

TEST REPORT

Report number : Z01C-04021

Issue date : February 20, 2004

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	: KHZ001M33330A
Trade name	: FUJITSU ISOTEC
Model number	: M33330A
Serial number	: N/A
EUT condition	: Pre-production

Date of test : February 20, 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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Table of contents

	Page
<i>1. Summary of Test</i>	<i>3</i>
1.1 Test standards	3
1.2 Emission measurement	3
1.3 Note.....	3
<i>2. Equipment Under Test.....</i>	<i>4</i>
2.1 EUT information	4
2.2 Operating mode.....	4
<i>3. Configuration of equipment.....</i>	<i>5</i>
3.1 Peripheral(s) used [RS232C I/F mode]	5
3.2 Cable(s) used [RS232C I/F mode]	5
3.3 System configuration [RS232C I/F mode]	6
<i>4. Conducted emission at mains port test information</i>	<i>7</i>
4.1 Measurement procedure.....	7
4.2 Test equipment for Conducted emission at mains port.....	8
4.3 Sample calculation	8
4.4 Uncertainty	8
4.5 Test data	9
<i>5. Radiated emission test information</i>	<i>10</i>
5.1 Measurement procedure.....	10
5.2 Test equipment for Radiated emission	11
5.3 Sample calculation	11
5.4 Uncertainty	11
5.5 Test data	12
<i>6. Laboratory description</i>	<i>13</i>

1. Summary of Test

1.1 Test standards

FCC Part 15 Subpart B

1.2 Emission measurement

Test item	Test method	Classification of EUT	Test
Conducted emission at mains port	ANSI C63.4-2001	Class B	Applied
Radiated emission	ANSI C63.4-2001	Class B	Applied

Note : None.

1.3 Note

EUT has similar model: M33331A. Model: M33331A was tested in full mode (Centronics I/F mode, RS232C I/F mode, USB I/F mode), please refer to Report No.: Z01C-03386. Because the difference between the EUT and model: M33331A is printing speed only, the worst mode test only (RS232C I/F mode) was applied to the EUT.

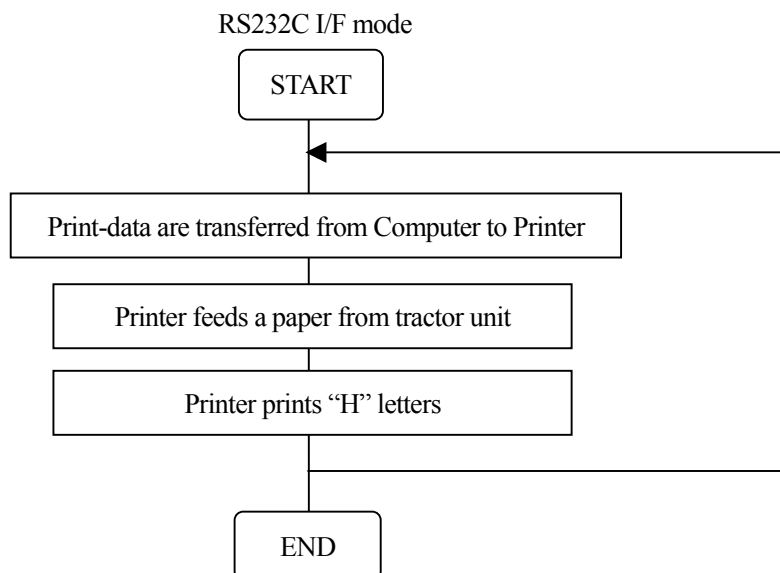
2. Equipment Under Test

2.1 EUT information

No.	EUT	Company	Model No.	Serial No.	DoC/FCC ID	Comment
1	Dot Matrix Printer	FUJITSU ISOTEC LIMITED	M33330A	N/A	KHZ001M33330A	-
2	RS232C Board	FUJITSU ISOTEC LIMITED	CA20160-B81X	N/A	N/A	Option

Max. used frequency	: 16MHz
Oscillator(s)/Crystal(s)	: Oscillator
Operating frequency	: Processor clock
	: Switching Frequencies
	: 16MHz (for Main), 12MHz(for USB)
	: 4.0MHz (for Main), 6.0MHz(for USB)
	: 37kHz to 56kHz
Power ratings	: AC 100-120V 50/60Hz [Power supply for EUT in testing was AC 120V 60Hz.]
Port(s)	: Centronics I/F RS232C I/F USB I/F
Size	: (W) 415 x (D) 330 x (H) 120 mm
Variation of model(s)	: Not applicable

2.2 Operating mode



3. Configuration of equipment

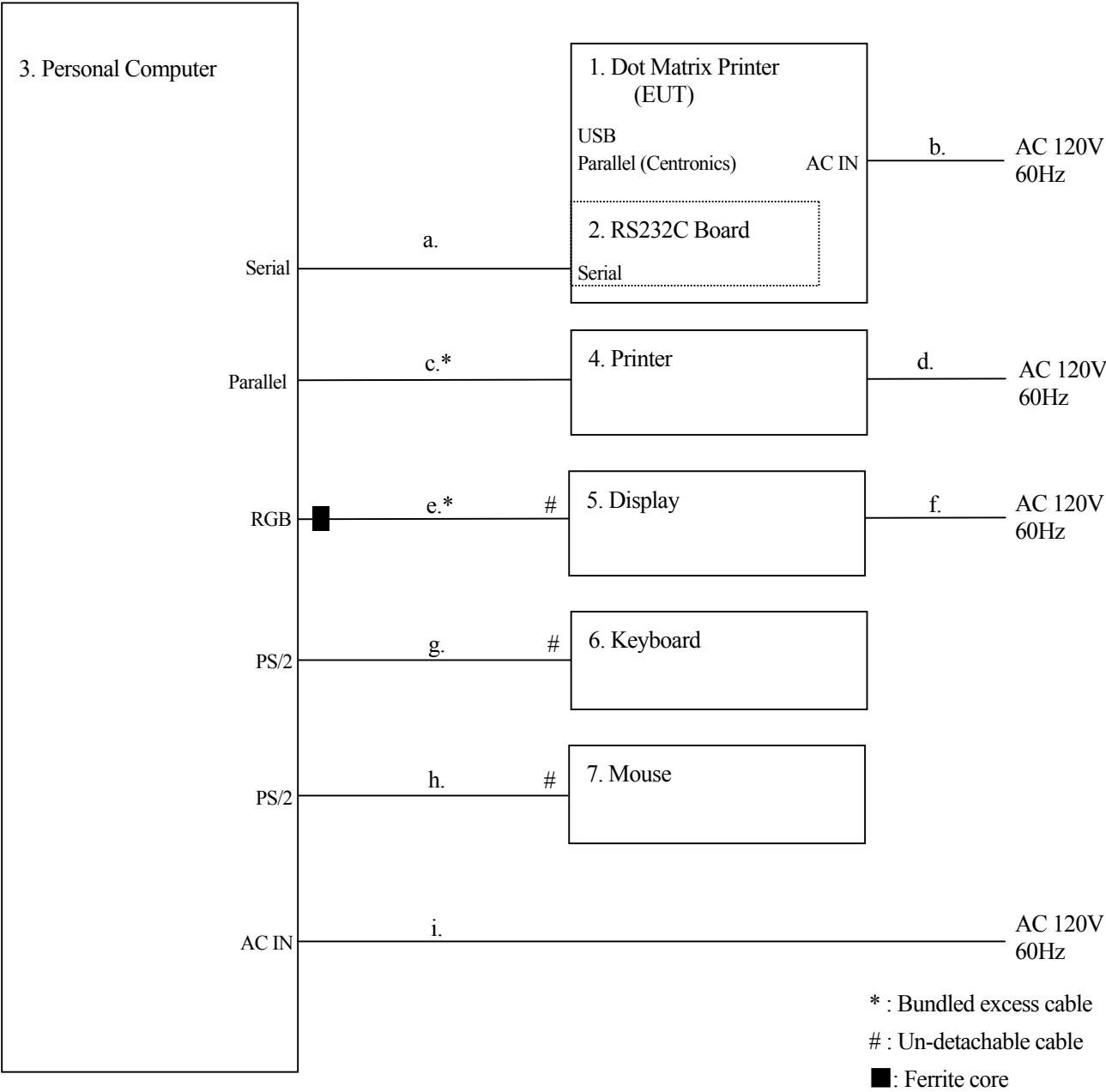
3.1 Peripheral(s) used [RS232C I/F mode]

No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
3	Personal Computer	DELL	DHM	1VBB51X	DoC	-
4	Printer	HP	C4555A	US6BC212N	B94C4555X	-
5	Display	DELL	P780	2047870	DoC	-
6	Keyboard	DELL	SK-8110	CN-07N247-38844-293-0.7	DoC	-
7	Mouse	DELL	M-SAW34	LZB23459449	DZL211029	-

3.2 Cable(s) used [RS232C I/F mode]

No.	Cable	Length[m]	Shield	Connector	From	To	Comment
a	Serial cable	1.5	Shielded	Metal	PC	EUT	-
b	AC power cord for EUT	2.0	Unshielded	Plastic	EUT	AC outlet	Accessory
c	Parallel cable	2.1	Shielded	Metal	PC	Printer	-
d	AC Power cord for Printer	2.7	Unshielded	Plastic	Printer	AC outlet	-
e	RGB cable	1.8	Shielded	Metal	PC	Display	-
f	AC Power cord for Display	1.7	Unshielded	Plastic	Display	AC outlet	-
g	Keyboard cable	2.1	Unshielded	Metal	PC	Keyboard	-
h	Mouse cable	1.8	Unshielded	Metal	PC	Mouse	-
i	AC power cord for PC	1.9	Unshielded	Plastic	PC	AC outlet	-

3.3 System configuration [RS232C I/F mode]



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”.

Note 2: RGB cable (No.e) with one ferrite core is accessory for Display(No.5).

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

- 50Ω/50μH
- LISN for EUT was placed 80cm away from EUT.
- LISN for peripheral was terminated in 50Ω.

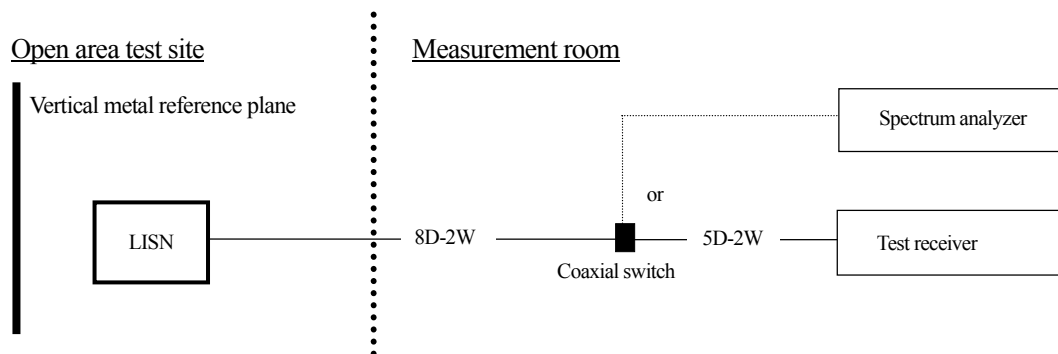
Reported emissions

- 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	E7405A	US41160344	Mar. 2004
Test receiver	Kyoritsu Electrical Works, Ltd.	KNM-2402	4N-192-1	Apr. 2004
Line impedance stabilization network for peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-1096-3	Mar. 2004
Line impedance stabilization network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-407	8-693-19	Jan. 2005
50Ω terminator	Agilent Technologies	11593A	N/A	May. 2004
Coaxial cable	FUJIKURA	8D-2W/15m 5D-2W/1m	YTCRFC#1C	May. 2004
Coaxial switch	ANRITSU	MP59B	6100097273	May. 2004

*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) (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 (Average) Reading = 45.0dBμV Cable loss + LISN 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 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 *****

Standard : FCC Part 15 Subpart B (CISPR 22)
Class : B

Sheet number : 1

Date of test : 2004/2/20
Test site : 1
Temperature [°C] : 19.0
Humidity [%] : 18.5
Operator : N.Marukawa
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33330A
Serial number : N/A
Test mode : RS232C I/F mode
Comment :

Signature :



Phase	Frequency [MHz]	Reading		Factor [dB]	Emission level		Limit		Margin		Comment
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
L1	0.150	51.5	39.2	0.4	51.9	39.6	66.0	56.0	14.1	16.4	*
L1	0.168	44.1	32.5	0.4	44.5	32.9	65.1	55.1	20.6	22.2	
L1	1.816	30.8	25.9	0.2	31.0	26.1	56.0	46.0	25.0	19.9	
L1	1.936	32.6	27.6	0.2	32.8	27.8	56.0	46.0	23.2	18.2	
L1	10.800	28.3	23.0	0.6	28.9	23.6	60.0	50.0	31.1	26.4	
L1	28.125	32.8	27.9	1.6	34.4	29.5	60.0	50.0	25.6	20.5	
L2	0.150	51.0	38.5	0.4	51.4	38.9	66.0	56.0	14.6	17.1	
L2	0.168	44.4	31.3	0.4	44.8	31.7	65.1	55.1	20.3	23.4	
L2	1.822	31.0	25.9	0.2	31.2	26.1	56.0	46.0	24.8	19.9	
L2	1.936	34.8	29.9	0.2	35.0	30.1	56.0	46.0	21.0	15.9	
L2	10.793	29.1	23.1	0.6	29.7	23.7	60.0	50.0	30.3	26.3	
L2	28.131	21.0	15.5	1.6	22.6	17.1	60.0	50.0	37.4	32.9	

*: The worst emission. Factor: AMN Factor + Cable Loss

Ver. 2.64 F1#010

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

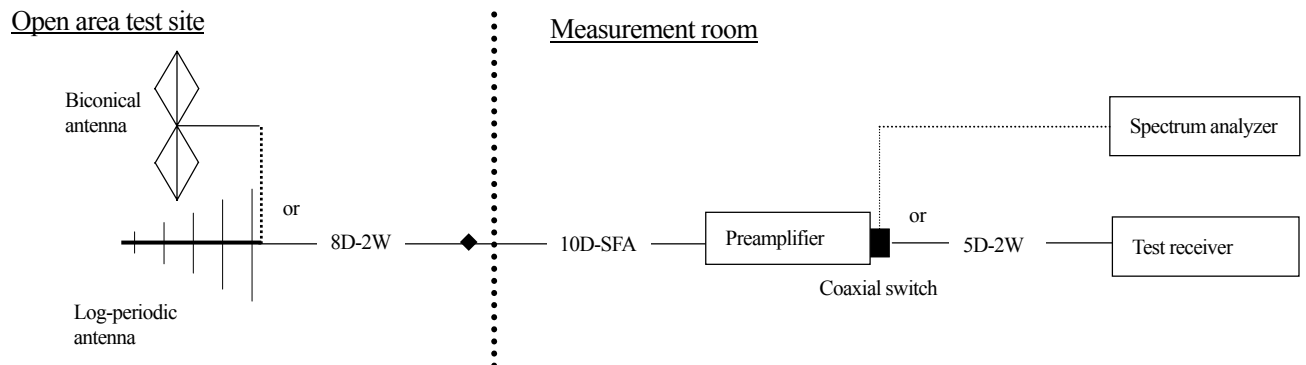
Reported emissions

- 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	E7405A	US41160344	Mar. 2004
Preamplifier	Anritsu	MH648A	M96057	May. 2004
Test receiver	Kyoritsu Electrical Works, Ltd.	KNM-5002 KCV-6002	4N-195-2 4-269-2	Jul. 2004
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	1635	Apr. 2004
Log periodic antenna	Schwarzbeck	UHALP9108A	0436	Apr. 2004
Coaxial cable	FUJIKURA	8D-2W/8m 10D-SFA/29m 5D-2W/1m	YTCRFC#1R	May. 2004
Coaxial switch	ANRITSU	MP59B	6100097273	May. 2004
Site attenuation	ZACTA Technology Corp.	Site 1	N/A	Jun. 2004

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

5.4 Uncertainty

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

± 5.2dB

... For 3m Radiated emission

5.5 Test data

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

Standard : FCC Part 15 Subpart B
Class : B
Distance [m] : 3
Date of test : 2004/2/20
Test site : 1
Temperature [°C] : 19.9
Humidity [%] : 18.2
Operator : N.Marukawa
Company name : FUJITSU ISOTEC LIMITED
EUT : Dot Matrix Printer
Model number : M33330A
Serial number : N/A
Test mode : RS232C I/F mode
Comment :

Sheet number : 1

Signature :



Antenna Pol.	Height	Table Radian	Reading Frequency	Level	Factor	Emission Level	Limit	Margin	Comment
HOR/VER	[m]	[Deg.]	[MHz]	[dBμV]	[dB/m]	[dBμV/m]	[dBμV/m]	[dB]	
VER	1.0	260	31.98	46.8	-12.1	34.7	40.0	5.3	*
VER	1.0	85	59.09	54.1	-20.0	34.1	40.0	5.9	
VER	1.0	5	127.92	39.9	-15.0	24.9	43.5	18.6	
VER	1.0	280	143.89	38.5	-13.9	24.6	43.5	18.9	
VER	1.0	245	181.90	36.9	-11.6	25.3	43.5	18.2	
VER	1.0	185	184.53	37.3	-11.6	25.7	43.5	17.8	
VER	1.6	280	350.60	45.4	-12.1	33.3	46.0	12.7	
HOR	1.0	265	345.50	48.4	-12.2	36.2	46.0	9.8	

* : The worst emission.

Factor : Antenna Factor + Cable Loss - Amp Gain

Ver.2.64 F1#010

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.