

Report No. : FG11-027EAL (1/9)

EMI Test report

CATEGORY : FCC Part-15 (2011); Class B
VCCI (2010)

PRODUCT : Personal computer

MODEL : Q550
AC adapter SEE55N2-19.0
Port Replicator FPCPR114
Wireless LAN WLU5110-D50
Bluetooth module BCM92070MD REF6

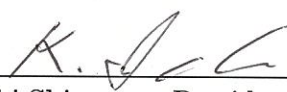
MANUFACTURER : FUJITSU LIMITED
4-1-1, Kamikodanaka, Nakahara-ku, Kawasaki 211-8588 JAPAN

TEST SITE : FUJITSU GENERAL EMC LABORATORY
1116, Suenaga, Takatsu-ku, Kawasaki 213-8502 JAPAN
2nd semi-anechoic chamber(R-1460)
1st shielded room(C-777/T-1687)

DATE TESTED : March 7, 2011 23°C 40%

TESTED BY : Hiroyuki Aikawa

EUT conforms to the above mentioning all regulations.

APPROVED BY :  DATE : March 10, 2011
for Hiroyuki Shimano, President

FUJITSU GENERAL EMC LABORATORY LIMITED
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CLIENT : Personal Computing Division I , FUJITSU LIMITED
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※ The description of the EUT and the system configuration in this report are provided by the client.



Product Service



Accredited by NVLAP.
Authorized by TÜV SÜD PS.
Appointed by TÜV Rheinland Japan.
Registered on VCCI.

1. Description of EUT

The EUT: Q550 is personal computer using CPU; ATOM Z670 1.5 GHz microprocessor. The EUT has a 10.1 inch WXGA and a system SSD (64 GB). The EUT has the interface for HDMI⑦, Phone-out①, USB×5②③④⑤⑥, Memory card slot, Bluetooth and wireless LAN module.

Internal clock frequency: 32.000 kHz, 14.318 MHz, 25.000 MHz, 30.000 MHz, 33.000 MHz, 48.000 MHz, 100.000 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 radiated emission measurement was performed with the worst case configuration of the preliminary measurement, Q550 with Port-replicator: FPCPR114, AC adapter; SEE55N2-19.0, internal wireless LAN module; WLU5110-D50, Bluetooth module; BCM92070MD REF6, Touch sensor; FD01-101W200A0X and all related equipments as 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 "EMC32.exe", "QA Test", "Blue.Tool" program under continuous operating condition to obtain maximum emission.

- | | | |
|------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------|
| ① PC | LCD-1: | Displaying "H" character on screen (Maximum contrast / Luminescence Display resolution 1280×800, 768/ Refresh rate 60Hz) |
| | SSD: | Read/ writ the test data |
| | CAMERA: | Monitoring the video picture of out side camera |
| | Wireless LAN: | Continuous transmission of the RF signal |
| | Bluetooth: | Continuous transmission of the RF signal |
| ② SD memory card: | | Read/ writ the test data |
| ③ LCD-2: | | Displaying "H" character on screen (Maximum contrast / Luminescence) |
| ④ Headset: | | Connecting only |
| ⑤ USB Memory (USB2.0): | | Read/ writ the test data (480 M Max) |
| ⑥ USB Mouse: | | Connecting only |

2. EMI test results summary

Applied standards: FCC Part-15(2011) and VCCI(2010)

Limit value: Class B

The limit of radiated emission(30 MHz to 1,000 MHz) of FCC part-15 was applied limit of CISPR22(2005). The test samples met the class B limit of VCCI (2010)/ CISPR22(2005) and applicable below regulations as shown the following highest 6 points of each emission profiles.

Canada: ICES-003 Issue4.(2004)

The test result is effective in only the EUT.

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

Freq. (MHz)	pol.	Noise level (QP; dB μ V/m)	Class B limit (QP; dB μ V/m)	Margin (dB)
100.86	Vert	25.0	30.0	5.0
120.00	Horiz	25.0	30.0	5.0
148.97	Vert	25.0	30.0	5.0
192.01	Horiz	24.8	30.0	5.2
960.00	Horiz	31.0	37.0	6.0
960.00	Vert	32.0	37.0	5.0

- Limit value ; CISPR22(2005)
- Measurement uncertainty : \pm 3.2 dB (K=2, 95 %)

2.2 Over 1 GHz Radiated emission : Measured at 3 m distance

<1 GHz to 7.5 GHz for FCC>

Freq. (GHz)	Pol.	Noise level (dB μ V/m)		Class B limit (dB μ V/m)		Margin (dB)	
		Peak	A V	Peak	A V	Peak	A V
1.0410	Horiz	48.1	38.2	74.0	54.0	25.9	15.8
1.1198	Horiz	49.5	40.9	74.0	54.0	24.5	13.1
1.1198	Vert	49.5	40.9	74.0	54.0	24.5	13.1
2.0023	Vert	44.2	38.1	74.0	54.0	29.8	15.9
2.7961	Horiz	47.0	40.0	74.0	54.0	27.0	14.0
2.7961	Vert	47.8	39.2	74.0	54.0	26.2	14.8

- Limit value ; FCC Part-15 (2011)
- Measurement uncertainty : \pm 3.3 dB (K=2, 95 %)

<1 GHz to 6 GHz for VCCI>

Freq. (GHz)	Pol.	Noise level (dB μ V/m)		Class B limit (dB μ V/m)		Margin (dB)	
		Peak	A V	Peak	A V	Peak	A V
1.0410	Horiz	48.1	38.2	70.0	50.0	21.9	11.8
1.1198	Horiz	49.5	40.9	70.0	50.0	20.5	9.1
1.1198	Vert	49.5	40.9	70.0	50.0	20.5	9.1
2.0023	Vert	44.2	38.1	70.0	50.0	25.8	11.9
2.7961	Horiz	47.0	40.0	70.0	50.0	23.0	10.0
2.7961	Vert	47.8	39.2	70.0	50.0	22.2	10.8

- Limit value ; VCCI (2010)
- Measurement uncertainty : \pm 3.3 dB (K=2, 95 %)

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

<AC120V 60Hz>

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	49.5	35.6	64.0	54.0	14.5	18.4
0.472	# 1	41.3	28.4	56.5	46.5	15.2	18.1
9.590	# 1	48.8	44.0	60.0	50.0	11.2	6.0
9.590	# 2	48.3	44.0	60.0	50.0	11.7	6.0
15.800	# 1	44.6	39.5	60.0	50.0	15.4	10.5
15.800	# 2	43.8	38.5	60.0	50.0	16.2	11.5

• Limit value: FCC Part-15 (2011)

<AC100V 50Hz>

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	48.4	33.2	64.0	54.0	15.6	20.8
0.662	# 1	39.3	25.5	56.0	46.0	16.7	20.5
9.590	# 1	49.0	45.6	60.0	50.0	11.0	4.4
9.590	# 2	48.8	45.5	60.0	50.0	11.2	4.5
15.660	# 1	44.3	39.8	60.0	50.0	15.7	10.2
15.660	# 2	44.2	38.5	60.0	50.0	15.8	10.5

• Limit value: VCCI (2010)

• Measurement uncertainty : ± 2.8 dB (K=2, 95 %)

2.4 Telecommunication line conducted emission (150 kHz to 30 MHz)

The EUT doesn't have the telecommunication port.

3. EUT modification under the test

None

4. Measurement procedure and test equipment

The measurement was performed without deviation from VCCI (2010) and ANSI C63.4 (2003).

4.1 Radiated emission

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

The measurement was performed in the 10 m RF semi-anechoic chamber. The EUT was set on the 80 cm height non-reflective desk (W: 150 cm×D: 100 cm) placed on the turntable. The HUB and PC-2 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 for the main spectrum that was obtained by the preliminary measurement.

Test equipment	Manufacturer	Type	S/N	Cal. Date	Due. Date
Dipole antenna	Schwarzbeck	VHA9103	VHA91031573	2010.04.13	2012.04.13
Dipole antenna	Schwarzbeck	UHA9105	UHA91052119	2010.04.13	2012.04.13
Bi Log antenna	Schwarzbeck	VULB9160	3118	2010.05.12	2011.05.12
Field strength meter	Rohde & Schwarz	ESCS30	849650/001	2010.07.08	2011.07.08
Spectrum analyzer	HP	85422E	3746A00242	2010.07.30	2011.07.30
RF switch	Anritsu	MP59B	M87079	2010.04.29	2011.04.29
RF cable	—	TF0207	—	2010.04.29	2011.04.29
2nd semianchoic chamber	Riken eletech				
EMI test program	FGE	Version 1.3			

4.1.2 Over 1 GHz radiated emission

The measurement was performed in the 10 m RF semi-anechoic chamber. The EUT was set on the 80 cm height styrene foam desk (W: 150 cm×D: 100 cm) on the turntable. The radiated emission measurement from 1 GHz to 7.5 GHz; Operating rate 1.5 GHz was performed using the spectrum analyzer (Peak detection, 1MHz band width) and the horn antenna that was positioned at 3 m from test volume for EN55022. The measurement was performed for both horizontal and vertical polarization. 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 using the 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	2010.04.22	2011.04.22
Spectrum analyzer	Advantest	U3772	161200140	2010.05.24	2011.05.24
Pre amplifier	HP	8449B	3008A01010	2010.03.26	2011.03.26
2nd semianchoic chamber	Riken eletech				

4.2 AC power line conducted emission

The measurement was performed in the shielded room. The EUT was set on the 80 cm height non-reflective desk and connected to the 50 Ω/50 μ H artificial mains network: AMN. The EUT was operated by AC 120 V/ 60 Hz and AC 100 V/ 50 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 was obtained by the preliminary measurement.

Test equipment	Manufacturer	Type	S/N	Cal. Date	Due. Date
AMN for EUT	Kyoritsu	KNW-407	8-823-18	2011.01.09	2012.01.09
AMN for AE	Kyoritsu	KNW-242C	8-1387-6	2011.01.09	2012.01.09
Field strength meter	Rohde & Schwarz	ESCS30	849650/003	2010.07.08	2011.07.08
Spectrum analyzer	HP	85422E	3746A00240	2010.07.30	2011.07.30
RF switch	Rohde & Schwarz	PSU	848290/005	2010.04.06	2011.04.06
Band pass filter	Advantest	TR14202	03560025	2010.04.06	2011.04.06
Pulse limiter	Rohde & Schwarz	ESH3-Z2	0357.8810.54	2010.04.06	2011.04.06
RF cable	—	TF0110	—	2010.04.06	2011.04.06
1st shielded room	Riken eletech				
EMI test program	FGE	Version 1.3			

5. Test site and traceability

The Fujitsu General EMC Laboratory performs testing under VCCI / EN / CISPR regulations and Fujitsu / Fujitsu General internal regulations. Test procedures and test facilities comply with the following international standards. The laboratory is registered on VCCI (Japan), NVLAP (USA), TÜV SÜD PS (Germany) and TÜV Rheinland.

VCCI: 1stSemi-Anechoic Chamber(R-753/G-53/C-776/T-1686)
1stShielded Room(C-777/T-1687)
2ndSemi-Anechoic Chamber(R-1460/G-54/C-1547/T-1688)
2nd Shielded Room(C-1548/T-1689)
3rd Shielded Room(C-1549)

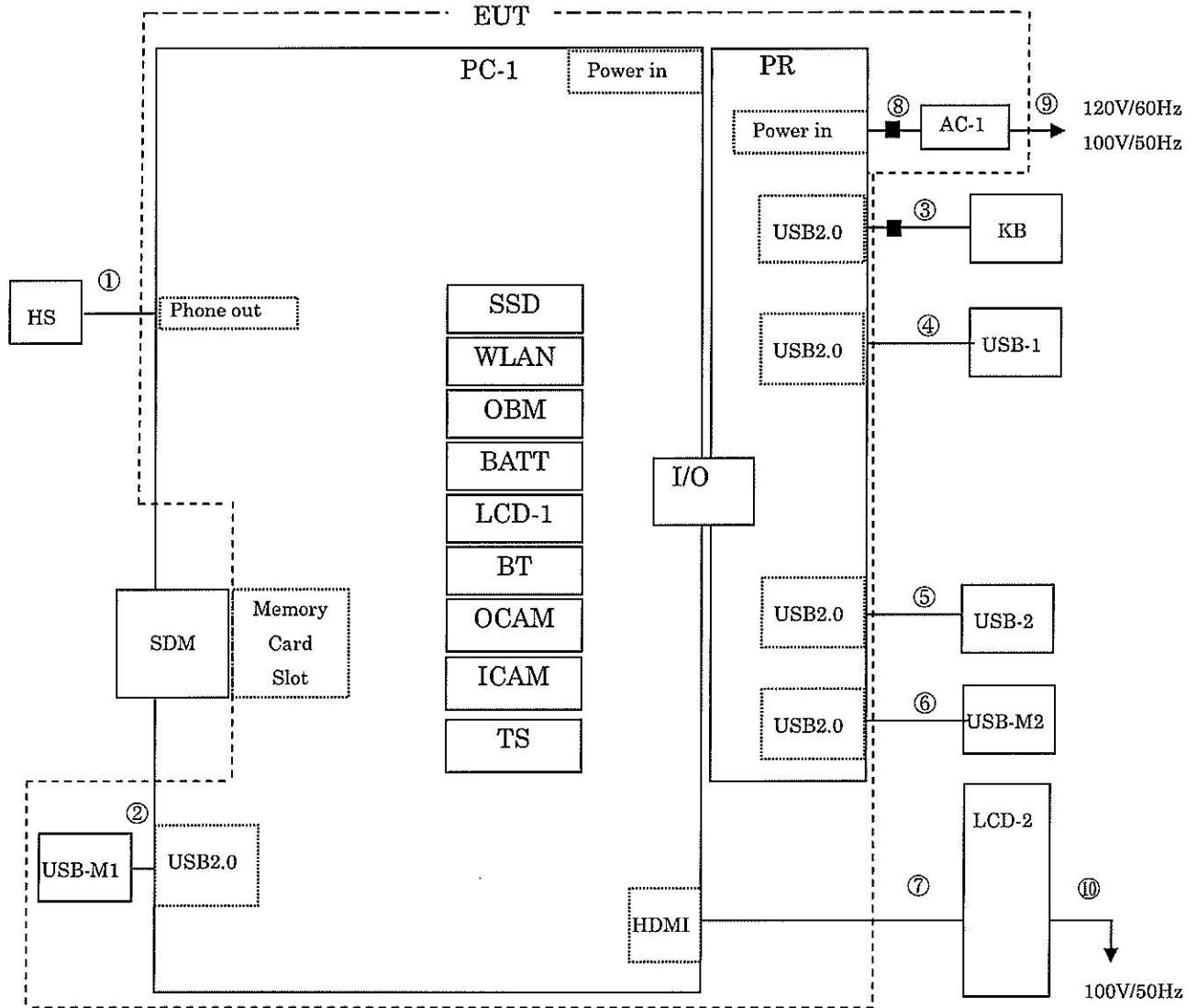
NVLAP: Dec.1st 1998 (Lab code: 200373-0)

TÜV SÜD PS: Jan.29th 1999

TÜV Rheinland Japan: Aug.25th 2005

The measuring equipments using in the laboratory and test data are under national and international standards. All equipment is maintained by regular inspection and daily check as whole measurement system in order to keep accuracy.

Figure-1 System configuration and cables



■ : Ferrite core

Main EUT

Code	Name	Type	S/N	Product
PC	Personal computer	Q550	Pre-production sample	Fujitsu

Related EUT

AC	AC adapter	SEE55N2-19.0	----	Fujitsu
PR	Port-Replicator	FPCPR114	----	Fujitsu

Included device; PC-1

Code	Name	Type	S/N	Product
SSD	SSD	THNSFB062GMSJ	----	TOSHIBA
WLAN	Wireless LAN	WLU5110-D50	----	Ralink
OBM	On Board memory	MT47H256M8	----	Micron
BATT	Battery (4 cell)	FPCBP313 7.2V 5240mA/h	----	Fujitsu
LCD-1	10.1" WXGA	LTN101AL01-701	----	Samsun
BT	Bluetooth	BCM92070MD REF6	----	Broadcom
OCA	Out-side camera	CNFA19021005131L	----	Chicony
ICA	In-side camera	CNFA07721005131L	----	Chicony
TS	Touch sensor	FD01-101W200A0X	----	N-TRIG
	Touch sensor	TCP10A94	----	TPK

Assisted equipment

Code	Name	Type	S/N	Product
LCD-2	LCD display	P22W-5 ECO	YE7G213217	FSC
HS	Head set	GN 501FSC	-----	FSC
SDM	SD memory card	Extreme 32 GB	-----	SanDisk
USB-M1	USB Memory	256MB	-----	I-O DATA
USB-M2	USB Memory	256MB	-----	I-O DATA
USB-1	USB Mouse	M-BT69e	HCA52701600	FSC
USB-2	USB Mouse	M-UAE96	LZ6410B0B4U	FSC
KB	USB Key-board	D-91275	001384	CHERY

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	Phone-out	Headset cable	-----	2.2m	NSLD, MC
②	USB2.0	USB cable	-----	1.0m	SLD, MC
③	USB2.0	USB Key board cable	-----	1.8m	SLD, MC fixed core
④	USB2.0	USB mouse cable	-----	1.8m	SLD, MC
⑤	USB2.0	USB mouse cable	-----	1.8m	SLD, MC
⑥	USB2.0	USB cable	-----	1.0m	SLD, MC
⑦	HDMI	HDMI cable	-----	2.0m	SLD, MC
⑧	Power in	AC Adapter cable	-----	1.1m	NSLD, NMC fixed core
⑨	-----	AC power cable	-----	1.5m	NSLD, NMC
⑩	-----	AC power cable	-----	2.0m	NSLD, NMC