

UL TEST REPORT AND PROCEDURE

Standard:	UL 60950-1, 2nd Edition, 2007-03-27 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03 (Information Technology Equipment - Safety - Part 1: General Requirements)
Certification Type:	Listing
CCN:	NWGQ, NWGQ7 (Information Technology Equipment Including Electrical Business Equipment)
Product:	Laptop Computer (OLPC)
Model:	XO-1.5HS, XO-1.75HS, XO-4 HS, XO-4 HS Touch
Rating:	12 Vdc, 2 A or 13.5Vdc, 1.85A
Applicant Name and Address:	QUANTA COMPUTER INC 188 WEN-HWA 2ND RD KUEI SHAN HSIANG TAOYUAN HSIEN 333 TAIWAN

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

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Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Prepared by: Charlie Chou

Reviewed by: Allen Huang

Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
 - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
 - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
 - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

Electronic components are mounted on PWB, which is enclosed by plastic enclosure and accompanied with three USB ports, one Card Reader.

Model Differences

- XO-1.5HS is similar to XO-1.75HS except for Mainboard layout, CPU.
- Models XO-4 HS and XO-4 HS Touch are similar to XO-1.75HS except for mainboard and CPU.
- Model XO-4 HS Touch is similar to model XO-4 HS except for touch function.

Technical Considerations


- Equipment mobility : transportable
- Connection to the mains : pluggable A
- Operating condition : continuous
- Access location : operator accessible
- Over voltage category (OVC) : N/A
- Mains supply tolerance (%) or absolute mains supply values : No direct connection
- Tested for IT power systems : No
- IT testing, phase-phase voltage (V) : N/A
- Class of equipment : Class III (supplied by SELV)
- Considered current rating (A) : N/A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : up to 2000m
- Altitude of test laboratory (m) : up to 2000m
- Mass of equipment (kg) : 1.32 (max.)
- The product was submitted and evaluated for use at the maximum ambient temperature (T_{ma}) permitted by the manufacturer's specification of: 45 degree C
- The following circuit locations (with circuit/schematic designation) were investigated as a limited

<p>power source (LPS): All connectors</p> <ul style="list-style-type: none"> ▪ The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual ▪ The manufacturer declaration that the OLPC is a laptop computer system not for Children used.

<p>Additional Information</p> <p>- Model XO-1.5 HS => CPU information: VIA / C7-M / 1.0 GHz. - Model XO-1.75HS => CPU information: Marvel / MMP2 / 1.0 GHz. - Model XO-4 HS, XO-4 HS Touch => CPU information: Marvell / MMP3 / 1.2 GHz.</p>
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<p>Additional Standards</p> <p>The product fulfills the requirements of: N/A</p>

Markings and instructions

Clause Title	Marking or Instruction Details
Power rating - Company identification	Listee's or Recognized company's name, Trade Name, Trademark or File Number
Power rating - Model	Model Number
Symbols - Stand-by switch	"Stand-by" to be indicated by  (60417-2-IEC-5009)
Replaceable batteries	"CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions."

<p>Special Instructions to UL Representative</p> <p>N/A</p>
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Production-Line Testing Requirements						
<u>Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.</u>						
Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
N/A						
<u>Earthing Continuity Test Exemptions - This test is not required for the following models:</u>						
<u>Electric Strength Test Exemptions - This test is not required for the following models:</u>						
<u>Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:</u>						
<u>Sample and Test Specifics for Follow-Up Tests at UL</u>						
Model	Component	Material	Test	Sample(s)	Test Specifics	
N/A						

TABLE: List of Critical Components

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
S01. Insulating Tubing/Sleeving	Various	Various	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1; 105 degree C, 300V.	UZFT2, YDPU2, YDTU2	UL
S02. Label	Various	Various	60 degree C if Max. surface temperature not specified	PGDQ2 or PGJI2	UL
S03. Wiring, internal, secondary	Various	Various	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1; min 30 V, 60 degree C, routed away from primary uninsulated live parts, and unless insulated for the highest voltage involved, from insulated primary circuit wiring	AVLV2	UL
S04. Internal Plastic Part Materials	Various	Various	Min. V-2	QMFZ2	UL
S05. Printed Wiring Board	Various	Various	V-1 min., rated min. 105 degree C	ZPMV2	UL
S06. Plastic Material of Flexible Printed Wiring	Various	Various	V-2 min. or VTM-2 min. when no components mounted on surface	QMFZ2 or QMTS2	UL
S07. Connector (SELV)	Various	Various	Min. V-2 or metal house with plastic	QMFZ2, ECBT2, RTRT2	UL
S08. Printed wiring board, flexible	Various	Various	Min V-2 or VTM-2, 105 degree C	ZPMV2 ZPK2	UL
01. Power Adaptor (For Rating 12V/2A only)	BESTEC POWER ELECTRONICS CO LTD	NA0241WAA ((NAwww1WyA)#	I/P: 100-240Vac, 1A, 50/60Hz; O/P: 12Vdc/2A (Class II) Tma=40 degree C, optional marked with "LPS" or "Limited Power Source"	QQGQ	UL
01a. Power Adaptor (Alternate) (For Rating 13.5V/1.85A only)	Bestec Power Electronics Co., Ltd	BT-AG250SDFxy (X="-", y=A-Z or blank. For marketing purpose	I/P: 100-240Vac, 50/60 Hz, 0.4A. O/P: 13.5V, 1.85A, Tma=40 degree C, optional marked with "LPS" or "Limited Power Source"	QQGQ	UL
01b. Power Adaptor (Alternate) (For Rating 13.5V/1.85A only)	Darfon	BB0J-C	I/P: 100-240V, 50-60Hz, 1A, Cl. II, O/P: 13.5Vdc, 1.85A, 25W max. Tma=45 degree C, optional marked with "LPS" or "Limited Power Source"	QQGQ	UL
01c. Power Adaptor	Darfon Electronics	BU24-1203	I/P: 100-240V, 50-60Hz, 1A, Cl. II, O/P: 12Vdc, 2A,	QQGQ	UL

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
(Alternate) (For Rating 12V/2A only)	Corp.		25W max. Tma=40 degree C, optional marked with "LPS" or "Limited Power Source"		
02. Battery pack	BYD	CL1	6.5 V, 3100 mAh (Li-ion)	NW/GQ/7, BBFS	UL
03. Keyboard	Various	Various	Min. flame HB	QMFZ2	UL
04. LCD panel	Various	Various	7.5" TFT-LCD type, LED backlight module.	--	--
05. Speakers	Various	Various	Rated 8 ohm, max. 1.0 Watt, max. two provided	--	--
06. Enclosure (top, panel area)	CHI MEI CORPORATION	PC-540	V-0, 1.5 mm min., 70 degree C. (Refer to Enclosure Id 4-01 for details.)	QMFZ2	UL
06-1. Coating	PARAGON TECHNOLOGIES CO. LTD	PT-1	0.2-2.0 mils	QMRX2	UL
07. Enclosure (For all enclosure area)	Chi Lin	PB-1201	V-0, 1.32mm min. 60 degree C. (Refer to Enclosure Id 4-01 for details.)	QMFZ2	UL
08. Mainboard for Model XO-1.5HS	--	--	--	--	--
08-1. R.T.C. Battery (Alternate)	PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA	ML1220	3 Vdc; Max Charging Voltage 12 Vdc; Max Charging Current 300 mA	BBCV2	UL
08a. R.T.C. Battery (alternate)	HITACHI MAXELL ENERGY LTD	ML1220	3 Vdc; Max Charging Voltage 12 Vdc; Max Charging Current 100 mA	BBCV2	UL
08-1-1. RTC Battery protected components	--	--	The RTC battery is protected by following: resistors (R309, R305/1kohm)(R298/4.7Kohm)(R306/1.2Kohm), a transistor (Q24) and a diode (D20).	--	--
08-2. Protector IC U5 (for USB use) (optional)	RICHTEK	RT9703 series	2.0-5.5Vdc, 3.5A	--	--
08-2a. Protector IC U5 (for USB use) (Alternate)(optional)	GLOBAL MIXED-MODE TECHNOLOGY IN	G5282 series	2.0-5.5Vdc, 1.0 A	-	--
09. Mainboard for Model XO-1.75HS	--	--	--	--	--

Object/part or Description	Manufacturer/ trademark	type/model	technical data	CCN	Marks of Conformity
09-1. R.T.C. Battery (Alternate)	PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA	ML1220	3 Vdc; Max Charging Voltage 12 Vdc; Max Charging Current 300 mA	BBCV2	UL
09a. R.T.C. Battery (alternate)	HITACHI MAXELL ENERGY LTD	ML1220	3 Vdc; Max Charging Voltage 12 Vdc; Max Charging Current 100 mA	BBCV2	UL
09-1-1. RTC Battery protected components	--	--	The RTC battery is protected by following: resistors (R35, R27/1kohm)(R26/4.7Kohm)(R23/1.2Kohm), a transistor (Q1) and a diode (D14).	--	--
09. Protect IC U9 (for USB use)	Diodes Inc	AP2171 AP2161	2.7-5.5Vdc, Cont. Current 1.0A; Prot. Current 2.0A	QVGS2	UL
10. Mother board for Models XO-4, XO-4 TOUCH	--	--	--	--	--
10-1 Wireless LAN Card	--	--	3.3Vdc	--	--
10-2. Protect IC U9 (for USB use)	Diodes Inc	AP2171, AP2161	2.7-5.5Vdc, Cont. Current 1.0A, Prot. Current 2.0A	QVGS2	UL
10-3. R.T.C. Battery (alternate)	HITACHI MAXELL ENERGY LTD	ML1220	3 Vdc; Max Charging Voltage 12 Vdc; Max Charging Current 100 mA	BBCV2	UL
10-3-1. RTC Battery protect components	--	--	The RTC battery is protected by following: resistors (R359, R377/1kohm) (R368/1.2Kohm), a transistor (Q39) and a diode (D19).	--	--

Enclosures

<u>Type</u>	<u>Supplement Id</u>	<u>Description</u>
Photographs	3-01	External View-1
Photographs	3-02	External View-2
Photographs	3-03	External View-3
Photographs	3-04	External View-4
Photographs	3-05	Internal View-1
Photographs	3-06	Internal View-2
Photographs	3-07	Internal View-3
Photographs	3-08	Mainboard-1(For Model XO-1.5HS)
Photographs	3-09	Mainboard-2(For Model XO-1.5HS)
Photographs	3-10	Mainboard-3(For Model XO-1.75HS)
Photographs	3-11	Mainboard-4(For Model XO-1.75HS)
Photographs	3-12	Component Side of Mainboard (Alternate) (For Model XO-4 HS, XO-41 HS TOUCH)
Photographs	3-13	Trace Side of Mainboard (Alternate) (For Model XO-4 HS, XO-41 HS TOUCH)
Photographs	3-14	Front Bezel (Alternate) (For Model XO-41 HS TOUCH only)
Diagrams	4-01	Overall Dimension
Schematics + PWB		
Manuals		
Miscellaneous	7-01	Limited Power Source Test Result.

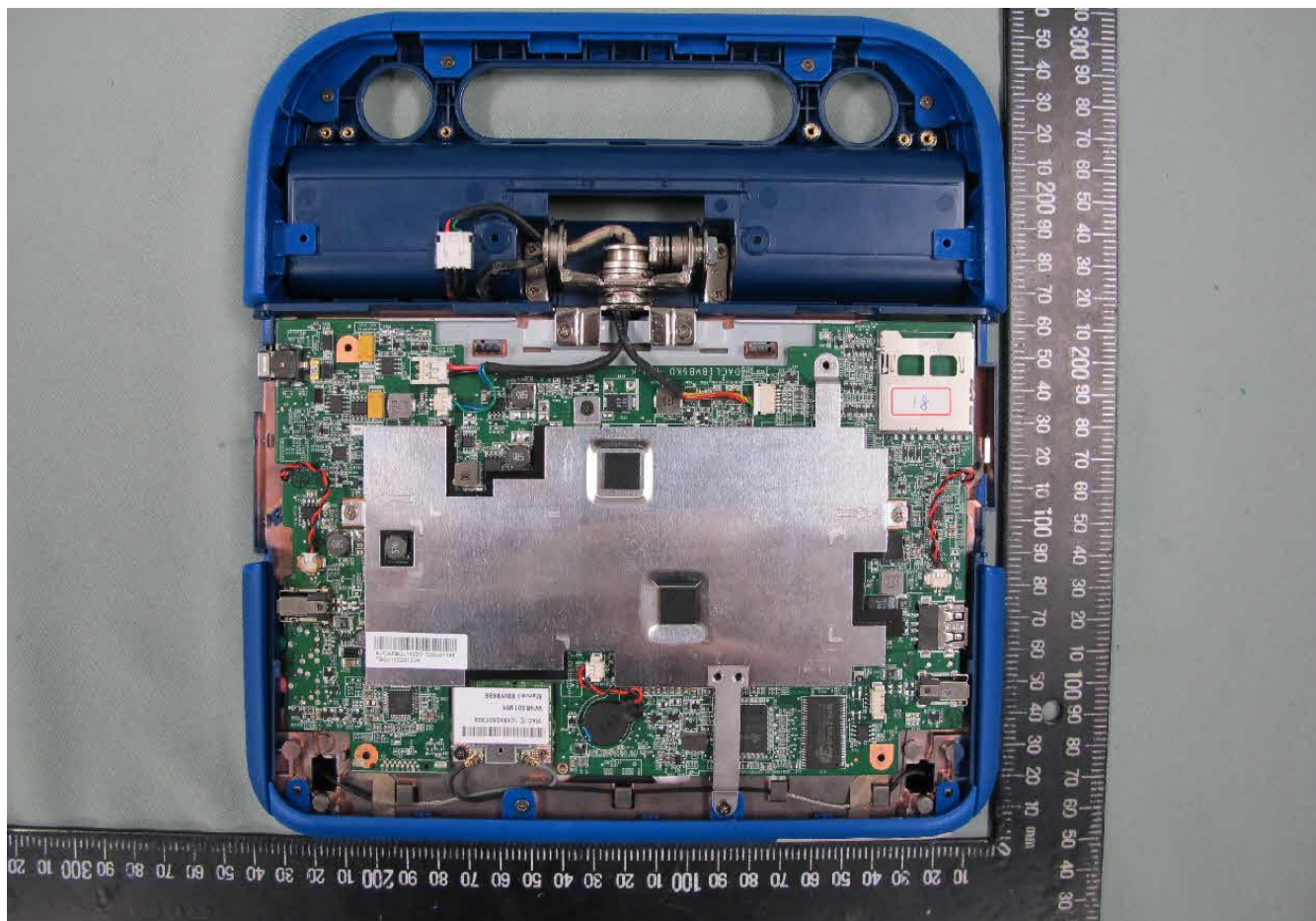


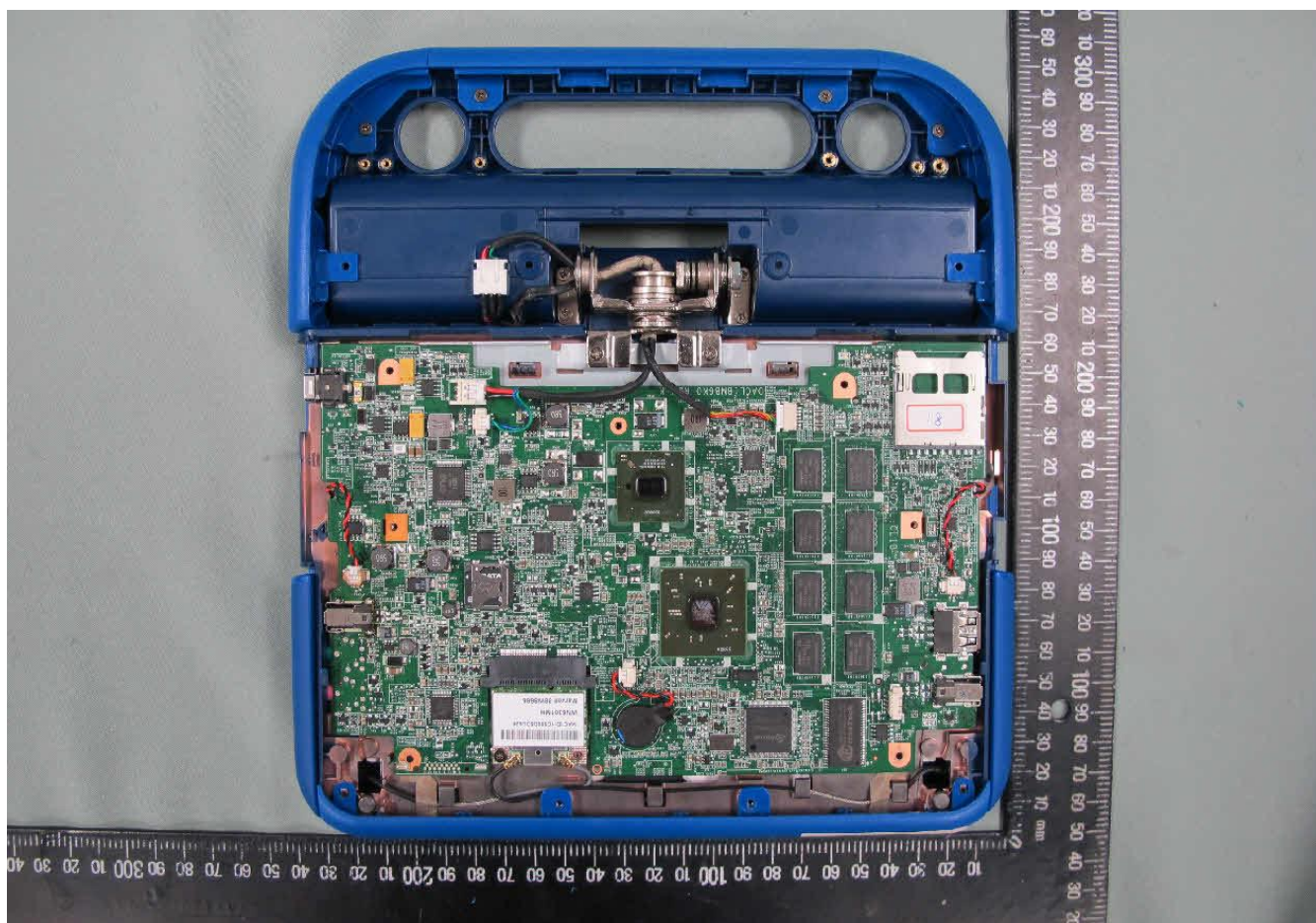


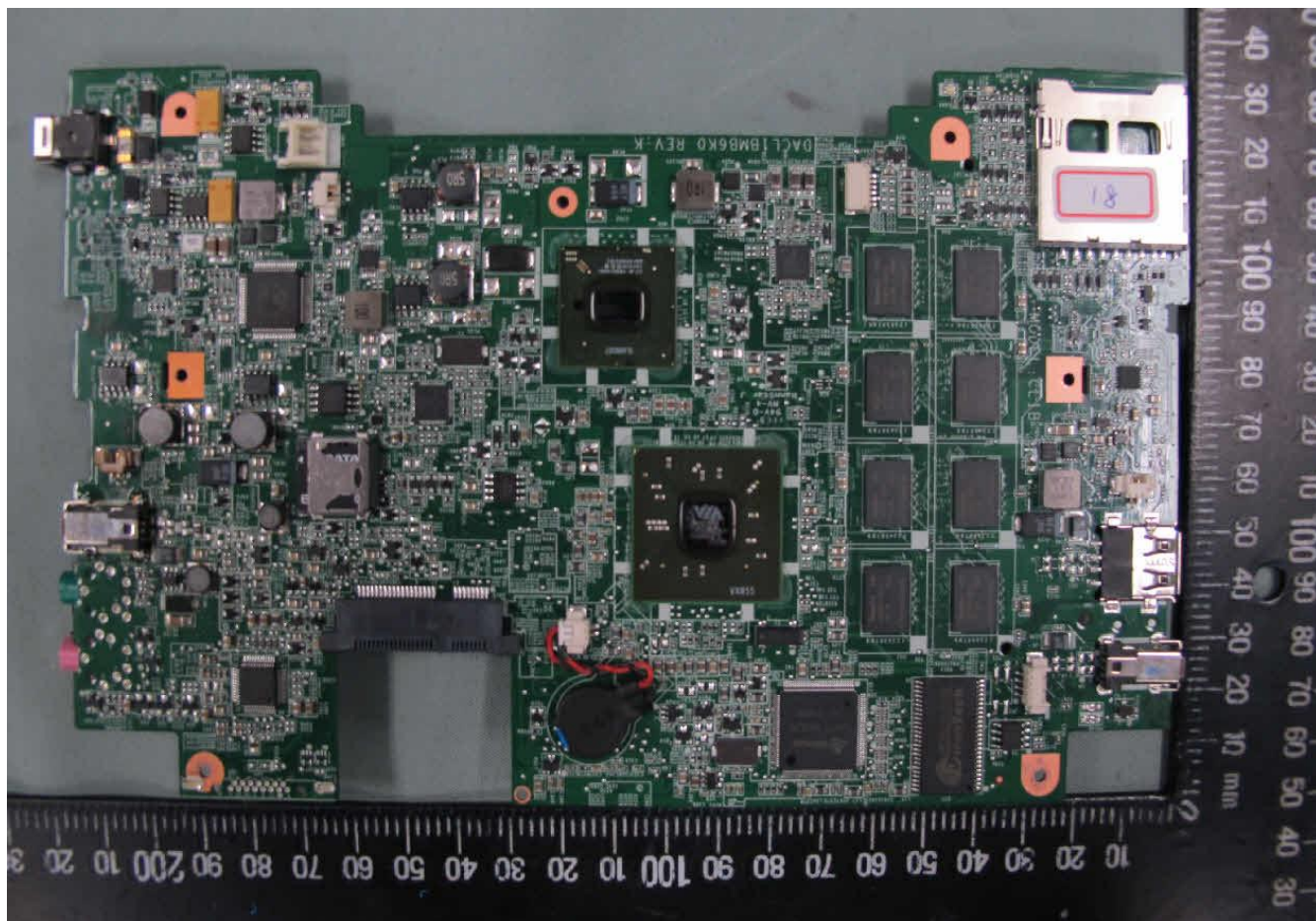


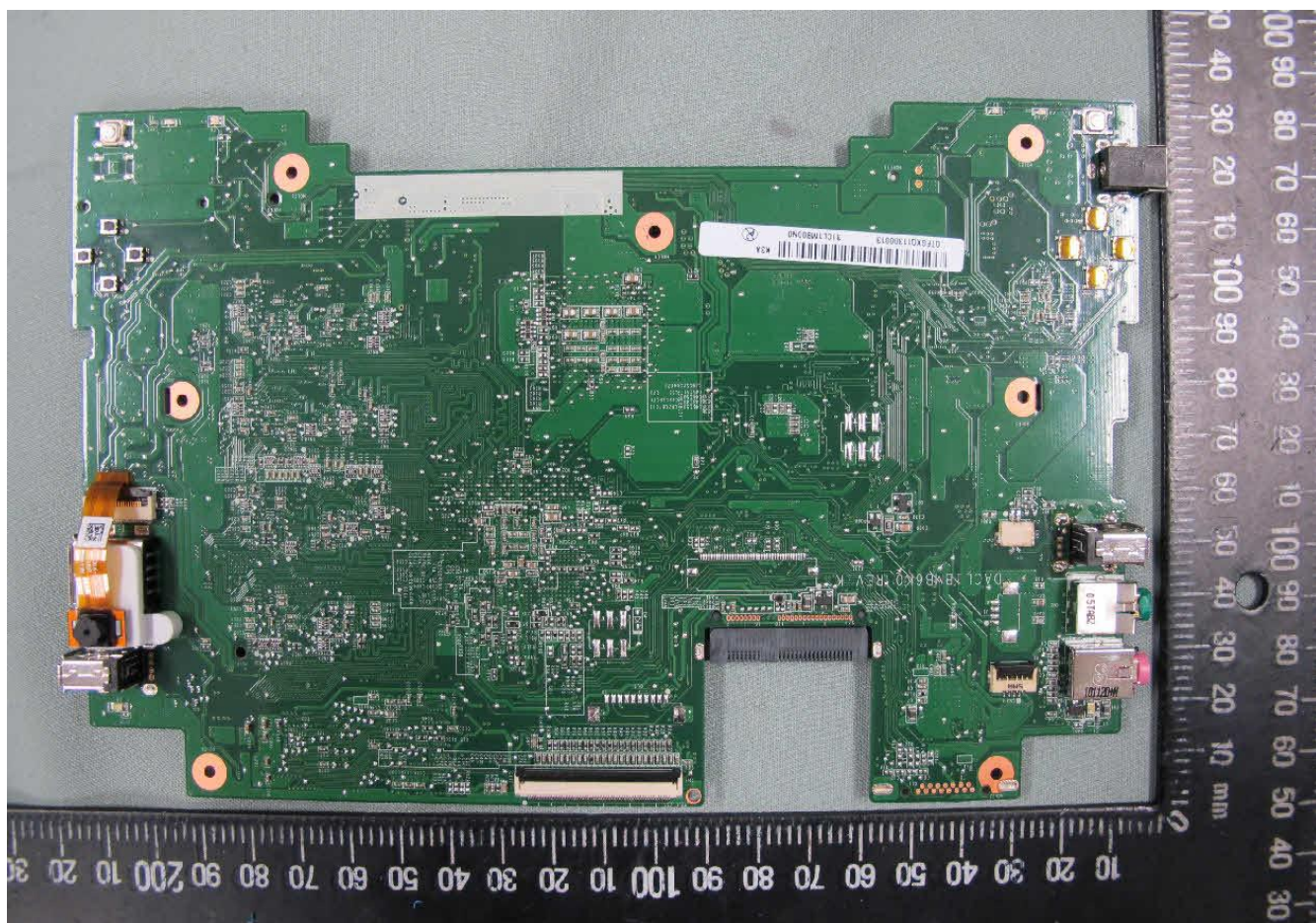


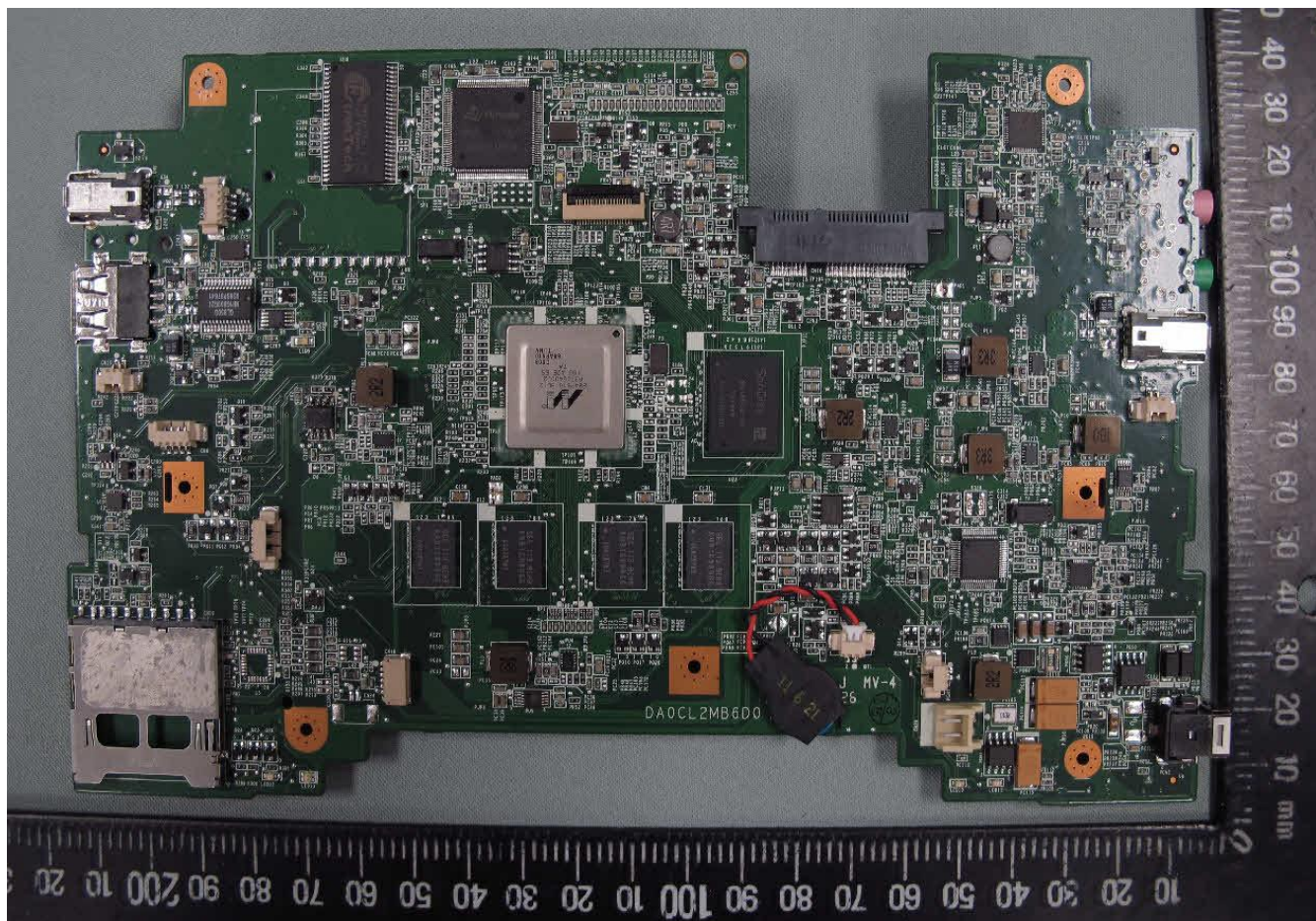




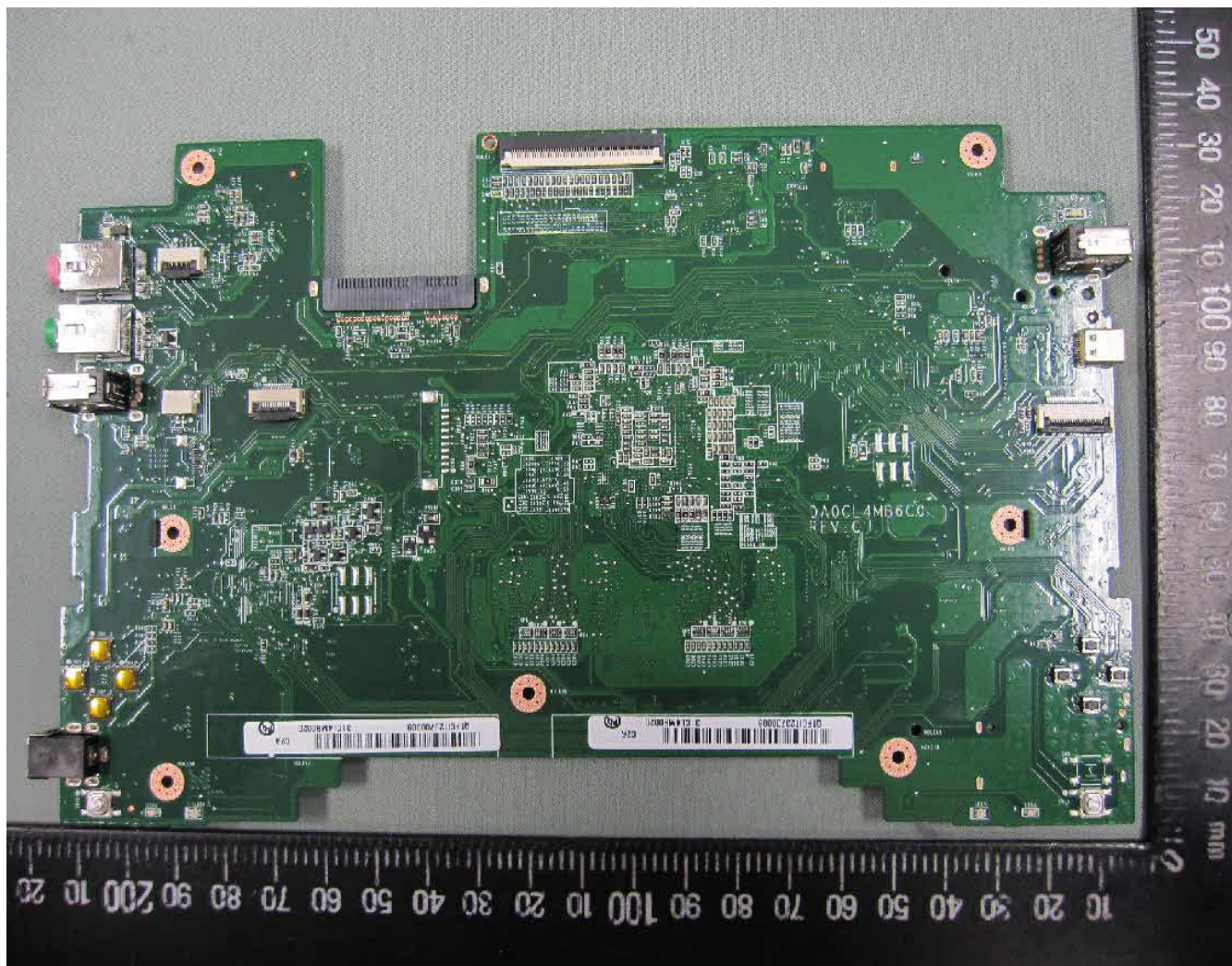


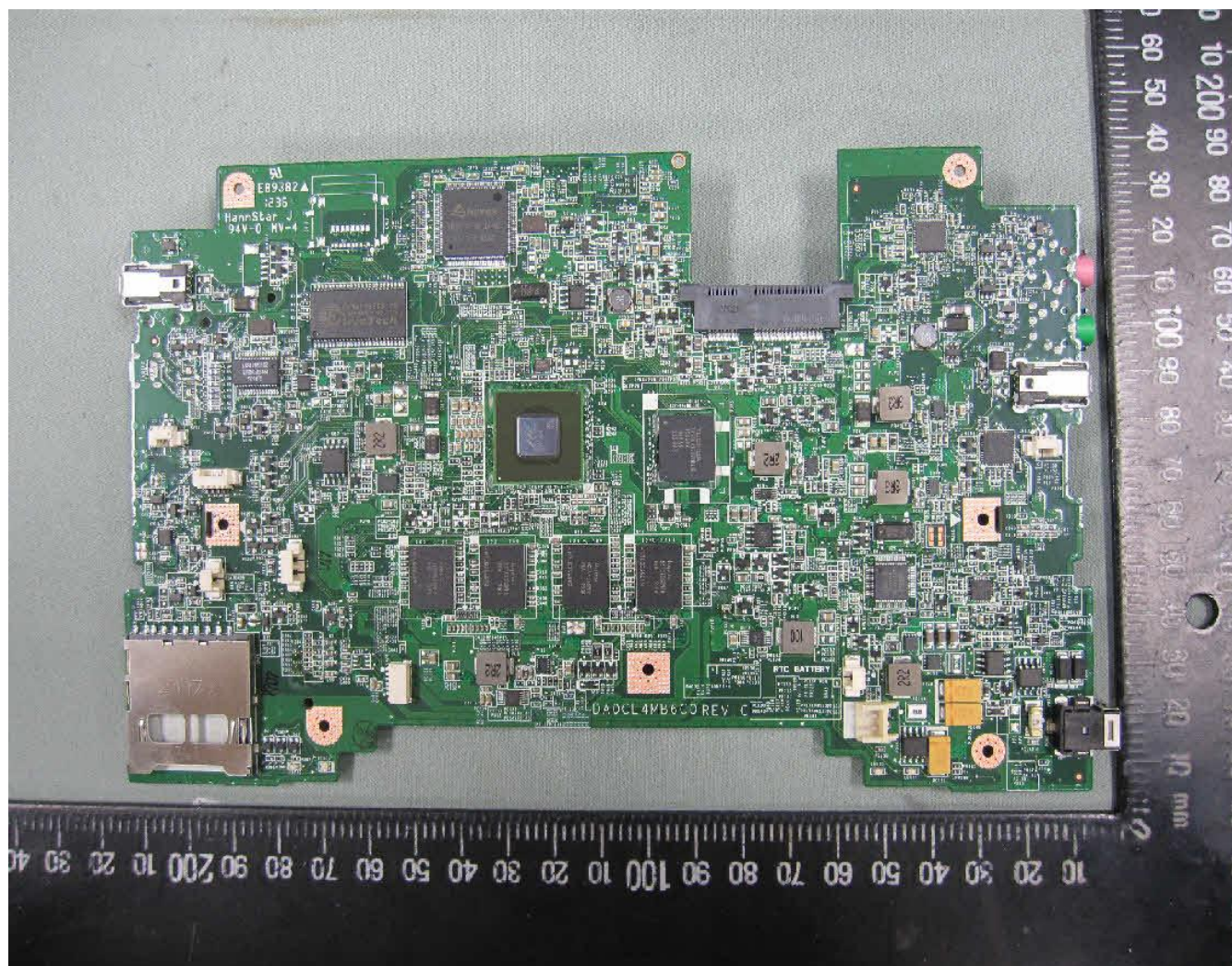


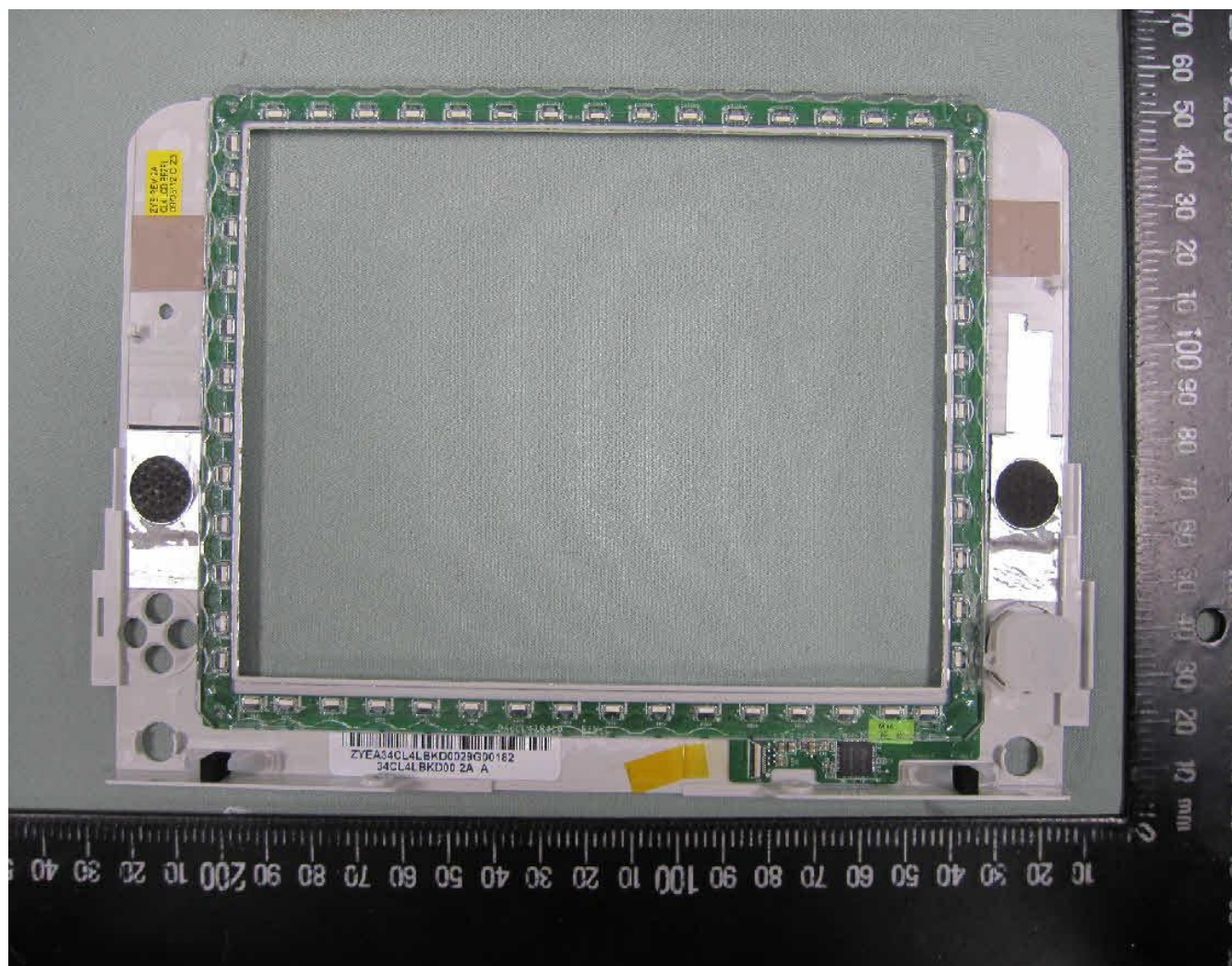


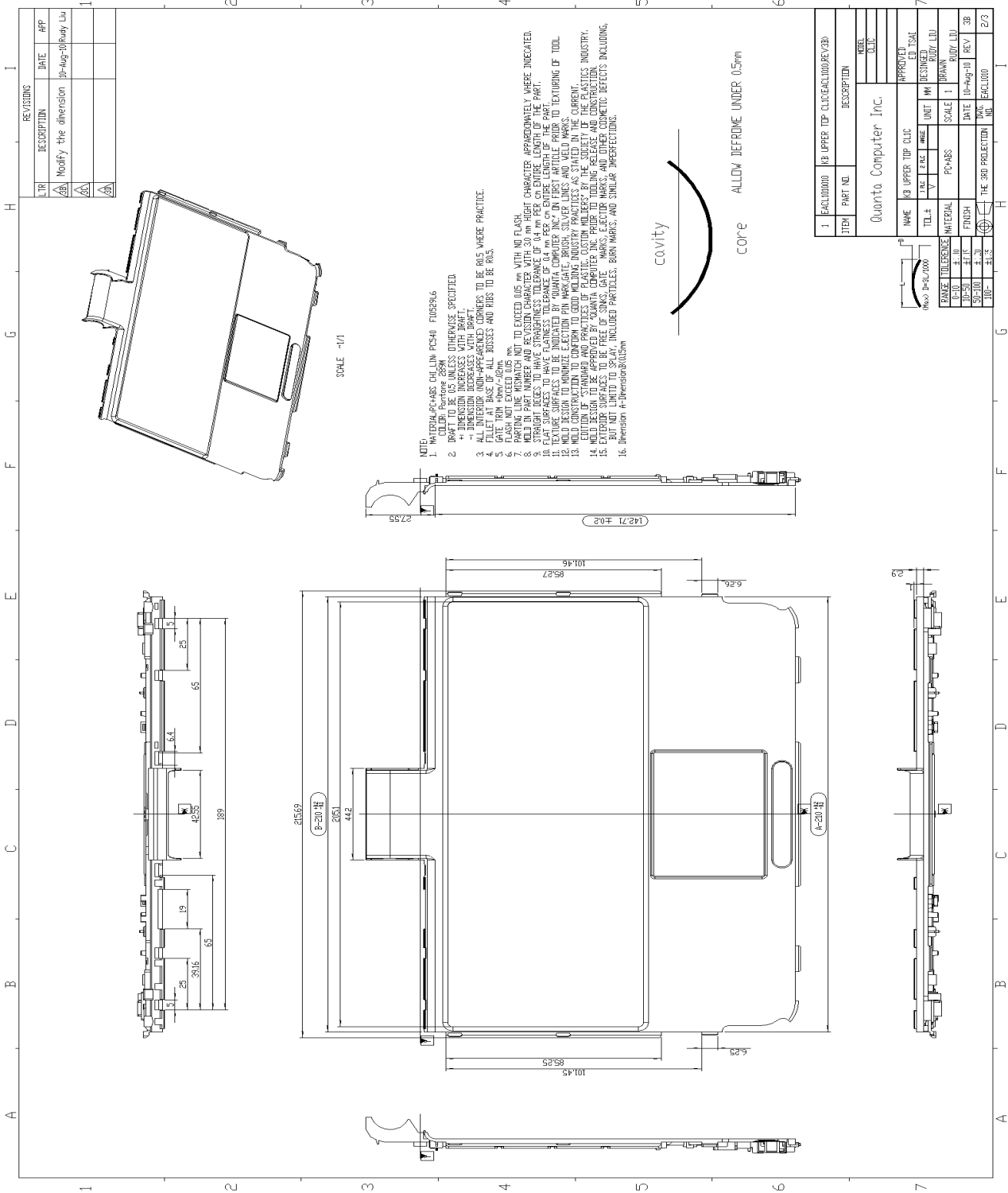












For Model XO-1.5HS

2.5	TABLE: limited power sources					P
	Uoc	I _{sc} (A)		VA		
		Meas.	Limit	Meas.	Limit	
USB port (CN8) pin 1 – RTN (normal)	4.96	3.30	8.0	9.80	100	
USB port (CN8) pin 2~4 – RTN (normal)	0	0	8.0	0	100	
USB port (CN8) pin 1 – RTN (PL10 s-c)	4.96	0.70	8.0	1.65	100	
USB port (CN8) pin 2~4 – RTN (PL10 s-c)	0	0	8.0	0	100	
USB port (CN8) pin 1 – RTN (PU10 pin2-8 s-c)	7.28	5.60	8.0	14.21	100	
USB port (CN8) pin 2~4 – RTN (PU10 pin2-8 s-c)	0	0	8.0	0	100	
USB port (CN9) pin 1 – RTN (normal)	4.96	3.30	8.0	10.29	100	
USB port (CN9) pin 2~4 – RTN (normal)	0	0	8.0	0	100	
USB port (CN9) pin 1 – RTN (PL10 s-c)	4.96	0.70	8.0	1.71	100	
USB port (CN9) pin 2~4 – RTN (PL10 s-c)	0	0	8.0	0	100	
USB port (CN9) pin 1 – RTN (PU10 pin2-8 s-c)	7.28	5.60	8.0	14.36	100	
USB port (CN9) pin 2~4 – RTN (PU10 pin2-8 s-c)	0	0	8.0	0	100	
USB port (CN14) pin 1 – RTN (normal)	4.96	3.31	8.0	9.38	100	
USB port (CN14) pin 2~4 – RTN (normal)	0	0	8.0	0	100	
USB port (CN14) pin 1 – RTN (PL10 s-c)	4.96	0.70	8.0	1.60	100	
	Uoc	I _{sc} (A)		VA		
		Meas.	Limit	Meas.	Limit	
USB port (CN14) pin 2~4 – RTN (PL10 s-c)	0	0	8.0	0	100	
USB port (CN14) pin 1 – RTN (PU10 s-c)	7.28	5.52	8.0	13.28	100	
USB port (CN14) pin 2~4 – RTN (PU10 s-c)	0	0	8.0	0	100	
SD Card reader (Con2) pin 10 - RTN	2.22	0	8.0	0	100	
SD Card reader (Con2) pin 1~9, 11~13 - RTN	0	0	8.0	0	100	
MIC port (All pins to RTN)	0	0	8.0	0	100	
Headphone port (All pins to RTN)	0	0	8.0	0	100	
Supplementary information:						
s-c=short circuit - All tests are conducted under U5 by-passed condition.						

For Model XO-1.75HS

2.5 - LIMITED POWER SOURCE MEASUREMENTS (con't)

RESULTS

Output Tested	Measured		Single Fault Condition	Maximum			Comments
	From	To		U _{oc}	I _{sc} 5s	VA 5s	
USB 1 (CN11)	Pin 1	Earth	Normal	4.95	1.31	5.28	Protect by U9
USB 1 (CN9)	Pin 1	Earth	Normal	4.95	1.31	5.28	Protect by U9
USB 1 (CN14)	Pin 1	Earth	Normal	4.95	1.31	5.18	Protect by U9
Card Reader (CN19)	Pin 4	Earth	Normal	2.22	0	0	signal
MIC (CN3)	Pin 1	Earth	Normal	0	0	0	signal
Earphone (CN4)	Pin 1	Earth	Normal	0	0	0	signal

Test Record No. 1

- The manufacturer submitted representative production samples of Laptop Computer (OLPC), Model XO-1.5 HS.

- Testing of Laptop Computer (OLPC), Model XO-1.5 HS was not considered necessary based upon previous evaluation under CB Scheme. The CB Scheme Test Certificate No. NO64205, date 2011-06-21 and Report Ref. No. 175993, date 2011-06-21 was prepared by NEMKO Under CB Scheme.

The following tests were waived:

Test	Rationale for Waiving
Input: Single-Phase (1.6.2)	Refer to CBTR
Limited Power Source Measurements (2.5)	Refer to CBTR
Steady Force (4.2.1 - 4.2.4)	Refer to CBTR
Drop (4.2.6, 4.2.1)	Refer to CBTR
Stress Relief (4.2.7, 4.2.1)	Refer to CBTR
Knob Pull/Handle Loading (4.3.2)	Refer to CBTR
Lithium Battery Reverse Current Measurement (4.3.8)	Refer to CBTR
Heating (4.5.1, 1.4.12, 1.4.13)	Refer to CBTR
Abnormal Operation (5.3.1 - 5.3.9)	Refer to CBTR
Overload of Operator Accessible Connector (5.3.7)	Refer to CBTR

Test Record No. 2

- The manufacturer submitted representative production samples of Laptop Computer (OLPC), Model XO-1.75HS, for investigation.

- Unless otherwise noted, all tests were conducted by Quanta Computer Inc., located in Tao Yuan, Taiwan under WTDP program.

- Only limited tests were deemed necessary due to employing as followings:

- 1) Alternate Model Name XO-1.75HS
- 2) Alternate Mainboard layout and circuit for Model XO-1.75HS with R/C protective IC
- 3) Alternate RTC battery source(HITACHI / ML1220)

- Only limited tests were performed on Model XO-1.75HS because of similar in construction to Model XO-1.5HS, see UL Report reference No. E142692-A300-UL previously evaluated unit.

- Only the following tests were deemed necessary.

The following tests were conducted:

Test	Testing Location/Comments
End Product Reference Page	
General Guidelines	
Input: Single-Phase (1.6.2)	
Limited Power Source Measurements (2.5)	
Lithium Battery Reverse Current Measurement (4.3.8)	
Heating (4.5.1, 1.4.12, 1.4.13)	
Overload of Operator Accessible Connector (5.3.7)	

Test results are valid only for the tested equipment. These tests are considered representative of the products covered by this Test Report. The test methods and results of the above tests have been reviewed and found to be in accordance with the requirements in the Standard(s) referenced at the beginning of this Test Report.

The following supplements are provided as a part of this Test Record. NOTE: These supplements are only available to the Applicant via the CDA system.

Type	Supplement Id	Description
Datasheet	2-01	Datasheet
Attachment	2-02	CRD

Issue Date: 2011-07-06

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Report Reference #

E142692-A300-UL

Revision Date: 2013-01-07

Test Record

Test Record No. 3

- The manufacturer submitted representative production samples of Laptop Computer (OLPC), model XO-1.5HS, XO-1.75HS for investigation, no tests were deemed necessary due to employing one RC adapter, Darfon Electronics Corp., model BU24-1203, the rating is identical to the adapter in original report.

Test Record No. 4

- The manufacturer submitted representative production samples of Laptop Computer (OLPC), Models XO-4 HS and XO-41 employing the alternative source of main board and new model designation, XO-4 HS and XO-41 .

- Testing of Laptop Computer (OLPC), Model XO-4 HS and XO-41 was not considered necessary based upon previous evaluation under CB Scheme. The CB Scheme Test Certificate No. NO64205/A1/M1, dated 2011-10-20, NO64205/A1/M2, dated 2012-10-03, NO64205/A1/M3, dated 2012-12-12 and Report Ref. No. 187672, dated 2011-10-20, 222283, dated 2012-10-03, 224779, dated 2012-12-12; was prepared by NEMKO Under CB Scheme.

The following tests were waived:

Test	Rationale for Waiving
Input: Single-Phase (1.6.2)	See Test Record
Lithium Battery Reverse Current Measurement (4.3.8)	See Test Record
Heating (4.5.1, 1.4.12, 1.4.13)	See Test Record

Test Record No. 5

- The manufacturer submitted representative production samples of Laptop Computer (OLPC), Models XO-1.5HS, XO-1.75HS, XO-4 HS, XO-4 HS Touch employing the correction for model designation.

- No tests were performed on Models XO-1.5HS, XO-1.75HS, XO-4 HS, XO-4 HS Touch employing correction to model designation due to testing previously performed on the subject unit.