



EMC COMPLIANCE TEST REPORT

REPORT NO.: 20070712-1

PRODUCT: Laptop

BRAND NAME: OLPC

MODEL NO.: XO-1, XO*** (* means any character or blank)

ISSUED DATE: Jul. 12, 2007

ISSUED BY: QSMC Compliance Center

LAB ADDRESS: No. 68, Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P. R. China

COMPLIANCE STANDARDS:

FCC 47CFR Part 15, Subpart B, Class B; ANSI C63.4:2003
ICES-003
CISPR 22:1993+A1:1995+A2:1996, Class B
CISPR 22: 2006
CISPR 24:1997+A1:2001+A2:2002
AS/NZS CISPR 22:2004, Class B
V-3/2006.04
V-4/2006.04
CNS13438
GB9254
GB17625.1
ETSI EN 301 489-1 v1.6.1: 2005
ETSI EN 301 489-17 v1.2.1:2002
EN 61000-3-2:2006
EN 61000-3-3:1995+A1:2001+A2:2006
EN 55024:1998+A1:2001+A2:2003
EN 61000-4-2:2001
EN 61000-4-3:2002+A1:2002
EN 61000-4-4:2004
EN 61000-4-5:2001
EN 61000-4-6:2003+A1:2004
EN 61000-4-8:2001
EN 61000-4-11:2004
EN 55022:1998+A1:2000+A2:2003, Class B
EN 55022:2006, Class B



Section 1: General Information

1.1 Introduction	5
1.2 Test Procedure	7

Section 2: Test Facility And Procedure

2.1 Test Facility used for Emission Testing	8
2.1.1 Measurement Uncertainty	8
2.1.2 Lab Accreditation	9
2.1.3 Software to exercise EUT	9
2.1.4 Special Accessories	9
2.1.5 Equipment Modifications and Deviations	9
2.1.6 Test Configuration	10
- Arrangement block diagram	10
- Associated equipment	10
- Pre-test configuration	11
- Worst case for final testing	11
2.1.7 Cable Description and Information	11
2.2 Measurement Equipment	12
2.2.1 Conducted Emissions	12
2.2.2 Radiated Emissions	12
2.2.3 Power Harmonic / Flickers	13
2.2.4 Electrostatic Discharge (ESD) Immunity	13
2.2.5 Radiated Electromagnetic Field Immunity	13
2.2.6 Fast Transient / Burst Immunity	14
2.2.7 Surge Immunity	14
2.2.8 Conducted Disturbance / Induced Radio-Frequency Field Immunity	14
2.2.9 Power Frequency Magnetic Field Immunity	15
2.2.10 Voltage Dips / Short Interruptions and Interruptions	15



Section 3: Electromagnetic Emissions Test

- 3.1 Emission 16
 - 3.1.1 Line Conducted Emissions Test 16
 - Measurement Procedures Utilized for Conducted Emissions 16
 - Conducted Emissions Test Data 16
 - 3.1.2 Radiated Emissions Test 19
 - Measurement Procedures Utilized for Radiated Emissions 19
 - Radiated Emissions Test Data 19
 - 3.1.3 Power Harmonics Measurement 23
 - 3.1.4 Power Voltage Fluctuation / Flicker Measurement 23
- 3.2 Electromagnetic Immunity Report 24
 - 3.2.1 Electrostatic Discharge (ESD) Immunity Test 24
 - 3.2.2 Radiated Electromagnetic Field Immunity Test 25
 - 3.2.3 Fast Transient/Burst Immunity Test 26
 - 3.2.4 Surge Immunity Test 27
 - 3.2.5 Conducted Disturbance / Induced Radio-Frequency Field Immunity Test 28
 - 3.2.6 Power Frequency Magnetic Field Immunity Test 29
 - 3.2.7 Voltage Dips / Short Interruptions and Interruptions Test 30

Section 4: Test Arrangement Photos

- 4.1 Conducted Emissions 31
- 4.2 Radiated Emissions 32



Applicant: OLPC
Manufacturer: Quanta Computer Inc.
Product: Laptop
Brand Name: OLPC
Model Number: XO-1, XO*** (* means any character or blank)
Test Date: Jun. 19 - Jul. 4, 2007

COMPLIANCE STANDARDS:

- FCC 47CFR Part 15, Subpart B, Class B; ANSI C63.4:2003
- ICES-003
- CISPR 22:1993+A1:1995+A2:1996, Class B
- CISPR 22: 2006
- CISPR 24:1997+A1:2001+A2:2002
- AS/NZS CISPR 22:2004, Class B
- V-3/2006.04
- V-4/2006.04
- CNS13438
- GB9254
- GB17625.1
- ETSI EN 301 489-1 v1.6.1: 2005
- ETSI EN 301 489-17 v1.2.1:2002
- EN 61000-3-2:2006
- EN 61000-3-3:1995+A1:2001+A2:2006
- EN 55024:1998+A1:2001+A2:2003
- EN 61000-4-2:2001
- EN 61000-4-3:2002+A1:2002
- EN 61000-4-4:2004
- EN 61000-4-5:2001
- EN 61000-4-6:2003+A1:2004
- EN 61000-4-8:2001
- EN 61000-4-11:2004
- EN 55022:1998+A1:2000+A2:2003, Class B
- EN 55022:2006, Class B

Approved By

Reviewed By

Herculius Hsu

Joyce Kuo



Section 1: General Information

1.1 Introduction

Product	Laptop		
Trade Name	OLPC		
Model Name	XO-1, XO*** (* means any character or blank)		
Housing Type	Plastic		
AC Power Adapter	Delta	Model	ADP-17FB AA
			ADP-17FB BA
			ADP-17FB CA
			ADP-17FB DA
	PIE	Model	AD5950 A LF
			AD5952 A LF
			AD5953 A LF
			AD5959 A LF
	Lite-On	Model	PA-1150-05Q1
			PA-1150-05Q2
			PA-1150-05Q3
			PA-1150-05Q4
AC Power Adapter Rating	I/P: 100-240VAC O/P: 12Vdc, 1250mA		
AC Power Core Type	Non-shielded AC 2-pin (1.8m)		
DC Power Cable Type	Non-shielded DC (1.8m) with one ferrite core		
CPU	AMD	Model	LX700
Memory Capacity	256MB		
RAM	PSC	Model	A3S12D40ETP-G6 X 4
	Hynix	Model	HY5DU121622CTP-J X 4
	Samsung	Model	K4H511638D-UCCC X 4
	Qimoda	Model	HYB25DC512160BE-5 X 4
LCD	CHILIN	Model	LS075AT011
NAND Flash	ST	Model	NAND08GW3B2AN6E (1GB)
	Hynix	Model	HY27UG088G5M-TPCB (1GB)
	Samsung	Model	K9K8G08U0A-PCB0 (1GB)
Camera	Lite-On	Model	06P052
	Suyin	Model	CM0316-OLPC01



VRAM	UMS	Model	M12S16161A-7TG
	ETI	Model	EM6A6165TS-7G
	ISSI	Model	IS42R16100C1-7TL
Battery	GPI	Model	NTA2488
	BYD	Model	600000049
Wireless LAN	QMI	Model	US101

I/O Port:

IO Port Types	Quantity
USB port	3
Audio in port	1
Audio out port	1
SD Card	1





1.2 Test Procedure

The EUT was tested using special test software called H patterns, which exercises all external I/O ports as well as the internal storage media by writing and reading (if applicable) a continuous stream of “H” characters. A pattern of continuous stream-scrolling black “H” on a white background was written to display. To exercise the optical drive, a CD was put into the optical drive and played through the internal audio while the EMC testing was being done. The measurements were made while the system was exercised in this manner.



Section 2: Test Facility and Procedure

2.1 Test Facility Used for Emission Testing

Conducted Emissions Facilities: Conducted Emissions were performed at QSMC Compliance Center of No.68 Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P. R. China

FCC Registration No. 602285

VCCI Registration No. C-2529

Radiated Emissions Facilities: Radiated Emissions measurements were performed at QSMC Compliance Center of No.68 Sanzhuang Road, Songjiang Export Processing Zone, Shanghai, P. R. China

FCC Registration No. 602285

VCCI Registration No. R-2319

2.1.1 Measurement Uncertainty

The measurement uncertainty has been determined to be the following:

Conducted Emissions = ± 3.2 dB

Radiated Emissions = ± 3.6 dB

The equipment conforms to the requirement of CISPR 16-1, CISPR 16-4-2, ANSI C63.2 and other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manual.

2.1.2 Lab Accreditations

Coverage	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter chamber and conducted test chamber to perform FCC Part 15/18 measurements	 602285
Japan	VCCI	3/10 meter chamber and conducted test chamber to perform radiated / conducted measurements	 R-2320 / 2319 C-2529
ISO/IEC 17025	CNAS	FCC 47CFR Part 15; CISPR22; AS/NZS CISPR 22; V-3/2006.04; V-4/2006.04; CNS13438; GB9254; GB17625.1; EN55022; EN61000-3-2; EN 61000-3-3; CISPR24; EN55024; EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5; EN61000-4-6; EN61000-4-8; EN61000-4-11	 

2.1.3 Software to Exercise EUT

The EUT was tested using special test software called H patterns, which exercises all external I/O ports as well as the internal storage media by writing and reading (if applicable) a continuous stream of “H” characters. A pattern of continuous stream-scrolling black “H” on a white background was written to display. To exercise the optical drive, a disk was put into the drive tray and played through the internal audio while the EMC testing was being done. The measurements were made while the system was exercised in this manner.

2.1.4 Special Accessories

There were no special accessories used during these tests.

2.1.5 Equipment Modifications and Deviations

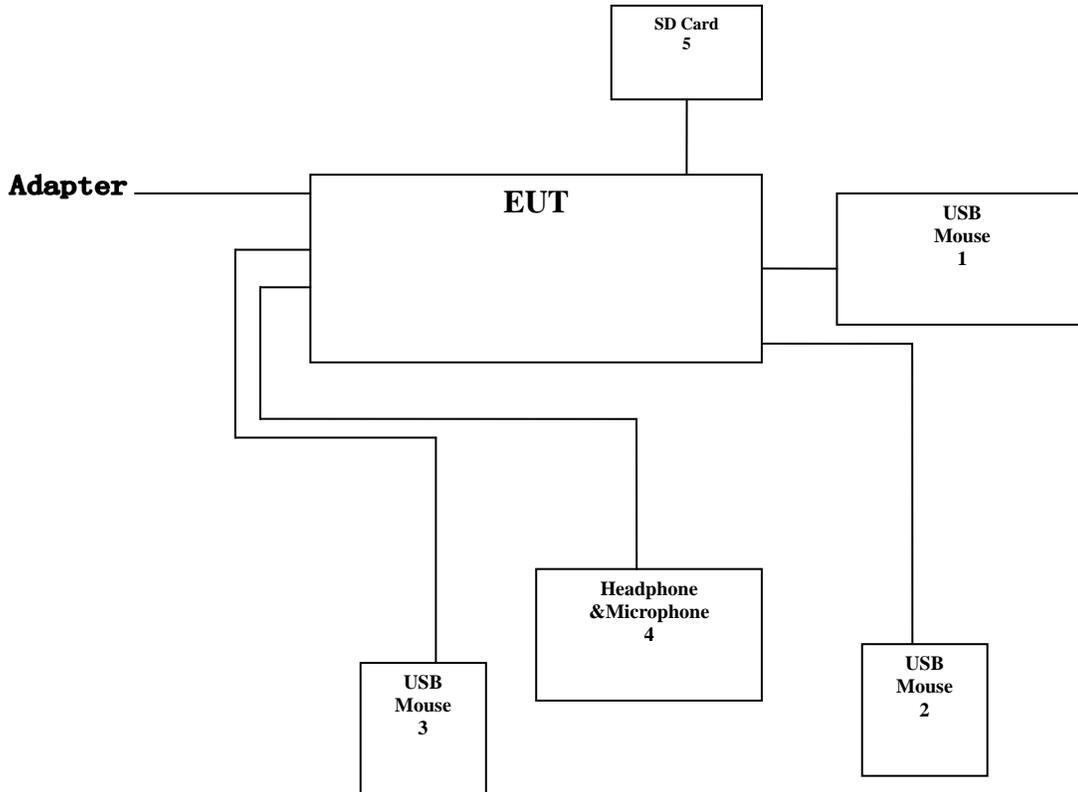
There is no EUT modification or test standard deviation.



2.1.6 Test Configuration

The EUT was configured as a worst case system configuration as a result from pre-testing as described below:

Arrangement Block Diagram



Associated Equipments

	Description	Model
1	Microsoft mouse	X08-71118
2	Microsoft mouse	X08-71118
3	Microsoft mouse	X08-71118
4	Philips headphone/mic	SBC HM450
5	SD card Transcend	1GB



Pre-test configuration

Prior to taking the formal emissions data collected in this report many hours of pre-testing have been performed. The selection of the worst case system documented in this report was based upon this pre-testing.

Mode	CPU	LCD Panel	Memory	Camera	WLAN	NAND Flash	VRAM	Battery	Adapter
1	AMD LX700	CHILIN LS075AT011	256MB	Lite-On 06P052	QMI US101	1GB	2MB	GPI NTA2488	Lite-On PA-1150-05Q1
2	AMD LX700	CHILIN LS075AT011	256MB	Lite-On 06P052	QMI US101	1GB	2MB	GPI NTA2488	Lite-On PA-1150-05Q2
3	AMD LX700	CHILIN LS075AT011	256MB	Lite-On 06P052	QMI US101	1GB	2MB	BYD 600000049	Lite-On PA-1150-05Q3
4	AMD LX700	CHILIN LS075AT011	256MB	Lite-On 06P052	QMI US101	1GB	2MB	BYD 600000049	Lite-On PA-1150-05Q4
5	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC0	QMI US101	1GB	2MB	GPI NTA2488	Delta ADP-17FB AA
6	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC0	QMI US101	1GB	2MB	GPI NTA2488	Delta ADP-17FB BA
7	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC0	QMI US101	1GB	2MB	BYD 600000049	Delta ADP-17FB CA
8	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC0	QMI US101	1GB	2MB	BYD 600000049	Delta ADP-17FB DA
9	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC01	QMI US101	1GB	2MB	GPI NTA2488	PIE AD5950 A LF
10	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC01	QMI US101	1GB	2MB	GPI NTA2488	PIE AD5952 A LF
11	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC01	QMI US101	1GB	2MB	BYD 600000049	PIE AD5953 A LF
12	AMD LX700	CHILIN LS075AT011	256MB	Suyin CM0316-OLPC01	QMI US101	1GB	2MB	BYD 600000049	PIE AD5959 A LF

Worse Case for Final Testing (mode 11 chosen)

Component	Vendor	Part Number
CPU	AMD	LX700
LCD Module	CHILIN	LS075AT011
Power Adapter	PIE	AD5953 A LF
Battery	BYD	600000049
Camera	Suyin	CM0316-OLPC01
Wireless LAN	QMI	US101
RAM	Hynix	256MB
NAND Flash	Hynix	1GB
VRAM	UMS	2MB

2.1.7 Cable Description and Information

Cable Type	Shielded	Ferrite
USB cable	Yes	No
Multimedia Headset	Yes	No



2.2 Measurement Equipment

N/A is an abbreviation for Not Applicable. All equipments are traceable to CNAS calibration standards.

2.2.1 Conducted Emissions

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Test Receiver	Rohde & Schwarz	ESC1	100167	5/24/2008
LISN	Schwarzbeck	NSLK8127	8127433	5/24/2008
LISN	Schwarzbeck	NSLK8128	8128229	5/24/2008
TLISN	FCC	FCC-TLISN-T2	20217	5/24/2008
TLISN	FCC	FCC-TLISN-T4	20218	5/24/2008
Software	ADT	ADT_Cond_V7.3 .4	N/A	N/A

2.2.2 Radiated Emissions

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Test Receiver	Rohde & Schwarz	ESCI	100166	5/24/2008
Test Receiver	Rohde & Schwarz	ESIB26	100307	5/24/2008
Bilog Antenna	Schwarzbeck	VULB9168	9168-198	6/1/2008
Bilog Antenna	Schwarzbeck	VULB9168	9168-195	6/1/2008
Preamplifier	Agilent	8447D	2944A10848	5/24/2008
Preamplifier	Agilent	8447D	2944A10847	5/24/2008
Preamplifier	Agilent	8449B	3008A02145	5/24/2008
Software	ADT	ADT_Radiated_V7	N/A	N/A
Antenna Mast	Innco	MA4000	MA4000/101/9 770405/L	N/A
Antenna Mast	Innco	MA4000	MA4000/104/9 770405/L	N/A
Turn Table	Innco	DT3000-1T-C	DT3000-1T-C/2 2	N/A
Controller	Innco	CO2000	CO2000/218/9 770405/L	N/A

**2.2.3 Power Harmonics and Voltage Fluctuation/Flicker**

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
AC Power Source	EMTest	ACS 500	V0523100459	5/24/2008
Harmonics & Flicker Analyzer	EMTest	DPA 500	72224	5/24/2008
Software	EMTest	EMTest software	N/A	N/A

2.2.4 Electrostatic Discharge (ESD) Immunity

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
ESD Simulator	EMTest	ESD 30C	V0523100460	6/1/2008
ESD Simulator	Noiseken	ESS-2002	ESS0423758	5/30/2008
ESD Simulator	Keytek	MZ-15/EC	0506331	5/30/2008

2.2.5 Radiated Electromagnetic Field Immunity

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Amplifier	Amplifier Research	150W1000	312368	N/A
Amplifier	Amplifier Research	60S1G3(M1)	312416	N/A
Antenna	Amplifier Research	AT5080	312113	N/A
Antenna Tripod	Evergo	TP1000A	N/A	N/A
Field Monitoring	Amplifier Research	IF4000A	310906	N/A
Power Meter	Boonton	4232A	142402	5/24/2008
Power Meter	Boonton	51011EMC	33838/33839	5/24/2008
Accessories	Amplifier Research	DC6180A	312192	N/A
Accessories	Amplifier Research	DC7144A	311989	N/A
Controller	Amplifier Research	SC1000M1	312477	N/A
Signal Generator	Rohde& Schwarz	SML03	102270	5/24/2008

**2.2.6 Fast Transient/Burst Immunity**

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
EFT Generator	EMTest	EFT500	V0523100450	5/24/2008
CA EFT kit	EMTest	KW50 / KW1000	N/A	N/A
EMTest	Software	EMTest Software	N/A	N/A

2.2.7 Surge Immunity

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Telecom surge generator	EMTest	TSS 500 M10	V0523100456	5/24/2008
Impulse Generator	EMTest	VCS 500 M10	V0523100451	5/24/2008

2.2.8 Conducted Disturbance/Induced Radio-Frequency Field Immunity

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Continuous Wave Simulator	EMTest	CWS 500C	V053100457	5/24/2008
Attenuator	EMTest	ATT 6/75	1104-13	N/A
CDN	EMTest	CDN-M2/M3	0705-02	N/A
CDN	EMTest	CDN-T2	0705-01	N/A
CDN	EMTest	Adapter T2-RJ11	N/A	N/A
CDN	EMTest	CDN-T4	0705-01	N/A
CDN	EMTest	CDN-T8-RJ45	N/A	N/A
EM Clamp	EMTest	EM Clamp	35737	N/A
Basic calibration kit	EMTest	CWS-CAL	N/A	N/A
CA M2/M3/AF3	EMTest	CA M2/M3/AF3	N/A	N/A
calibration kit	EMTest	CA T2/AF2	N/A	N/A
calibration kit	EMTest	CA T4/AF4/M4	N/A	N/A
Built-in power monitor	EMTest	PM402	0705-01	N/A
calibration kit	EMTest	CA EM	276	N/A
Operation system for CWS500C	EMTest	Win lcd I2	0705-01	N/A



Capacitive coupling clamp	EMTest	HFK (-4)	0605-08	N/A
CDN	EMTest	CDN-M1	N/A	N/A
CDN	EMTest	CDN-AF4	0705-01	N/A
calibration kit	EMTest	CAA M2/M3	0263	N/A
calibration kit	EMTest	CA-M1	N/A	N/A

2.2.9 Power Frequency Magnetic Field Immunity

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Current transformer	EMTest	MC 2630 (-8)	0705-04	N/A
Motorized Variation	EMTest	MV 2616 (-8)	V0523100453	N/A
Software	EMTest	EMTest Software	N/A	N/A

2.2.10 Voltage Dips and Short Interruptions

Description	Manufacturer	Model No.	Serial No.	Calibrated Until
Power Fail Simulator	EMTest	UCS500M4-PFS	V0523100452	5/24/2008
Software	EMTest	EMTest Software	N/A	N/A



Section: 3 Electromagnetic Emissions Test

3.1 Emission

3.1.1 Line Conducted Emissions Test

- Measurement Procedures Utilized for Conducted Emissions

The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55022.

Associated equipment, if needed, was placed as per EN 55022.

All I/O cables were positioned to simulate typical actual usage as per EN 55022.

The test equipment EUT installed received AC power through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.

All associated equipment received power from a second LISN.

For conducted emission test on telecommunication ports, a telecommunication port is connected by its signal cable to an impedance stabilization network (ISN).

During the testing, the LAN utilization is in excess of 10 % and sustain that level for a minimum of 250 ms. The traffic rate is monitored by the program of NetSpeed.

The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150K Hz to 30MHz for emissions in each of the test modes.

During the above scans under battery charging mode, the emissions were maximized by cable manipulation.

The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

- Conducted Emissions Test Data

The following data was collected with a spectrum analyzer in peak detection mode, unless otherwise noted.

Test date: 06/19/2007

Temperature 17°C

Rel. Humidity 55%



120 VAC 60 Hz Mains

Live Line

Frequency	Correction factor	Reading dB(μ V)		Emission dB(μ V)		Limit dB(μ V)		Margins dB	
		QP	AV	QP	AV	QP	AV	QP	AV
0.18600	11.28	39.42	21.10	50.70	32.38	64.21	54.21	-13.51	-21.83
0.36999	10.62	30.15	20.01	40.77	30.63	58.50	48.50	-17.73	-17.87
0.55397	10.51	24.57	3.13	35.08	13.64	56.00	46.00	-20.92	-32.36
0.75796	10.46	25.47	10.52	35.93	20.98	56.00	46.00	-20.07	-25.02
4.90968	10.47	23.66	1.20	34.13	11.67	56.00	46.00	-21.87	-34.33
28.07213	10.82	26.06	14.72	36.88	25.54	60.00	50.00	-23.12	-24.46

Neutral Line

Frequency	Correction factor	Reading dB(μ V)		Emission dB(μ V)		Limit dB(μ V)		Margins dB	
		QP	AV	QP	AV	QP	AV	QP	AV
0.19400	11.13	36.55	26.70	47.68	37.83	63.86	53.86	-16.18	-16.03
0.37399	10.61	30.24	19.35	40.85	29.96	58.41	48.41	-17.56	-18.45
0.48998	10.53	8.92	1.50	19.45	12.03	56.17	46.17	-36.72	-34.14
0.75796	10.46	23.94	12.95	34.40	23.41	56.00	46.00	-21.60	-22.59
4.35772	10.46	25.32	5.20	35.78	15.66	56.00	46.00	-20.22	-30.34
28.30011	10.82	25.56	11.91	36.38	22.73	60.00	50.00	-23.62	-27.27

Note: Conducted Emissions data was also taken at 100/110VAC, 60Hz. This data was found to be equivalent or lower than the data listed above.



230 VAC 50 Hz Mains

Live Line

Frequency	Correction factor	Reading dB(μV)		Emission dB(μV)		Limit dB(μV)		Margins dB	
		QP	AV	QP	AV	QP	AV	QP	AV
MHz	dB								
0.24599	10.91	37.51	28.88	48.42	39.79	61.89	51.89	-13.47	-12.10
0.49398	10.53	29.57	17.17	40.10	27.70	56.10	46.10	-16.00	-18.40
0.73796	10.47	27.60	17.85	38.07	28.32	56.00	46.00	-17.93	-17.68
3.86575	10.46	24.22	-5.20	34.68	5.26	56.00	46.00	-21.32	-40.74
6.07760	10.48	20.41	-5.64	30.89	4.84	60.00	50.00	-29.11	-45.16
28.14013	10.82	29.45	23.84	40.27	34.66	60.00	50.00	-19.73	-15.34

Neutral Line

Frequency	Correction factor	Reading dB(μV)		Emission dB(μV)		Limit dB(μV)		Margins dB	
		QP	AV	QP	AV	QP	AV	QP	AV
MHz	dB								
0.16600	11.66	30.28	24.54	41.94	36.20	65.16	55.16	-23.22	-18.96
0.72196	10.47	19.90	7.34	30.37	17.81	56.00	46.00	-25.63	-28.19
4.01774	10.46	8.11	-5.38	18.57	5.08	56.00	46.00	-37.43	-40.92
6.45358	10.48	22.25	-5.06	32.73	5.42	60.00	50.00	-27.27	-44.58
17.52884	10.67	12.40	2.21	23.07	12.87	60.00	50.00	-36.93	-37.13
27.75215	10.81	25.93	19.89	36.74	30.70	60.00	50.00	-23.26	-19.30

Note: Conducted Emissions data was also taken at 220VAC/240VAC, 50Hz. This data was found to be equivalent or lower than the data listed above.



3.1.2 Radiated Emissions Test

- Measurement Procedures Utilized for Radiated Emissions

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane.

Associated equipment, if needed, was placed as per EN 55022.

All I/O cables were positioned to simulate typical usage as per EN 55022.

The EUT received AC power source, from the outlet socket under the turntable. All associated equipment received power from another socket under the turntable.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No. extension cords shall be used to mains receptacle.

The antenna was placed at 10 meter away from the EUT as stated in EN 55022. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The analyzer/receiver scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned under battery charging mode and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both vertical and horizontal polarization, to maximize the emission reading level.

The test mode(s) described in Item 2.1.6 were scanned during the preliminary test:

After the preliminary scan, we found the test mode described in Item 2.1.7 producing the highest emission level.

The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

FCC Part 15 measurements below 1 GHz were performed at an EUT to antenna distance of 10 meters. Measurements taken above 1GHz were taken at an EUT to antenna distance of 3 meters. CISPR 22 measurements were performed at an EUT to antenna distance of 10 meters.

- Radiated Emissions Test Data

Radiated Emissions measurements were performed at QSMC Compliance Center. The data lists the worst case emission frequencies, measured levels, antenna, cable and amplifier corrections, the corrected field strength, and the limit. The data was collected at 10 meters and compared to the CISPR 22 Class B limits.

Test date: 07/03/2007

Temperature 18°C

Rel. Humidity 60%



120 VAC 60 Hz Mains

Vertical Polarization

Frequency	Factor	Reading	Emission	Limit	Margin	Mast Height	Turn Table
MHz	dB/m	dB(μV)	dB(μV/m)	dB(μV/m)	dB	cm	deg
41.13 (QP)	13.90	7.35	21.25	30.00	-8.75	100	277
257.74 (QP)	13.73	10.50	24.23	37.00	-12.77	100	193
462.95 (QP)	20.47	7.67	28.14	37.00	-8.86	400	112
491.33 (QP)	21.06	8.84	29.90	37.00	-7.10	400	268
731.00 (QP)	25.18	4.68	29.86	37.00	-7.14	400	212
931.74 (QP)	27.49	0.67	28.16	37.00	-8.84	400	61

Horizontal Polarization

Frequency	Factor	Reading	Emission	Limit	Margin	Mast Height	Turn Table
MHz	dB/m	dB(μV)	dB(μV/m)	dB(μV/m)	dB	cm	deg
257.70 (QP)	14.60	13.95	28.55	37.00	-8.45	200	91
426.28 (QP)	20.16	6.94	27.10	37.00	-9.90	400	338
463.70 (QP)	20.69	8.17	28.86	37.00	-8.14	400	163
493.11 (QP)	21.29	9.02	30.31	37.00	-6.69	400	219
519.98 (QP)	22.02	5.22	27.24	37.00	-9.76	400	229
575.33 (QP)	22.95	4.05	27.00	37.00	-10.00	400	5

Note: Radiated Emissions data was also taken at 100VAC/110VAC, 60Hz. This data was found to be equivalent or lower than the data listed above.



230 VAC 50 Hz Mains

Vertical Polarization

Frequency	Factor	Reading	Emission	Limit	Margin	Mast Height	Turn Table
MHz	dB/m	dB(μV)	dB(μV/m)	dB(μV/m)	dB	cm	deg
41.76 (QP)	13.85	7.35	21.20	30.00	-8.80	100	268
224.94 (QP)	12.46	11.25	23.71	30.00	-6.29	100	173
449.88 (QP)	20.20	8.63	28.83	37.00	-8.17	100	12
731.03 (QP)	25.18	4.08	29.26	37.00	-7.74	100	163
843.42 (QP)	26.16	4.50	30.66	37.00	-6.34	100	190
955.90 (QP)	27.82	0.77	28.59	37.00	-8.41	200	228

Horizontal Polarization

Frequency	Factor	Reading	Emission	Limit	Margin	Mast Height	Turn Table
MHz	dB/m	dB(μV)	dB(μV/m)	dB(μV/m)	dB	cm	deg
224.52 (QP)	13.28	9.43	22.71	30.00	-7.29	400	188
417.49 (QP)	20.06	8.65	28.71	37.00	-8.29	400	317
439.12 (QP)	20.29	10.01	30.30	37.00	-6.70	400	157
449.83 (QP)	20.42	10.40	30.82	37.00	-6.18	400	199
453.90 (QP)	20.50	7.65	28.15	37.00	-8.85	400	247
955.95 (QP)	28.84	-0.25	28.59	37.00	-8.41	400	144

Note: Radiated Emissions data was also taken at 220VAC/240VAC, 50Hz. This data was found to be equivalent or lower than the data listed above.



230 VAC 50 Hz Mains

Vertical Polarization (above 1GHz to 5th harmonics)

Frequency	Factor	Reading	Emission	Limit	Margin	Mast Height	Turn Table
MHz	dB/m	dB(μV)	dB(μV/m)	dB(μV/m)	dB	cm	deg
1321.67 (AV)	27.74	-22.27	5.47	54.00	-48.53	100	270
1571.33 (AV)	28.17	-23.64	4.53	54.00	-49.47	100	283
1976.62 (AV)	29.06	-23.11	5.95	54.00	-48.05	100	178
2698.86 (AV)	31.22	-22.43	8.79	54.00	-45.21	100	356
3260.91 (AV)	31.88	-22.27	9.61	54.00	-44.39	100	54
4281.04 (AV)	33.93	-21.93	11.99	54.00	-42.01	100	172

Horizontal Polarization (above 1GHz to 5th harmonics)

Frequency	Factor	Reading	Emission	Limit	Margin	Mast Height	Turn Table
MHz	dB/m	dB(μV)	dB(μV/m)	dB(μV/m)	dB	cm	deg
1320.99 (AV)	27.74	-24.74	3.00	54.00	-51.00	100	304
1569.89 (AV)	28.17	-23.58	4.59	54.00	-49.41	100	4
1985.12 (AV)	29.08	-22.49	6.59	54.00	-47.41	100	280
2812.19 (AV)	31.39	-22.03	9.37	54.00	-44.63	100	340
4119.08 (AV)	33.58	-22.08	11.51	54.00	-42.49	100	71
4582.90 (AV)	34.57	-21.62	12.95	54.00	-41.05	100	156

Note: Radiated Emissions data was also taken at 100VAC/110VAC/120VAC, 60Hz, 220VAC/240VAC, 50Hz. This data was found to be equivalent or lower than the data listed above.



3.1.3 Power Harmonics Measurement

The product with power less than 75 Watt was met the requirements specified in EN61000-3-2:2006. No test is required.

3.1.4 Power Voltage Fluctuation/ Flicker Measurement

The product was tested and met the requirements specified in EN61000-3-3:1995 + A1:2001 + A2:2006

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-3-3
Test Operator	Blesson Wu
Date of Test	06/20/07
Relative Humidity	54%
Temperature	21°C
Atmospheric Pressure	100.5 kPa

Test Results

	EUT Values	Limit	Result	Remark
P_{st}	0.028	1.00	Pass	P_{st} means short-term flicker indicator
P_{lt}	0.028	0.65	Pass	P_{lt} means long-term flicker indicator
d_c [%]	0.005	3.30	Pass	d_c means relative steady-state voltage change
d_{max} [%]	0.076	4.00	Pass	d_{max} means maximum relative voltage change
d_t [s]	0.000	0.50	Pass	T_{dt} means maximum time that d_t exceeds 3.3%



3.2 Electromagnetic Immunity Report

EN55024:1998+A1:2001+A2:2003

3.2.1 Electrostatic Discharge (ESD) Immunity Measurement

The product was tested and met the requirements specified in EN 61000-4-2:2001

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-2
Test Operator	Blesson Wu
Date of Test	07/04/07
Relative Humidity	56%
Temperature	22°C
Atmospheric Pressure	99 kPa

Test Results

Amount of Discharge	Voltage	Coupling	Performance Criteria	Result (Pass/Fail)
10 / Point	± 8 kV	Air Discharge	B	Pass
25 / Point	± 4 kV	Contact Discharge	B	Pass
25 / Point	± 4 kV	Indirect Discharge HCP	B	Pass
25 / Point	± 4 kV	Indirect Discharge VCP (Right)	B	Pass
25 / Point	± 4 kV	Indirect Discharge VCP (Left)	B	Pass



3.2.2 Radiated Electromagnetic Field Immunity Test

The product was tested and met the requirements specified in EN 61000-4-3:2002 + A1:2002

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-3
Test Operator	Blesson Wu
Date of Test	06/20/07
Relative Humidity	55%
Temperature	21°C
Atmospheric Pressure	101 kPa

Test Results

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Performance Criteria	Result (Pass/Fail)
80-1000	3V/m	Yes	H	B/F/L/R	A	Pass
80-1000	3V/m	Yes	V	B/F/L/R	A	Pass
1400-2700	3V/m	Yes	H	B/F/L/R	A	Pass
1400-2700	3V/m	Yes	V	B/F/L/R	A	Pass



3.2.3 Fast Transient/Burst Immunity Test

The product was tested and met the requirements specified in EN 61000-4-4:2004

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-4
Test Operator	Blesson Wu
Date of Test	06/29/07
Relative Humidity	59%
Temperature	18°C
Atmospheric Pressure	101.3 kPa

Test Results

Inject Line	Voltage	Inject Method	Performance Criteria	Result (Pass/Fail)
L	± 1 KV	Direct	B	Pass
N	± 1 KV	Direct	B	Pass
L + N	± 1 KV	Direct	B	Pass



3.2.4 Surge Immunity Test

The product was tested and met the requirements specified in EN 61000-4-5:2001

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-5
Test Operator	Blesson Wu
Date of Test	06/28/07
Relative Humidity	59%
Temperature	20°C
Atmospheric Pressure	101 kPa

Test Results

Coupling Line	Voltage	Polarity	Coupling Method	Performance Criteria	Result (Pass/Fail)
L1-L2	1 KV	Positive	Capacitive	B	Pass
L1-L2	1 KV	Negative	Capacitive	B	Pass



3.2.5 Conducted Disturbance, Induced Radio-Frequency Field

The product was tested and met the requirements specified in EN 61000-4-6:2003 + A1:2004

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-6
Test Operator	Blesson Wu
Date of Test	07/03/07
Relative Humidity	64%
Temperature	19°C
Atmospheric Pressure	101 kPa

Test Results

Frequency Step: 1% of fundamental

Dwell Time: 3 sec

Range (MHz)	Field	Modulation	Performance Criteria	Result (Pass/Fail)
0.15-80	3V	Yes	A	Pass



3.2.6 Power Frequency Magnetic Field Immunity Test

The product was tested and met the requirements specified in EN 61000-4-8:2001

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-8
Test Operator	Blesson Wu
Date of Test	07/03/07
Relative Humidity	59%
Temperature	19°C
Atmospheric Pressure	101 kPa

Test Results

Power Freq.: 50Hz

Orientation	Field	Performance Criteria	Result (Pass/Fail)
X	1A/m	A	Pass
Y	1A/m	A	Pass
Z	1A/m	A	Pass



3.2.7 Voltage Dips / Short Interruptions and Interruptions Test

The product was tested and met the requirements specified in EN 61000-4-11:2004

Test Condition

Equipment Tested	Notebook
Test Software	H patterns
Test Standard	EN 61000-4-11
Test Operator	Blesson Wu
Date of Test	07/03/07
Relative Humidity	55%
Temperature	20°C
Atmospheric Pressure	101 kPa

Test Results

The duration with a sequence of three dips/interruptions with interval of 10 s minimum (Between each test event)

Voltage Dips:

Test Level % U_T	Reduction	Duration (periods)	Performance Criteria	Result (Pass/Fail)
0	> 95%	0.5	B	Pass
0	> 95%	1	B	Pass
40	60%	5	C	Pass
70	30%	0.5	B	Pass
70	30%	25	C	Pass

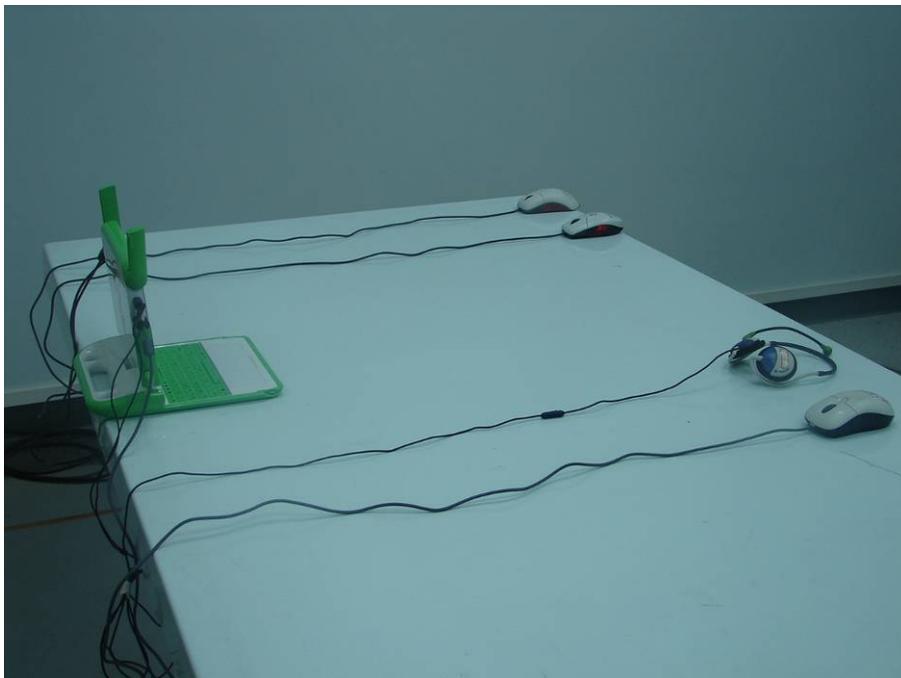
Voltage Interruptions:

Test Level % U_T	Reduction	Duration (periods)	Performance Criteria	Result (Pass/Fail)
0	> 95%	250	C	Pass



SECTION 4: Test Arrangement Photos

4.1 Conducted Emissions





4.2 Radiated Emissions

