0	10.7	
HOR	1.0	210	400.02	48.0	-11.4	36.6	46.0	9.4	
VER	1.1	170	499.99	43.0	-9.6	33.4	46.0	12.6	
HOR	1.7	150	534.28	41.8	-8.8	33.0	46.0	13.0	
VER	1.0	215	550.00	40.7	-8.4	32.3	46.0	13.7	
VER	1.0	215	650.00	40.6	-6.6	34.0	46.0	12.0	
VER	1.1	165	960.09	38.7	-2.7	36.0	54.0	18.0	

* : The worst emission.

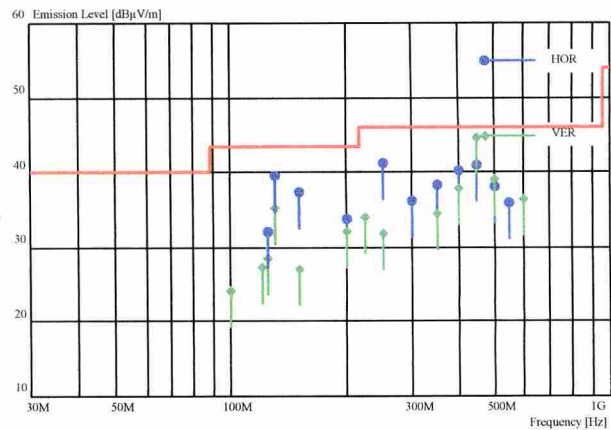
Factor : Antenna Factor + Cable Loss - Amp Gain

Ver.2.80 F3#023

***** RADIATED EMISSION *****

Sheet number : 4

Standard : FCC Part 15 Subpart B
 Class : B
 Distance [m] : 3
 Date of test : 2006/6/30
 Test site : 3
 Temperature [°C] : 24.3
 Humidity [%] : 49.1
 Operator : Y. Takahashi
 Signature : *Y. Takahashi*
 Company name : FUJITSU ISOTEC LIMITED
 EUT : Dot Matrix Printer
 Model number : M33324A
 Serial number : N/A
 Test mode : H Print mode
 Comment : LAN I/F



Antenna Pol.	Height [m]	Table Radian [Deg.]	Reading Frequency [MHz]	Level [dBμV]	Factor [dB/m]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Comment
HOR/VER									
VER	1.0	145	100.06	43.3	-19.0	24.3	43.5	19.2	
VER	1.0	285	120.04	43.3	-15.9	27.4	43.5	16.1	
VER	1.0	160	125.01	44.1	-15.6	28.5	43.5	15.0	
HOR	2.4	195	125.02	47.7	-15.6	32.1	43.5	11.4	
VER	1.0	140	130.07	50.5	-15.3	35.2	43.5	8.3	
HOR	2.3	120	130.09	54.9	-15.3	39.6	43.5	3.9	
VER	1.0	170	150.02	41.3	-14.2	27.1	43.5	16.4	
HOR	2.3	185	150.03	51.7	-14.2	37.5	43.5	6.0	
HOR	1.6	275	200.02	45.6	-11.7	33.9	43.5	9.6	
VER	1.0	200	200.02	43.8	-11.7	32.1	43.5	11.4	
VER	1.0	225	225.03	45.1	-11.1	34.0	46.0	12.0	
VER	1.0	185	250.01	42.4	-10.6	31.8	46.0	14.2	
HOR	1.4	240	250.03	51.8	-10.6	41.2	46.0	4.8	
HOR	1.0	200	300.03	50.3	-14.2	36.1	46.0	9.9	
HOR	1.0	195	350.02	51.5	-13.2	38.3	46.0	7.7	
VER	1.9	310	350.20	47.8	-13.2	34.6	46.0	11.4	
HOR	1.0	50	400.01	51.8	-11.4	40.4	46.0	5.6	
VER	1.6	310	400.02	49.4	-11.4	38.0	46.0	8.0	
HOR	1.0	25	450.02	51.1	-10.2	40.9	46.0	5.1	
VER	1.2	150	450.02	54.9	-10.2	44.7	46.0	1.3	*
HOR	1.0	55	500.00	47.9	-9.7	38.2	46.0	7.8	
VER	1.2	180	500.00	48.9	-9.7	39.2	46.0	6.8	
HOR	1.0	70	550.00	44.2	-8.3	35.9	46.0	10.1	
VER	1.2	200	600.01	43.7	-7.2	36.5	46.0	9.5	

* : The worst emission.

Factor : Antenna Factor + Cable Loss - Amp Gain

Ver.2.80 F3#022

6. Uncertainty of measurement

Expanded uncertainties stated were calculated with a coverage Factor $k=2$.

Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port (150kHz - 30MHz)	$\pm 2.6\text{dB}$
Radiated emission (30MHz - 1000MHz)	$\pm 4.1\text{dB}$
Radiated emission (1000MHz - 26GHz)	$\pm 3.6\text{dB}$

7. Laboratory description

1. Location: ZACTA Technology Corporation Yonezawa Testing Center

4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan

Phone: +81-238-28-2880 Fax: +81-238-28-2888

2. Facility type:

Site name: Site 1, Site 2 and Site 3 - Total 3 sites.

Site type: Whether protected site

*3m/10m Radiated emission & Conducted emission testing can be performed on each site

3m anechoic chamber

Shielded room

3. Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) Industry Canada Oats site filing: Pursuant to RSS 212, Issue 1(Provisional)

Site name	Sites on file: Oats 3m/10m	Filing date (Terms of validity: 3 years)
Site 1	4224-1	January 11, 2005
Site 2	4224-2	January 11, 2005
Site 3	4224-3	January 11, 2005

3) VCCI site filing: Pursuant to V-5/2003.04 VCCI regulations for registration of measurement facilities

Site name	Radiated emission registration No.	Conducted emission registration No.	Duration of registration
Site 1	R-136	C-132	September 30, 2006
Site 2	R-137	C-133	September 30, 2006
Site 3	R-138	C-134	September 30, 2006

4) ETL SEMKO authorization:

Authorized as an EMC test laboratory.

5) TUV Rheinland authorization:

Authorized as an EMC test laboratory.

8. Configuration photographs

Conducted emission at mains port [Centronics I/F mode]



The photographs show maximized emission configuration.

Radiated emission [Centronics I/F mode]



The photographs show maximized emission configuration.

Conducted emission at mains port [Serial I/F mode]



The photographs show maximized emission configuration.

Radiated emission [Serial I/F mode]



The photographs show maximized emission configuration.

Conducted emission at mains port [USB I/F mode]



The photographs show maximized emission configuration.

Radiated emission [USB I/F mode]



The photographs show maximized emission configuration.

Conducted emission at mains port [LAN I/F mode]



The photographs show maximized emission configuration.

Radiated emission [LAN I/F mode]



The photographs show maximized emission configuration.