Attachment 3

FCC Part 15B Test Report (FG06-134EFC)

FUJITSU GENERAL EMC LABORATORY LIMITED
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EMI Test report

CATEGORY : FCC Part-15(2006) ; Class B

MANUFACTURER : FUJITSU LIMITED
4-1-1, Kamikodanaka, Nakahara-ku, Kawasaki 211-8588 JAPAN

MODEL : Personal computer P7230
AC Adapter SEC80N2-16.0
Port Replicator FPCPR72
Wireless LAN WM3945ABG AR5BXB6
Bluetooth module EYTF3CS FT

TEST SITE : FUJITSU GENERAL EMC LABORATORY
1116, Suenaga, Takatsu-ku, Kawasaki-shi, 213-8502 JAPAN

DATE TESTED : October 19, 2006 23℃ 55%

TESTED BY : Hiroyuki Aikawa

Above EUT conforms mentioned regulations.

APPROVED BY : for K. Jashi DATE : October 20, 2006
Hiroyuki Shimanoe, President

FUJITSU GENERAL EMC LABORATORY LIMITED
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TEL: (044)861-7897 FAX: (044)861-9890

CLIENT : Global Business Division, FUJITSU LIMITED
4-1-1, Kamikodanaka, Nakahara-ku, Kawasaki 211-8588 JAPAN

※ The description of the EUT and the system configuration in this report are provided by the client.

1. Description of EUT

The EUT: P7320 personal computer using Core Duo U2500 1.2 GHz microprocessor has a 10.6 inch WXGA Display, a DVD-super multi drive and a system disk (80 GB×1). The EUT has the interface for 1394③, RGB⑯, Mic-in②, Phone-out②, LAN⑦, Modem⑥, USB×5①⑤⑳㉑㉒, Audio-out⑰ and has PC card slot, Memory card slot, Bluetooth and wireless LAN.

Internal clock frequency : 32.768 kHz, 4.000 MHz, 12.000 MHz, 14.318 MHz, 24.576 MHz, 25.000 MHz, 33.300 MHz, 48.000 MHz, 96.000 MHz,100.000 MHz, 133.000 MHz

Input power : AC 100 V-240 V, 50 / 60 Hz, Single-phase 2 wires

The EUT is intended to use generally in the residential / domestic area or commercial and light industrial area; category class B.

1.1 Test system configuration

The measurement was performed using P7230 with FPCPR72 as a maximum personal computer system with all related equipment shown in figure-1.

The EUT was selected from the pre-production line.

1.2 Operating condition

The following EUT and dependent devices were tested using "EMC.exe", "Blue test" and "CRTU" or "ART" program under continuous operating condition to obtain maximize emission.

① PC-1	LCD-1:	Display "H" character on screen (Maximum contrast / Luminescence/ Display resolution 1280×768 / Refresh rate 60Hz)
	LAN:	Continuous transmission and receiving ping command. (1000 M Max)
	HDD-1:	Read/write the test data
	Wireless LAN:	Continuous transmission of the RF signal
	Bluetooth:	Continuous transmission of the RF signal
	DVD:	Play the test disk
② PC card:		Non-connection (Radiated emission)
		Read/write the test data (Conducted emission)
③ MEM card:		Non-connection (Radiated emission)
		Read/write the test data (Conducted emission)
④ LCD-2:		Display "H" character on screen (Maximum contrast / Luminescence)
⑤ Headset:		Connecting only
⑥ USB mouse:		Connecting only
⑦ USB Memory(USB2.0):		Read/write the test data (480 M Max)
⑧ HDD-2(IEEE1394):		Read/write the test data (480 M Max)
⑨ AV (S-Video):		Connecting only
⑩ PC-2:		Continuous transmission and receiving ping command. (1000 M Max)

2. EMI test results summary

Applied standards: FCC Part-15 (2006)/ CISPR22(1997)
The test sample met the Class B limit of FCC Part-15(2006) as following highest 6 points of each emission profiles.

The test result is effective in only the EUT.

2.1 Radiated emission (30 MHz to 1,000 MHz) : Measured at 10 m distance

2.1.1; Wireless module; WM3645AGB

Freq. (MHz)	pol.	Noise level (QP; dB μ V/m)	Class B limit (QP; dB μ V/m)	Margin (dB)
41.47	Vert	26.1	30.0	3.9
96.03	Horiz	24.0	30.0	6.0
169.23	Horiz	22.6	30.0	7.4
471.20	Vert	31.1	37.0	5.9
749.08	Horiz	29.6	37.0	7.4
855.12	Vert	32.2	37.0	4.8

- Limit value ; CISPR22(1997)
- Measurement uncertainty : ± 3.3 dB (K=2, 95 %)

2.1.2 Wireless module; AR5BXB6

Freq. (MHz)	pol.	Noise level (QP; dB μ V/m)	Class B limit (QP; dB μ V/m)	Margin (dB)
30.35	Vert	26.4	30.0	3.6
41.75	Vert	26.5	30.0	3.5
96.03	Horiz	26.5	30.0	3.5
131.64	Horiz	24.4	30.0	5.6
184.54	Vert	24.1	30.0	5.9
240.00	Horiz	33.7	37.0	3.3

- Limit value ; CISPR22(1997)
- Measurement uncertainty : ± 3.3 dB (K=2, 95 %)

2.2 Above 1 GHz RF Radiated emission : Measured at 3 m distance (1 GHz to 6 GHz)

Freq. (GHz)	Pol	Noise level (dB μ V/m)	Class B limit (dB μ V/m)		Margin (dB to AV)
		Peak	Peak	AV	
1.0600	Vert	43.9	74.0	54.0	10.1
1.1793	Vert	40.7	74.0	54.0	13.3
1.2800	Vert	38.5	74.0	54.0	15.5
1.5400	Horiz	36.6	74.0	54.0	17.4
1.5943	Horiz	42.0	74.0	54.0	12.0
1.5943	Vert	36.4	74.0	54.0	17.6

- Limit value ; FCC Part15 (2006)

2.3 AC power line conducted emission (150 kHz to 30 MHz)

2.3.1; Wireless module; WM3645AGB

Freq. (MHz)	Line #	Noise level (dB μ V)		Class B limit (dB μ V)		Margin (dB)	
		Q P	A V	Q P	A V	Q P	A V
0.201	# 1	52.2	39.1	63.6	53.6	11.4	14.5
0.201	# 2	51.8	39.0	63.6	53.6	11.8	14.6
0.305	# 2	43.4	33.6	60.1	50.1	16.7	16.5
0.417	# 1	41.3	33.9	57.5	47.5	16.2	13.6
0.417	# 2	39.9	32.5	57.5	47.5	17.6	15.0
0.638	# 2	36.5	29.1	56.0	46.0	19.5	16.9

- Limit value; CISPR22(1997).
- Measurement uncertainty : ± 2.5 dB (K=2, 95 %)

2.3.2 Wireless module; AR5BXB6

Freq. (MHz)	Line #	Noise level (dB μ V)		Class B limit (dB μ V)		Margin (dB)	
		Q P	A V	Q P	A V	Q P	A V
0.190	# 1	52.7	40.8	64.0	54.0	11.3	13.2
0.190	# 2	54.0	43.9	64.0	54.0	10.0	10.1
0.285	# 1	46.7	38.7	60.7	50.7	14.0	12.0
0.285	# 2	46.2	38.4	60.7	50.7	14.5	12.3
0.750	# 1	37.5	34.4	56.0	46.0	18.5	11.6
0.750	# 2	37.6	33.7	56.0	46.0	18.4	12.3

- Limit value; CISPR22(1997).
- Measurement uncertainty : ± 2.5 dB (K=2, 95 %)

3. EUT modification under the test

None.

4. Measurement procedure and test equipment

4.1 Radiated emission

4.1.1 Radiated emission (30MHz～1,000MHz)

The EUT was set on the 80 cm height desk placed on the turntable in the 10 m RF semi-anechoic chamber. The PC-2 and HUB were placed at outside of the chamber to make usual install condition at the different place. The maximum noise level in the frequency range from 30 MHz to 1,000 MHz were measured by 10 m method with scanning the antenna height from 1 m to 4 m above the ground plane and rotating the EUT through 360 degrees for both horizontal and vertical polarization.

Preliminary measurement using spectrum analyzer peak detection was performed to arrange the minimum margin spectrum. The settings of the interface cables and the mouse were adjusted to obtain maximum level at the minimum margin spectrum. The final measurement was performed using the RFI receiver (CISPR Quasi-peak, 120 kHz band width) and calibrated broadband antennas or dipole antennas about the main spectrums that is obtained by the preliminary measurement.

Test equipment	Manufacturer	Type	S/N	Cal. Date	Due. Date
Bi Log antenna	Schwarzbeck	VULB9160	3123	2006.01.04	2007.01.04
Dipole antenna	Schwarzbeck	VHA9103	VHA91031573	2004.12.28	2006.12.28
Dipole antenna	Schwarzbeck	UHA9105	UHA91052119	2004.12.28	2006.12.28
Field strength meter	Rohde & Schwarz	ESCS30	849650/003	2006.04.25	2007.04.25
Spectrum analyzer	HP	85422E	3746A00242	2006.04.24	2007.04.24
RF switch	Rohde & Schwarz	PSU	846628/003	2006.05.07	2007.05.07
RF cable	———	CF013	———	2006.05.07	2007.05.07
2nd semi-anechoic chamber	Riken eletech	———	———	2005.01.16	2007.01.16
EMI test program	FGE	Version 1.3			

4.1.2 Radiated emission (1 GHz~6 GHz)

The EUT was set on the 80 cm height non-reflective desk on the turntable. The radiated emission measurement from 1 GHz to 6 GHz was performed using the spectrum analyzer (Peak detection, 1MHz band width) and the horn antenna that was positioned at 3 m from the EUT for class B. The measurement was performed with both horizontal and vertical polarization, rotating the The measurement was performed with rotating the EUT through 360 degrees and fixing the antenna height to the 1 m for both horizontal and vertical polarization.

The measurement was performed with RF signal "off" mode of the wireless LAN and Bluetooth.

Test equipment	Manufacturer	Type	S/N	Cal. Date	Due. Date
Horn antenna	Schwarzbeck	BBHA9120D	414	2005.02.23	2007.02.23
Spectrum analyzer	Advantest	R3371A	75060396	2006.04.01	2007.04.01
Pre amplifier	HP	8449B	3008A01110	2005.03.24	2007.03.24

4.2 AC power line conducted emission

The conducted emission measurement was performed in the shielded room. The EUT was set on the 80 cm height wooden desk with using the 50Ω/50μH artificial mains network: AMN ,and operated by AC 120 V/ 60 Hz. Preliminary measurement using spectrum analyzer peak detection was performed in the frequency range from 150 kHz to 30 MHz to arrange the minimum margin spectrum. The setting of the cables was adjusted to obtain maximum level at the minimum margin spectrum. The final measurement was performed using the RFI receiver (CISPR Quasi-peak, 9 kHz band width) ,and recorded the maximum value in the monitored interval of the main spectrum that is obtained by the preliminary measurement.

Test equipment	Manufacturer	Type	S/N	Cal. Date	Due. Date
AMN for EUT	Kyoritsu	KNW-407	8-823-18	2006.01.15	2007.01.15
AMN for AE	Kyoritsu	KNW-242C	8-1387-7	2006.01.15	2007.01.15
Field strength meter	Rohde & Schwarz	ESCS30	849650/003	2006.04.25	2007.04.25
Spectrum analyzer	HP	85422E	3746A00242	2006.04.24	2007.04.24
RF switch	Rohde & Schwarz	PSU	848290/003	2006.05.07	2007.05.07
Band pass filter	Advantest	TR14202	03560027	2006.05.07	2007.05.07
Transient Limiter	HP	11947A	———	2006.05.07	2007.05.07
RF cable	———	CF017	———	2006.05.07	2007.05.07
EMI test program	FGE	Version 1.3			

5. Test site and traceability

The FUJITSU GENERAL EMC LABORATORY performs the test for VCCI / EN / CISPR regulation and Fujitsu / Fujitsu General internal regulations. The test procedures and test facilities are comply with international standard. The laboratory is filed on VCCI (Japan), accredited from NVLAP (U.S.A.), authorized from TÜV SÜD PS (Germany) and appointed from TÜV Rheinland (Germany).

VCCI : 1st semi-anechoic chamber(R-753/C-776), Small shielded room(C-777)
Large shielded room(C-778)
2nd semi-anechoic chamber(R-1460/C-1547), 2nd shielded room(C-1548)
3rd shielded room(C-1549)

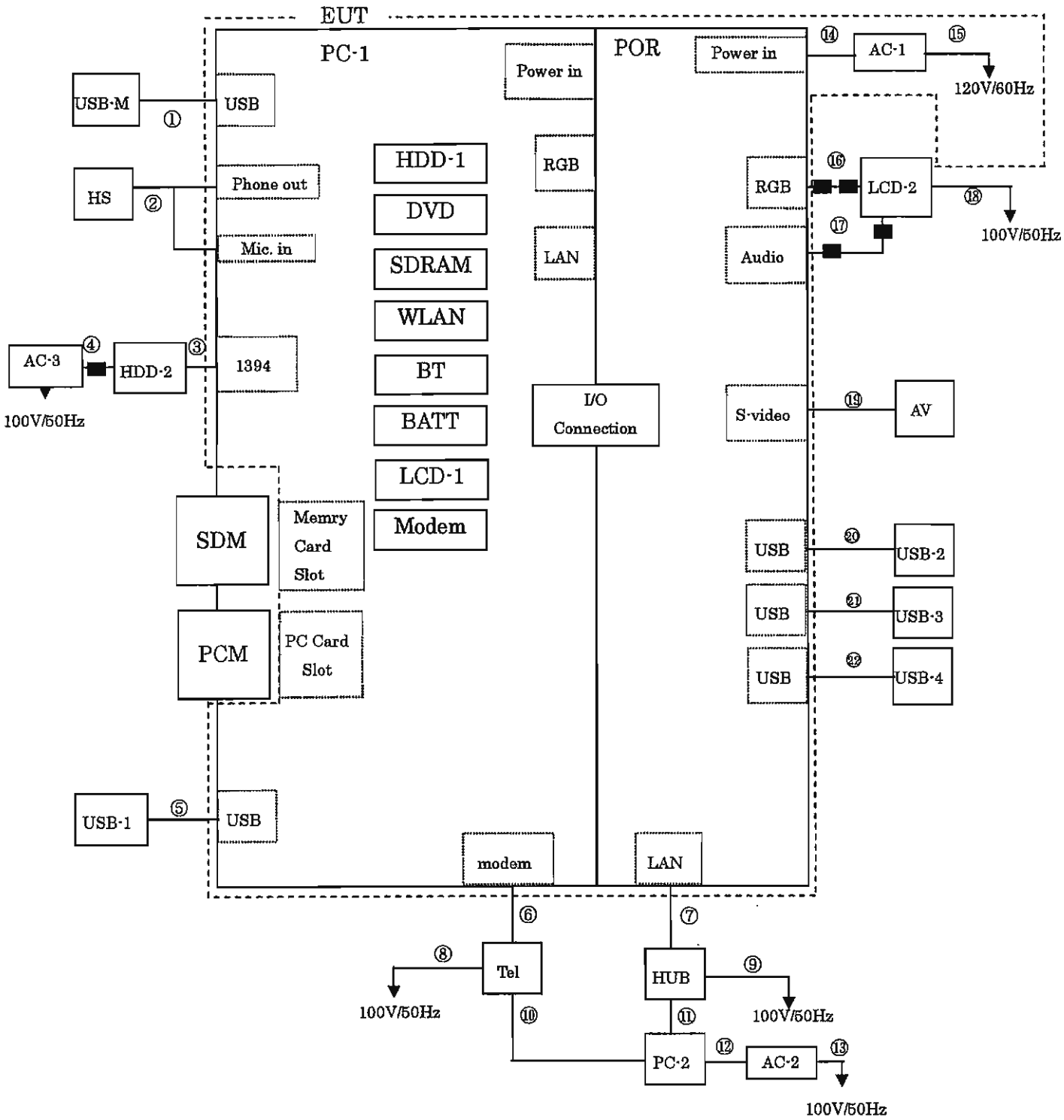
NVLAP : 1998.12.01 Accredited: Lab code 200373-0

TÜV SÜD PS : 1999.01.29 Authorized

TÜV Rheinland Japan : 2005.08.25 Appointed

The measuring equipment used in the laboratory and test data are traceable to the national or international standard. Each equipment is maintain by periodical calibration and by daily check as a total measurement system to keep those accuracy.

Figure-1 System configuration and cables



■ : Ferrite core

Main EUT

Code	Name	Type	S/N	Product
PC-1	Personal computer	P7230	Pre-production sample	Fujitsu

Related EUT

POR	Port Replicator	FPCPR72	———	Fujitsu
AC-1	AC adapter	SEC80N2-16.0	———	Fujitsu

Included device: PC-1

Code	Name	Type	S/N	Product
HDD-1	80GB HDD	MK8007GAH	———	Toshiba
DVD	DVD-Multi	UJ-852	———	Matsushita
SDRAM	2048 MB	MT16HTS25664HY-667A1×1	———	———
WLAN	Wireless LAN	WM3945ABG	———	Intel
		AR5BXB6	———	Intel
BT	Bluetooth	EYTF3CS FT	———	TAOYO YUDEN
BATT	Battery (6cell)	FPCBP172 10.8V 5200mA/h	———	Fujitsu
LCD-1	10.6 inch WXGA	LTD106EXXF	———	Toshiba Matsushita
Modem	Modem	MDC1.5 modem Model:D40	———	Agrere

Assisted equipment

Code	Name	Type	S/N	Product
LCD-2	LCD display	P19-1	YEGA217490	FSC
HDD-2	Hard disk drive	Storagebird	0004371	FSC
HS	Head set	GN 501FSC	———	FSC
PC-2	Personal computer	FMV	———	Fujitsu
HUB	Switching Hub	ETG-SH-8	VD7000010513N	I·O DATA
AC-2	AC adapter	FMV-AC314	———	Fujitsu
AC-3	AC adapter	ACTN-21	———	Sunfone
USB-1	USB Mouse	M-BT69e	HCA52701556	FSC
USB-2	USB Mouse	M-BJ69e	HCA52701562	FSC
USB-3	USB Mouse	M-BJ69e	HCA52701578	FSC
USB-4	USB Mouse	M-BJ69e	HCA52701600	FSC
USB-M	USB memory	Easy Disk 64MB	———	I·O DATA
PCM	PC memory card	20 MB	———	SunDisk
SDM	SD memory card	128MB	———	Panasonic
AV	AV Selector	JX-S3	———	Victor

Cables SLD: Shielded NSLD: Non-shielded CAX: Coaxial
Connector MC: Metal NMC: Non-metal PMC: Point contact metal

No.	I/O Port	Name	Type	Length	Cable type
①	USB	USB cable	———	1.5 m	SLD, MC
②	Phone-out / Mic-in	Headset cable	———	2.2 m	NSLD, MC
③	1394	IEE1394 cable	———	1.0 m	SLD, MC
④	———	AC adaptor cable	———	1.8 m	NSLD, NMC with core ＊1
⑤	USB	USB mouse cable	———	1.9 m	SLD, MC
⑥	modem	Modular cable	———	20.0 m	NSLD, NMC
⑦	LAN	LAN cable	———	20.0 m	SLD, MC
⑧	———	AC power cable	———	2.0 m	2P-NSLD
⑨	———	AC power cable	———	2.0 m	2P-NSLD
⑩	———	Modular cable	———	2.0 m	NSLD, NMC
⑪	LAN	LAN cable	———	1.0 m	SLD, MC
⑫	———	AC adaptor cable	———	1.8 m	2P NSLD, NMC
⑬	———	AC power cable	———	2.0 m	2P-NSLD
⑭	———	AC adaptor cable	———	1.8 m	NSLD, NMC
⑮	———	AC power cable	———	2.0 m	2P-NSLD
⑯	RGB	RGBcable	———	1.8 m	SLD, MC with fixed core
⑰	Audio	Audio cable	———	1.8 m	NSLD, MC
⑱	———	AC power cable	———	2.0 m	2P-NSLD
⑲	S-Video	S-Video cable	———	1.0 m	SLD, MC
⑳	USB	USB mouse cable	———	1.9 m	SLD, MC
㉑	USB	USB mouse cable	———	1.9 m	SLD, MC
㉒	USB	USB mouse cable	———	1.9 m	SLD, MC

＊ 1: KITAGAWA industry Co.,Ltd; TFT-72SK