

TEST REPORT

Report number : Z01C-04373

Issue date : January 17, 2005

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

FCC Part15 Subpart B

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-gun, Fukushima 960-0695 Japan Phone: +81-24-575-2191 Fax: +81-24-574-2277
Equipment under test (EUT)	: Dot Matrix Printer
FCC ID	: KHZ001M33331A
Trade name	: FUJITSU ISOTEC
Model number	: M33331A
Serial number	: N/A
EUT condition	: Pre-production

Date of test : December 6, 7, 2004

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

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: Kiyoshi Endo
General Manager of EMC Technical Division



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1. Summary of Test

1.1 Purpose of the test

EUT, FCC ID: KHZ001M33331A, has been granted on Feb. 20, 2004. Purpose of test is retest of EUT by adding optional LAN card. There are three printing mode in total; Parallel I/F, USB I/F and LAN I/F mode. LAN I/F mode only is reported in this report because it is the worst mode of operation. When the LAN cable is connected, the parallel and USB cable cannot be used. This is specified in users manual.

1.2 Test standards

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.

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	M33331A	N/A	KHZ001M33331A	-
2	LAN Card	FUJITSU ISOTEC LIMITED	KA02004-0225	006092 0F3858	N/A	Option

Max. used frequency : 33MHz

Oscillator(s)/Crystal(s) : Oscillator 4.0MHz (for Main) /6.0MHz (for USB) /
 Operating frequency 4.125MHz, 25MHz (for LAN)
 Processor clock 16MHz (for Main) /12MHz (for USB) /
 33MHz, 25MHz (for LAN)
 Switching 37KHz to 56KHz
 Frequencies

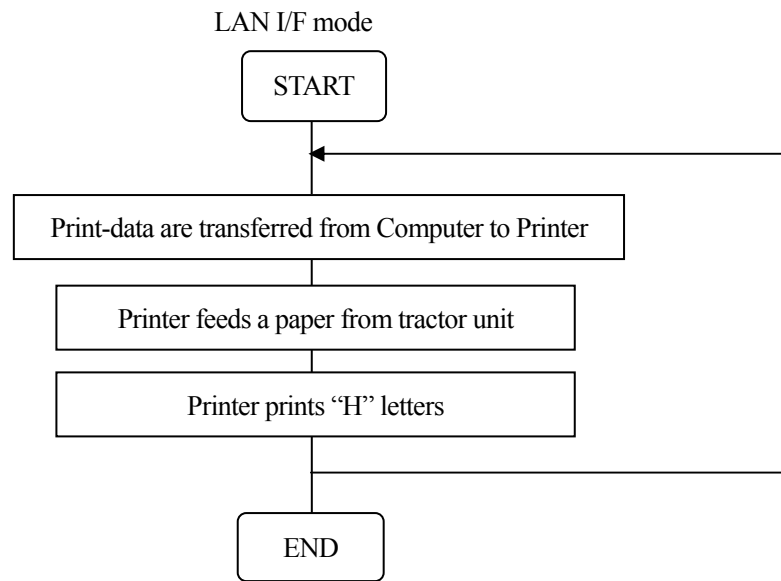
Power ratings : AC 100-120V 50/60Hz
 [Power supply for EUT in testing was AC 120V 60Hz.]

Port(s) : Centronics I/F
 USB I/F
 LAN I/F
 RS232C
 AC IN

Size : (W) 625 × (D) 250 × (H) 300 mm

Variation of model(s) : Not applicable

2.2 Operating mode



3. Configuration of equipment

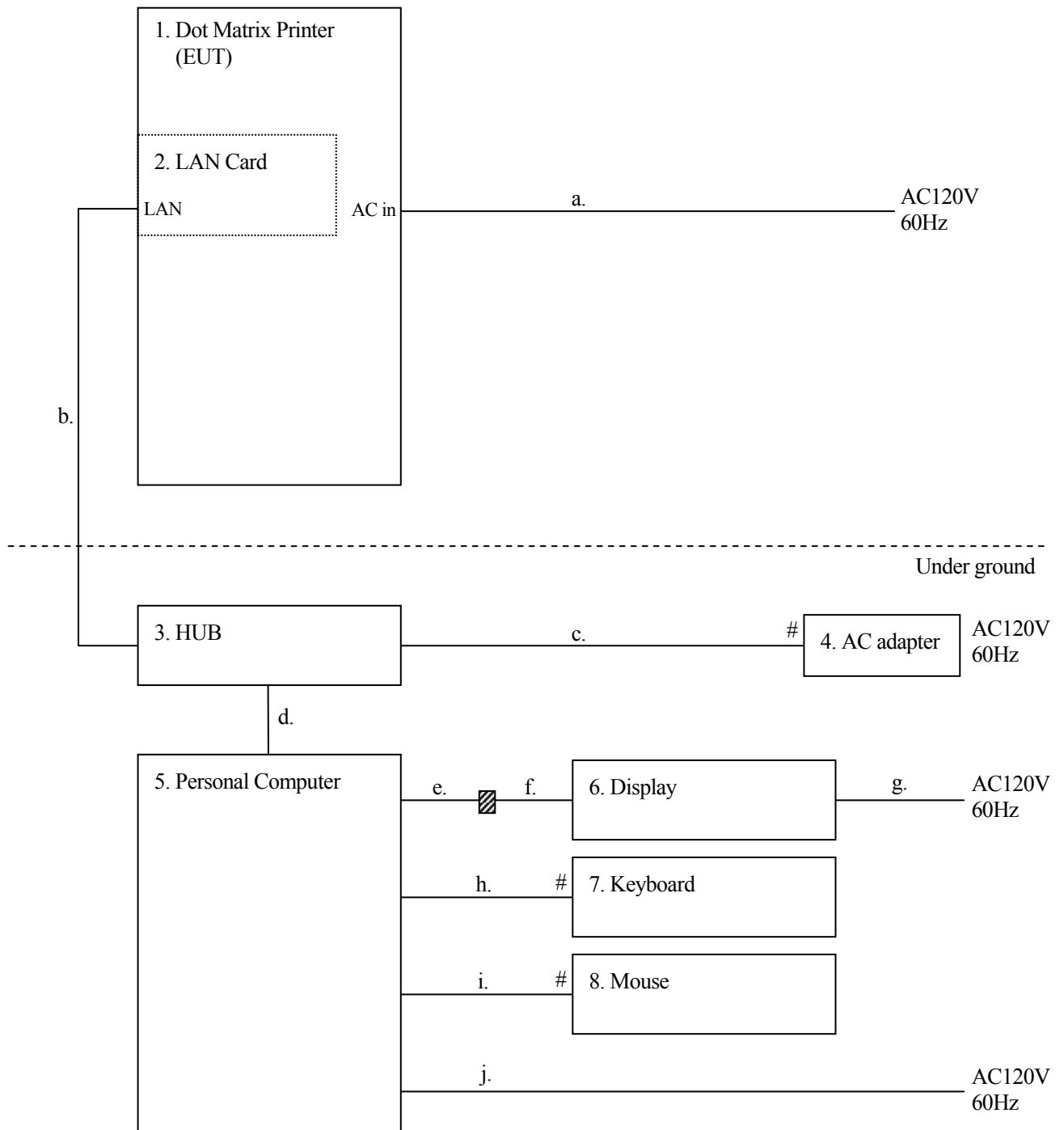
3.1 Peripheral(s) used

No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
3	HUB	BUFFALO	LSW-TX-SEP	16481435028271	N/A	FCC class A approved
4	AC adapter for HUB	BUFFALO	US100320	309-013611	N/A	-
5	Personal Computer	DELL	DCM	SFCY8	E2KZERM	-
6	Display	ACER	AF715	EU.F0108.007420 0008FPK01	DoC	-
7	Keyboard	DELL	SK-8000	N/A	DoC	-
8	Mouse	DELL	M-S34	LNB13200724	DZL211029	-

3.2 Cable(s) used

No.	Cable	Length[m]	Shield	Connector	From	To	Comment
a	AC power cord for EUT	2.0	Unshielded	Plastic	EUT	AC outlet	Accessory
b	LAN cable	5.0	Unshielded	Plastic	EUT	HUB	-
c	DC cable for HUB AC adapter	1.2	Shielded	Metal	HUB	AC adapter	-
d	LAN cable	1.2	Unshielded	Plastic	HUB	PC	-
e	Exchange cable	0.3	Shielded	Metal	PC	Exchange Connector	-
f	RGB cable	1.5	Shielded	Metal	Exchange Connector	Display	-
g	AC power cord for Display	1.8	Unshielded	Plastic	Display	AC outlet	-
h	Keyboard cable	2.1	Unshielded	Metal	PC	Keyboard	-
i	Mouse cable	1.8	Shielded	Metal	PC	Mouse	-
j	AC power cord for PC	1.8	Unshielded	Plastic	PC	AC outlet	-

3.3 System configuration



Note 1: 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”.

4. Conducted emission at mains port test information

4.1 Measurement procedure

Test receiver setting

- Detector: Quasi-peak, Average
- Bandwidth: 9kHz

Frequency range: 0.15MHz to 30MHz

Vertical Metal Reference Plane: 2.4m(W) × 2.7m(H) in size was placed 0.4m away from EUT.

Line Impedance Stabilization Network

- LISN for EUT was placed 80cm away from EUT.

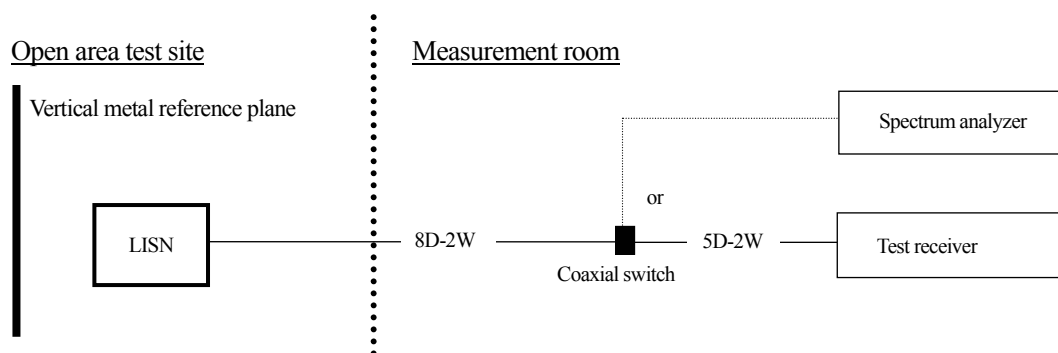
Reported emissions

- At least 6 points of maximum emission are reported.
- Maximum emission configuration was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Others

- Table: Wooden table of 2.3m(W) × 1.0m(D) × 0.8m(H) in size
- Sufficient time for EUT, support equipment and test equipment were 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	2732A03847 2648A13585	Mar. 2005
Test receiver	ROHDE&SCHWARZ	ESHS10	100017	Mar. 2005
Artificial mains network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-875-19	Mar. 2005
Artificial mains network for peripheral	Kyoritsu Electrical Works, Ltd.	KNW-407	8-693-20	Mar. 2005
50Ω terminator	SUHNER	65-BNC-50-0-7	N/A	Apr. 2005
Coaxial cable	FUJIKURA	8D-2W/15m	YTCRFC#2C	Apr. 2005
Coaxial cable	FUJIKURA	8D-2W/1m	YTCRFC#2R,2C-004	Apr. 2005
Coaxial switch	ANRITSU	MP59B	6100097264	Apr. 2005

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

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)
0.5MHz to 5MHz	56	46	(Quasi peak) Reading = 51.2dBμV Cable loss + LISN factor = 0.3dB Total = 51.2 + 0.3 = 51.5dBμV Margin = 60.0 – 51.5 = 8.5dB
5MHz to 30MHz	60	50	(Average) Reading = 45.0dBμV Cable loss + LISN factor = 0.3dB Total = 45.0 + 0.3 = 45.3dBμV Margin = 50.0 – 45.3 = 4.7dB

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

4.4 Uncertainty

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

±3.0dB

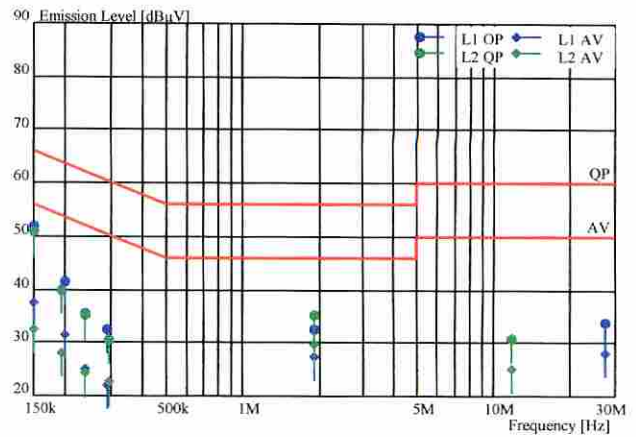
··· For Conducted emission

4.5 Test data

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

Sheet number : I

Standard : FCC Part 15 Subpart B
Class : B
Terminal : Mains
Date of test : 2004/12/6
Test site : 2
Temperature [°C] : 21.0
Humidity [%] : 33.6
Operator : Y.Shindo
Signature : *Yuki Shindo*
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33331A
Serial number : N/A
Test mode : H Print LAN I/F mode
Comment :



Phase	Frequency		Reading		Factor	Emission level		Limit		Margin		Comment
	[MHz]		QP	AV		QP	AV	QP	AV	QP	AV	
			[dBμV]	[dBμV]		[dBμV]	[dBμV]	[dBμV]	[dBμV]	[dB]	[dB]	
L1	0.150		50.7	36.3	1.3	52.0	37.6	66.0	56.0	14.0	18.4	*
L1	0.198		40.4	30.3	1.3	41.7	31.6	63.7	53.7	22.0	22.1	
L1	0.238		34.8	24.4	0.8	35.6	25.2	62.2	52.2	26.6	27.0	
L1	0.293		31.7	21.2	0.8	32.5	22.0	60.4	50.4	27.9	28.4	
L1	1.902		32.1	27	0.4	32.5	27.4	56.0	46.0	23.5	18.6	
L1	27.503		32.7	27.1	1.0	33.7	28.1	60.0	50.0	26.3	21.9	
L2	0.150		49.5	31.1	1.3	50.8	32.4	66.0	56.0	15.2	23.6	
L2	0.191		38.6	26.8	1.3	39.9	28.1	64.0	54.0	24.1	25.9	
L2	0.240		34.2	23.5	0.8	35.0	24.3	62.1	52.1	27.1	27.8	
L2	0.298		29.8	21.8	0.8	30.6	22.6	60.3	50.3	29.7	27.7	
L2	1.922		34.8	29.4	0.4	35.2	29.8	56.0	46.0	20.8	16.2	
L2	11.889		30.3	24.6	0.6	30.9	25.2	60.0	50.0	29.1	24.8	

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

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5. Radiated emission test information

5.1 Measurement procedure

Test receiver setting

- Detector: Quasi-peak
- Band width: 120kHz

Frequency range: 30MHz to 1000MHz

Distance: 3 m

Turntable rotated: 0 to 360 degrees

Antenna position

- Height: 1m to 4m
- Polarity: Horizontal and Vertical

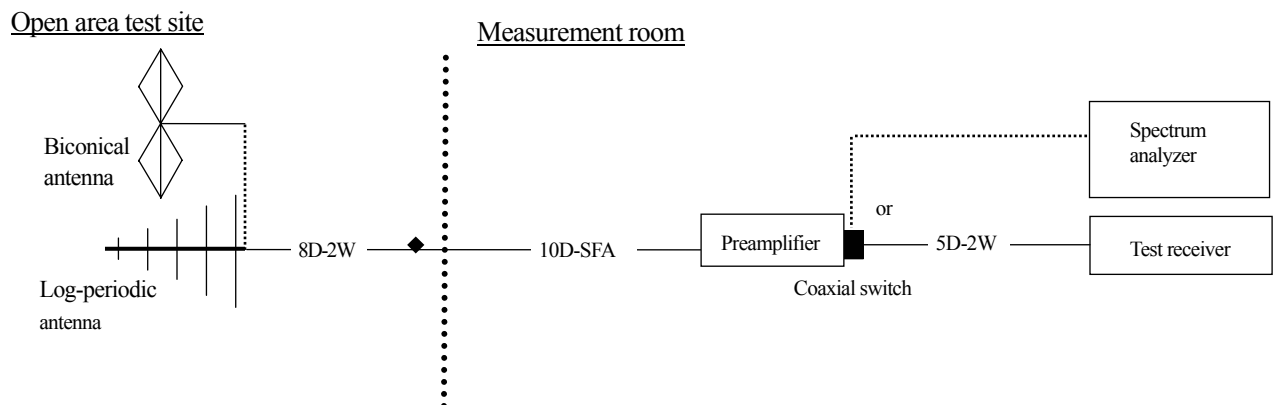
Reported emissions

- At least 6 points of maximum emission are reported.
- Maximum emission configuration was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Others

- Table: Wooden table of 2.3m(W) × 1.0m(D) × 0.8m(H) in size
- Sufficient time for EUT, support equipment and test equipment were 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	2732A03847 2648A13585	Mar. 2005
Test receiver	ROHDE&SCHWARZ	ESVS10	832655/0012	May. 2005
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	1563	Apr. 2005
Log periodic antenna	Schwarzbeck	UHALP9108A	0438	Apr. 2005
Coaxial cable	FUJIKURA	8D-SFA/15m	YTCRFC#2R-001	Apr. 2005
Coaxial cable	FUJIKURA	8D-SFA/15m	YTCRFC#2R-002	Apr. 2005
Coaxial cable	FUJIKURA	8D-2W/8m	YTCRFC#2R-003	Apr. 2005
Coaxial cable	FUJIKURA	8D-2W/1m	YTCRFC#2R,2C-004	Apr. 2005
Preamplifier	ANRITSU	MH648A	M96157	Apr. 2005
Coaxial switch	ANRITSU	MP59B	6100097264	Apr. 2005
Site attenuation	ZACTA Technology Corp.	N/A	N/A	Jun. 2005

*The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

5.3 Sample calculation

Radiated emission [Sample calculation]

Frequency	Class B limit	Sample of field strength calculation
	QP(dB μ V/m)	
30MHz to 88MHz	40.0	$\text{dB}\mu\text{V/m} = 20\log_{10}(\mu\text{V/m})$ 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 Uncertainty

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

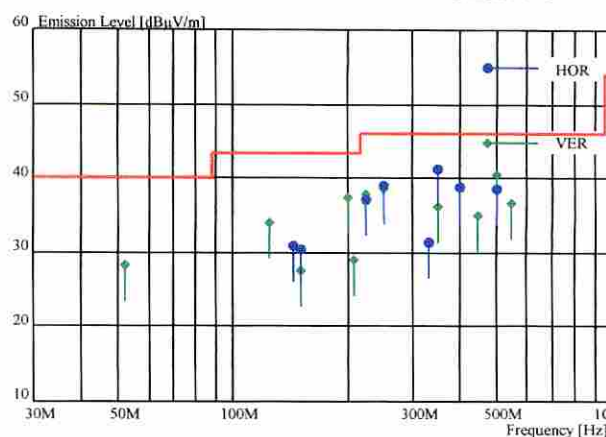
$\pm 5.2\text{dB}$	... For 3m Radiated emission
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5.5 Test data

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

Sheet number : 1

Standard : FCC Part 15 Subpart B
 Class : B
 Distance [m] : 3
 Date of test : 2004/12/7
 Test site : 2
 Temperature [°C] : 22.9
 Humidity [%] : 35.6
 Operator : Y.Shindo
 Signature : *Yuki Shindo*
 Company name : FUJITSU ISOTEC LIMITED
 EUT : Dot Matrix Printer
 Model number : M33331A
 Serial number : N/A
 Test mode : H Print LAN I/F mode
 Comment :



Antenna Pol.	Height [m]	Table Radian [Deg.]	Reading Frequency [MHz]	Reading Level [dBμV]	Factor [dB/m]	Emission Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Comment
HOR/VER									
VER	1.0	125	51.99	46.1	-17.9	28.2	40.0	11.8	
VER	1.0	255	125.00	48.7	-14.6	34.1	43.5	9.4	
HOR	2.4	300	143.30	44.3	-13.5	30.8	43.5	12.7	
HOR	2.3	150	150.00	43.6	-13.1	30.5	43.5	13.0	
VER	1.0	205	150.00	40.7	-13.1	27.6	43.5	15.9	
VER	1.6	145	200.02	48.4	-10.9	37.5	43.5	6.0	
VER	1.0	85	208.53	39.7	-10.6	29.1	43.5	14.4	
HOR	1.9	315	225.00	47.6	-10.4	37.2	46.0	8.8	
VER	1.4	135	225.03	48.3	-10.4	37.9	46.0	8.1	
HOR	1.4	330	250.00	48.7	-9.7	39.0	46.0	7.0	
VER	1.2	135	250.00	48.4	-9.7	38.7	46.0	7.3	
HOR	1.0	285	332.31	44.1	-12.8	31.3	46.0	14.7	
HOR	1.0	5	350.00	53.5	-12.2	41.3	46.0	4.7	*
VER	1.3	250	350.00	48.5	-12.2	36.3	46.0	9.7	
HOR	1.0	5	400.00	48.9	-10.1	38.8	46.0	7.2	
VER	1.3	150	450.00	44.2	-9.3	34.9	46.0	11.1	
HOR	1.0	285	500.00	46.7	-8.2	38.5	46.0	7.5	
VER	1.0	50	500.00	48.8	-8.2	40.6	46.0	5.4	
VER	1.0	270	550.00	43.9	-7.3	36.6	46.0	9.4	

* : The worst emission.

Factor : Antenna Factor + Cable Loss - Amp Gain

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6. 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) FCC site filing: Pursuant to CFR47 § 2.948

Site name	Filing date (Terms of validity: 3 years)
Site 1, Site 2 and Site 3	December 17, 2002

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 31, 2002
Site 2	4224-2	January 31, 2002
Site 3	4224-3	January 31, 2002

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) NVLAP accreditation:

NVLAP Lab. code: 200306-0

This test report must not be used by client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

5) ETL SEMKO authorization:

Authorized as an EMC test laboratory.

6) TUV Rheinland authorization:

Authorized as an EMC test laboratory.