CE Radio Test Report

APPLICANT	**:**	**Quanta Computer Inc.**
EQUIPMENT	**:**	**Laptop Computer**
BRAND NAME	**:**	**OLPC**
MODEL NAME	**:**	**XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS**
STANDARD	**:**	**ETSI EN 300 328 V1.7.1 (2006-10)**
TEST DATE(S)	**:**	**Jan. 31, 2013 ~ Feb. 05, 2013**

The measurements shown in this test report were made in accordance with the procedures given in EUROPEAN COUNCIL DIRECTIVE 1999/5/EC and found to be in compliance with ETSI Standard EN 300 328 V1.7.1 (2006-10).

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY **3**

SUMMARY OF TEST RESULT **4**

1. GENERAL DESCRIPTION **5**

1.1 Applicant 5
1.2 Manufacturer 5
1.3 Feature of Equipment Under Test 6
1.4 Testing Facility 7
1.5 Applied Standards 7
1.6 Description of Test System 7
1.7 Test Condition 7

2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST **8**

2.1 RF Power 8
2.2 Test Mode 10
2.3 Connection Diagram of Test System 12
2.4 Test Software 13

3. TRANSMITTER PARAMETERS **14**

3.1 Maximum Transmit Power 14
3.2 Maximum e.i.r.p. Spectral Density 18
3.3 Transmitter Frequency Range 21
3.4 Frequency Hopping Requirements 26
3.5 Transmitter Spurious Emissions 31

4. RECEIVER PARAMETERS **43**

4.1 Receiver Spurious Emissions 43

5. MEDIUM ACCESS PROTOCOL **47**

5.1 Definition and Requirement 47
5.2 Declaration 47

6. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION **48**

7. LIST OF MEASURING EQUIPMENT **52**

8. UNCERTAINTY EVALUATION **53**

APPENDIX A. PHOTOGRAPHS OF EUT

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
ER2D1707A	Rev. 01	Initial issue of report	Feb. 25, 2013

SUMMARY OF TEST RESULT

CLAUSE (EN 300 328)	TEST PARAMETER	PASS/FAIL	REMARK
Transmitter Parameters			
4.3.1	Maximum Transmit Power	PASS	-
4.3.2	Maximum E.I.R.P. Spectral Density	PASS	-
4.3.3	Frequency Range	PASS	-
4.3.4	Frequency Hopping Requirements	PASS	-
4.3.5	Medium Access Protocol	PASS	-
4.3.6	Transmitter Spurious Emissions	PASS	Under limit 10.31 dB at 5182.000 MHz
Receiver Parameters			
4.3.7	Receiver Spurious Emissions	PASS	Under limit 2.10 dB at 244.920 MHz

1. General Description

1.1 Applicant

Quanta Computer Inc.
No.188, Wen Hwa 2nd Rd., Kuei Shan Hsiang, Tao Yuan Shien, TaiWan

1.2 Manufacturer

Quanta Computer Inc.
No.188, Wen Hwa 2nd Rd., Kuei Shan Hsiang, Tao Yuan Shien, TaiWan

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Laptop Computer
Brand Name	OLPC
Model Name	XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS
WLAN Module	Trade Name: Liteon Model Name: WCBN603MH
Tx / Rx Frequency Range	WLAN : 2412 MHz ~ 2472 MHz Bluetooth : 2402 MHz ~ 2480 MHz
Number of Channels	WLAN : 13 Bluetooth : 79
Channel Spacing	WLAN : 5 MHz Bluetooth : 1 MHz
Maximum EIRP Average Power	802.11b : 12.64 dBm 802.11g : 12.60 dBm 802.11n HT20 : 12.83 dBm 802.11n HT40 : 13.87 dBm Bluetooth BDR (1Mbps) : 4.84 dBm
Duty Cycle	802.11b : 100.00% 802.11g : 100.00% 802.11n HT20 : 100.00% 802.11n HT40 : 100.00% Bluetooth BDR (1Mbps) : 78.45 %
Antenna Type	WLAN : Monopole Antenna Bluetooth : Monopole Antenna
Antenna Gain	WLAN : 0.12 dBi Bluetooth : 1.37 dBi
Type of Modulation	Bluetooth BDR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. There are four models of this project. The differences between them are summary below:

Sample List	Model Name	Configuration
Sample 1	XO-4 Touch	Child Product with touch screen
Sample 2	XO-4 HS Touch	ITE Product with touch screen
Sample 3	XO-4	Child Product without touch screen
Sample 4	XO-4 HS	ITE Product without touch screen

2. For other wireless features of this EUT, test report will be issued separately.
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Facility

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958
Test Site No.	**Sporton Site No. :**
	05CH01-KS ; TH01-KS

1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must complies with the requirements of **ETSI EN 300 328 V1.7.1 (2006-10).**

Note: All test items were verified and recorded according to the standards and without any deviation during the test.

1.6 Description of Test System

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1	Bluetooth Base Station	R&S	CBT	FCC DoC	N/A	Unshielded,1.8m
2	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

1.7 Test Condition

Normal Voltage	DC 6.5V
Extreme Voltage	DC 5.0V and DC 7.5V
Normal Temperature	25℃
Extreme Temperature	-20℃ and 55℃

Note:

1. The manufacturer declared that the EUT could work properly between voltage 5.0V~7.5V.

2. The test temperature was between 0˚C ~ 45˚C by manufacturer requested.

2. Test Configuration of Equipment under Test

2.1 RF Power

a. During testing, the interface cables and equipment positions were varied according to European Standard EN 300 328 V1.7.1 (2006-10).

b. Preliminary tests were performed in different data rate and recorded the RF power output in the following tables:

Channel	Frequency (MHz)	2.4GHz 802.11b RF Power (dBm)			
		DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	12.18	11.74	11.64	11.58
CH 07	2442 MHz	12.48	12.42	12.34	12.44
CH 13	2472 MHz	**12.52**	12.45	12.46	12.48
Duty cycle (%)		100.00	100.00	100.00	100.00

Channel	Frequency (MHz)	2.4GHz 802.11g RF Power (dBm)							
		OFDM Data Rate							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
CH 01	2412 MHz	11.20	10.99	10.98	11.14	11.08	10.98	10.92	10.74
CH 07	2442 MHz	**12.48**	12.42	12.39	12.36	12.34	12.28	12.04	12.23
CH 13	2472 MHz	12.38	12.12	12.17	12.35	12.32	12.24	9.18	11.85
Duty cycle (%)		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Channel	Frequency (MHz)	2.4GHz 802.11n (HT 20) RF Power (dBm)							
		OFDM Data Rate							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
CH 01	2412 MHz	11.48	11.44	11.25	11.08	10.98	11.04	10.95	10.89
CH 07	2442 MHz	**12.71**	12.54	12.48	12.35	12.18	12.08	11.92	11.88
CH 13	2472 MHz	12.28	12.22	12.19	12.10	12.24	12.22	12.18	11.93
Duty cycle (%)		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Channel	Frequency (MHz)	2.4GHz 802.11n (HT 40) Conducted Power (dBm)							
		OFDM Data Rate							
		13.5 Mbps	27 Mbps	40.5 Mbps	54 Mbps	81 Mbps	108 Mbps	121.5 Mbps	135 Mbps
CH 03	2422 MHz	11.72	11.24	11.15	11.08	11.13	11.17	11.21	11.26
CH 07	2442 MHz	12.74	12.53	11.93	11.89	12.31	12.38	12.32	12.22
CH 11	2462 MHz	13.06	12.82	13.12	12.72	12.77	12.62	13.13	**13.17**
Duty cycle (%)		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Channel	Frequency	Bluetooth RF Power (dBm)		
		Data Rate / Modulation		
		1 Mbps / GFSK	2 Mbps / π/4-DQPSK	3 Mbps / 8-DPSK
CH00	2402 MHz	-0.87	-4.87	-4.56
CH39	2441 MHz	1.00	-3.84	-3.63
CH78	2480 MHz	**1.16**	-3.34	-3.67
Duty cycle (%)		78.45	33.23	32.59

c. All the test data for each data rate were verified, but only the worst case was reported.

d. The data rates of WLAN 802.11b/g/n were set in 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n (HT 20) and 135Mbps for 802.11n (HT 40) due to the highest RF output power.

e. Data rate Bluetooth BDR (1Mbps) was chosen to be tested due to the highest RF output power.

2.2 Test Mode

Frequency range of radiation was investigated from 30 MHz to 12750 MHz.

Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

Test Modes	
RF	**Bluetooth BDR (1Mbps) GFSK**
Tx	Mode 1: CH00 (2402MHz) in Laptop Mode with Adapter 1 for Sample 1 **Mode 2: CH78 (2480MHz) in Laptop Mode with Adapter 1 for Sample 1** Mode 3: CH78 (2480MHz) in Tablet Mode with Adapter 1 for Sample 1 Mode 4: CH78 (2480MHz) in Laptop Mode with Adapter 2 for Sample 2 Mode 5: CH78 (2480MHz) in Laptop Mode with Adapter 3 for Sample 3 Mode 6: CH78 (2480MHz) in Laptop Mode with Adapter 4 for Sample 4
Rx	Mode 1: CH00 (2402MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 2: CH78 (2480MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 3: CH78 (2480MHz) in Tablet Mode with Adapter 1 for Sample 1

Test Modes	
RF	**802.11b DSSS**
Tx	Mode 7: CH01 (2412MHz) in Laptop Mode with Adapter 1 for Sample 1 **Mode 8: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1** Mode 9: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1
Rx	Mode 4: CH01 (2412MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 5: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 6: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1

Test Modes	
RF	**802.11g OFDM**
Tx	Mode 10: CH01 (2412MHz) in Laptop Mode with Adapter 1 for Sample 1 **Mode 11: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1** Mode 12: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1
Rx	Mode 7: CH01 (2412MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 8: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1 **Mode 9: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1**

Test Modes	
RF	**802.11n (HT 20) OFDM**
Tx	Mode 13: CH01 (2412MHz) in Laptop Mode with Adapter 1 for Sample 1 **Mode 14: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1** Mode 15: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1
Rx	Mode 10: CH01 (2412MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 11: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 12: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1

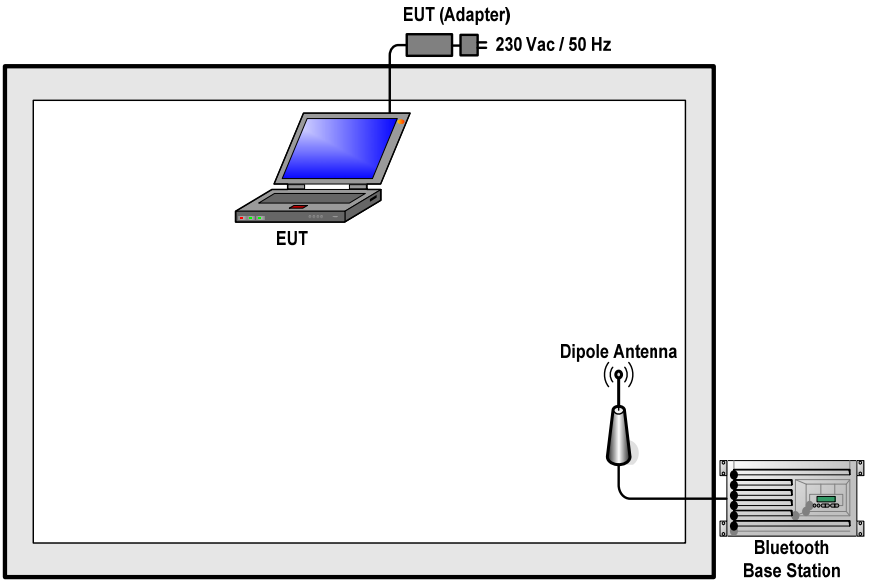
Test Modes	
RF	**802.11n (HT 40) OFDM**
Tx	Mode 16: CH03 (2422MHz) in Laptop Mode with Adapter 1 for Sample 1 **Mode 17: CH11 (2462MHz) in Laptop Mode with Adapter 1 for Sample 1** Mode 18: CH11 (2462MHz) in Tablet Mode with Adapter 1 for Sample 1
Rx	Mode 13: CH03 (2422MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 14: CH11 (2462MHz) in Laptop Mode with Adapter 1 for Sample 1 Mode 15: CH11 (2462MHz) in Tablet Mode with Adapter 1 for Sample 1

Remark:

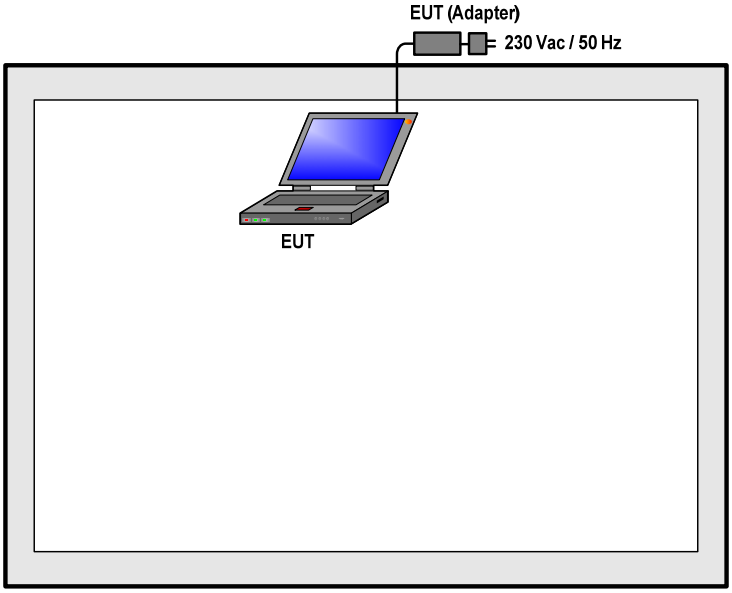
1. The worse cases of the Transmitter Radiated Spurious Emission (RSE) were Bluetooth CH78 (in Laptop Mode with Adapter 1 for Sample 1), 802.11b CH13 (in Laptop Mode with Adapter 1 for Sample 1), 802.11g CH13 (in Laptop Mode with Adapter 1 for Sample 1), 802.11n HT20 CH13 (in Laptop Mode with Adapter 1 for Sample 1) and 802.11n HT40 CH11 (in Laptop Mode with Adapter 1 for Sample 1) Tx modes; only the test data of these modes were reported.
2. The Receiver Radiated Spurious Emission (RSE) is not obviously related to the different modulation, so only the data of the worst case of 802.11g CH13 (in Tablet Mode with Adapter 1 for Sample 1) Rx mode was reported.

2.3 Connection Diagram of Test System

<Bluetooth Tx/Rx Mode>



<WLAN Tx/Rx Mode>



2.4 Test Software

For Bluetooth function, turn on “Terminal” program under Linux system which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for continuous transmitting and receiving signals.

For WLAN function, turn on “Terminal” program under Linux system, the EUT will get into the engineering modes; then, entry instruction under CMD program in the notebook, the EUT will contact with WLAN AP for continuous transmitting and receiving signals.

3. Transmitter Parameters

3.1 Maximum Transmit Power

3.1.1 Limit of Effective Isotropic Radiated Power

SUBCLAUSE 4.3.1.2	
TEST CONDITION	**LIMIT**
Under all Test Conditions	20dBm / -10dBW

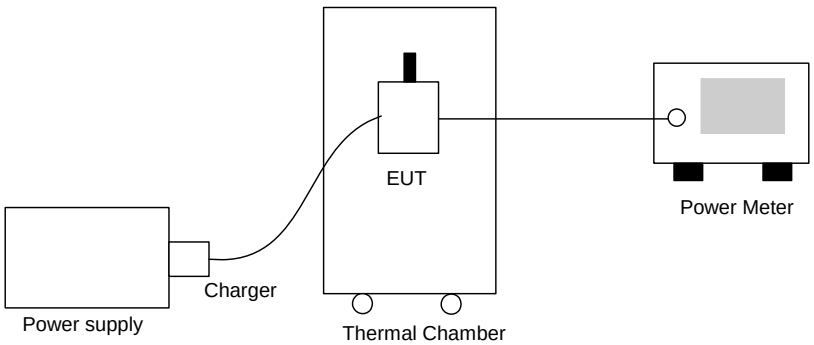
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. Placing the EUT in thermal chamber.
2. The transmitter output port was connected to the power meter.
3. Connecting the charger to power supply.
4. Setting thermal chamber temperature and power supply voltage at suitable values.
5. The power is equal to the reading on power meter plus cable loss.
6. Repeating step 4 and 5 at different condition and different channel.
7. The EIRP = A+G+10*log(1/x), where A is the power measured in (2), G is the gain of the antenna of the EUT in dBi and x is the duty cycle of the EUT in continuously transmitting mode.

3.1.4 Test Setup



3.1.5 Test Results of Maximum Transmit Power

EUT Mode :	802.11b	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	13.80dB	**Duty Factor :**	0.00dB

TEST CONDITIONS				TRANSMITTER POWER EIRP (AVERAGE) (dBm)		
				CH 01 2412 MHz	CH 07 2442 MHz	CH 13 2472 MHz
T nom (℃)	25	V nom(V)	6.5	12.30	12.60	12.64
T min (℃)	-20	V max(V)	7.5	11.34	11.96	11.69
		V min(V)	5.0	11.36	12.03	11.74
T max (℃)	55	V max(V)	7.5	11.30	11.14	11.66
		V min(V)	5.0	11.34	11.17	11.68
Measurement uncertainty				1.5dB		

Note:

Measured average power has offset cable loss and duty factor.

For example: cable loss = 13.80 dB, Duty Factor = 0.00 dB, and antenna gain = 1.37 dBi at Ch01, 2412MHz, EIRP = 12.18 dBm (measured average power) + 0.12 dBm (antenna gain) = 12.30 dBm

EUT Mode :	802.11g	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	13.80dB	**Duty Factor :**	0.00dB

TEST CONDITIONS				TRANSMITTER POWER EIRP (AVERAGE) (dBm)		
				CH 01 2412 MHz	CH 07 2442 MHz	CH 13 2472 MHz
T nom (℃)	25	V nom(V)	6.5	11.32	12.60	12.50
T min (℃)	-20	V max(V)	7.5	11.40	11.50	11.58
		V min(V)	5.0	11.44	11.51	11.66
T max (℃)	55	V max(V)	7.5	10.16	9.66	10.21
		V min(V)	5.0	10.20	9.69	10.27
Measurement uncertainty				1.5dB		

EUT Mode :	802.11n HT20	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	13.80dB	**Duty Factor :**	0.00dB

TEST CONDITIONS				TRANSMITTER POWER EIRP (AVERAGE) (dBm)		
				CH 01 2412 MHz	CH 07 2442 MHz	CH 13 2472 MHz
T nom (℃)	25	V nom(V)	6.5	11.60	12.83	12.40
T min (℃)	-20	V max(V)	7.5	12.17	12.05	11.66
		V min(V)	5.0	12.18	12.10	11.74
T max (℃)	55	V max(V)	7.5	10.27	10.16	9.40
		V min(V)	5.0	10.29	10.20	9.44
Measurement uncertainty				1.5dB		

EUT Mode :	802.11n HT40	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	13.80dB	**Duty Factor :**	0.00dB

TEST CONDITIONS				TRANSMITTER POWER EIRP (AVERAGE) (dBm)		
				CH 03 2422 MHz	CH 07 2442 MHz	CH 11 2462 MHz
T nom (℃)	25	V nom(V)	6.5	11.38	12.34	13.29
T min (℃)	-20	V max(V)	7.5	12.16	13.74	13.81
		V min(V)	5.0	12.30	13.78	13.87
T max (℃)	55	V max(V)	7.5	10.50	11.07	11.71
		V min(V)	5.0	10.53	11.09	11.74
Measurement uncertainty				1.5dB		

EUT Mode :	Bluetooth BDR (1Mbps)	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	1.37dBi	**Duty Cycle :**	78.45%
Cable loss	15.00dB	**Duty Factor :**	1.05dB

TEST CONDITIONS				TRANSMITTER POWER EIRP (AVERAGE) (dBm)		
				CH 00 2402 MHz	**CH 39 2441 MHz**	**CH 78 2480 MHz**
T nom (℃)	25	V nom(V)	6.5	0.50	2.37	2.53
T min (℃)	-20	V max(V)	7.5	4.77	4.71	4.75
		V min(V)	5.0	4.84	4.66	4.79
T max (℃)	55	V max(V)	7.5	4.15	2.93	2.10
		V min(V)	5.0	4.10	2.90	2.17
Measurement uncertainty				1.5dB		

Note:

Measured average power has offset cable loss and duty factor.

For example: cable loss = 15.00 dB, Duty Factor = 1.05 dB, and antenna gain = 1.37 dBi at Ch00, 2402MHz, EIRP = -0.87 dBm (measured average power) + 1.37 dBm (antenna gain) = 0.50 dBm

3.2 Maximum e.i.r.p. Spectral Density

3.2.1 Limit of Maximum Spectral Power Density

SUBCLAUSE 4.3.2.2	
TEST CONDITION	**LIMIT**
Under all Test Conditions	-20 dBW / MHz 10 dBm / MHz

Remark: Maximum spectral power density is not applicable to FHSS device.

3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedure

1. The transmitter output port was connected to spectrum analyzer directly and IF port of spectrum analyzer was connected to power meter.
2. The spectrum analyzer's resolution bandwidth was set at 1 MHz RBW and 1 MHz VBW under fundamental frequency.
3. The maximum spectral power density, e.i.r.p., is determined by summation of the conducted power density and antenna peak gain with 10log (1/x), where x is the duty cycle of the EUT in continuously transmitting mode.

3.2.4 Test Setup

3.2.5 Test Results of Maximum e.i.r.p. Spectral Density

EUT Mode :	802.11b	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	15.00dB	**Duty Factor :**	0.00dB

TEST CONDITIONS	Power Density (dBm/MHz)		
	CH 01 2412MHz	CH07 2442MHz	CH 13 2472MHz
Measured Power Density	-1.12	0.81	0.51
Maximum Spectral Power Density EIRP (dBm)	-1.00	0.93	0.63
Measurement uncertainty	3dB		

Note:

1. Measured power density (dBm) has offset with cable loss.

2. Maximum Spectral Power Density EIRP(dBm) = Measured power density (dBm) + Antenna gain (dBi) + duty factor.

EUT Mode :	802.11g	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	15.00dB	**Duty Factor :**	0.00dB

TEST CONDITIONS	Power Density (dBm/MHz)		
	CH 01 2412MHz	CH07 2442MHz	CH 13 2472MHz
Measured Power Density	-2.41	-2.50	-2.67
Maximum Spectral Power Density EIRP (dBm)	-2.29	-2.38	-2.55
Measurement uncertainty	3dB		

Note:

1. Measured power density (dBm) has offset with cable loss.

2. Maximum Spectral Power Density EIRP(dBm) = Measured power density (dBm) + Antenna gain (dBi) + duty factor.

EUT Mode :	802.11n HT20	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	15.00dB	**Duty Factor :**	0.00dB

TEST CONDITIONS	Power Density (dBm/MHz)		
	CH 01 2412MHz	CH07 2442MHz	CH 13 2472MHz
Measured Power Density	-2.86	-2.76	-5.06
Maximum Spectral Power Density EIRP (dBm)	-2.74	-2.64	-4.94
Measurement uncertainty	1.5dB		

Note:

1. Measured power density (dBm) has offset with cable loss.

2. Maximum Spectral Power Density EIRP(dBm) = Measured power density (dBm) + Antenna gain (dBi) + duty factor.

EUT Mode :	802.11n HT40	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12 dBi	**Duty Cycle :**	100.00%
Cable loss	15.00dB	**Duty Factor :**	0.00dB

TEST CONDITIONS	Power Density (dBm/MHz)		
	CH 03 2422MHz	CH07 2442MHz	CH 11 2462MHz
Measured Power Density	-4.96	-3.99	-3.43
Maximum Spectral Power Density EIRP (dBm)	-4.84	-3.87	-3.31
Measurement uncertainty	1.5dB		

Note:

1. Measured power density (dBm) has offset with cable loss.

2. Maximum Spectral Power Density EIRP(dBm) = Measured power density (dBm) + Antenna gain (dBi) + duty factor.

3.3 Transmitter Frequency Range

3.3.1 Limit of Transmitter Frequency Range

SUBCLAUSE 4.3.3.2	
TEST CONDITION	**LIMIT**
Under all Test Conditions	f_L > 2400.0 MHz f_H < 2483.5 MHz

Remark: Lowest frequency band limit = 2400MHz, highest frequency band limit = 2454MHz for France

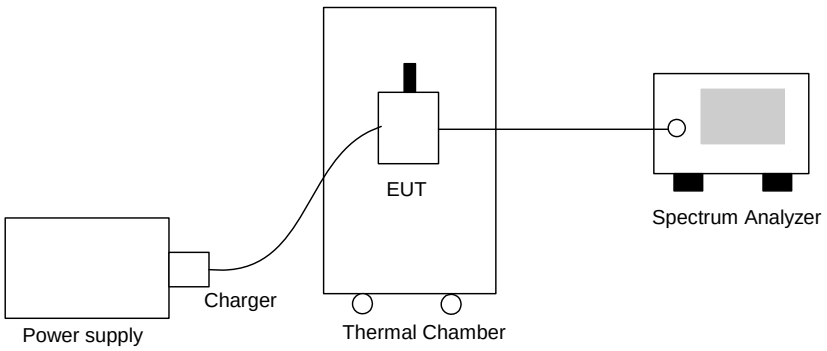
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedure

1. Placing the EUT in thermal chamber.
2. The transmitter output port was connected to the spectrum analyzer.
3. Connecting the charger to power supply.
4. The settings on spectrum analyzer are 100 KHz RBW and 100 KHz VBW.
5. Setting thermal chamber temperature and power supply voltage at suitable value.
6. Recording f_L or f_H according subclause 5.7.4
7. Repeating step 5 and 6 at different conditions and different channels.

3.3.4 Test Setup



3.3.5 Test Results of Transmitter Frequency Range

EUT Mode :	802.11b	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12dBi	**Duty Cycle :**	100.00%

TEST CONDITIONS				**FREQUENCY (MHz) at which –80 dBm/Hz occurs**	
				CH 01 2412 MHz	**CH 13 2472 MHz**
T nom (℃)	25	V nom (V)	6.5	2404.32	2480.04
T min (℃)	-20	V max (V)	7.5	2403.78	2480.28
		V min (V)	5.0	2403.72	2480.28
T max (℃)	55	V max (V)	7.5	2403.84	2479.92
		V min (V)	5.0	2403.84	2479.92
Measured frequencies (lowest and highest)				f_L = 2403.72	f_H = 2480.28
Measurement uncertainty				1×10^{-5}	

EUT Mode :	802.11g	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12dBi	**Duty Cycle :**	100.00%

TEST CONDITIONS				**FREQUENCY (MHz) at which –80 dBm/Hz occurs**	
				CH 01 2412 MHz	**CH 13 2472 MHz**
T nom (℃)	25	V nom (V)	6.5	2403.18	2480.76
T min (℃)	-20	V max (V)	7.5	2403.00	2480.82
		V min (V)	5.0	2403.00	2480.82
T max (℃)	55	V max (V)	7.5	2403.24	2480.34
		V min (V)	5.0	2403.24	2480.34
Measured frequencies (lowest and highest)				f_L = 2403.00	f_H = 2480.82
Measurement uncertainty				1×10^{-5}	

EUT Mode :	802.11n HT20	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12dBi	**Duty Cycle :**	100.00%

TEST CONDITIONS				**TRANSMITTER POWER EIRP (AVERAGE) (dBm)**	
				CH 01 2412 MHz	**CH 13 2472 MHz**
T nom (℃)	25	V nom(V)	6.5	2402.58	2481.36
T min (℃)	-20	V max(V)	7.5	2402.52	2481.42
		V min(V)	5.0	2402.52	2481.42
T max (℃)	55	V max(V)	7.5	2402.58	2481.36
		V min(V)	5.0	2402.58	2481.36
Measured frequencies (lowest and highest)				f_L = 2402.52	f_H = 2481.42
Measurement uncertainty				1.5dB	

EUT Mode :	802.11n HT40	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	0.12dBi	**Duty Cycle :**	100.00%

TEST CONDITIONS				**TRANSMITTER POWER EIRP (AVERAGE) (dBm)**	
				CH 03 2422 MHz	**CH 11 2462 MHz**
T nom (℃)	25	V nom(V)	6.5	2403.34	2480.63
T min (℃)	-20	V max(V)	7.5	2403.25	2480.81
		V min(V)	5.0	2403.25	2480.81
T max (℃)	55	V max(V)	7.5	2403.43	2480.54
		V min(V)	5.0	2403.43	2480.54
Measured frequencies (lowest and highest)				f_L = 2403.25	f_H = 2480.81
Measurement uncertainty				1.5dB	

EUT Mode :	Bluetooth BDR (1Mbps)	Temperature :	20~21℃
Test Engineer :	Zhi Lu	Relative Humidity :	40~41%
Antenna Gain :	1.37dBi	Duty Cycle :	78.45%

TEST CONDITIONS				FREQUENCY (MHz) at which –80 dBm/Hz occurs	
				CH 00 2402 MHz	CH 78 2480 MHz
T nom (℃)	25	V nom (V)	6.5	2401.34	2480.62
T min (℃)	-20	V max (V)	7.5	2401.36	2480.64
		V min (V)	5.0	2401.36	2480.64
T max (℃)	55	V max (V)	7.5	2401.34	2480.62
		V min (V)	5.0	2401.34	2480.62
Measured frequencies (lowest and highest)				f_L = 2401.34	f_H = 2480.64
Measurement uncertainty				1×10^{-5}	

EUT Mode :	Bluetooth EDR (2Mbps)	Temperature :	20~21℃
Test Engineer :	Zhi Lu	Relative Humidity :	40~41%
Antenna Gain :	1.37dBi	Duty Cycle :	33.23%

TEST CONDITIONS				FREQUENCY (MHz) at which –80 dBm/Hz occurs	
				CH 00 2402 MHz	CH 78 2480 MHz
T nom (℃)	25	V nom (V)	6.5	2401.30	2480.66
T min (℃)	-20	V max (V)	7.5	2401.30	2480.66
		V min (V)	5.0	2401.30	2480.66
T max (℃)	55	V max (V)	7.5	2401.30	2480.66
		V min (V)	5.0	2401.30	2480.66
Measured frequencies (lowest and highest)				f_L = 2401.30	f_H = 2480.66
Measurement uncertainty				1×10^{-5}	

EUT Mode :	Bluetooth EDR (3Mbps)	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	1.37dBi	**Duty Cycle :**	32.59%

TEST CONDITIONS				**FREQUENCY (MHz) at which –80 dBm/Hz occurs**	
				CH 00 2402 MHz	**CH 78 2480 MHz**
T nom (℃)	25	V nom (V)	6.5	2401.32	2480.68
T min (℃)	-20	V max (V)	7.5	2401.32	2480.68
		V min (V)	5.0	2401.32	2480.68
T max (℃)	55	V max (V)	7.5	2401.30	2480.68
		V min (V)	5.0	2401.30	2480.68
Measured frequencies (lowest and highest)				f_L = 2401.30	f_H = 2480.68
Measurement uncertainty				1×10^{-5}	

3.4 Frequency Hopping Requirements

3.4.1 Dwell Time

3.4.1.1 Limit of Dwell Time

SUBCLAUSE 4.3.4.1.2	
TEST CONDITION	**LIMIT**
Under all Test Conditions	The maximum dwell time shall be 0.4 s

3.4.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.1.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
3. Set the center frequency on the channel would be measured and set the frequency span to zero span.
4. Get the Dwell Time = Hops Over Occupancy Time (hops) x Package Transfer Time.

3.4.1.4 Test Setup

3.4.1.5 Test Result of Dwell Time

EUT Mode :	Bluetooth Normal	Temperature :	20~21℃
Test Engineer :	Zhi Lu	Relative Humidity :	40~41%
Antenna Gain :	1.37 dBi	Duty Cycle :	78.45%

Package Mode	Hops Over Occupancy Time (hops)	Package Transfer Time (ms)	Dwell Time (s)	Limit (s)
DH1	106.67	412	0.04	0.4
DH3	106.67	1682	0.18	0.4
DH5	106.67	2942	0.31	0.4

EUT Mode :	Bluetooth AFH	Temperature :	20~21℃
Test Engineer :	Zhi Lu	Relative Humidity :	40~41%
Antenna Gain :	1.37 dBi	Duty Cycle :	78.45%

Package Mode	Hops Over Occupancy Time (hops)	Package Transfer Time (ms)	Dwell Time (s)	Limit (s)
DH1	53.34	412	0.02	0.4
DH3	53.34	1682	0.09	0.4
DH5	53.34	2942	0.16	0.4

Remark:

1. In normal mode, hopping rate is 1600hops/s with 6 slots in 79 hopping channels.
   With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) (s),
   Hops Over Occupancy Time comes to (1600 / 6 / 79) x (0.4 x 79) = 106.67 hops.
2. In AFH mode, hopping rate is 800hops/s with 6 slots in 20 hopping channels.
   With channel hopping rate (800 / 6 / 20) in Occupancy Time Limit (0.4 x 20) (s),
   Hops Over Occupancy Time comes to (800 / 6 / 20) x (0.4 x 20) = 53.34 hops.
3. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

3.4.2 Hopping Channel Separation

3.4.2.1 Limit of Hopping Channel Separation

SUBCLAUSE 4.3.4.2.2	
TEST CONDITION	**LIMIT**
Under all Test Conditions	At least 1 MHz

3.4.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.2.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
3. The Hopping Channel Separation is defined as the channel frequency separation with the adjacent channel.

3.4.2.4 Test Setup

3.4.2.5 Test Result of Hopping Channel Separation

EUT Mode :	Bluetooth BDR (1Mbps)	**Temperature :**	20~21℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	40~41%
Antenna Gain :	1.37 dBi	**Duty Cycle :**	78.45%

Channel	Frequency (MHz)	Channel Separation (MHz)	Limits (MHz)
00	2402	1.002	1.000
39	2441	1.002	1.000
78	2480	1.002	1.000

3.4.3 Hopping Sequence

3.4.3.1 Limit of Hopping Sequence

SUBCLAUSE 4.3.4.3.2	
TEST CONDITION	**LIMIT**
Under all Test Conditions	A minimum of 20 hopping channels

3.4.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer directly.
2. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
3. The number of hopping frequency is defined as the total channel numbers to hop.

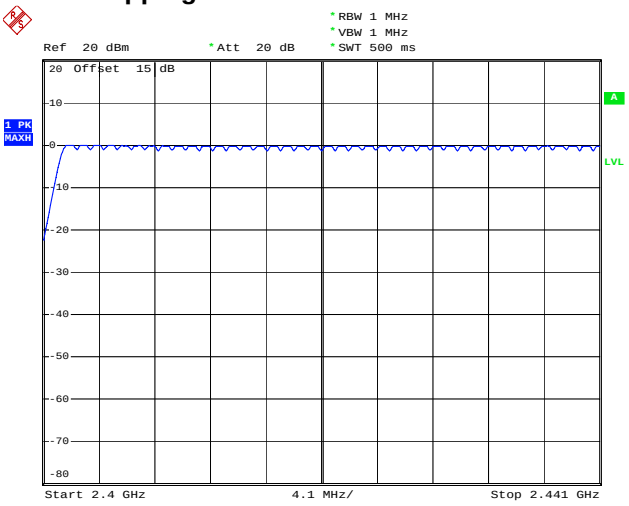
3.4.3.4 Test Setup

3.4.3.5 Test Result of Hopping Sequence

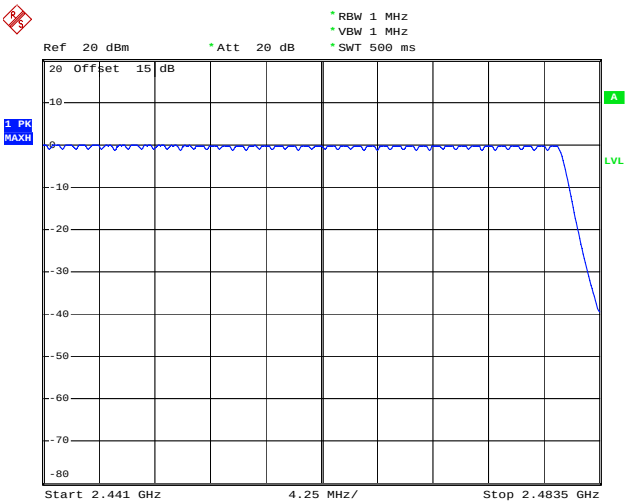
EUT Mode :	Bluetooth BDR (1Mbps)	Temperature :	20~21℃
Test Engineer :	Zhi Lu	Relative Humidity :	40~41%
Antenna Gain :	1.37 dBi	Duty Cycle :	78.45%

Total Number of Hopping Frequency (Channel)	Minimum Number of Adaptive Frequency Hopping (Channel)	Limit (Channel)
79	20	20

Number of Hopping Channel Plot on Channel 00 - 78



Date: 31.JAN.2013 04:16:58



Date: 31.JAN.2013 04:28:37

3.5 Transmitter Spurious Emissions

3.5.1 Limit of Transmitter Spurious Emissions

Transmitter limits for narrowband spurious emissions:

SUBCLAUSE 4.3.6.2	
FREQUENCY RANGE	**LIMIT WHEN OPERATING**
30 MHz to 1 GHz	-36 dBm
Above 1 GHz to 12,75 GHz	-30 dBm
1,8 GHz to 1,9 GHz 5,15 GHz to 5,3 GHz	-47 dBm

3.5.2 Measuring Instruments

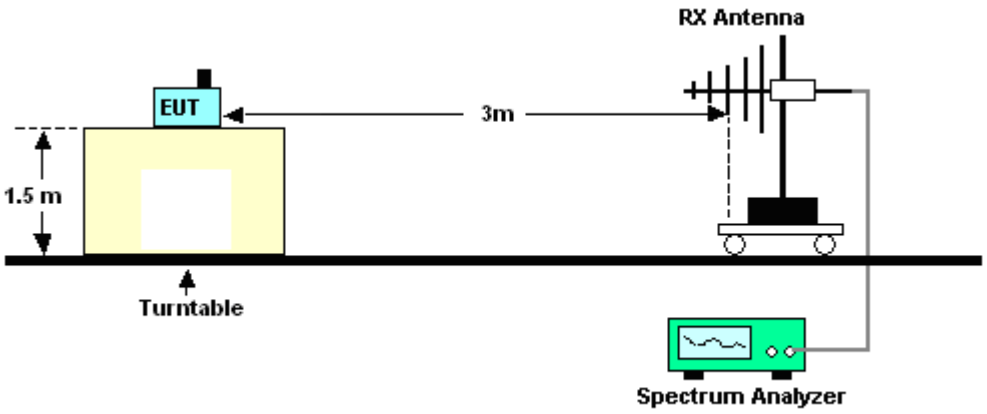
See list of measuring instruments of this test report.

3.5.3 Test Procedures

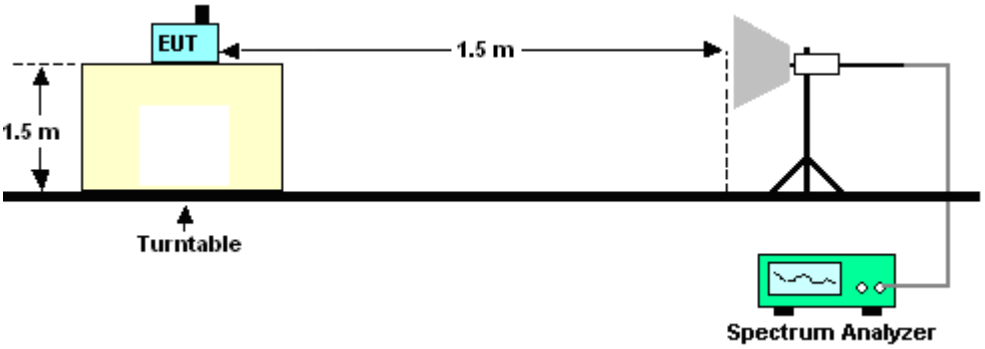
1. The EUT was placed on a turntable with 1.5m height.
2. The test distance between the receiving antenna and the EUT is 3m at frequencies up to 1GHz. For frequencies above 1GHz, the test distance is 1.5m which 5 times to the EUT size in far field test condition. The receiving antenna is kept at 1.5m height.
3. Set EUT in continuous transmitting with maximum output power.
4. The table was rotated from 0 to 360 degree to search the highest radiated emission.
5. Repeating step 3 and 4 for each polarization and channel to find the worst emission level.
6. The results obtained are compared to the limits in order to prove compliance with the requirement.

3.5.4 Test Setup

<Below 1GHz>

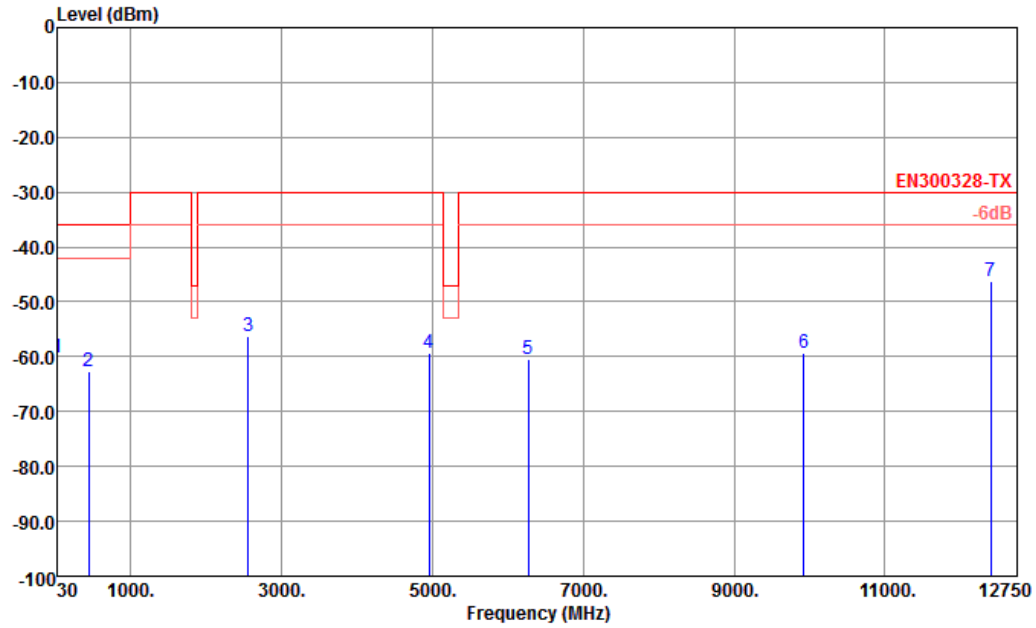


<Above 1GHz>



3.5.5 Test Result

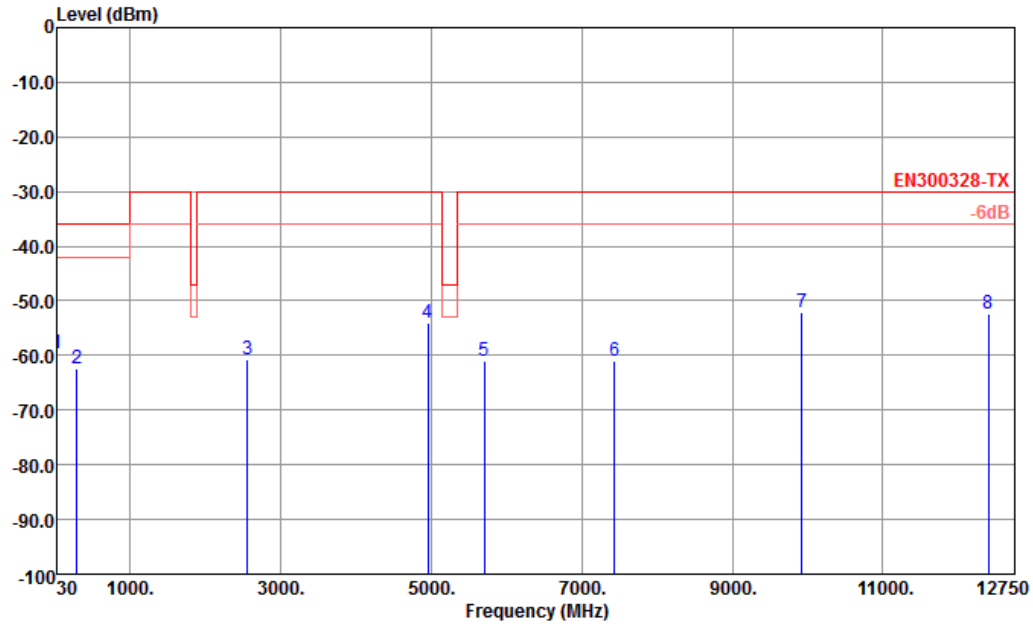
Test Mode :	Mode 2: CH78 (2480MHz) in Laptop Mode with Adapter 1 for Sample 1	Temperature :	21~22℃
Test Engineer :	Lucky Pan	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : EN300328-TX LF EIRP_090504 HORIZONTAL
Project : (ER)2D1707

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.67	-60.18	-24.18	-36.00	-64.01	3.83
2	448.40	-62.69	-26.69	-36.00	-64.83	2.14
3	2566.00	-56.34	-26.34	-30.00	-66.31	9.97
4	4960.00	-59.25	-29.25	-30.00	-73.07	13.82
5	6272.00	-60.43	-30.43	-30.00	-75.75	15.32
6	9922.00	-59.23	-29.23	-30.00	-74.79	15.56
7 p	12400.75	-46.29	-16.29	-30.00	-69.82	23.53

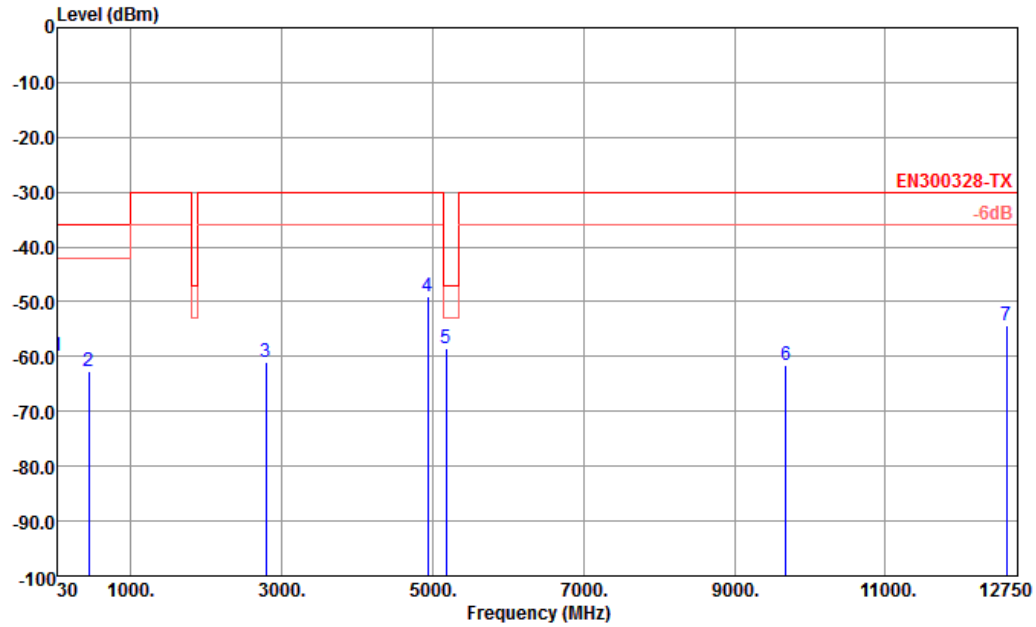
Test Mode :	Mode 2: CH78 (2480MHz) in Laptop Mode with Adapter 1 for Sample 1	**Temperature :**	21~22℃
Test Engineer :	Lucky Pan	**Relative Humidity :**	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	**Polarization :**	Vertical




```
Site                : 05CH01-KS
Condition           : EN300328-TX LF EIRP_090504 VERTICAL
Project             : (ER)2D1707
```

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.67	-59.60	-23.60	-36.00	-63.43	3.83
2	300.70	-62.50	-26.50	-36.00	-61.84	-0.66
3	2566.00	-60.82	-30.82	-30.00	-70.45	9.63
4	4960.00	-54.17	-24.17	-30.00	-68.19	14.02
5	5706.00	-61.11	-31.11	-30.00	-76.45	15.34
6	7438.00	-61.12	-31.12	-30.00	-76.28	15.16
7 p	9922.00	-52.20	-22.20	-30.00	-73.41	21.21
8	12400.75	-52.48	-22.48	-30.00	-73.42	20.94

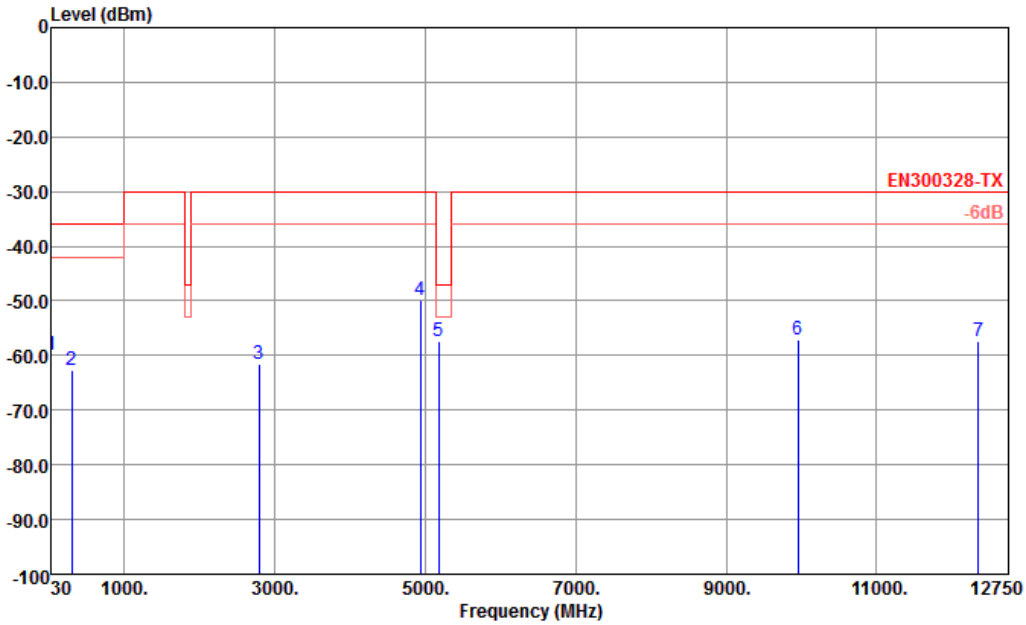
Test Mode :	Mode 8: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1	Temperature :	21~22℃
Test Engineer :	Lucky Pan	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : EN300328-TX LF EIRP_090504 HORIZONTAL
Project : (ER)2D1707

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.67	-60.02	-24.02	-36.00	-63.85	3.83
2	448.40	-62.54	-26.54	-36.00	-64.68	2.14
3	2792.00	-60.94	-30.94	-30.00	-69.99	9.05
4	4944.00	-49.10	-19.10	-30.00	-63.09	13.99
5 p	5182.00	-58.62	-11.62	-47.00	-73.03	14.41
6	9679.00	-61.42	-31.42	-30.00	-77.50	16.08
7	12604.25	-54.26	-24.26	-30.00	-78.05	23.79

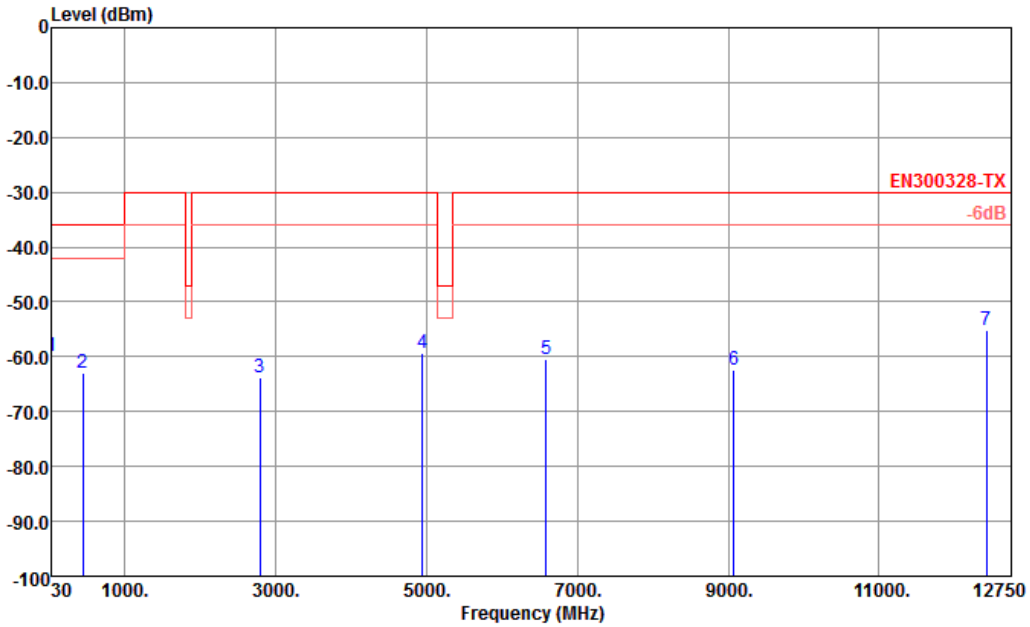
Test Mode :	Mode 8: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1	**Temperature :**	21~22℃
Test Engineer :	Lucky Pan	**Relative Humidity :**	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	**Polarization :**	Vertical




```
Site                : 05CH01-KS
Condition           : EN300328-TX LF EIRP_090504 VERTICAL
Project             : (ER)2D1707
```

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.40	-59.87	-23.87	-36.00	-63.70	3.83
2	303.50	-62.64	-26.64	-36.00	-61.93	-0.71
3	2792.00	-61.47	-31.47	-30.00	-70.47	9.00
4	4944.00	-49.87	-19.87	-30.00	-64.00	14.13
5 p	5182.00	-57.31	-10.31	-47.00	-71.57	14.26
6	9952.00	-57.11	-27.11	-30.00	-78.31	21.20
7	12348.50	-57.32	-27.32	-30.00	-77.95	20.63

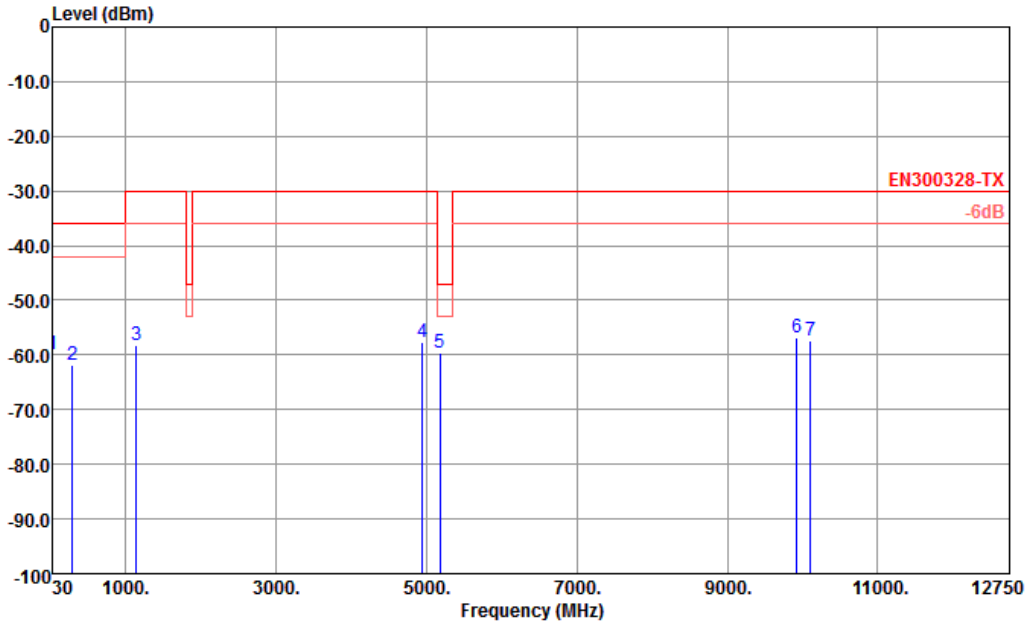
Test Mode :	Mode 11: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1	**Temperature :**	21~22℃
Test Engineer :	Lucky Pan	**Relative Humidity :**	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	**Polarization :**	Horizontal




```
Site                : 05CH01-KS
Condition           : EN300328-TX LF EIRP_090504 HORIZONTAL
Project             : (ER)2D1707
M
```

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 p	35.67	-59.75	-23.75	-36.00	-63.58	3.83
2	448.40	-62.93	-26.93	-36.00	-65.07	2.14
3	2792.00	-63.79	-33.79	-30.00	-72.84	9.05
4	4946.00	-59.45	-29.45	-30.00	-73.35	13.90
5	6592.00	-60.33	-30.33	-30.00	-75.15	14.82
6	9079.00	-62.43	-32.43	-30.00	-78.11	15.68
7	12425.50	-55.06	-25.06	-30.00	-78.63	23.57

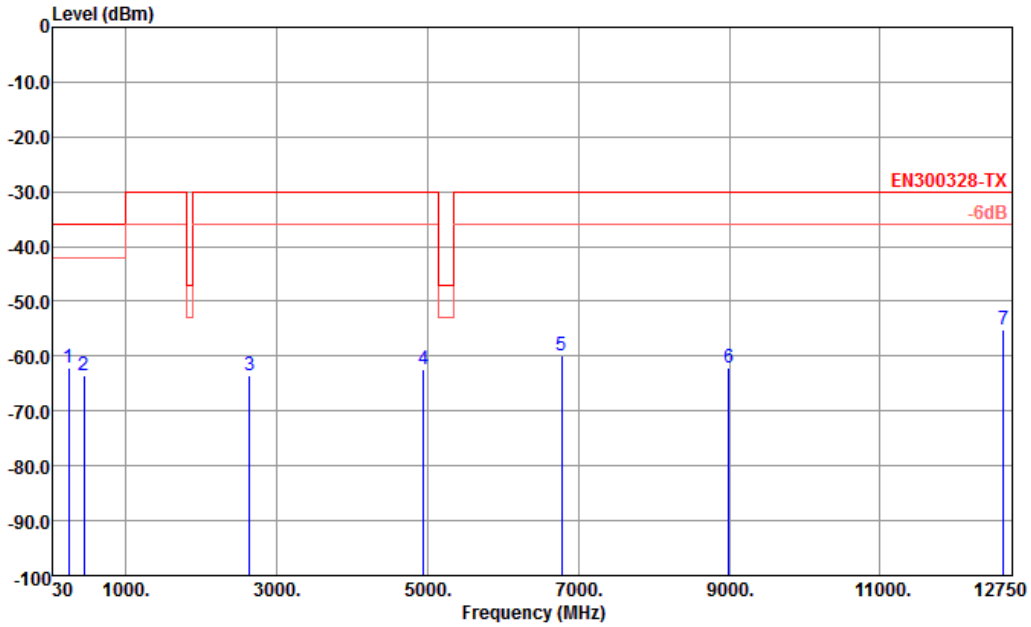
Test Mode :	Mode 11: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1	Temperature :	21~22℃
Test Engineer :	Lucky Pan	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Vertical



Site : 05CH01-KS
Condition : EN300328-TX LF EIRP_090504 VERTICAL
Project : (ER)2D1707

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.67	-59.76	-23.76	-36.00	-63.59	3.83
2	302.10	-61.78	-25.78	-36.00	-61.12	-0.66
3	1146.00	-58.26	-28.26	-30.00	-60.23	1.97
4	4946.00	-57.58	-27.58	-30.00	-71.65	14.07
5 p	5182.00	-59.56	-12.56	-47.00	-73.82	14.26
6	9922.00	-56.86	-26.86	-30.00	-78.07	21.21
7	10104.50	-57.29	-27.29	-30.00	-78.20	20.91

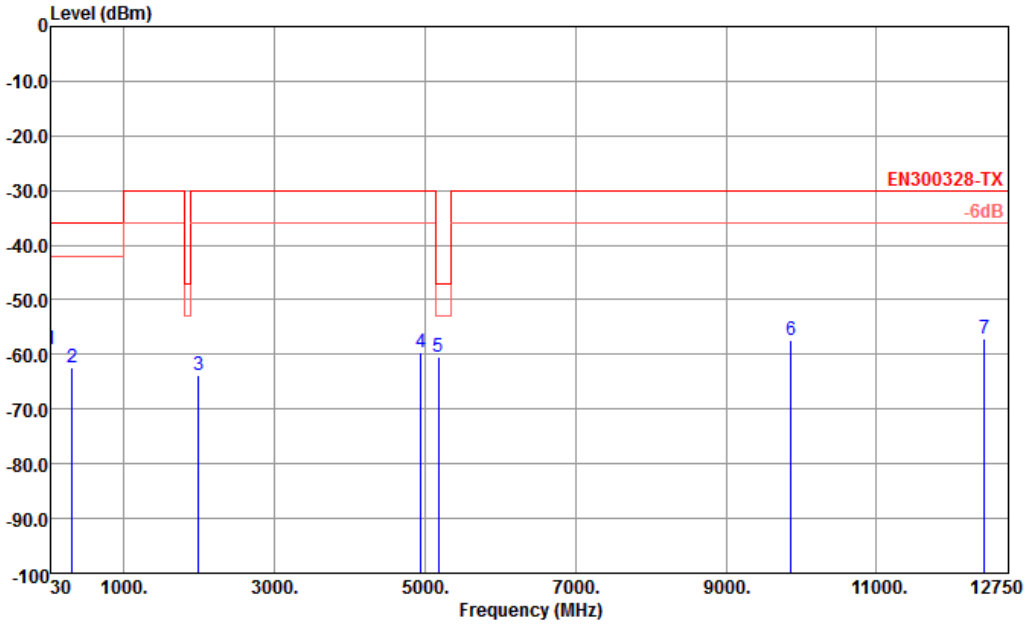
Test Mode :	Mode 14: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1	Temperature :	21~22℃
Test Engineer :	Lucky Pan	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : EN300328-TX LF EIRP_090504 HORIZONTAL
Project : (ER)2D1707

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	244.92	-62.07	-26.07	-36.00	-60.32	-1.75
2	448.40	-63.39	-27.39	-36.00	-65.53	2.14
3	2644.00	-63.57	-33.57	-30.00	-73.57	10.00
4	4948.00	-62.42	-32.42	-30.00	-76.32	13.90
5	6778.00	-59.94	-29.94	-30.00	-75.36	15.42
6	8989.00	-62.03	-32.03	-30.00	-78.15	16.12
7 p	12629.00	-55.26	-25.26	-30.00	-79.09	23.83

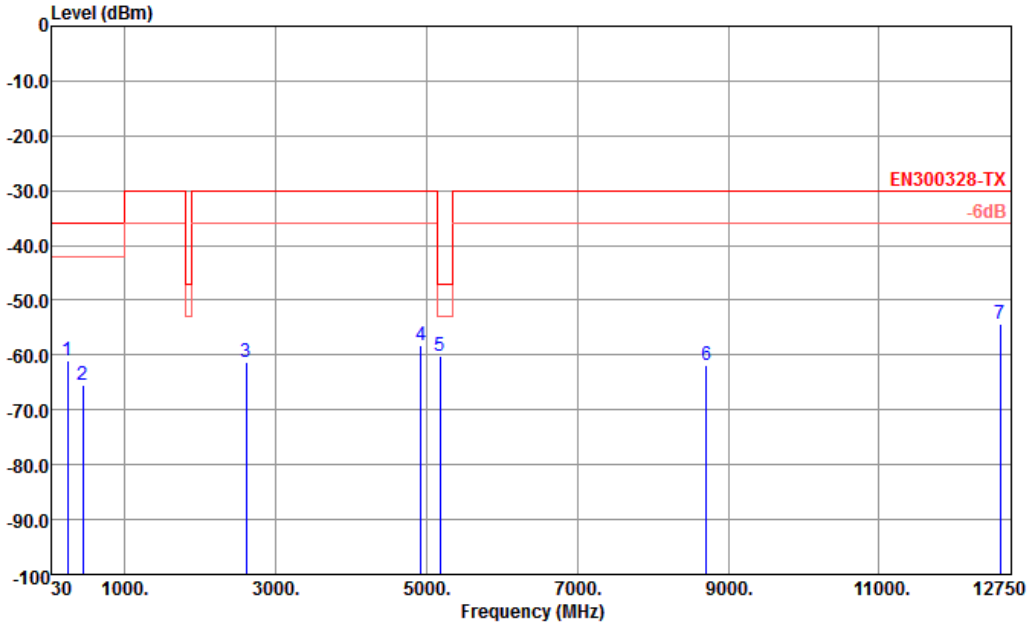
Test Mode :	Mode 14: CH13 (2472MHz) in Laptop Mode with Adapter 1 for Sample 1	**Temperature :**	21~22℃
Test Engineer :	Lucky Pan	**Relative Humidity :**	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	**Polarization :**	Vertical




```
Site                : 05CH01-KS
Condition           : EN300328-TX LF EIRP_090504 VERTICAL
Project             : (ER)2D1707
```

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	33.24	-59.18	-23.18	-36.00	-64.36	5.18
2	314.70	-62.48	-26.48	-36.00	-61.43	-1.05
3	1994.00	-63.79	-33.79	-30.00	-71.22	7.43
4	4946.00	-59.49	-29.49	-30.00	-73.56	14.07
5 p	5182.00	-60.36	-13.36	-47.00	-74.62	14.26
6	9859.00	-57.38	-27.38	-30.00	-78.49	21.11
7	12433.75	-57.22	-27.22	-30.00	-78.21	20.99

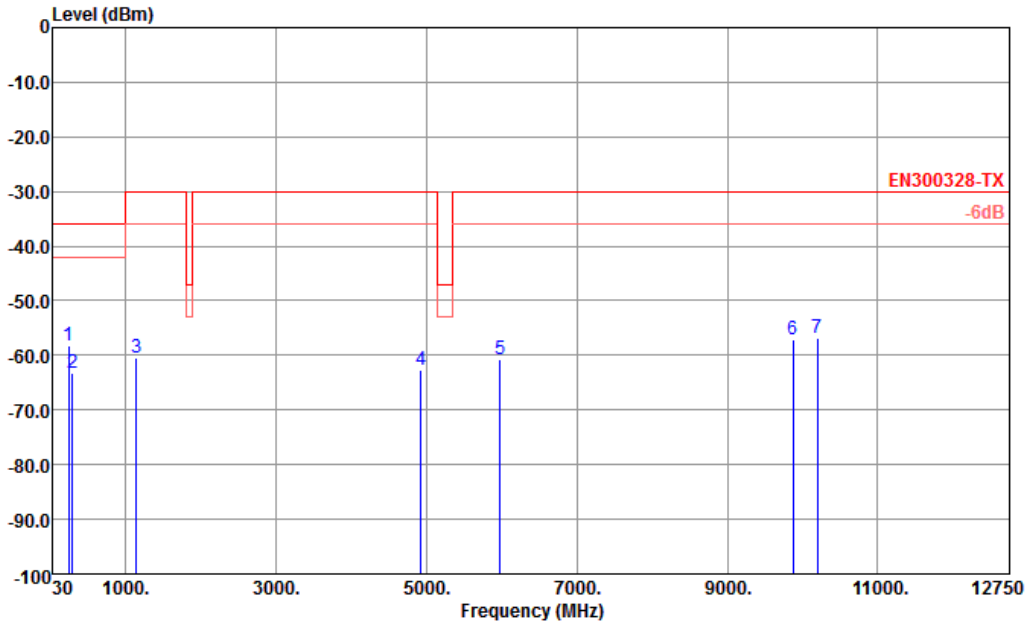
Test Mode :	Mode 17: CH11 (2462MHz) in Laptop Mode with Adapter 1 for Sample 1	Temperature :	21~22℃
Test Engineer :	Lucky Pan	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : EN300328-TX LF EIRP_090504 HORIZONTAL
Project : (ER)2D1707

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	244.65	-61.05	-25.05	-36.00	-59.30	-1.75
2	448.40	-65.45	-29.45	-36.00	-67.59	2.14
3	2612.00	-61.25	-31.25	-30.00	-71.21	9.96
4	4928.00	-58.29	-28.29	-30.00	-71.85	13.56
5 p	5182.00	-60.28	-13.28	-47.00	-74.69	14.41
6	8713.00	-61.74	-31.74	-30.00	-77.53	15.79
7	12598.75	-54.36	-24.36	-30.00	-78.14	23.78

Test Mode :	Mode 17: CH11 (2462MHz) in Laptop Mode with Adapter 1 for Sample 1	**Temperature :**	21~22℃
Test Engineer :	Lucky Pan	**Relative Humidity :**	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	**Polarization :**	Vertical




```
Site                : 05CH01-KS
Condition           : EN300328-TX LF EIRP_090504 VERTICAL
Project             : (ER)2D1707
```

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 p	249.24	-58.19	-22.19	-36.00	-56.65	-1.54
2	300.70	-63.14	-27.14	-36.00	-62.48	-0.66
3	1146.00	-60.51	-30.51	-30.00	-62.48	1.97
4	4924.00	-62.66	-32.66	-30.00	-75.82	13.16
5	5980.00	-60.81	-30.81	-30.00	-76.73	15.92
6	9871.00	-57.17	-27.17	-30.00	-78.35	21.18
7	10198.00	-56.78	-26.78	-30.00	-77.48	20.70

4. Receiver Parameters

4.1 Receiver Spurious Emissions

4.1.1 Limit of Receiver Spurious Emissions

Narrowband spurious emission limits for receivers

SUBCLAUSE 4.3.7.2	
FREQUENCY RANGE	**LIMIT WHEN OPERATING**
30 MHz to 1 GHz	-57 dBm
Above 1 GHz to 12,75 GHz	-47 dBm

4.1.2 Measuring Instruments

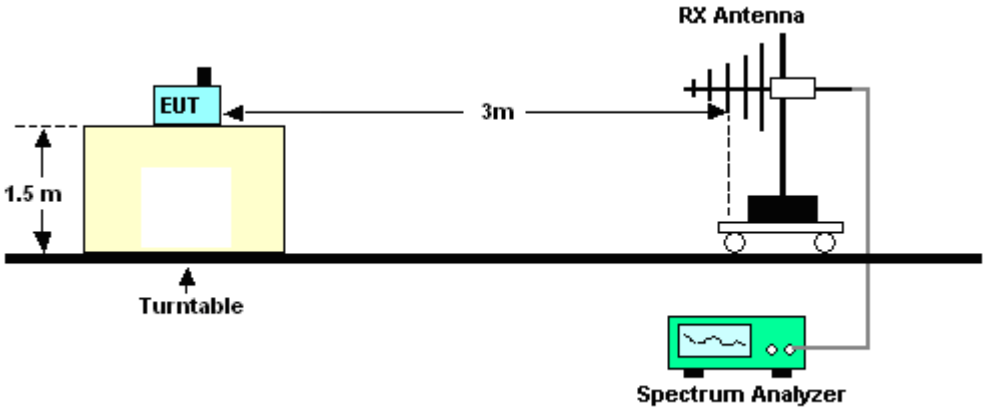
See list of measuring instruments of this test report.

4.1.3 Test Procedures

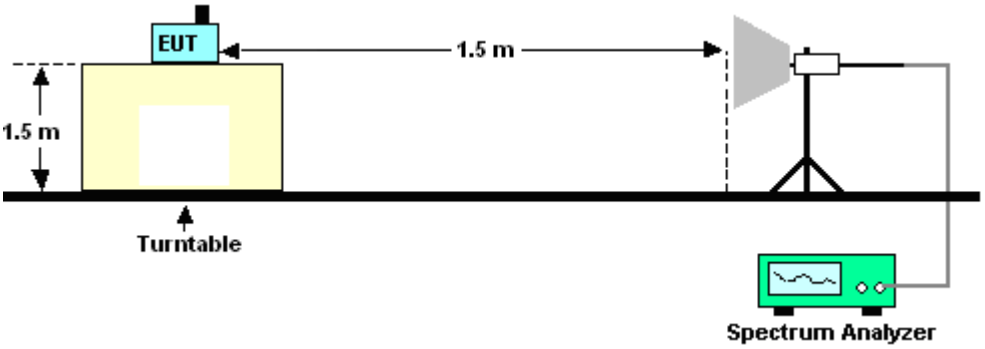
1. The EUT was placed on a turntable with 1.5m height.
2. The test distance between the receiving antenna and the EUT is 3m at frequencies up to 1GHz. For frequencies above 1GHz, the test distance is 1.5m which 5 times to the EUT size in far field test condition. The receiving antenna is kept at 1.5m height.
3. Set EUT in continuous transmitting with maximum output power.
4. The table was rotated from 0 to 360 degree to search the highest radiated emission.
5. Repeating step 3 and 4 for each polarization and channel to find the worst emission level.
6. The results obtained are compared to the limits in order to prove compliance with the requirement.

4.1.4 Test Setup

<Below 1GHz>

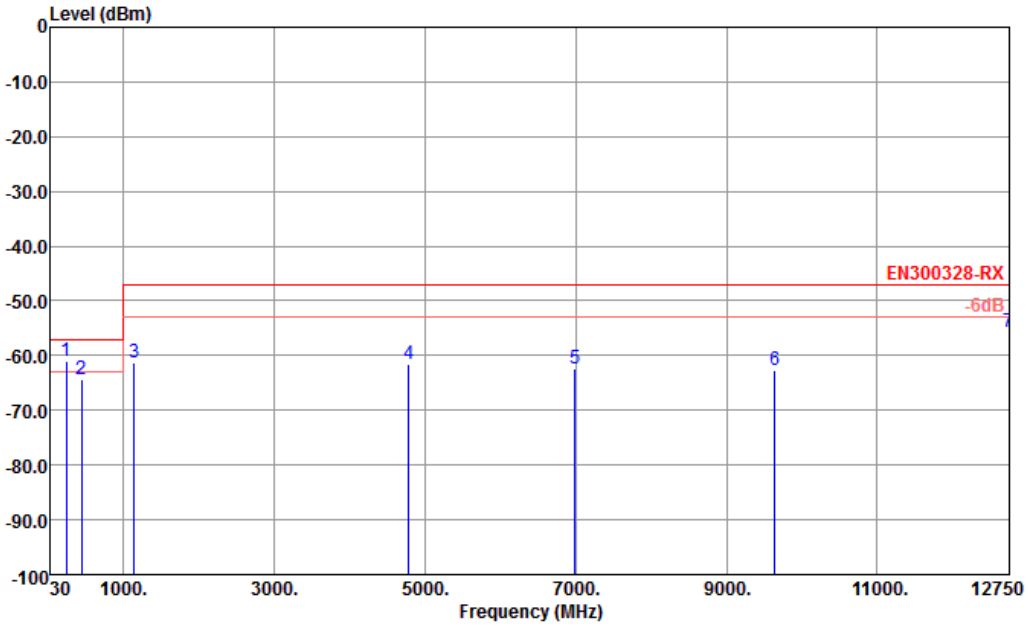


<Above 1GHz>



4.1.5 Test Result

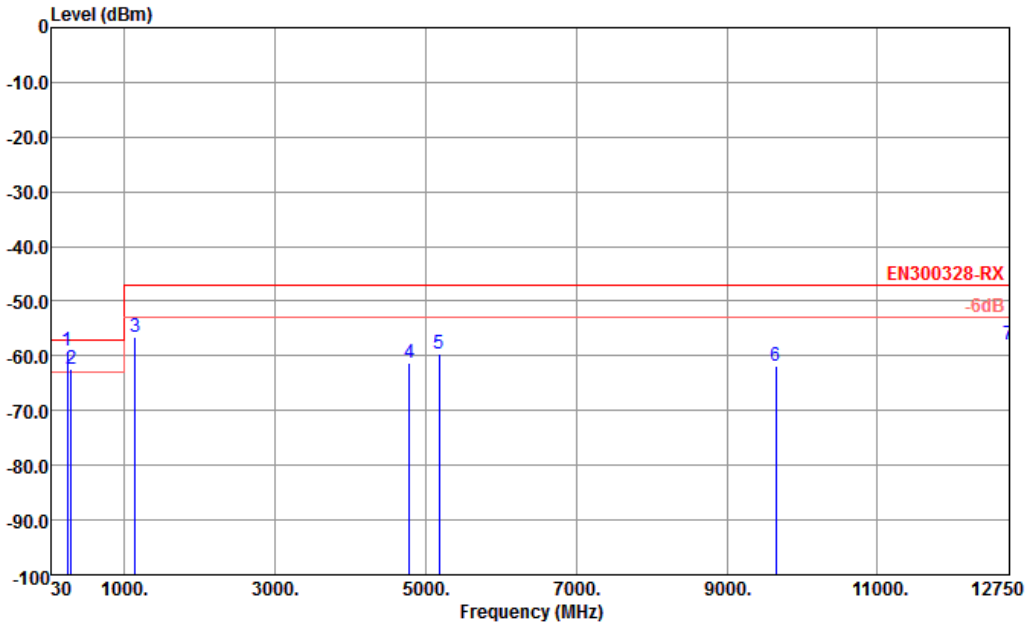
Test Mode :	Mode 9: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1	Temperature :	21~22℃
Test Engineer :	Lucky Pan	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal




```
Site                : 05CH01-KS
Condition           : EN300328-RX LF EIRP_090504 HORIZONTAL
Project             : (ER)2D1707
```

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 p	245.19	-60.95	-3.95	-57.00	-59.20	-1.75
2	448.40	-64.25	-7.25	-57.00	-66.39	2.14
3	1146.00	-61.31	-14.31	-47.00	-63.50	2.19
4	4784.00	-61.69	-14.69	-47.00	-72.73	11.04
5	6992.00	-62.51	-15.51	-47.00	-76.51	14.00
6	9643.00	-62.69	-15.69	-47.00	-78.06	15.37
7	12741.75	-55.78	-8.78	-47.00	-79.10	23.32

Test Mode :	Mode 9: CH13 (2472MHz) in Tablet Mode with Adapter 1 for Sample 1	**Temperature :**	21~22℃
Test Engineer :	Lucky Pan	**Relative Humidity :**	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	**Polarization :**	Vertical



Site : 05CH01-KS
Condition : EN300328-RX LF EIRP_090504 VERTICAL
Project : (ER)2D1707

		Freq	Level	Over Limit	Limit Line	Read Level	Factor
		MHz	dBm	dB	dBm	dBm	dB
1	p	244.92	-59.10	-2.10	-57.00	-57.35	-1.75
2	!	300.00	-62.44	-5.44	-57.00	-61.83	-0.61
3		1146.00	-56.68	-9.68	-47.00	-58.65	1.97
4		4784.00	-61.35	-14.35	-47.00	-73.92	12.57
5		5182.00	-59.68	-12.68	-47.00	[illegible]	60
6		9655.00	-61.95	-14.95	-47.00	-77.38	15.43
7		12741.75	-57.80	-10.80	-47.00	-79.07	21.27

5. Medium Access Protocol

5.1 Definition and Requirement

A medium access protocol is a mechanism designed to facilitate spectrum sharing with other devices in a wireless network and the medium access protocol shall be implemented in WiFi and BT devices.

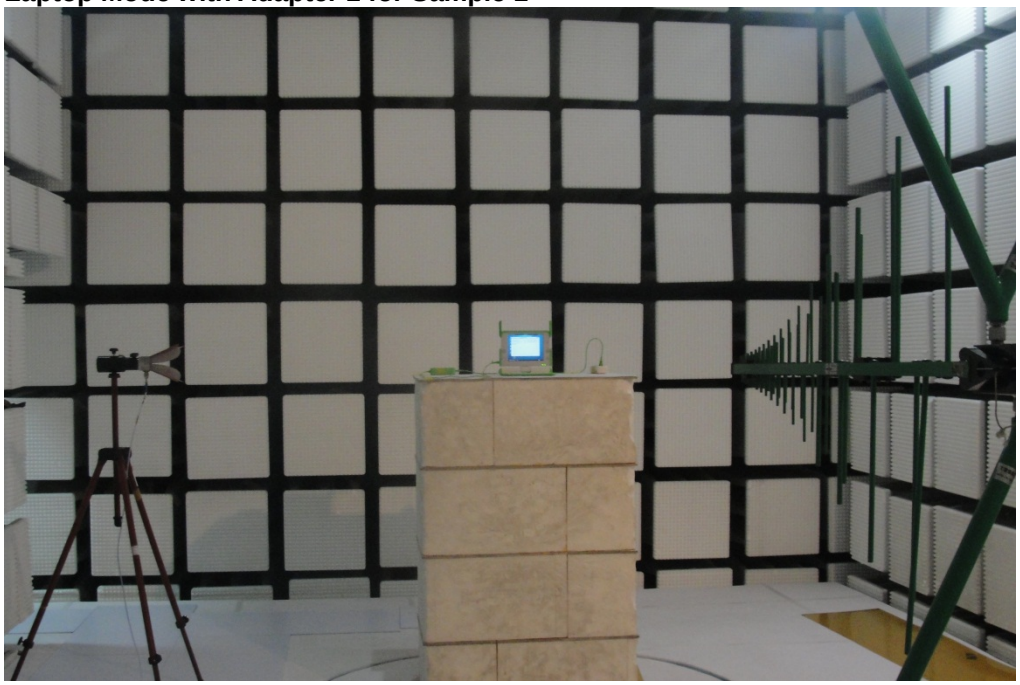
5.2 Declaration

According to the manufacturer's declaration and verification in live network, this device complies with this test case.

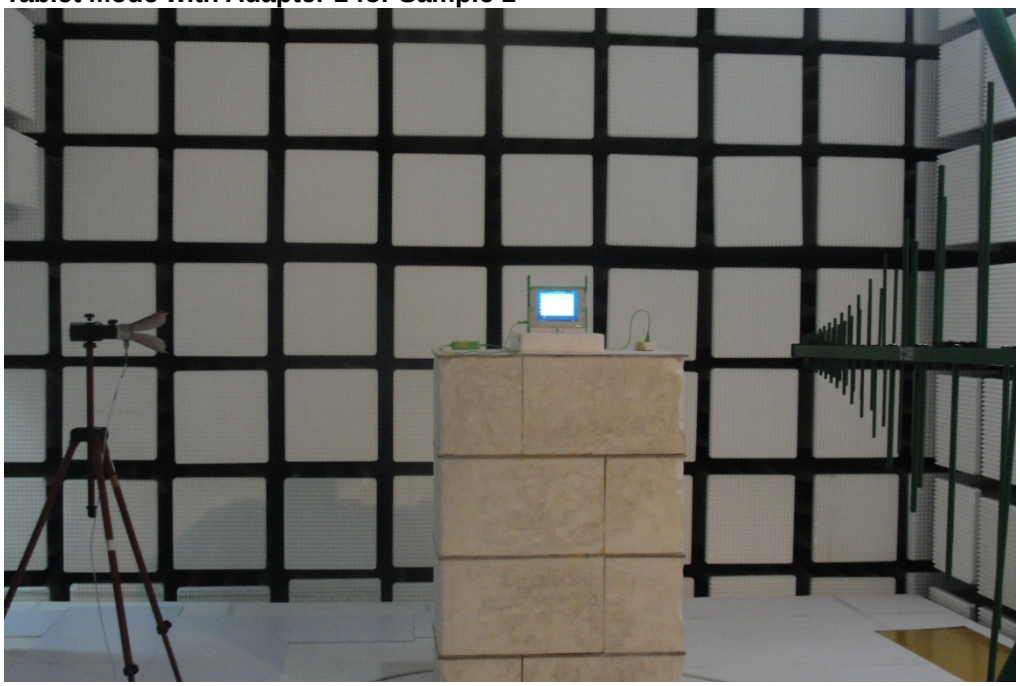
6. Photographs of Radiated Emission Test Configuration

Bluetooth Tx/Rx Mode

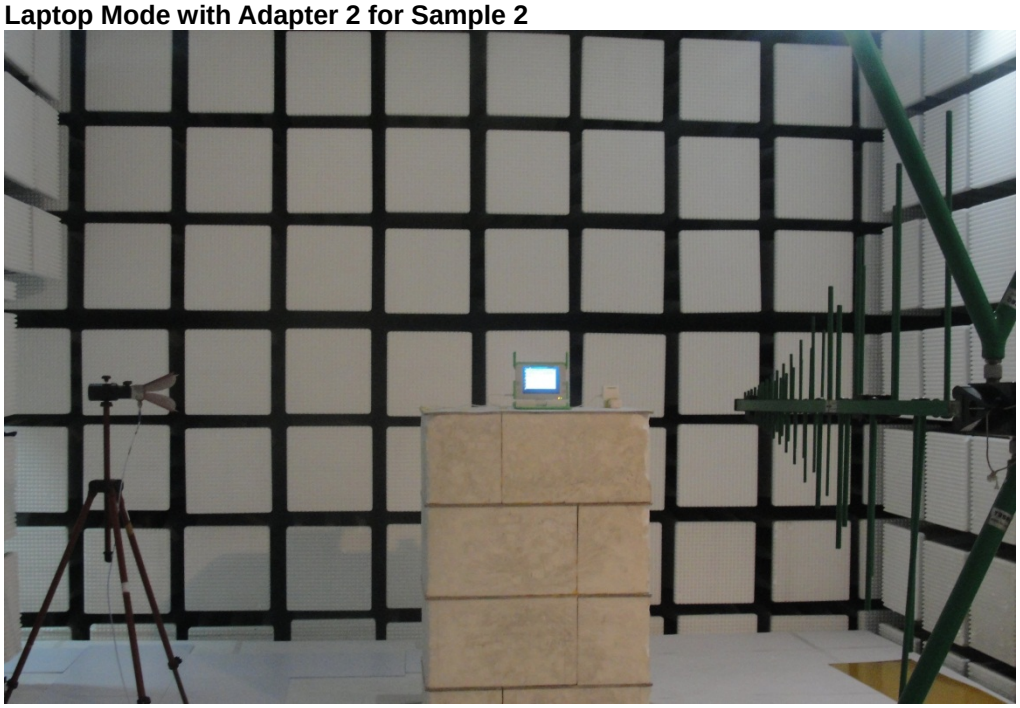
Laptop Mode with Adapter 1 for Sample 1



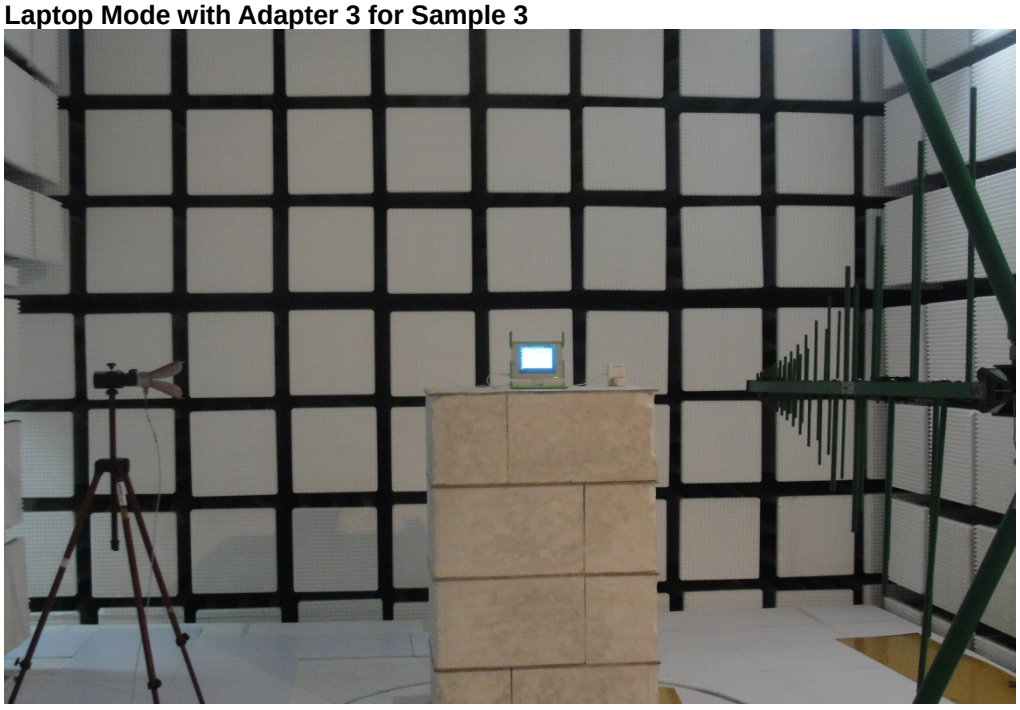
Tablet Mode with Adapter 1 for Sample 1



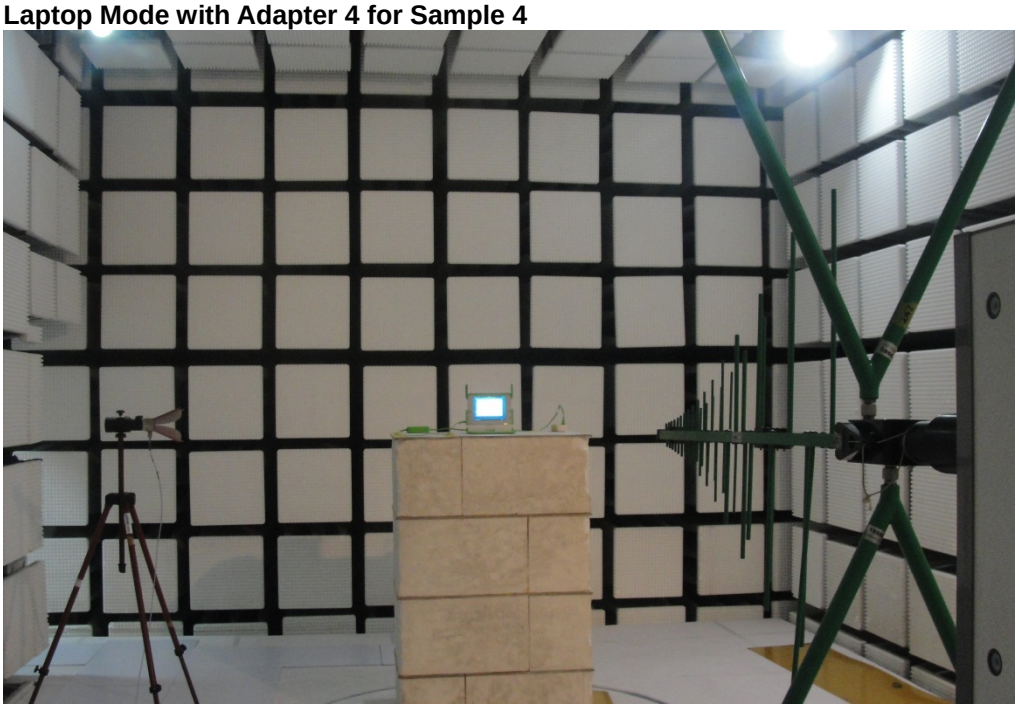
Laptop Mode with Adapter 2 for Sample 2



Laptop Mode with Adapter 3 for Sample 3

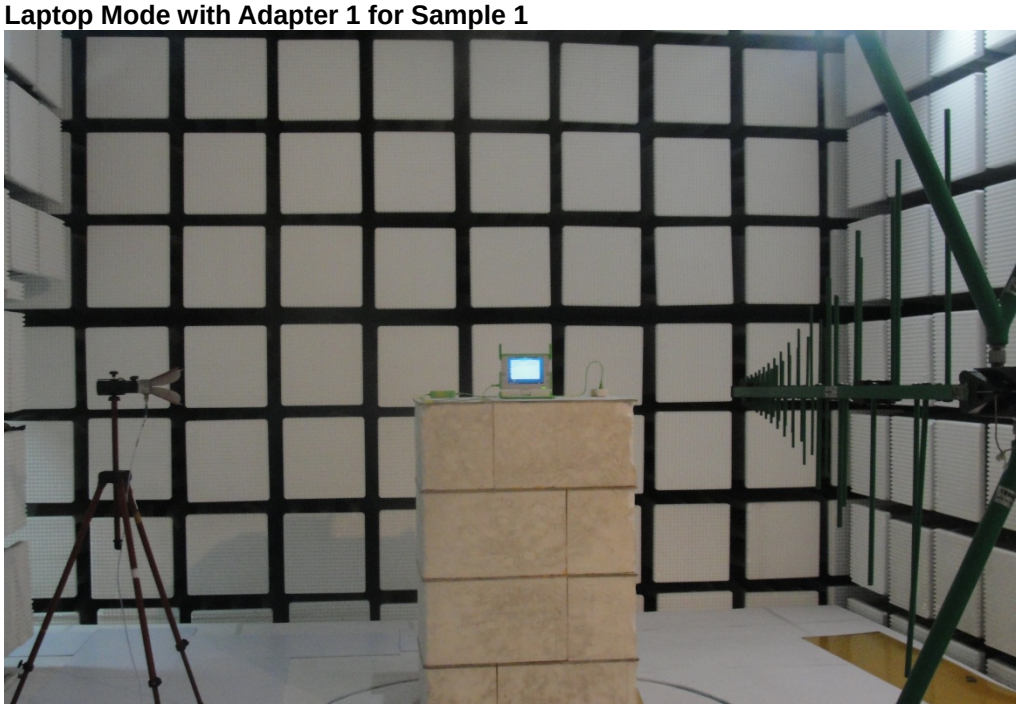


Laptop Mode with Adapter 4 for Sample 4



WLAN Tx/Rx Mode

Laptop Mode with Adapter 1 for Sample 1



Tablet Mode with Adapter 1 for Sample 1

7. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 29, 2012	Jan. 31, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 22, 2012	Jan. 31, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 22, 2012	Jan. 31, 2013	Aug. 21, 2013	Conducted (TH01-KS)
DC Power Supply	GWINSTEK	GPS-3030D	E1884515	N/A	Aug. 22, 2012	Jan. 31, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Dec. 29, 2012	Jan. 31, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	100845	9kHz – 30GHz	Nov. 06, 2012	Feb. 05, 2013	Nov. 05, 2013	Radiation (05CH01-KS)
Bilog Antenna	TESEQ	CBL6112D	23183	25MHz~2GHz	Dec. 07, 2012	Feb. 05, 2013	Dec. 06, 2013	Radiation (05CH01-KS)
DRG	ETS-Lindgren	1908/7/13	00075957	1GHz~18GHz	Dec. 07, 2012	Feb. 05, 2013	Dec. 06, 2013	Radiation (05CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	9kHz~2GHz	Dec. 29, 2012	Feb. 05, 2013	Dec. 28, 2013	Radiation (05CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 07, 2012	Feb. 05, 2013	Dec. 06, 2013	Radiation (05CH01-KS)
Bluetooth Base Station	R&S	CBT	100783	N/A	Aug. 17, 2012	Jan. 31, 2013~ Feb. 05, 2013	Aug. 16, 2013	-

8. Uncertainty Evaluation

Uncertainty of Radiated Emission Evaluation (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.16**

Uncertainty of Radiated Emission Evaluation (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**

Appendix A. Photographs of EUT

Please refer to Sporton report number EP2D1707 as below.

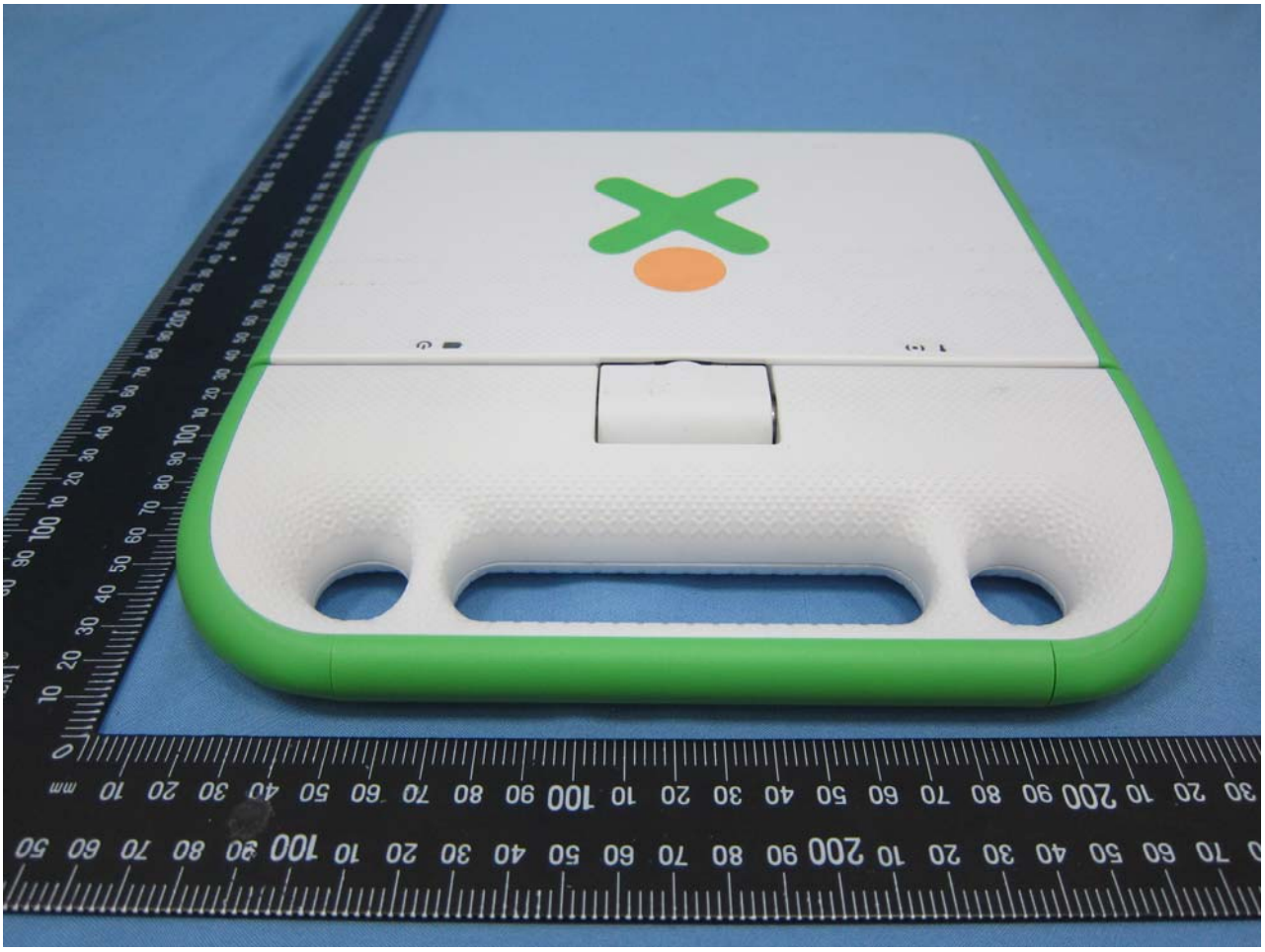
1. External Photograph of EUT

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

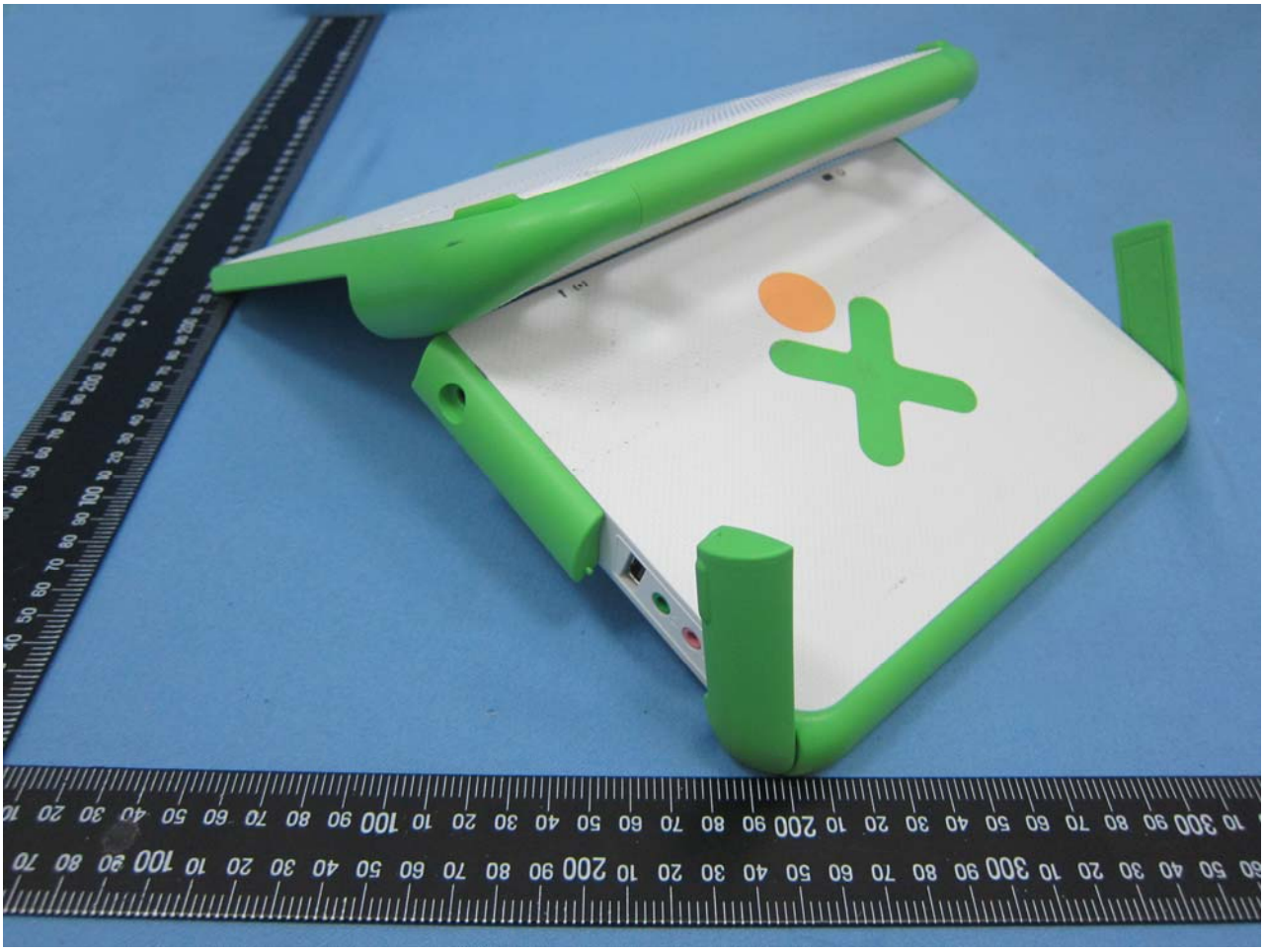


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

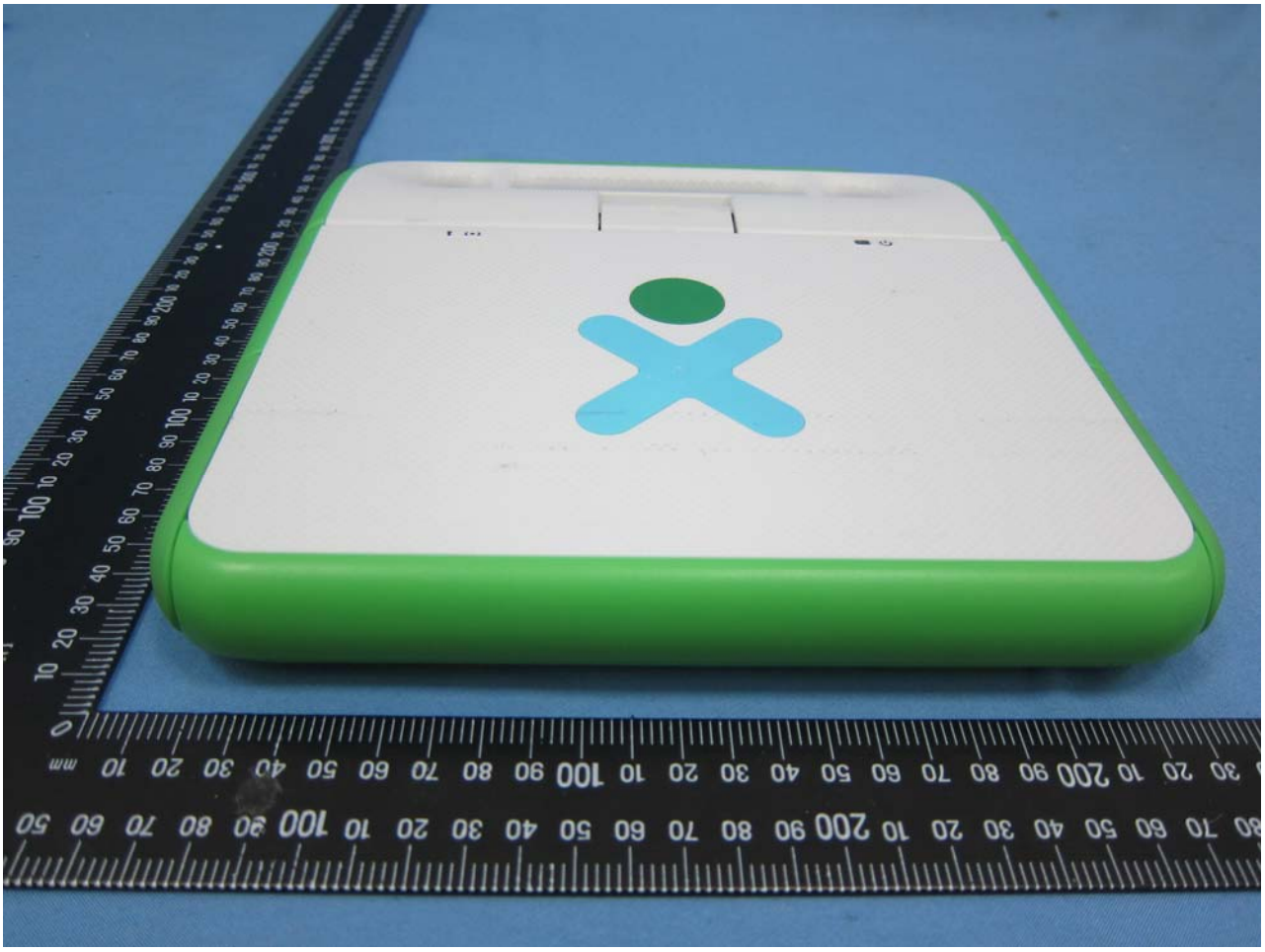
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

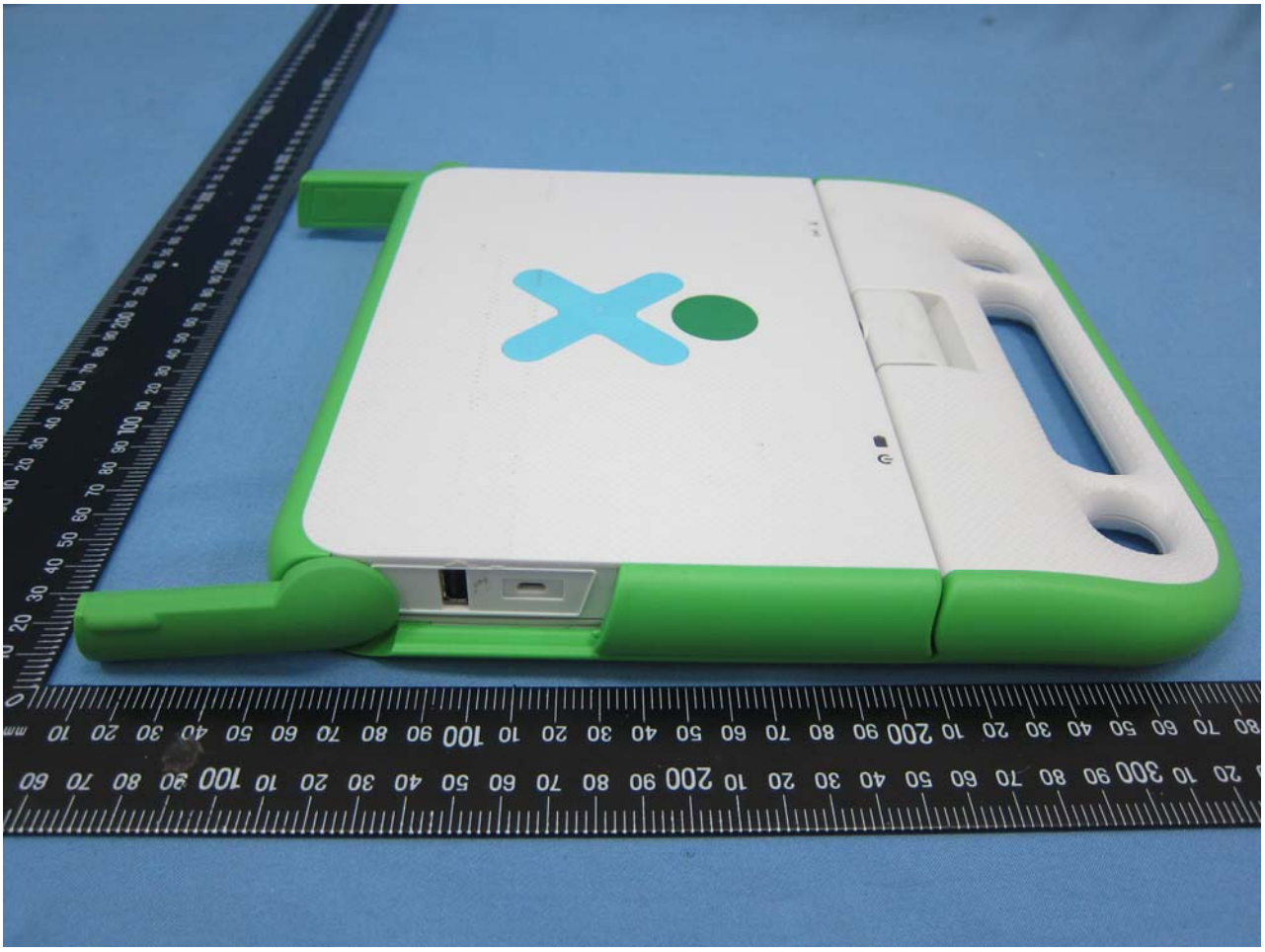


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

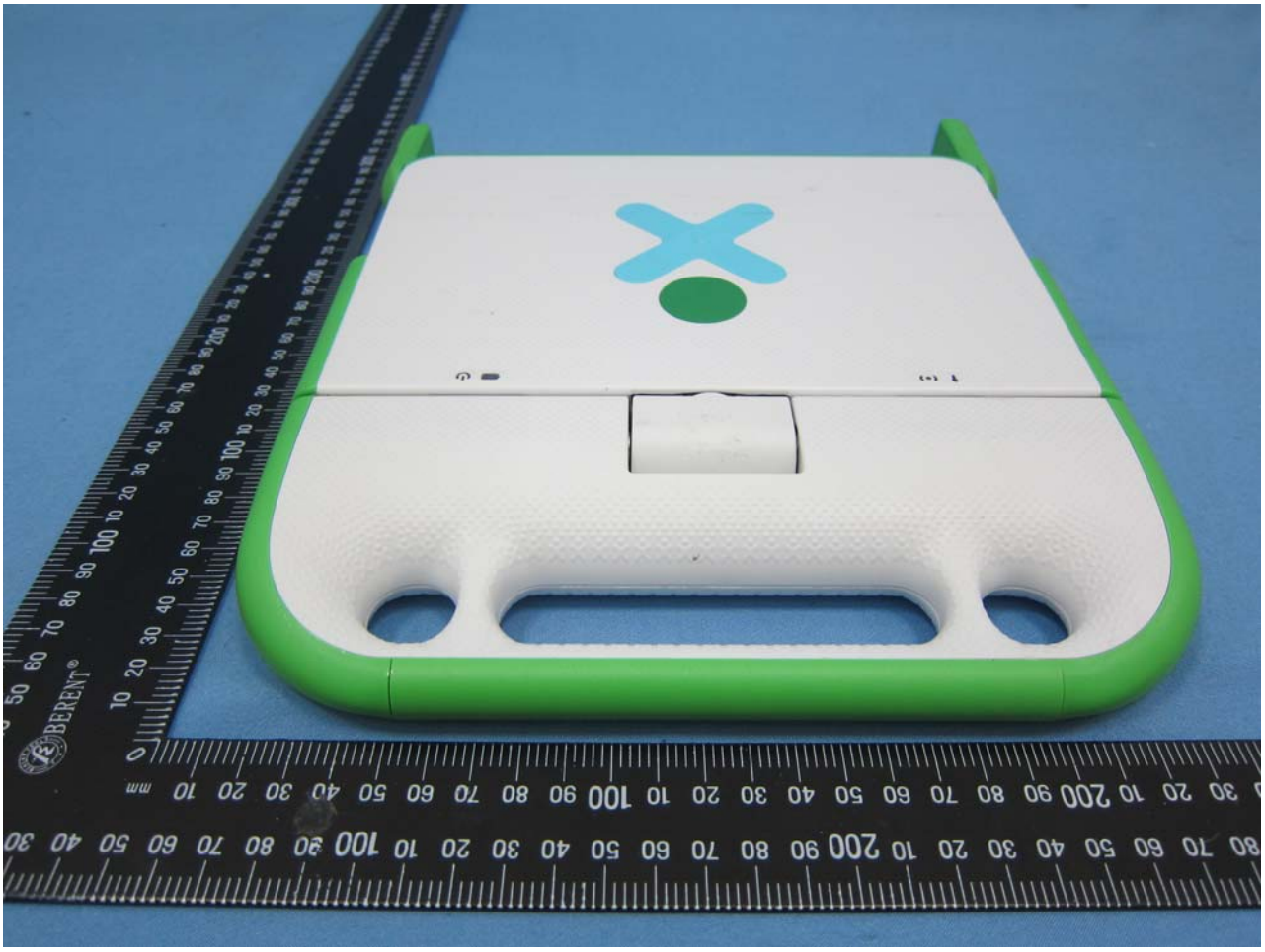
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



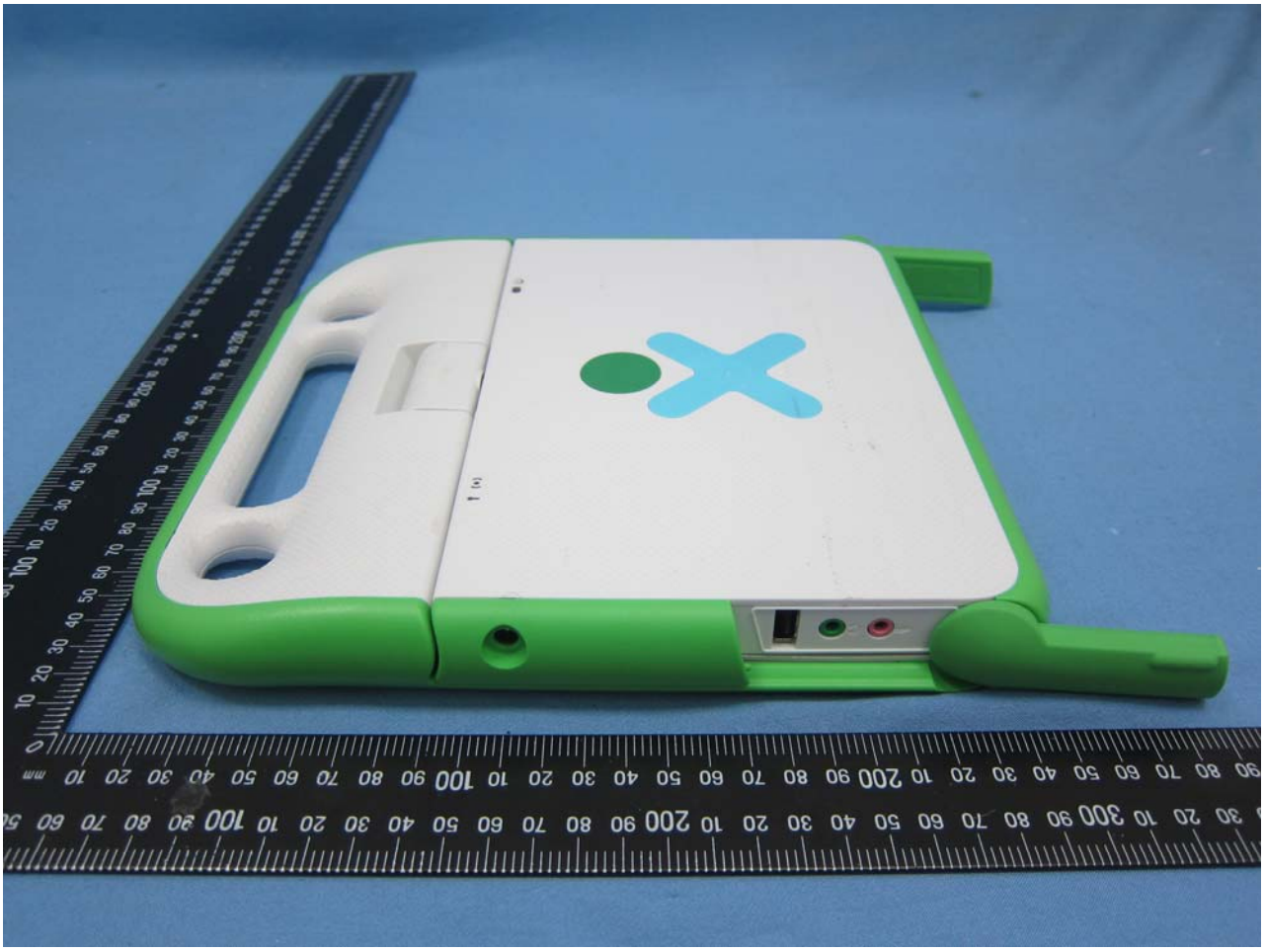
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



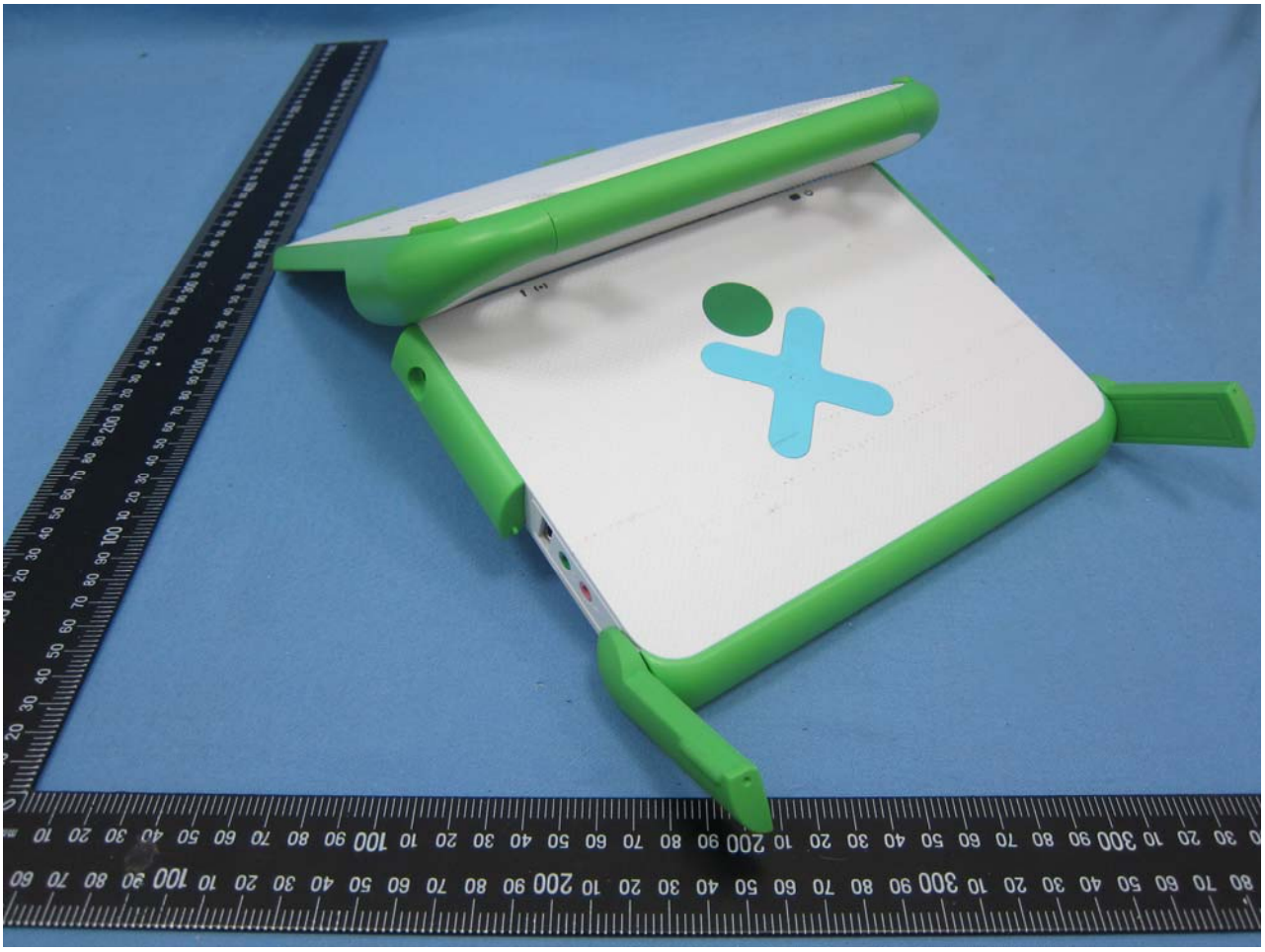
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

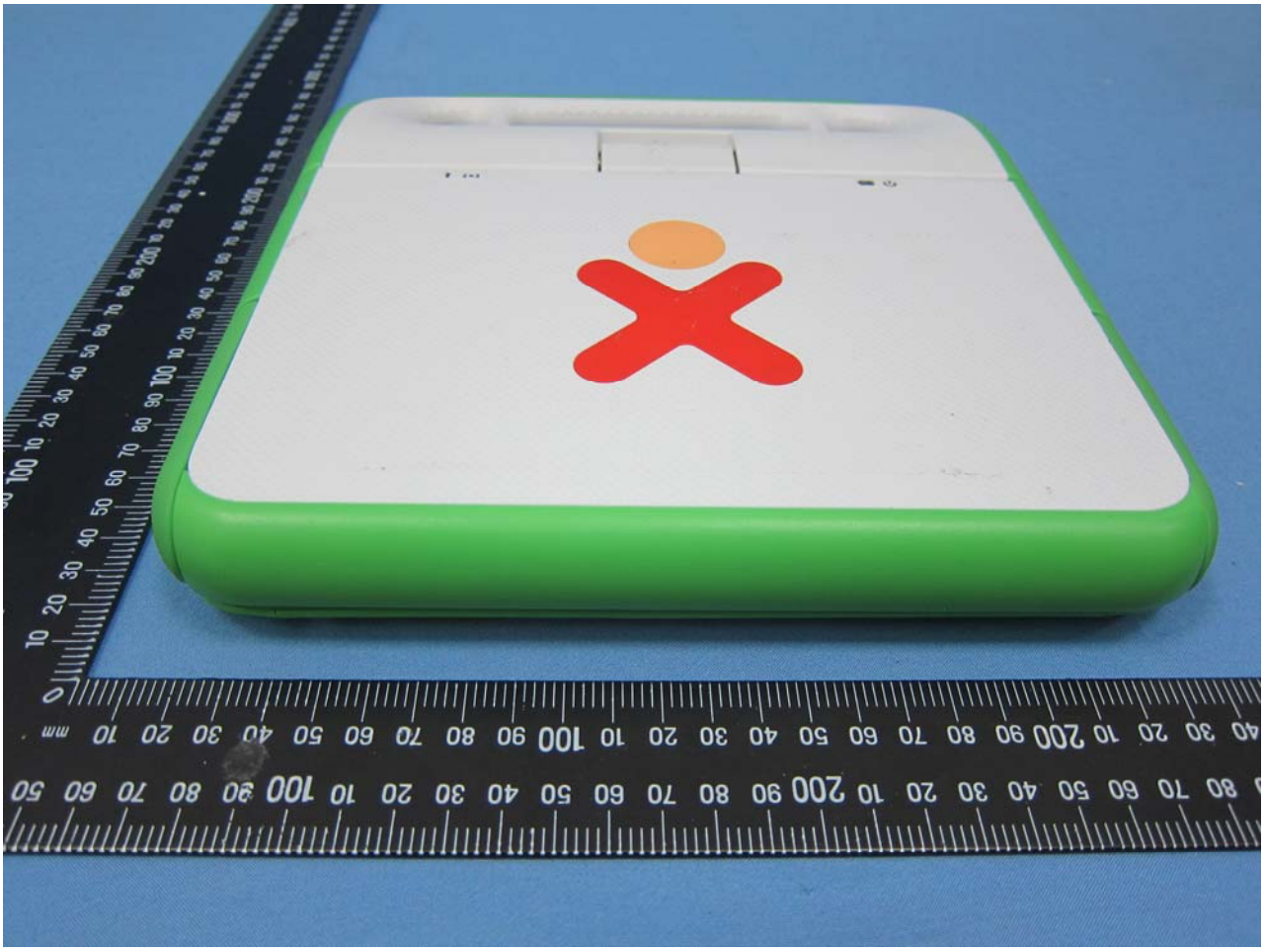
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

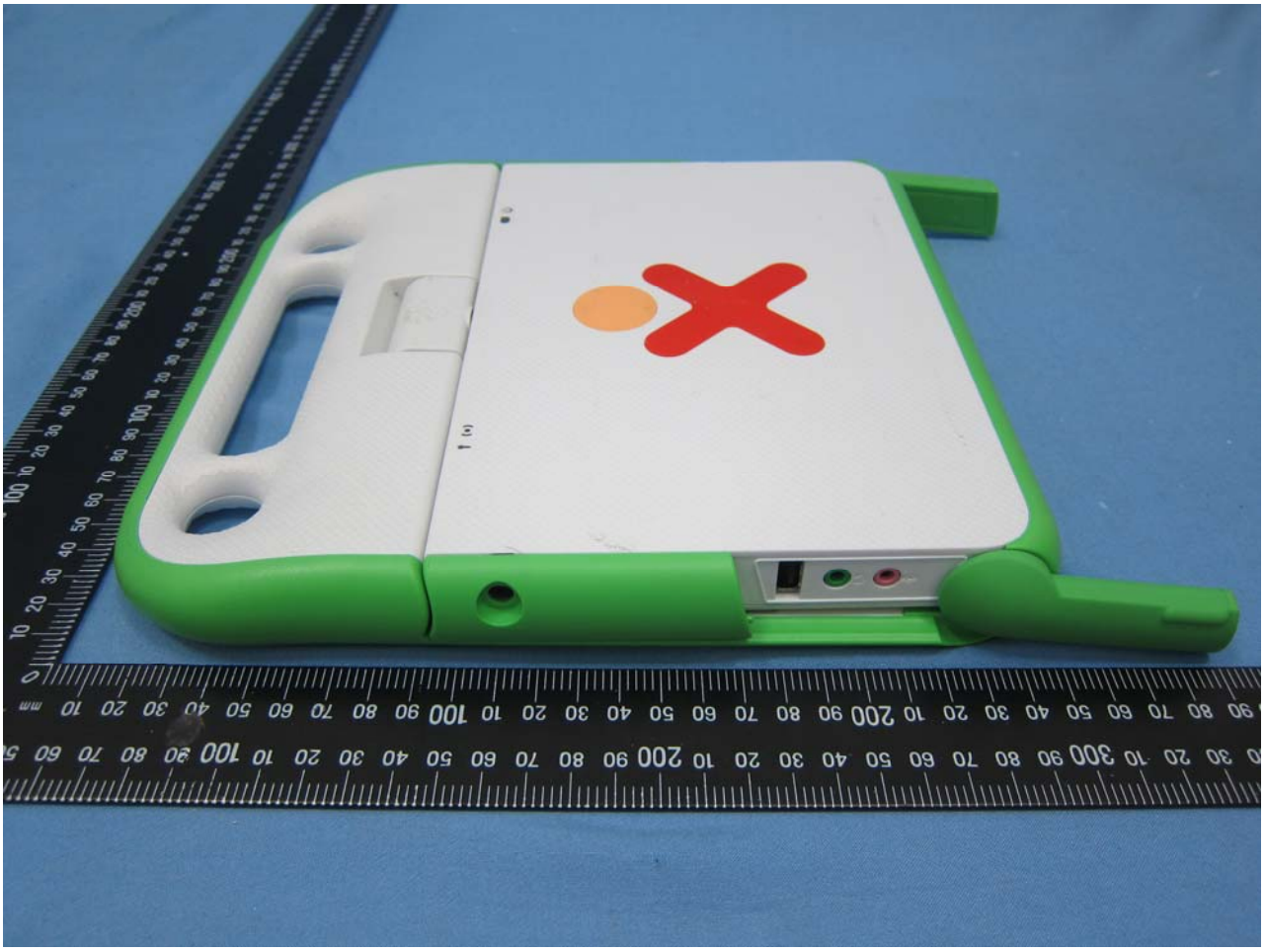
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

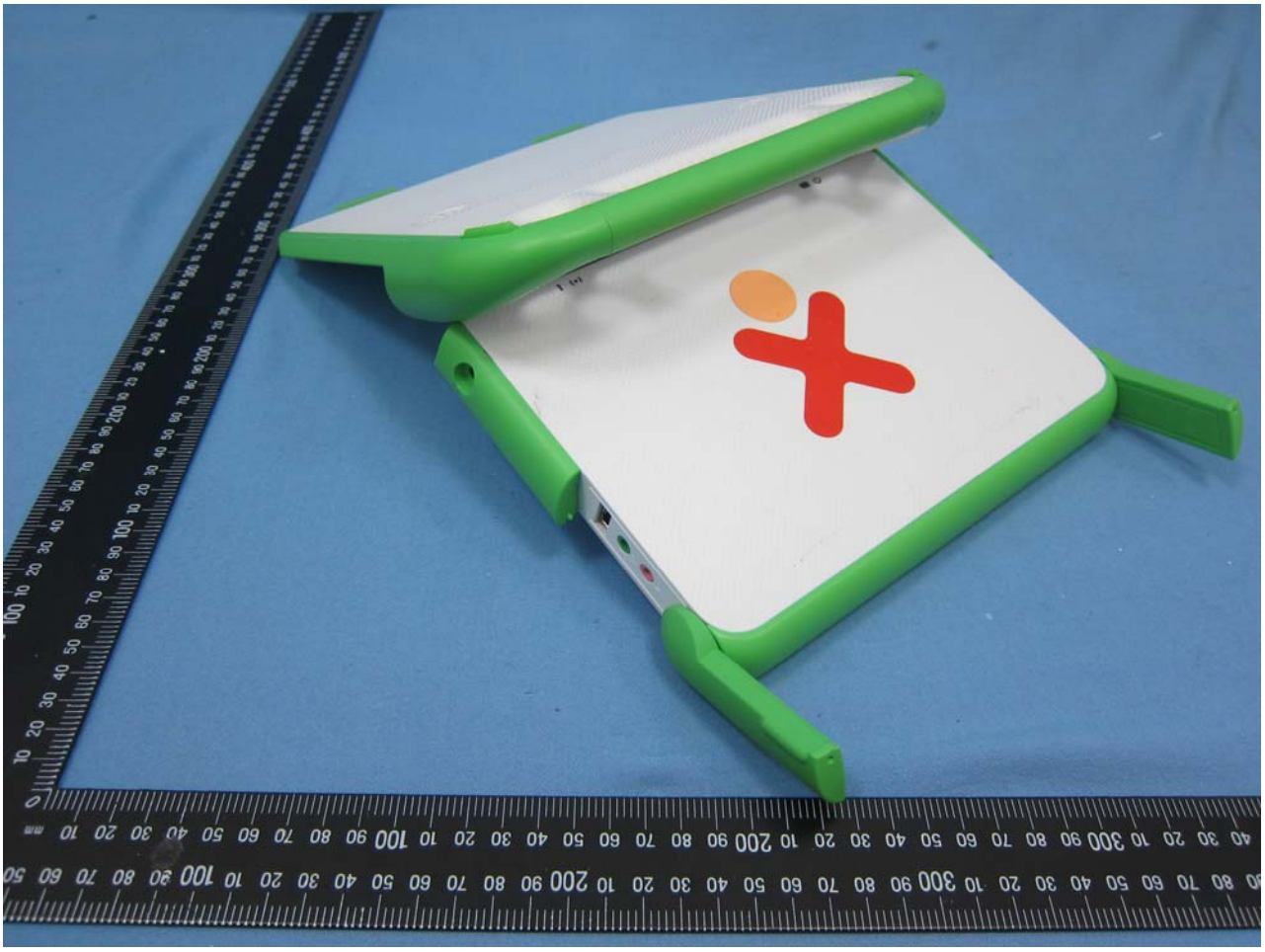
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

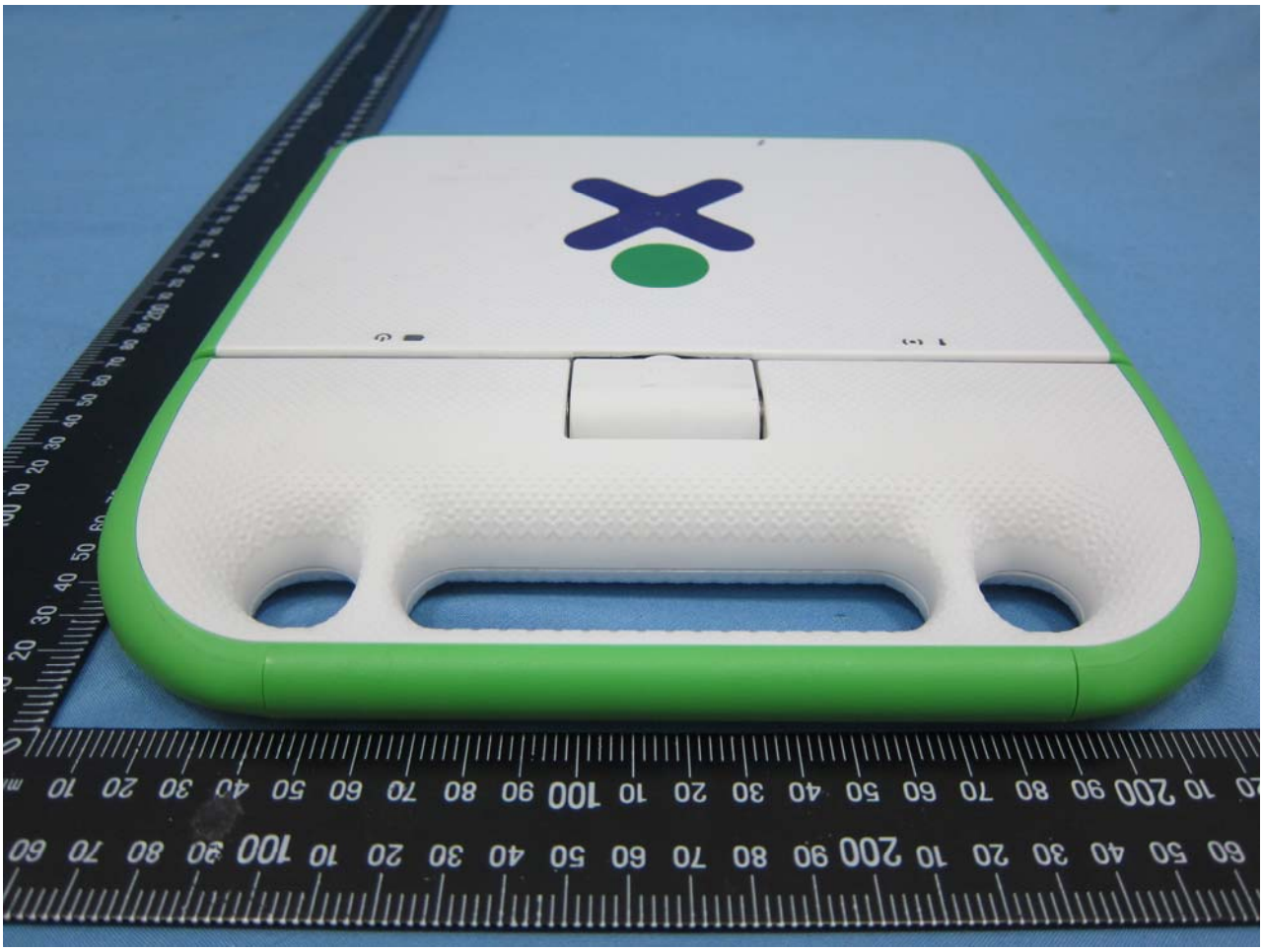


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

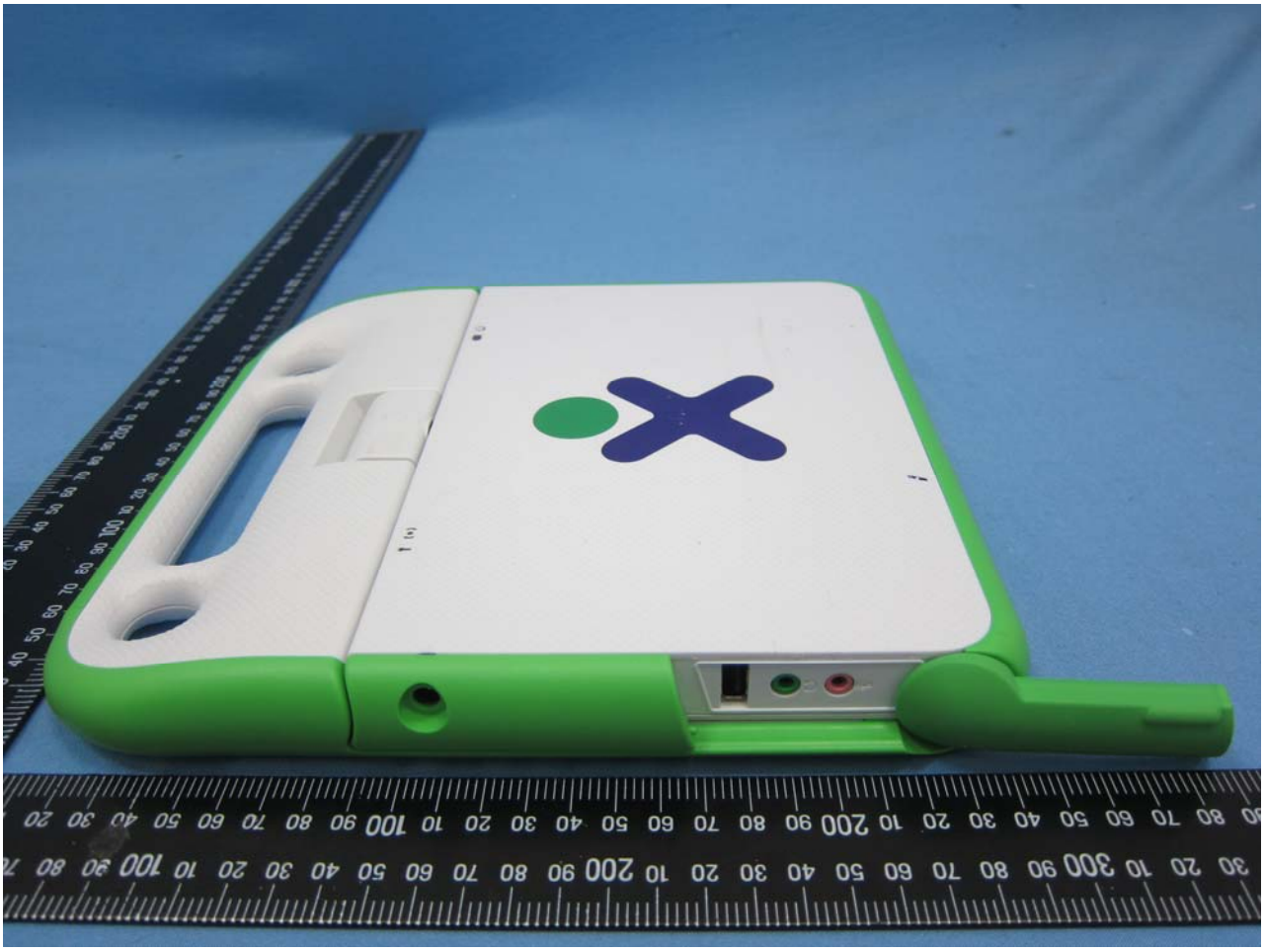
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



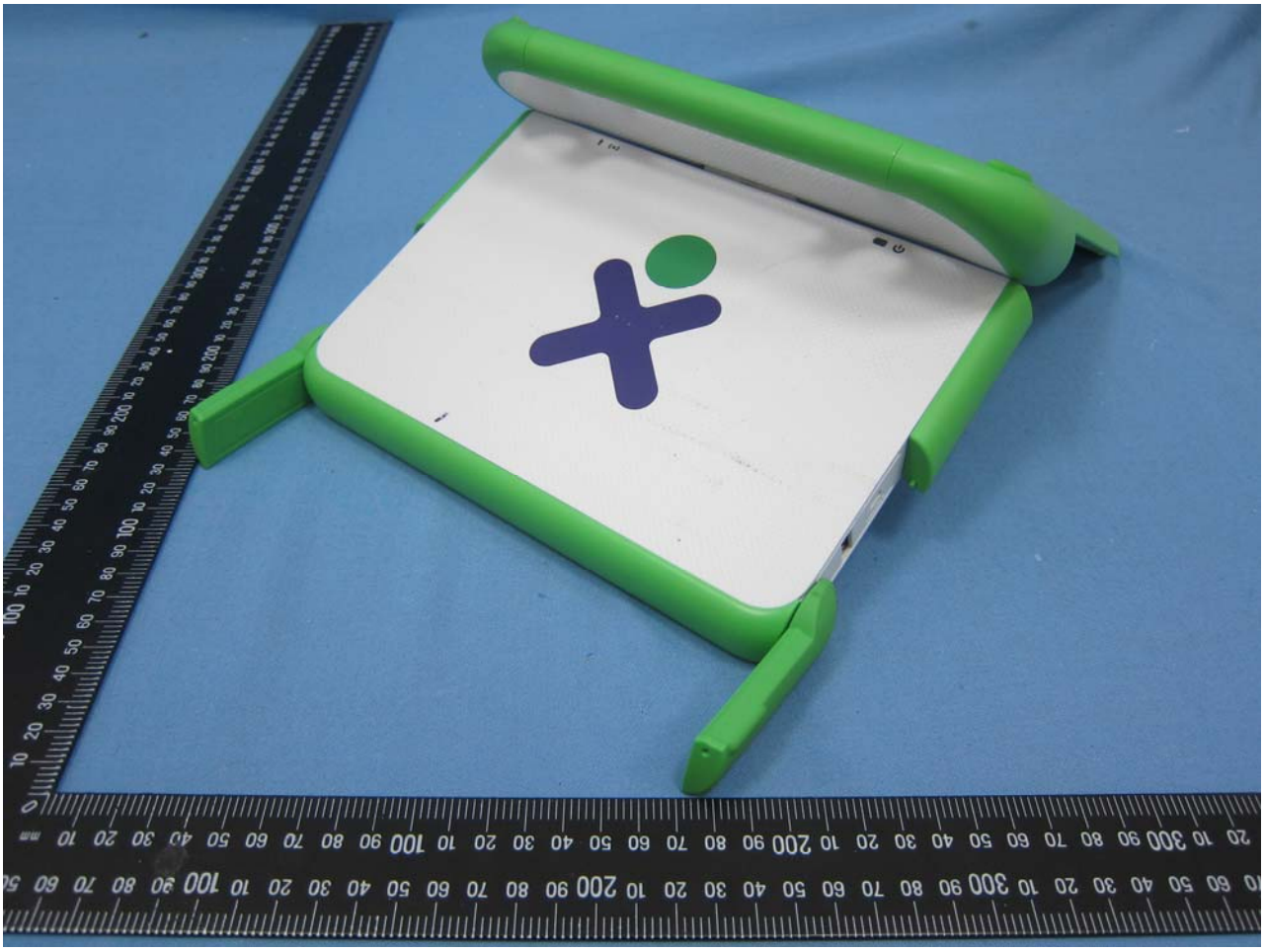
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



2. Photograph of Accessory

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

List of Accessory:

Specification of Accessory		
AC Adapter 1	**Brand Name**	DARFON
	Model Name	BB0J-C
AC Adapter 2	**Brand Name**	Bestec
	Model Name	NA0241WAA
AC Adapter 3	**Brand Name**	DARFON
	Model Name	BX24-1203(X=U or P)
AC Adapter 4	**Brand Name**	Bestec
	Model Name	BT-AG250SDF
Battery	**Brand Name**	OLPC
	Model Name	CL1

Remark: For accessories equipped with this EUT, please refer to the following photos.

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

AC Adapter 1

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

AC Adapter 2

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

AC Adapter 3

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

AC Adapter 4

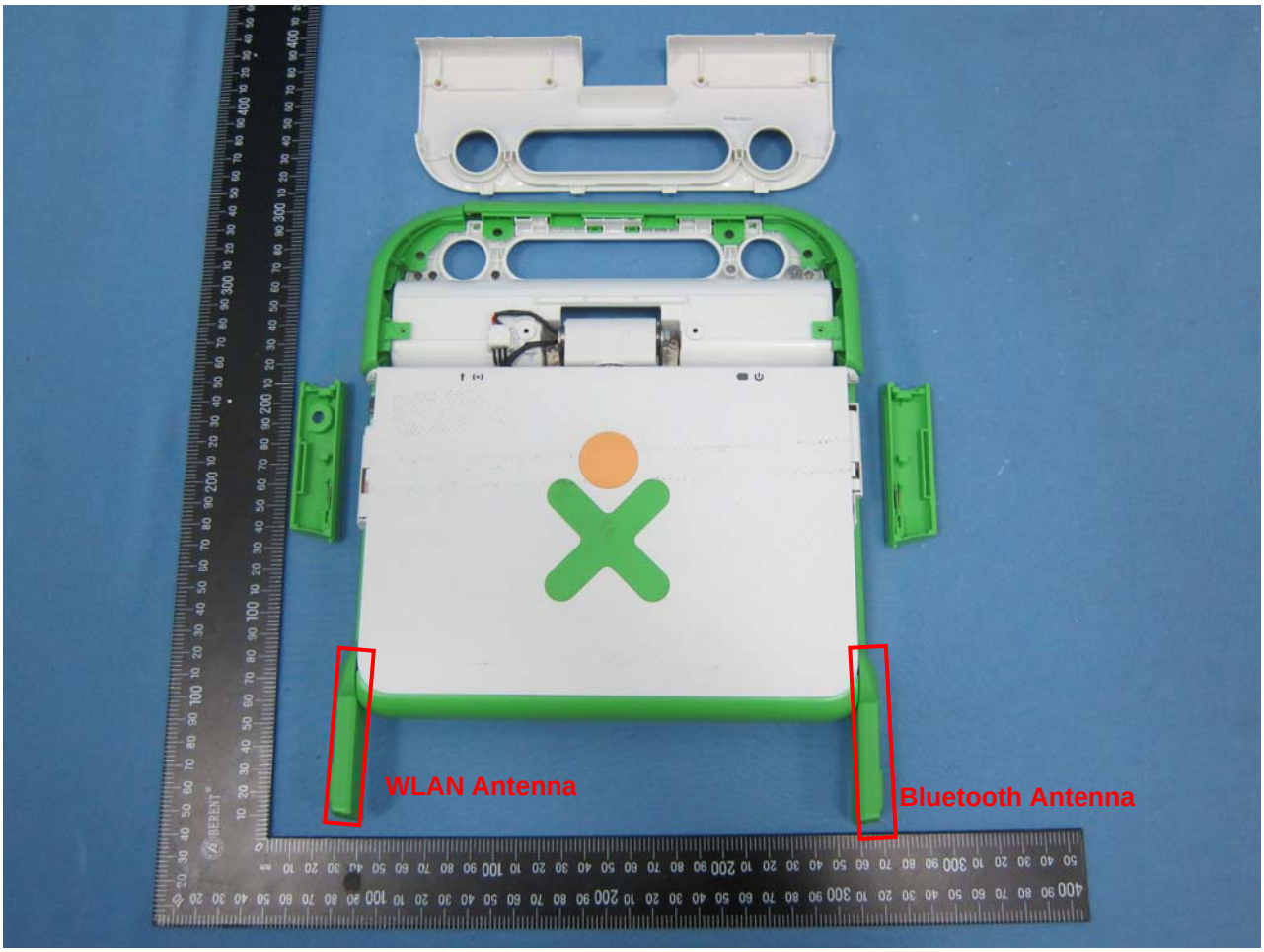
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

3. Internal Photograph of EUT

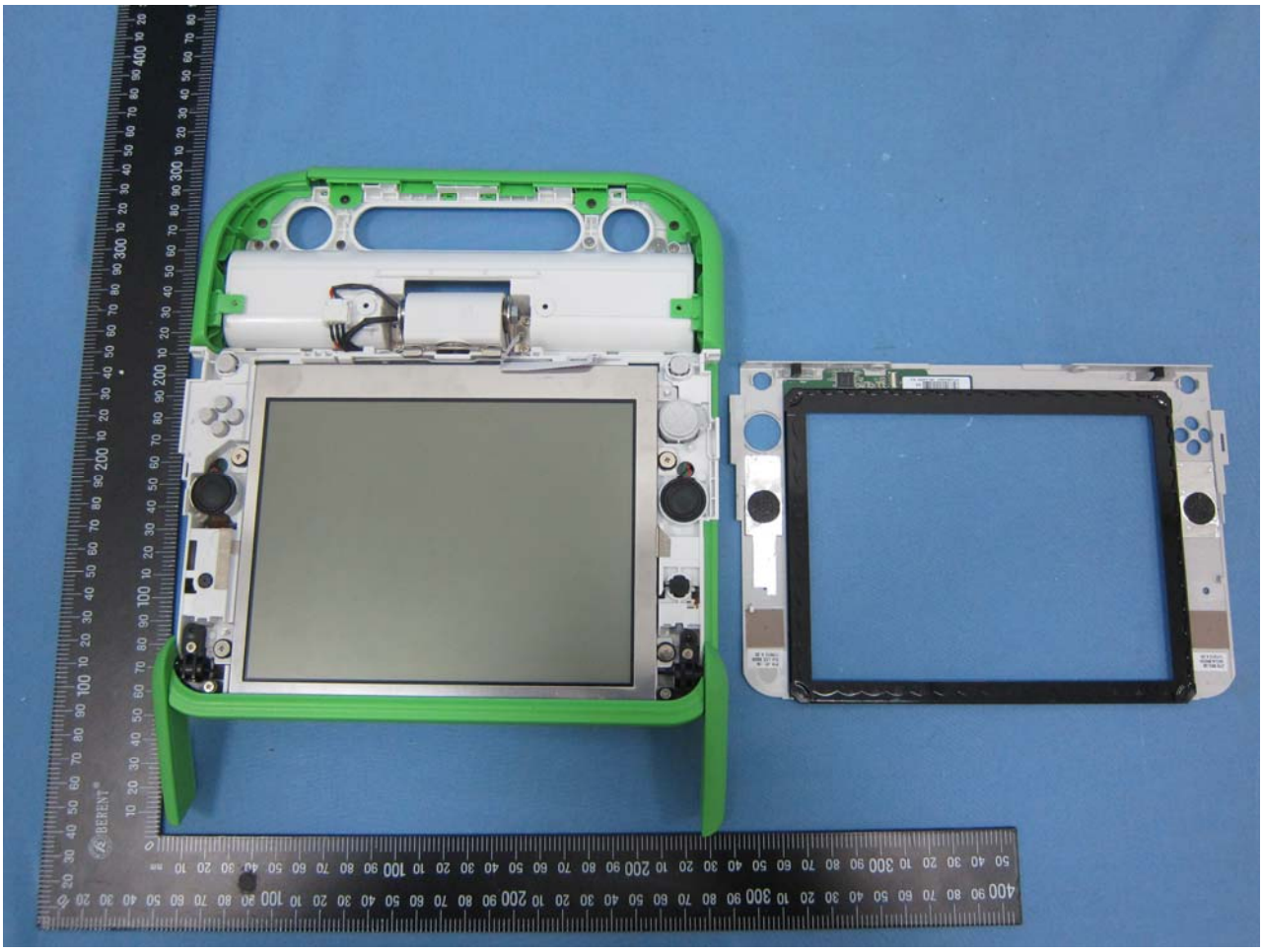
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

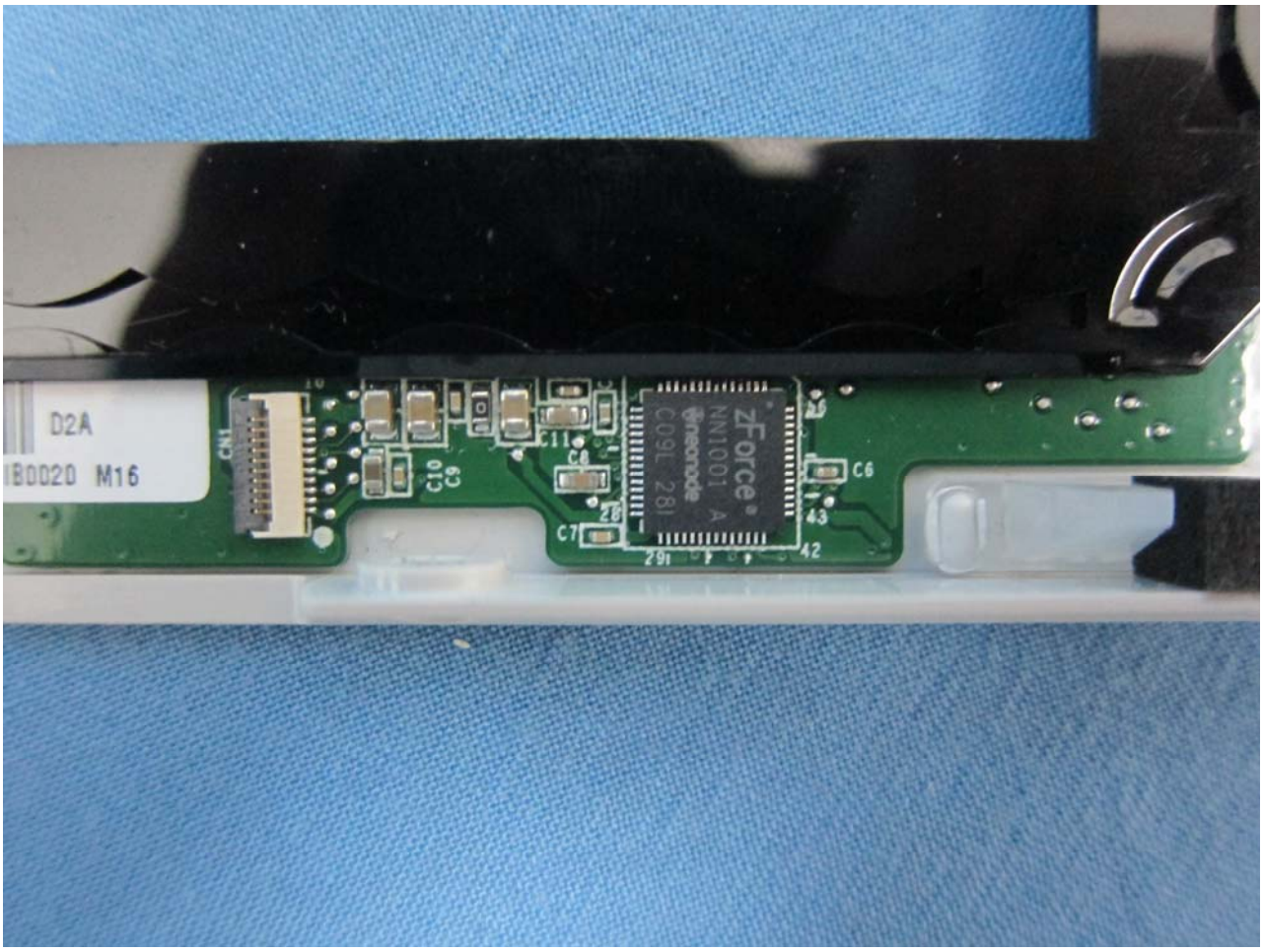
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

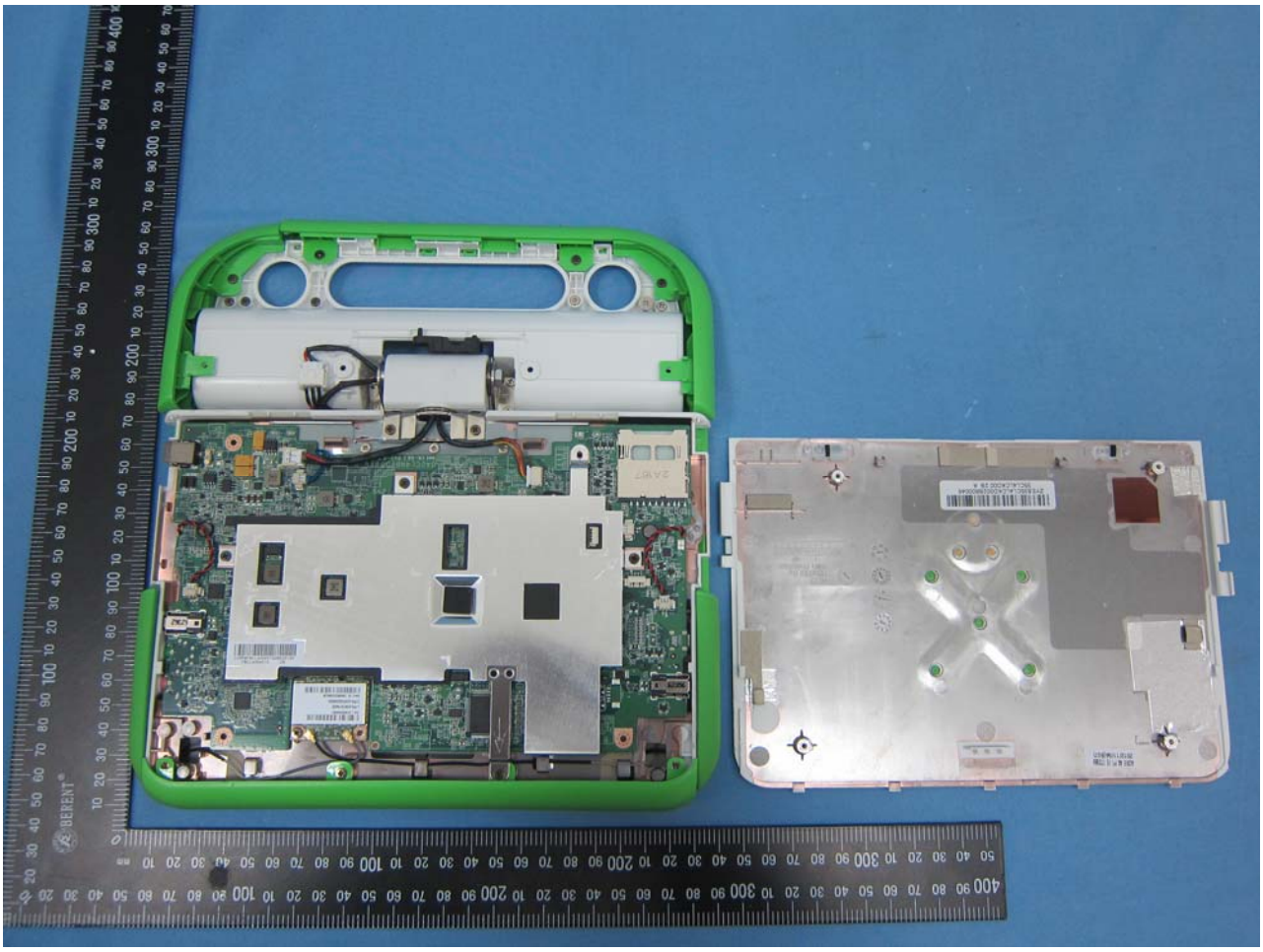


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

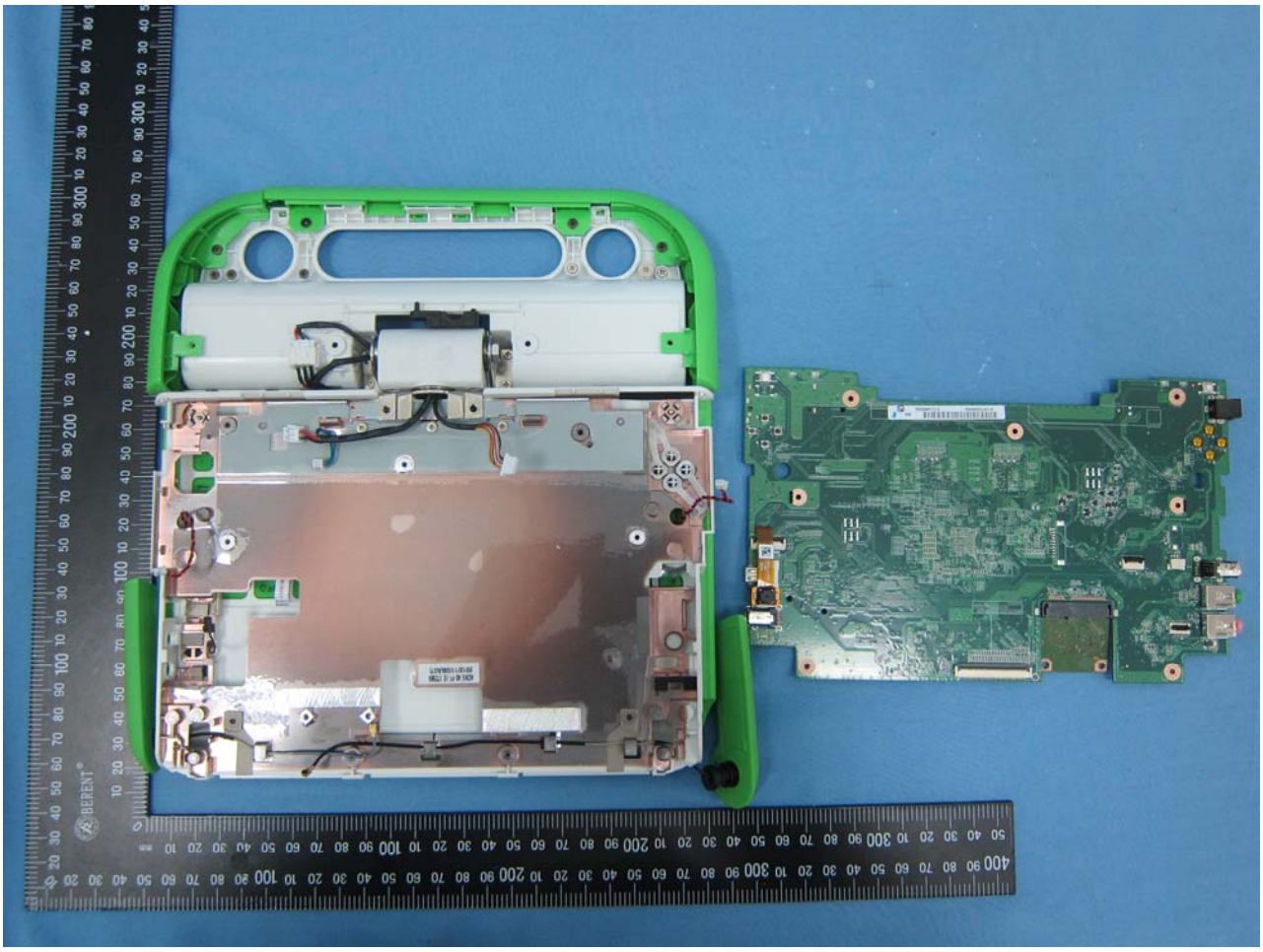


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

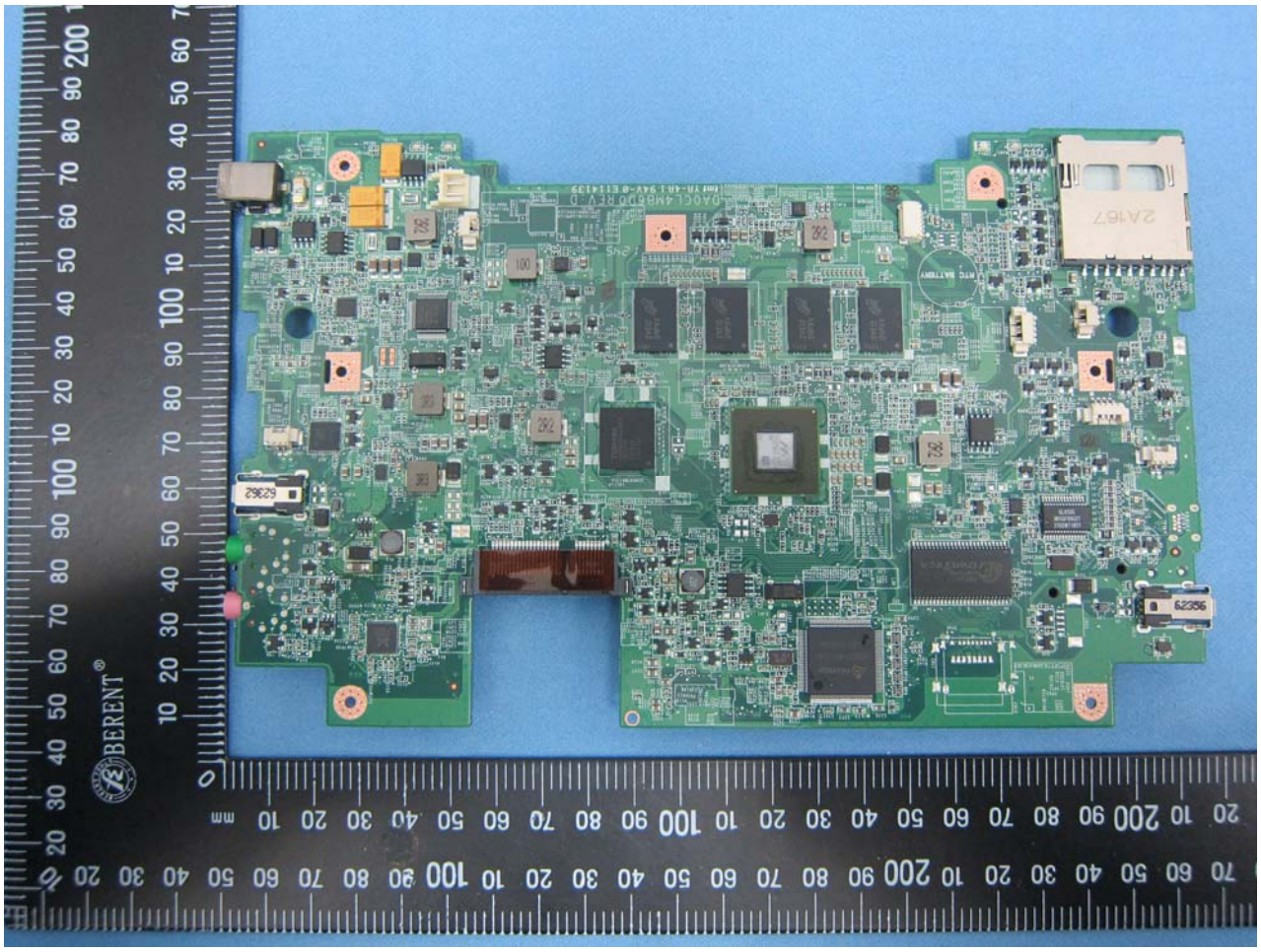
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



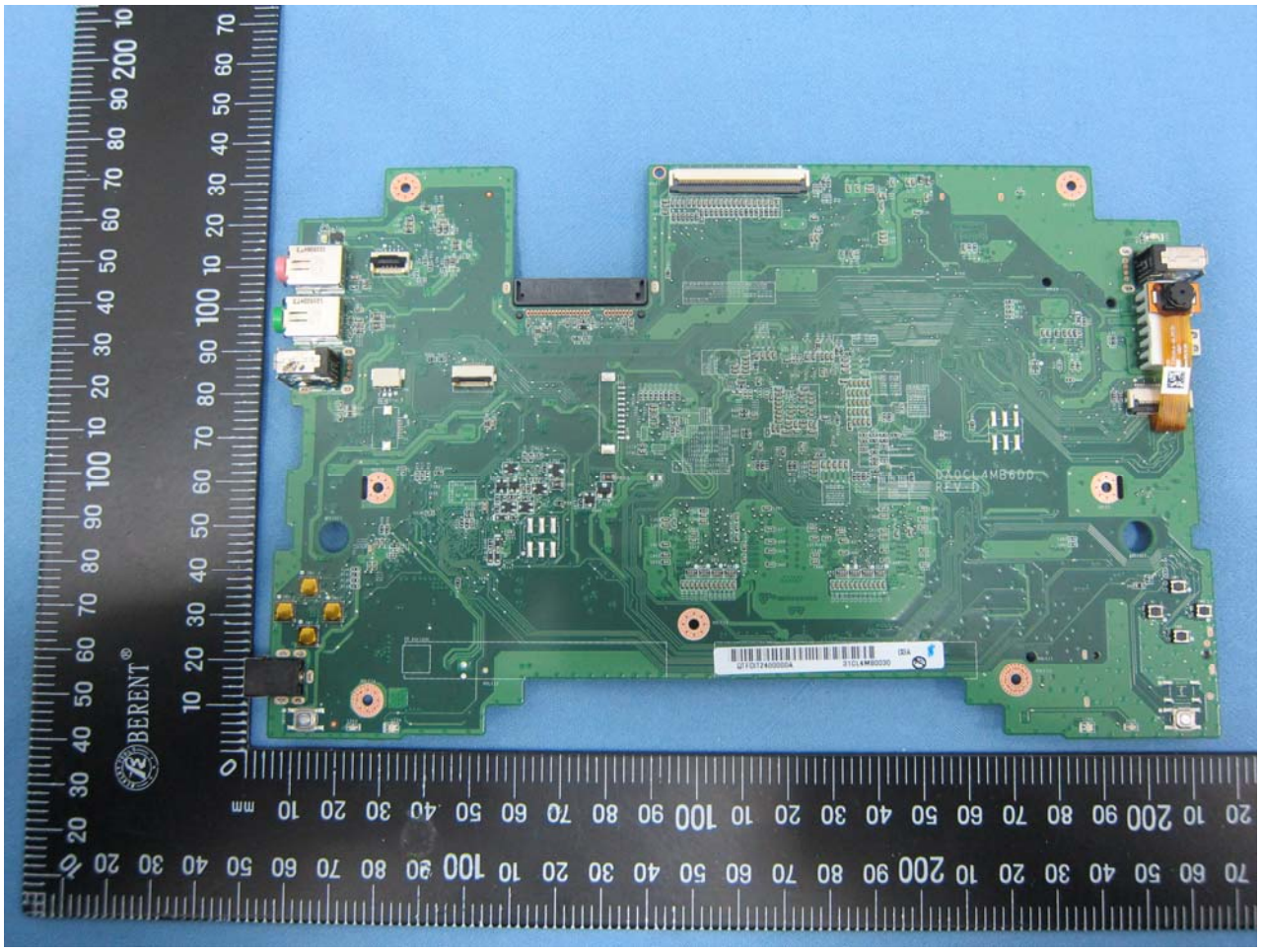
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



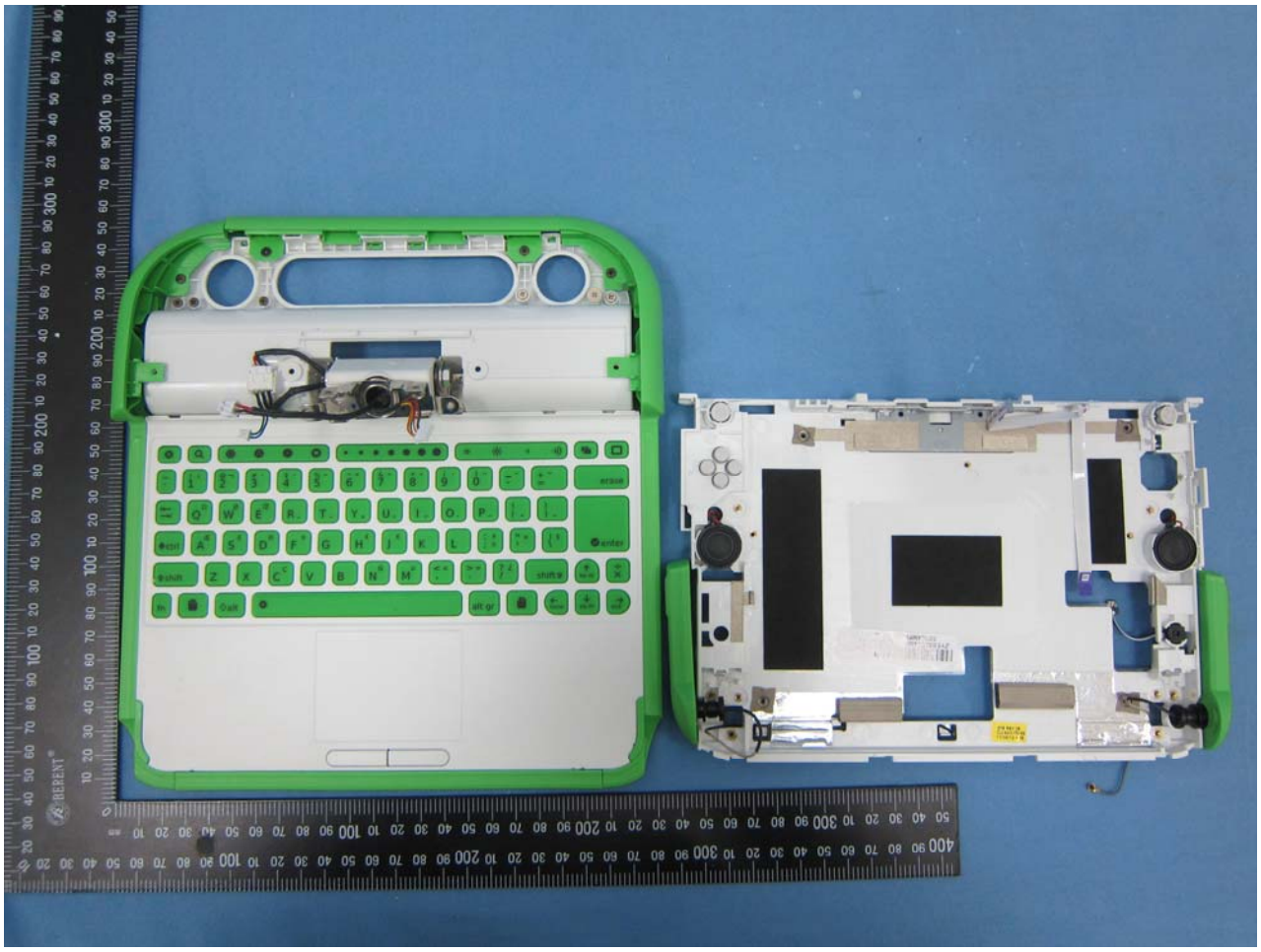
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



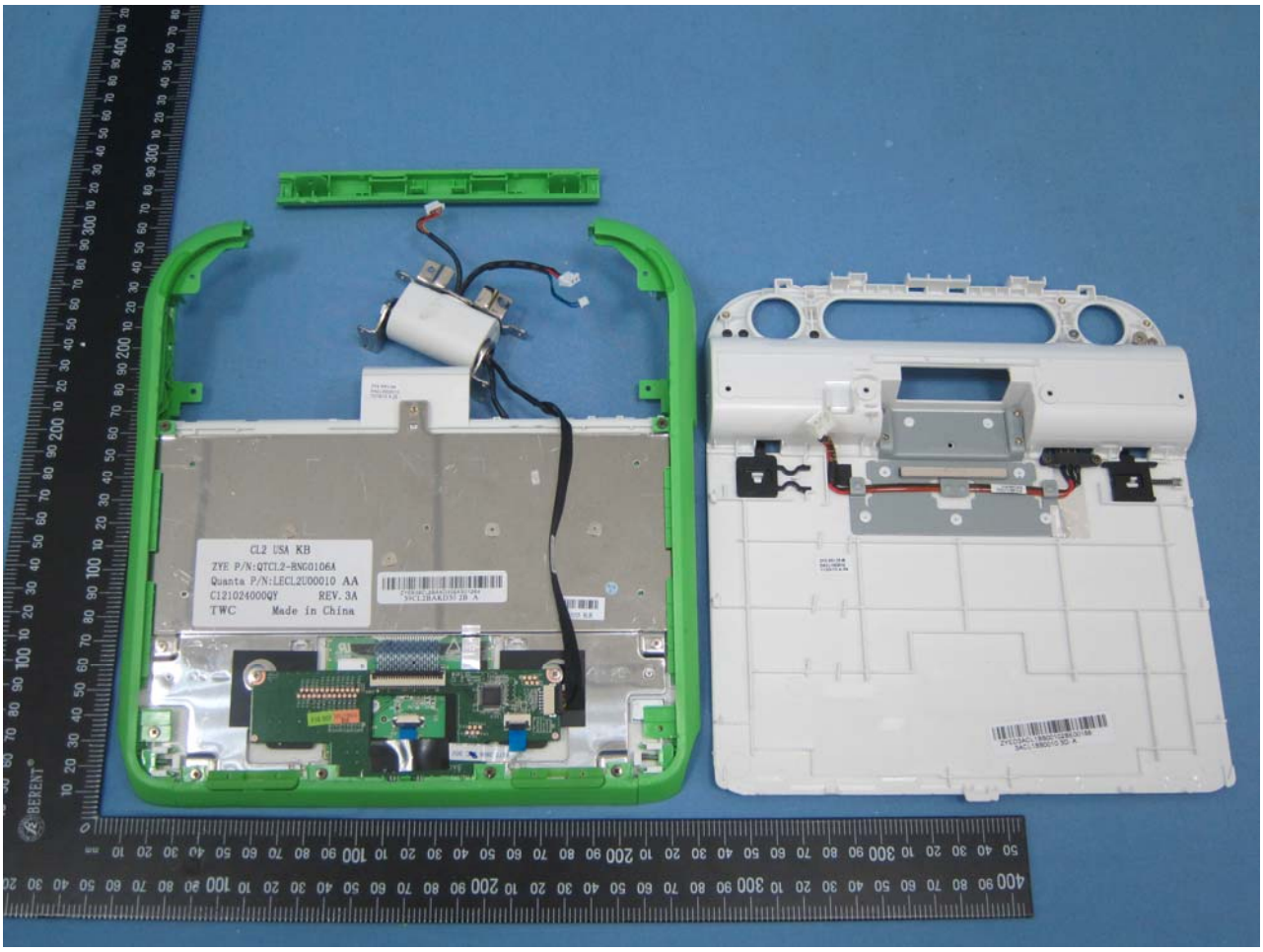
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



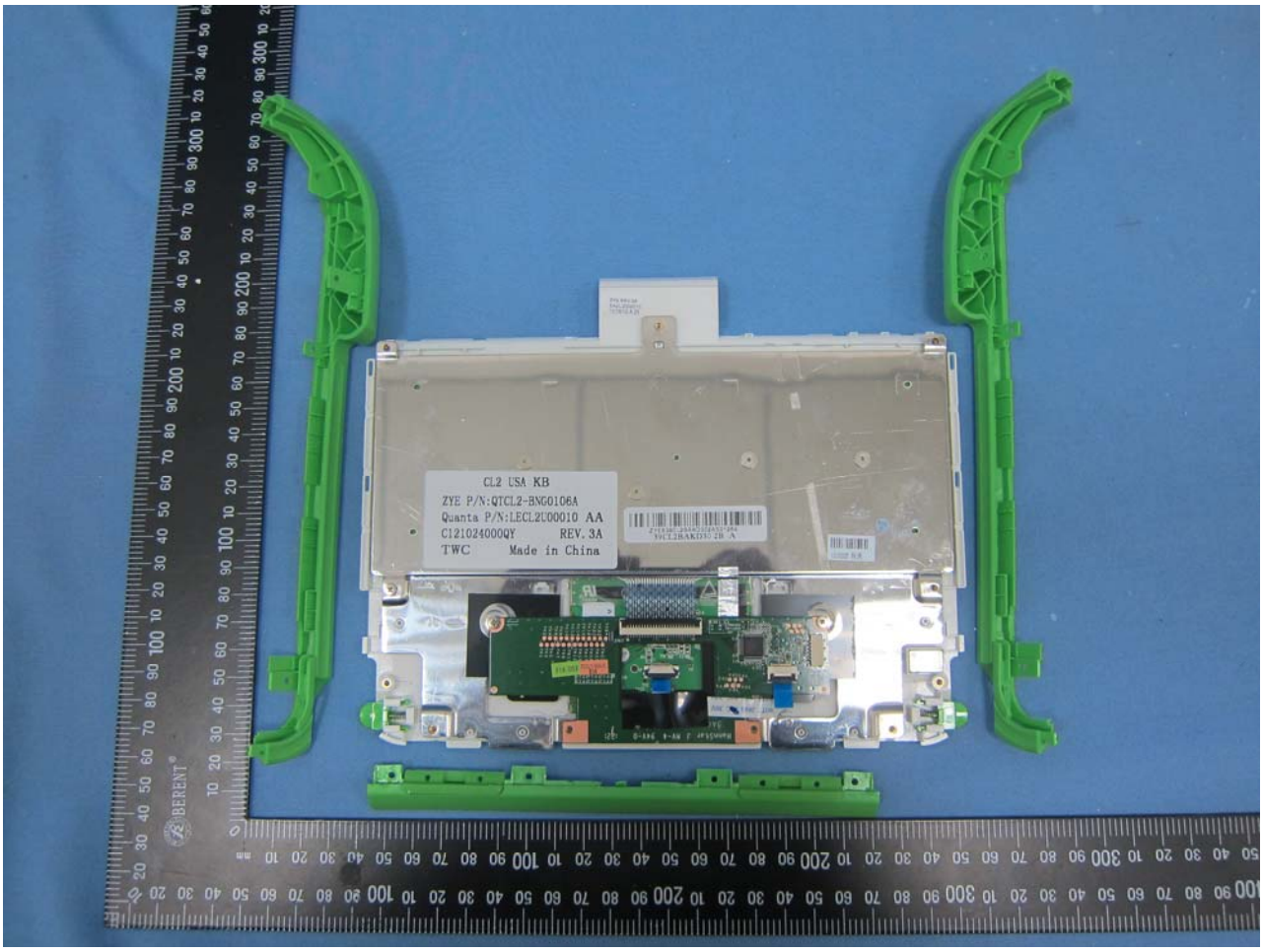
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

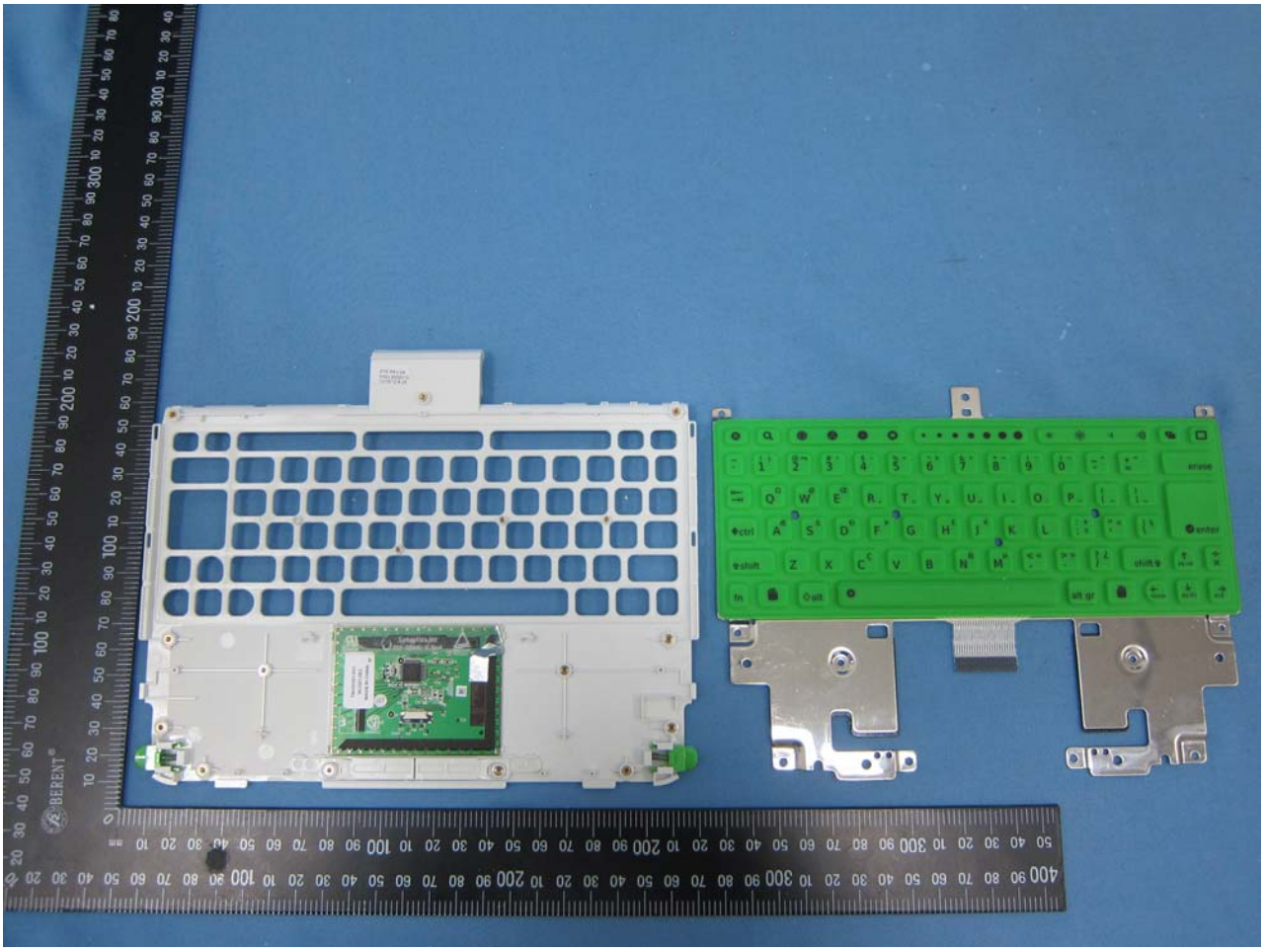


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

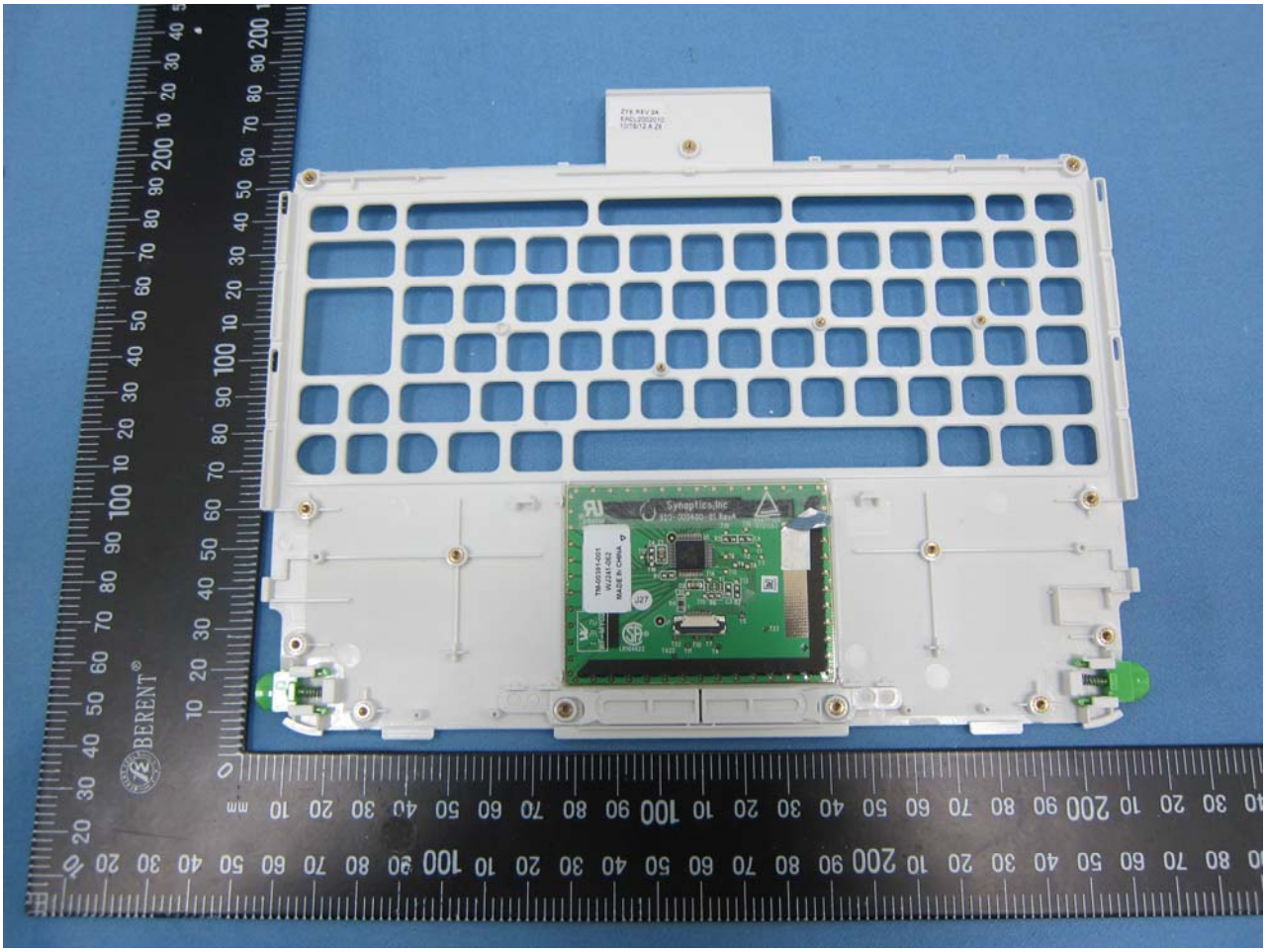


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

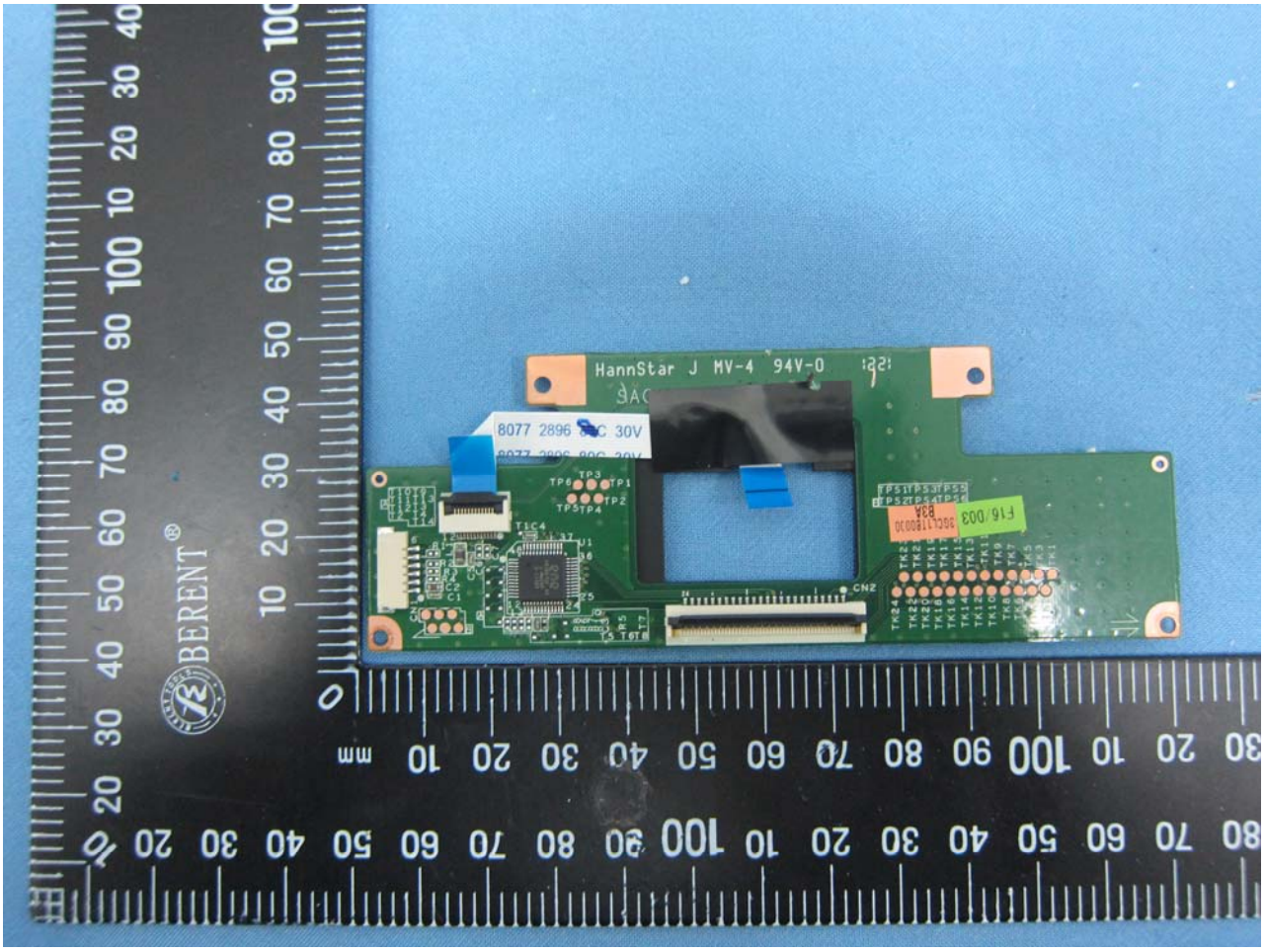
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



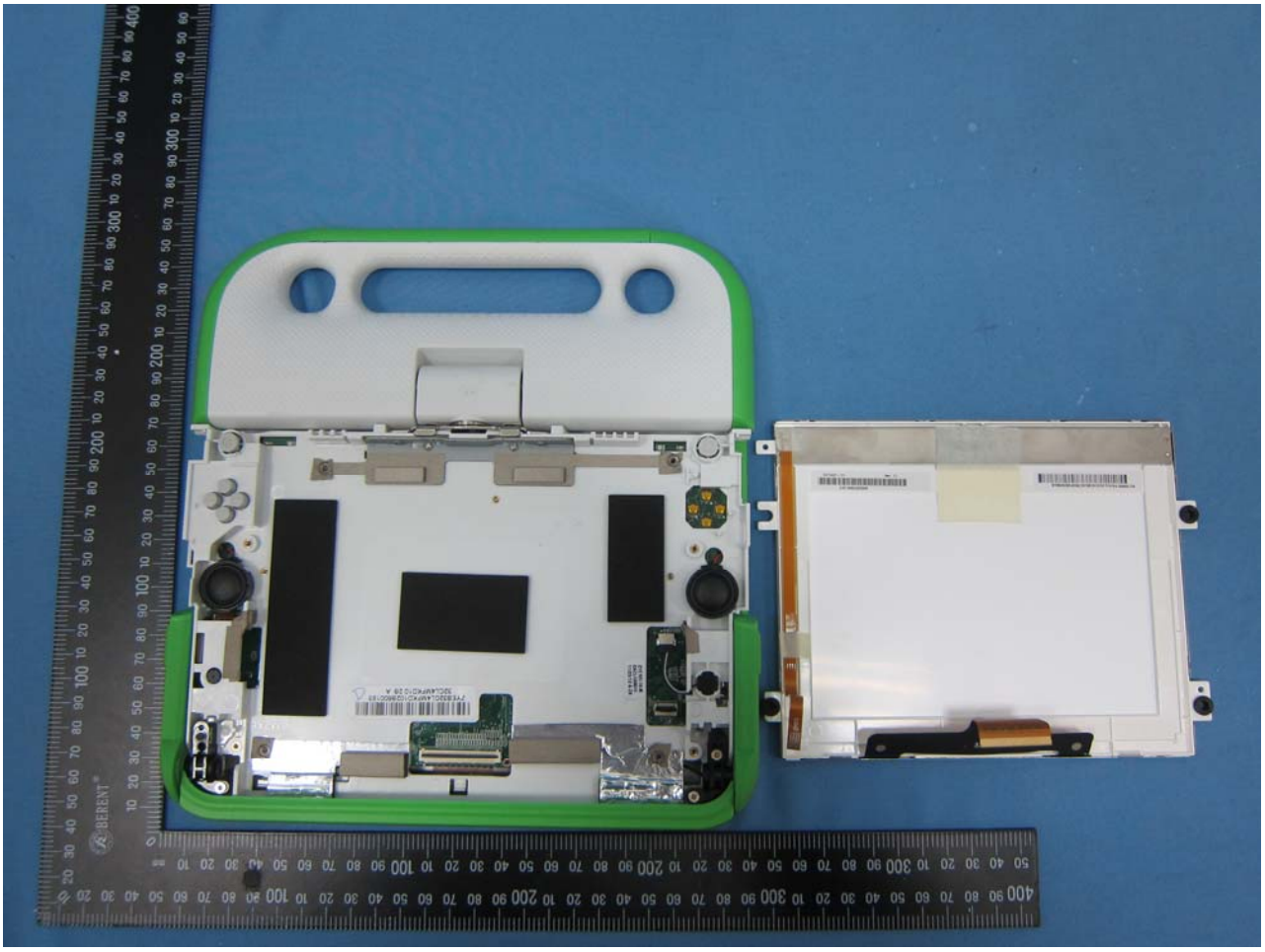
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

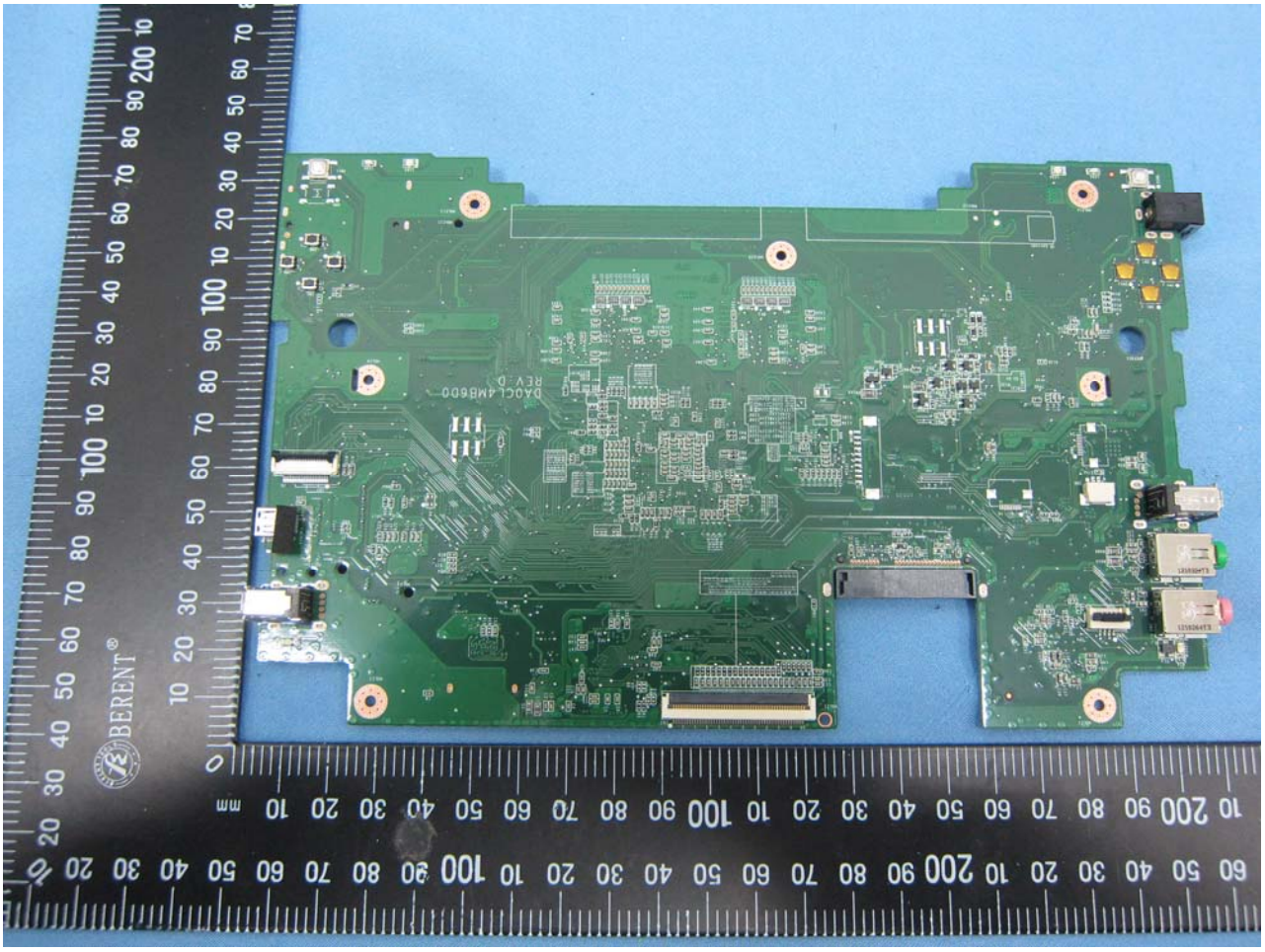
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



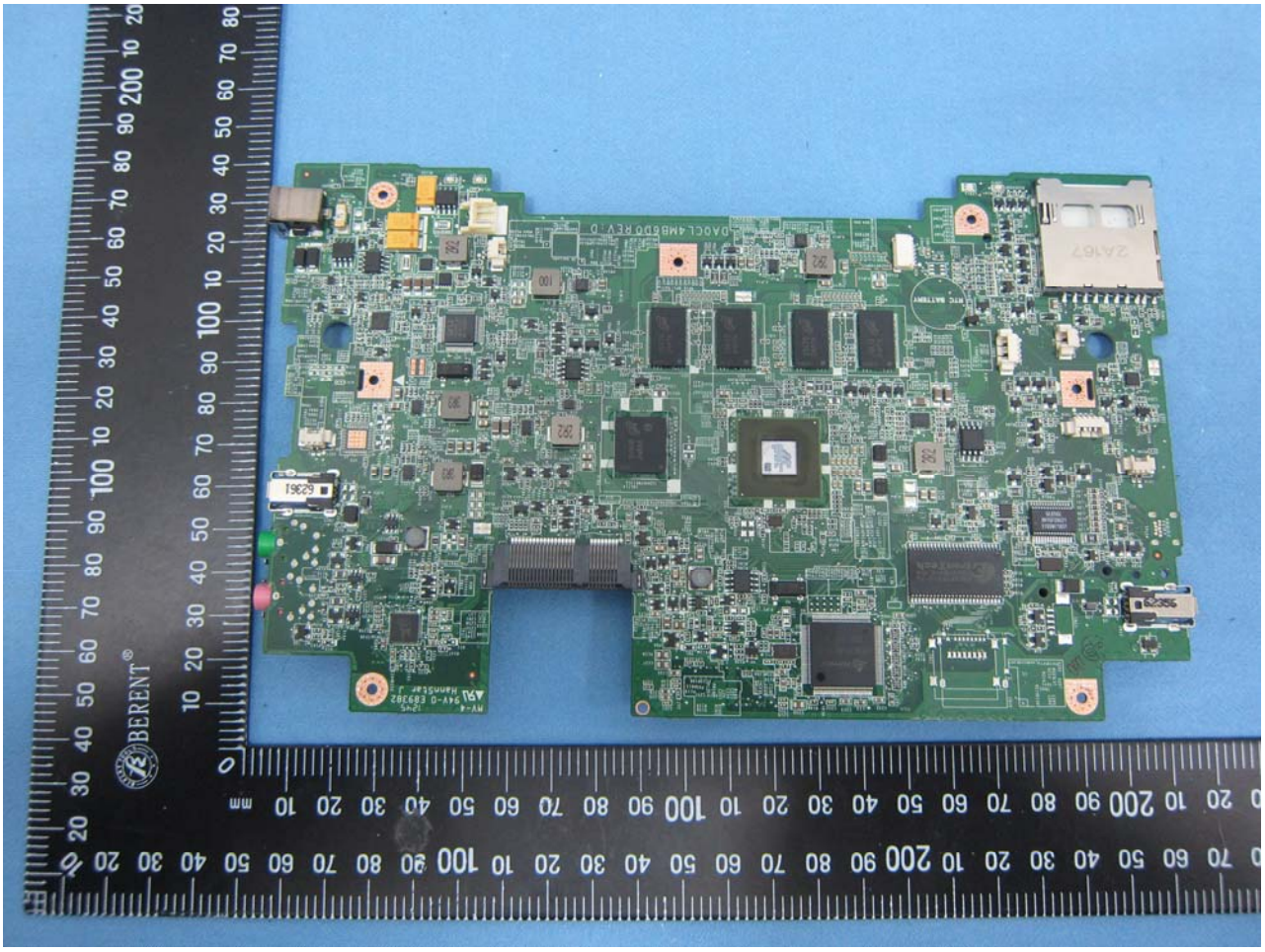
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

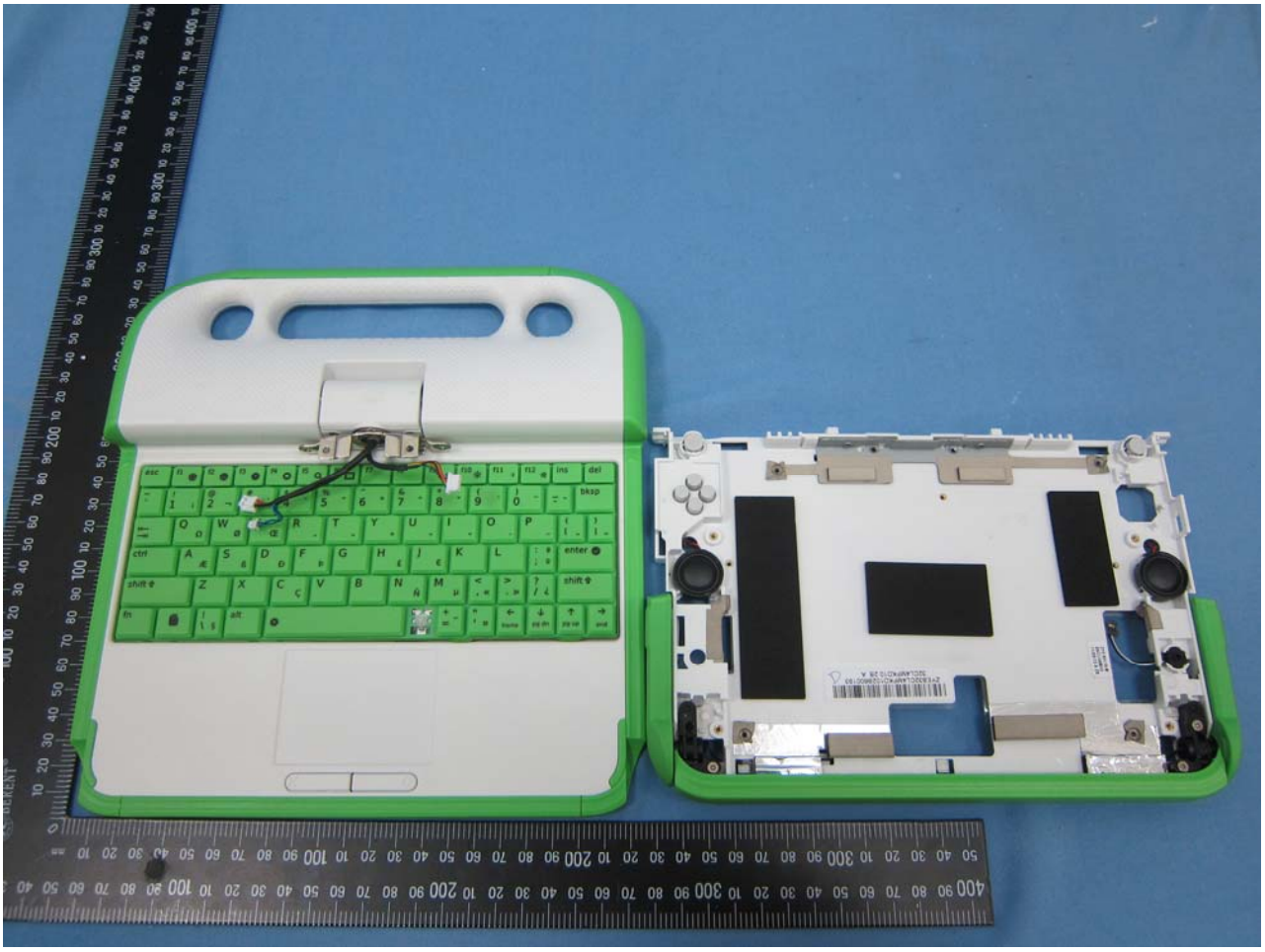
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



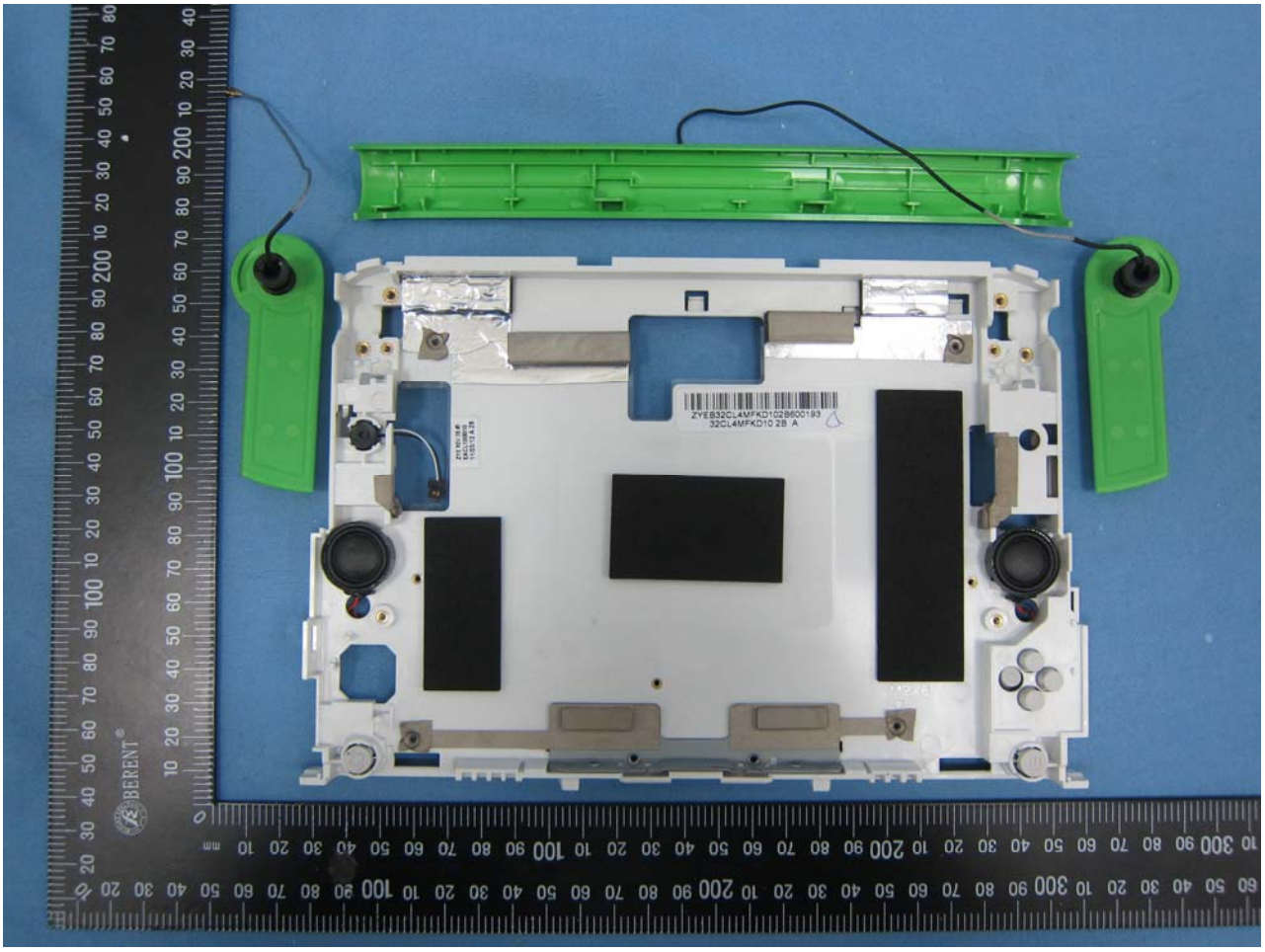
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



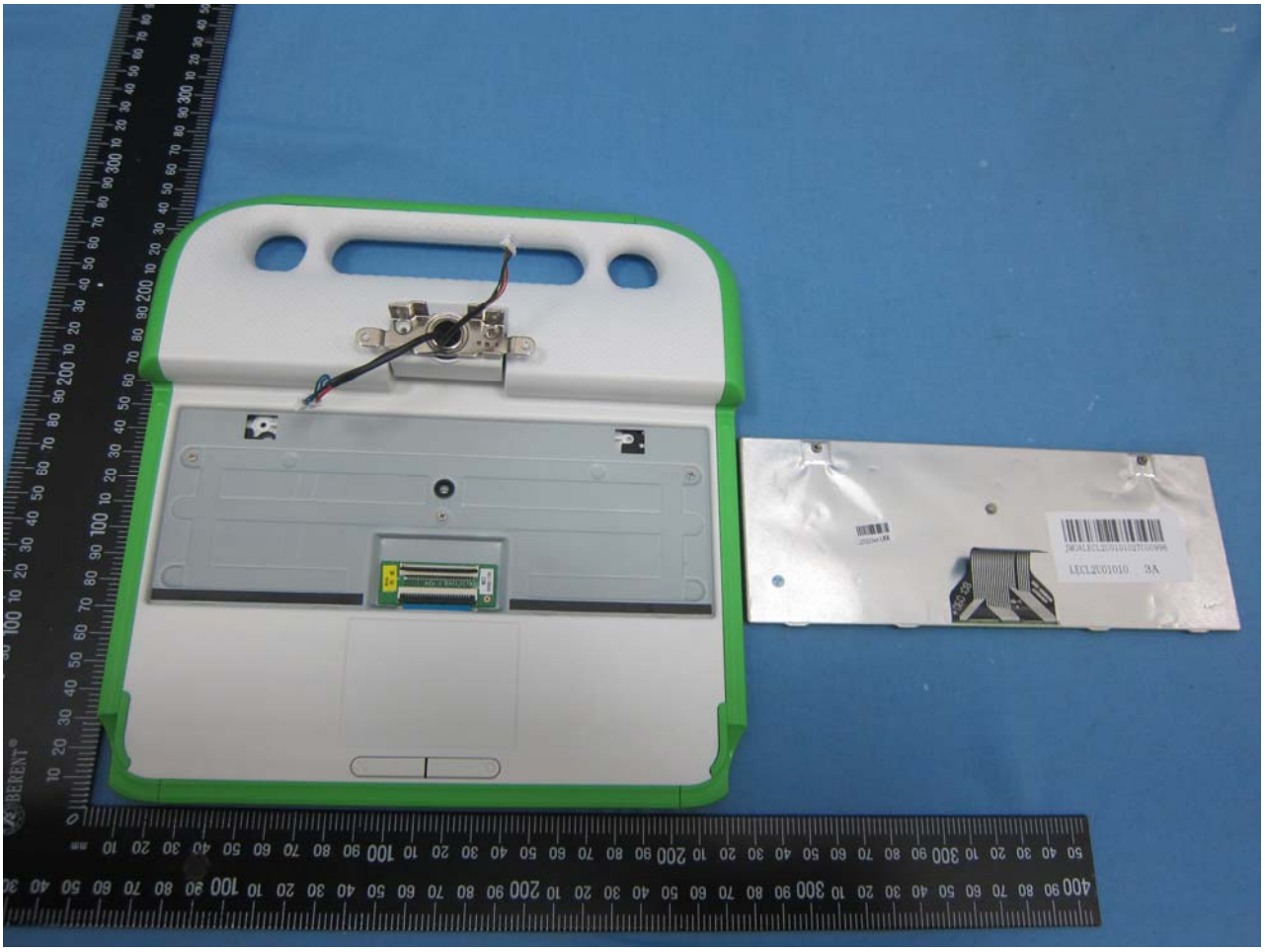
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



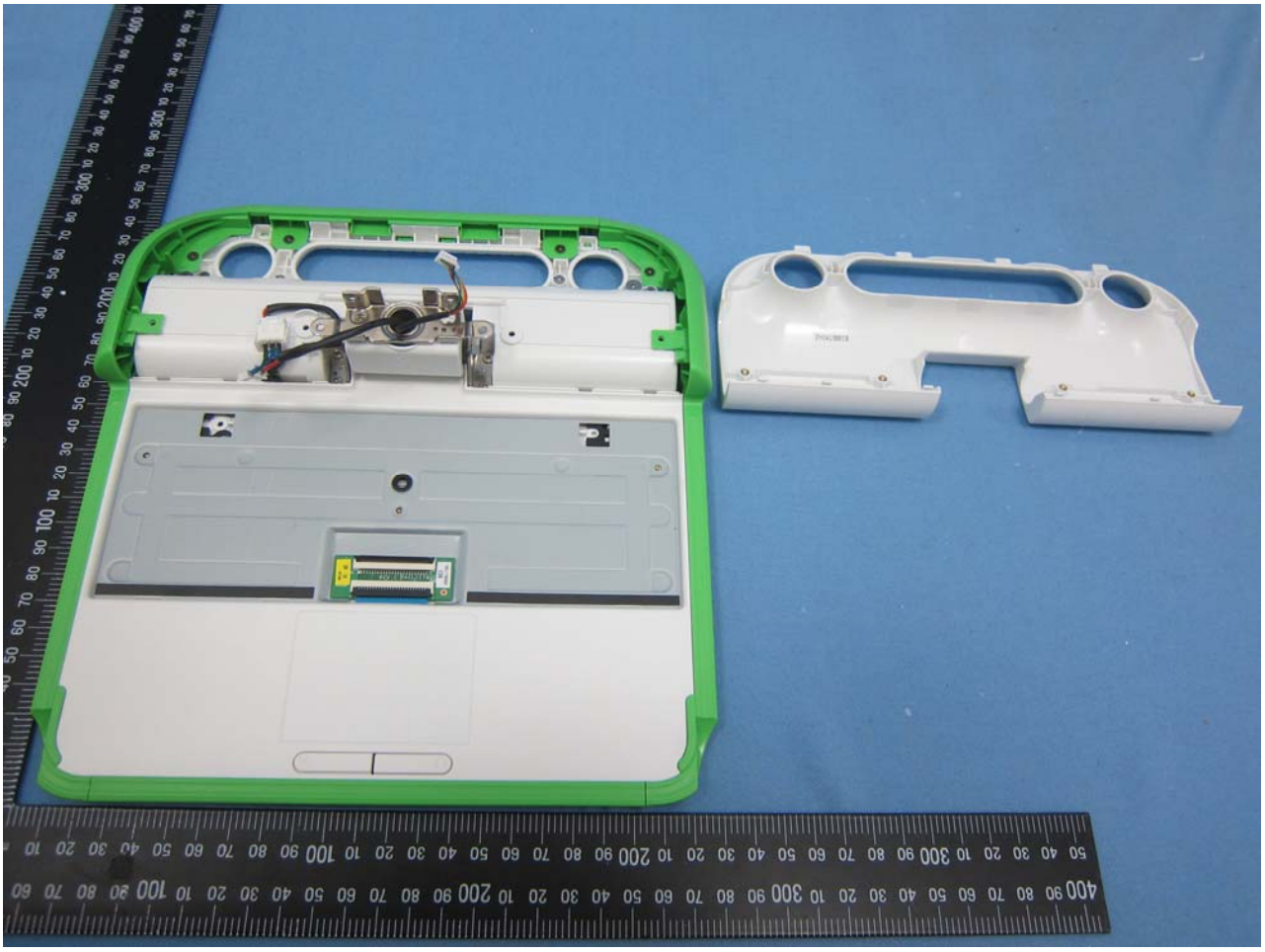
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



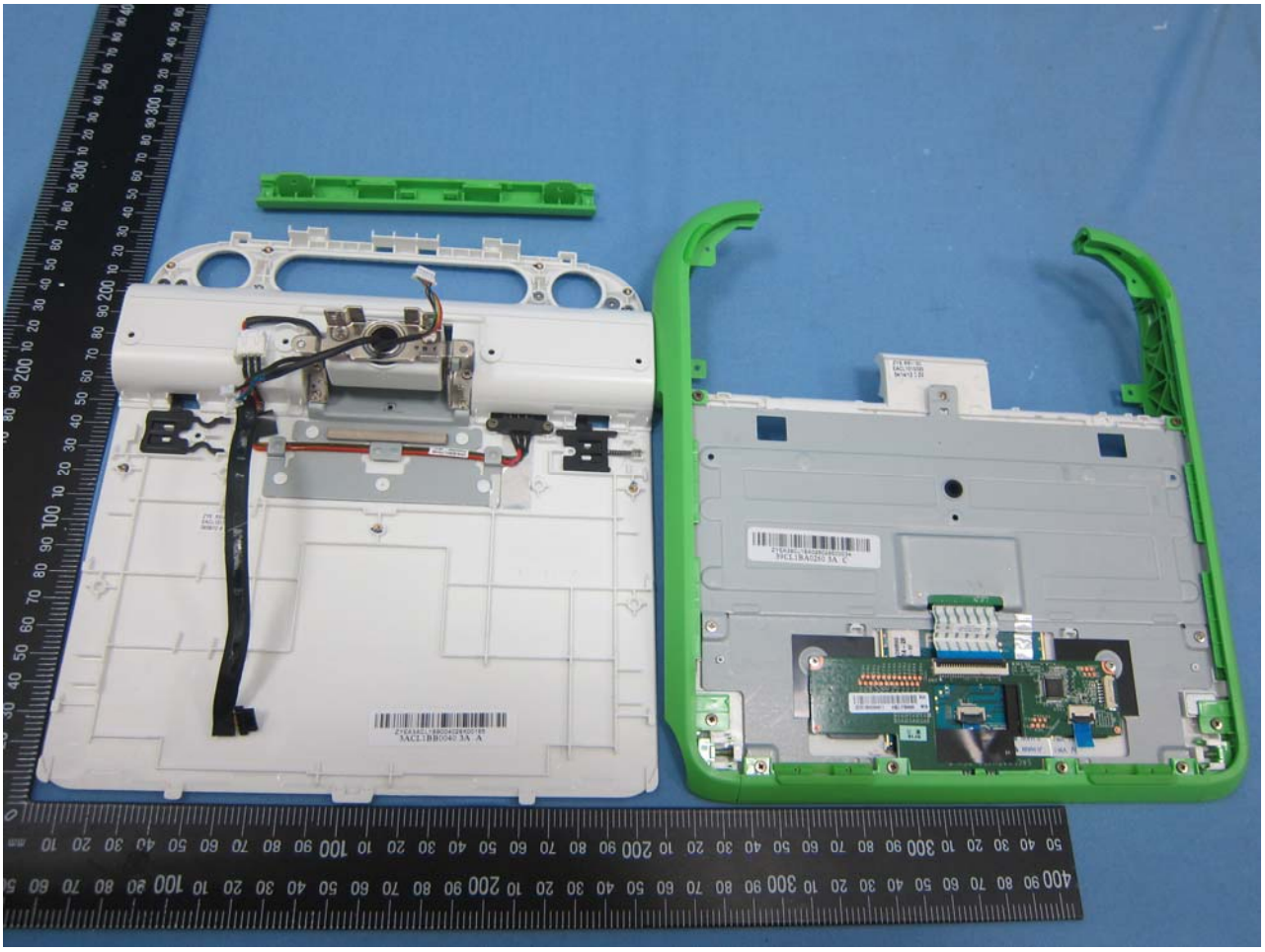
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



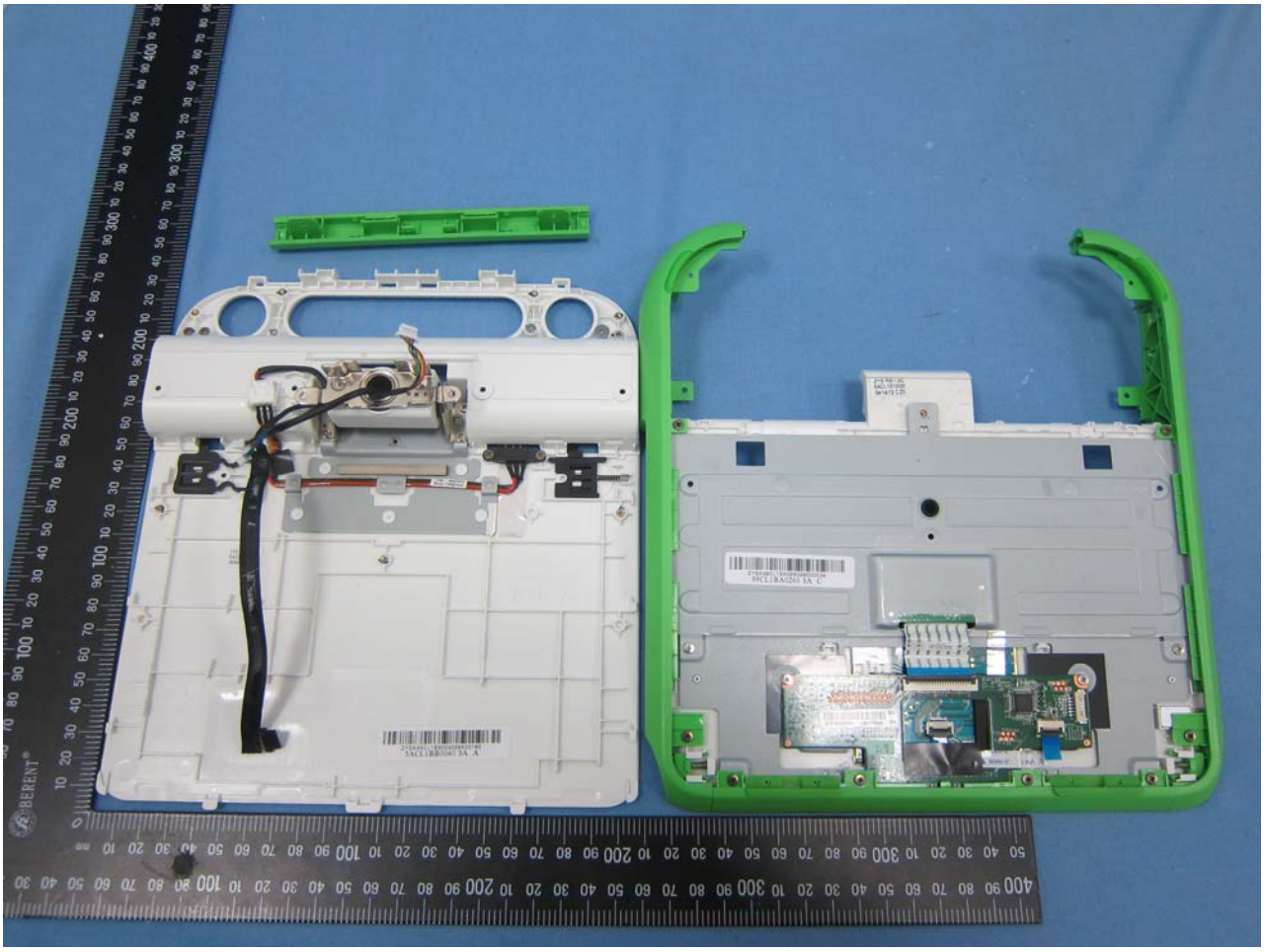
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

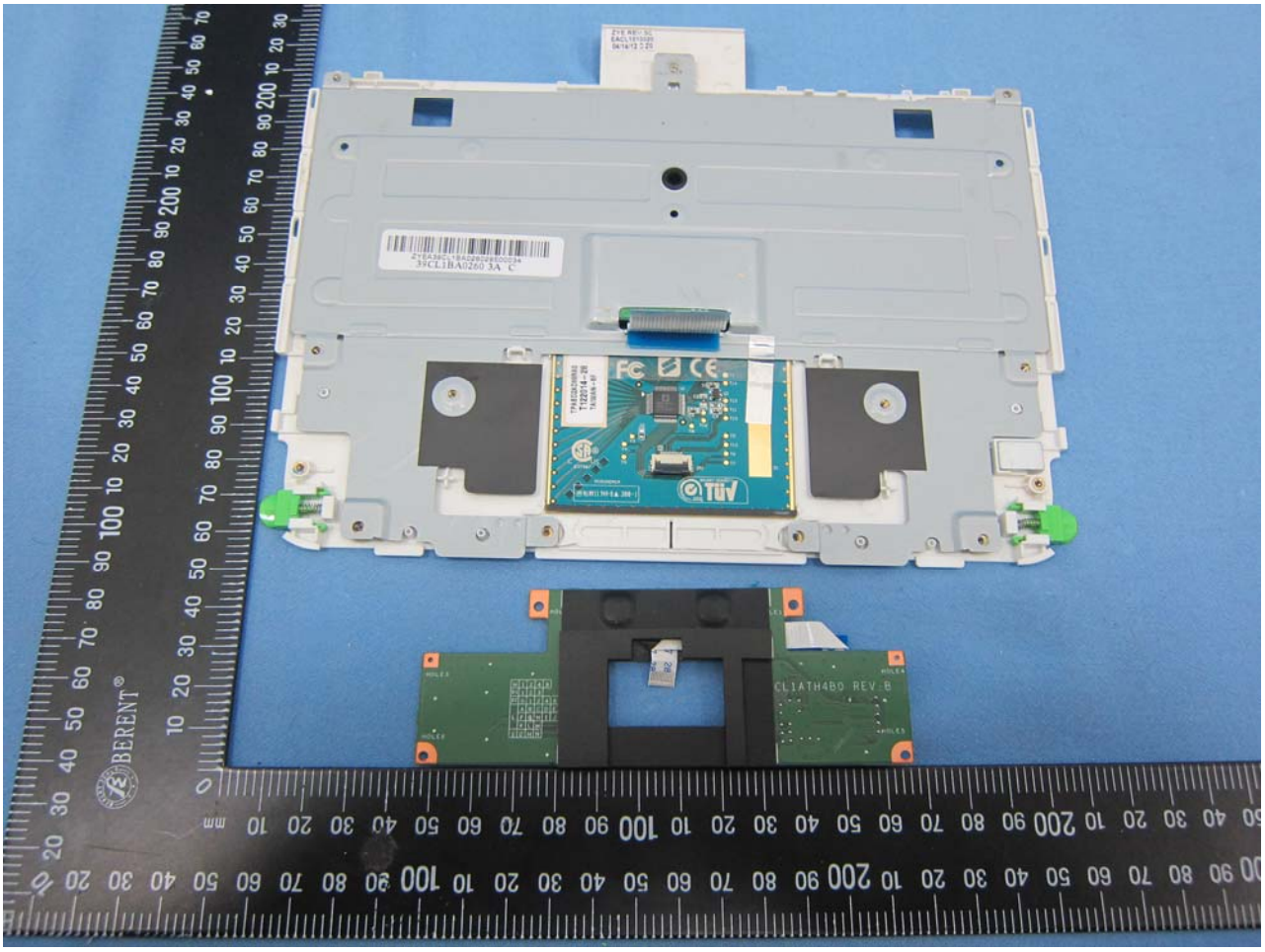


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

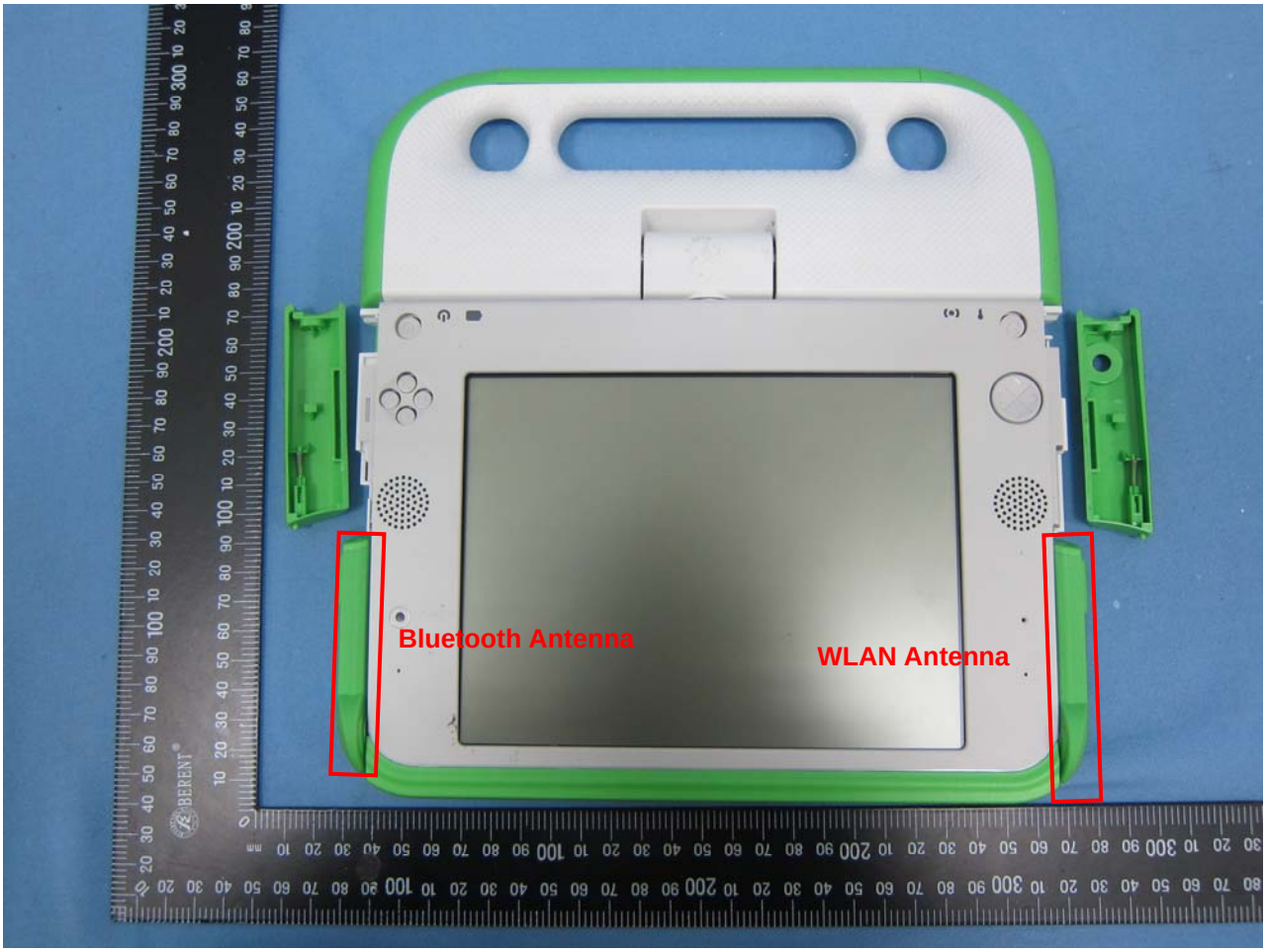
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

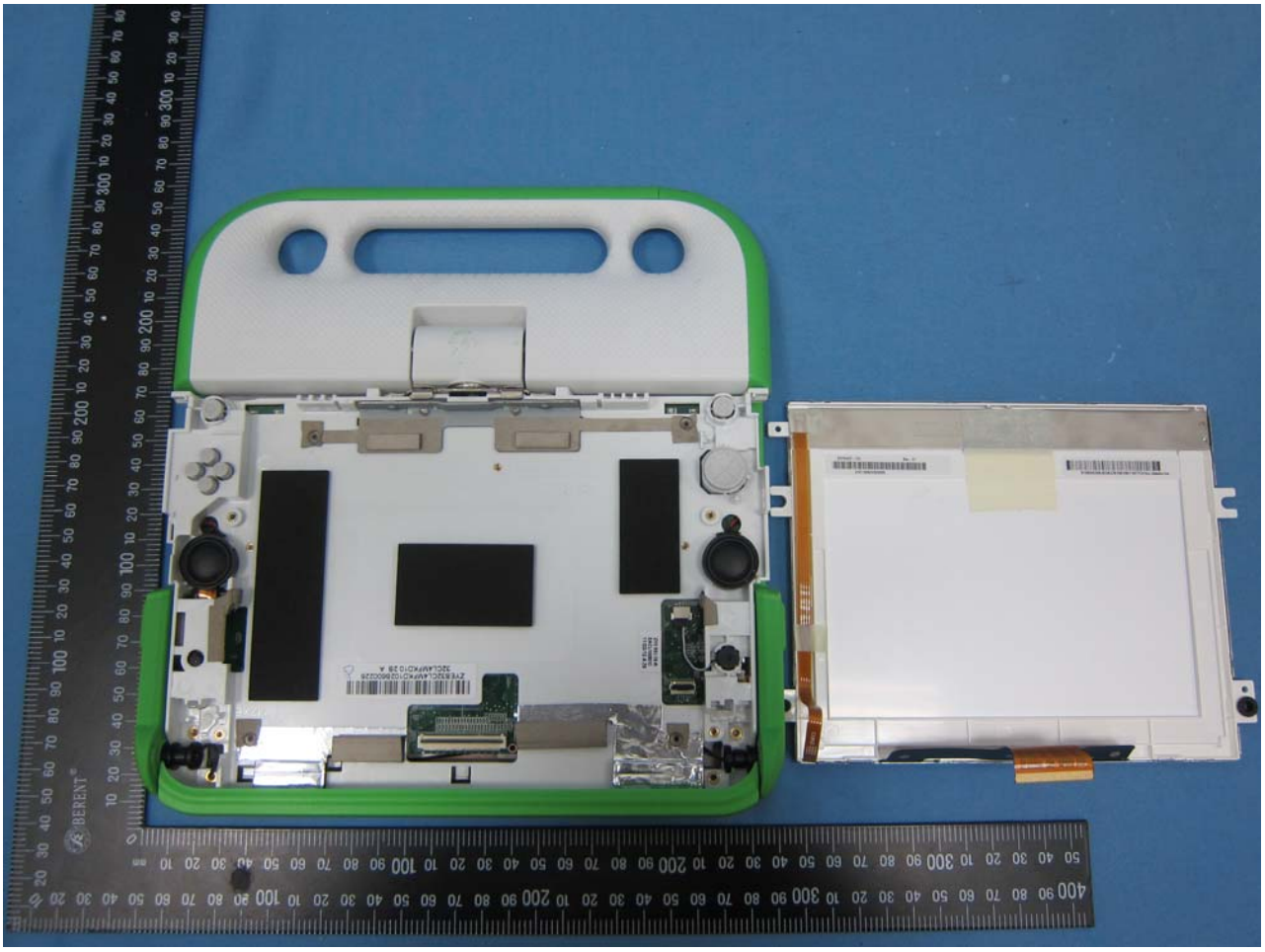
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



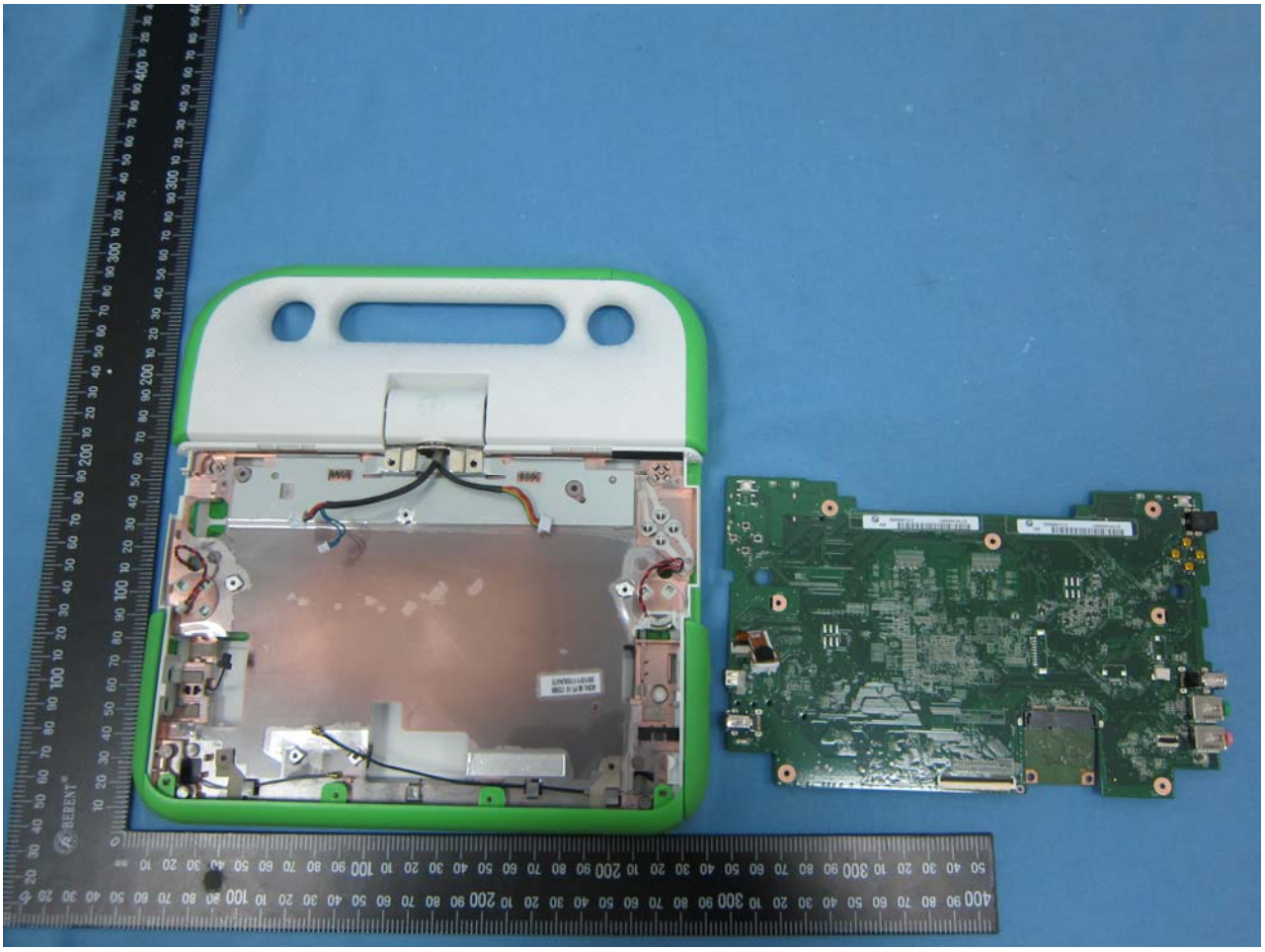
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

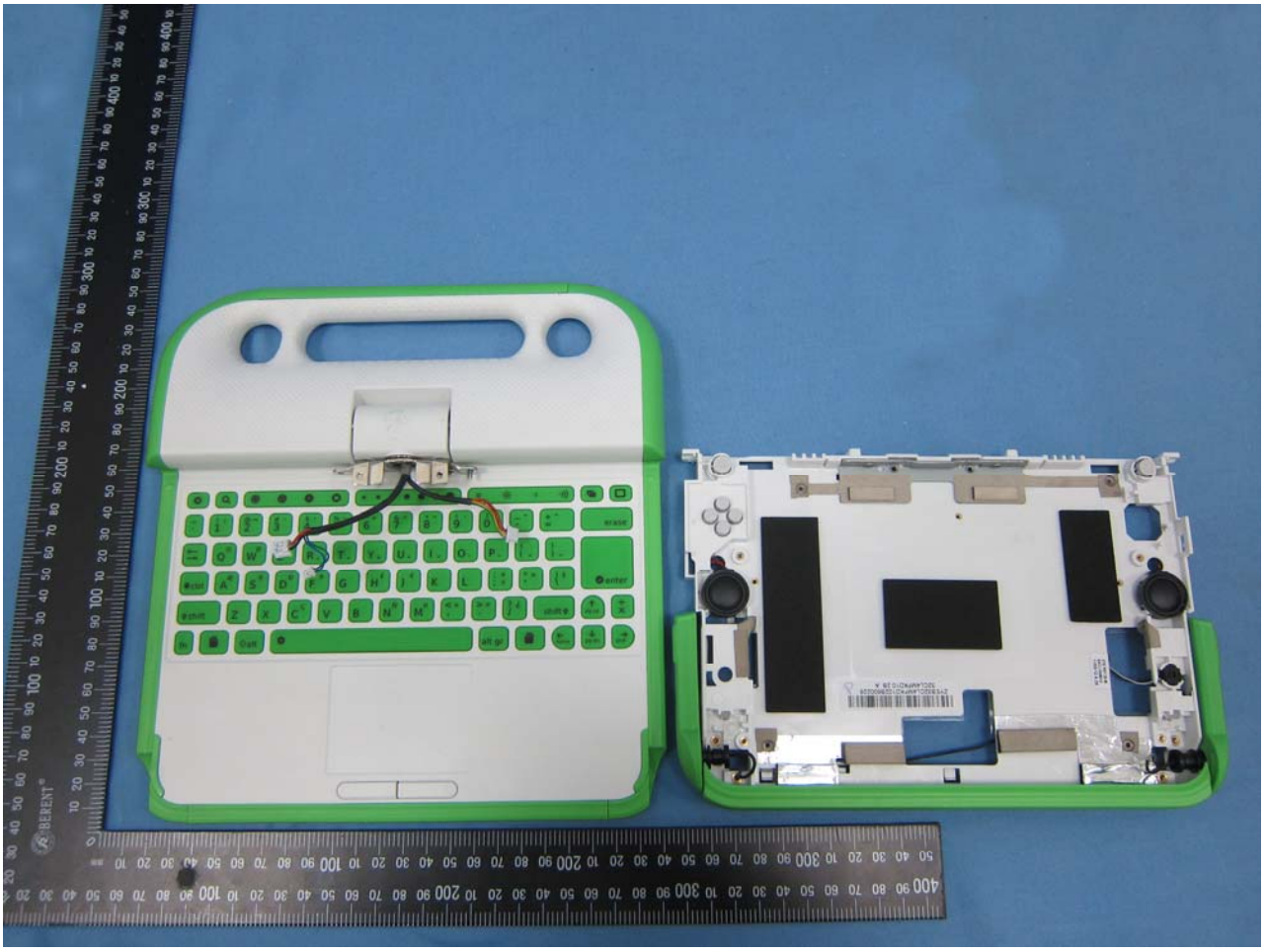


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

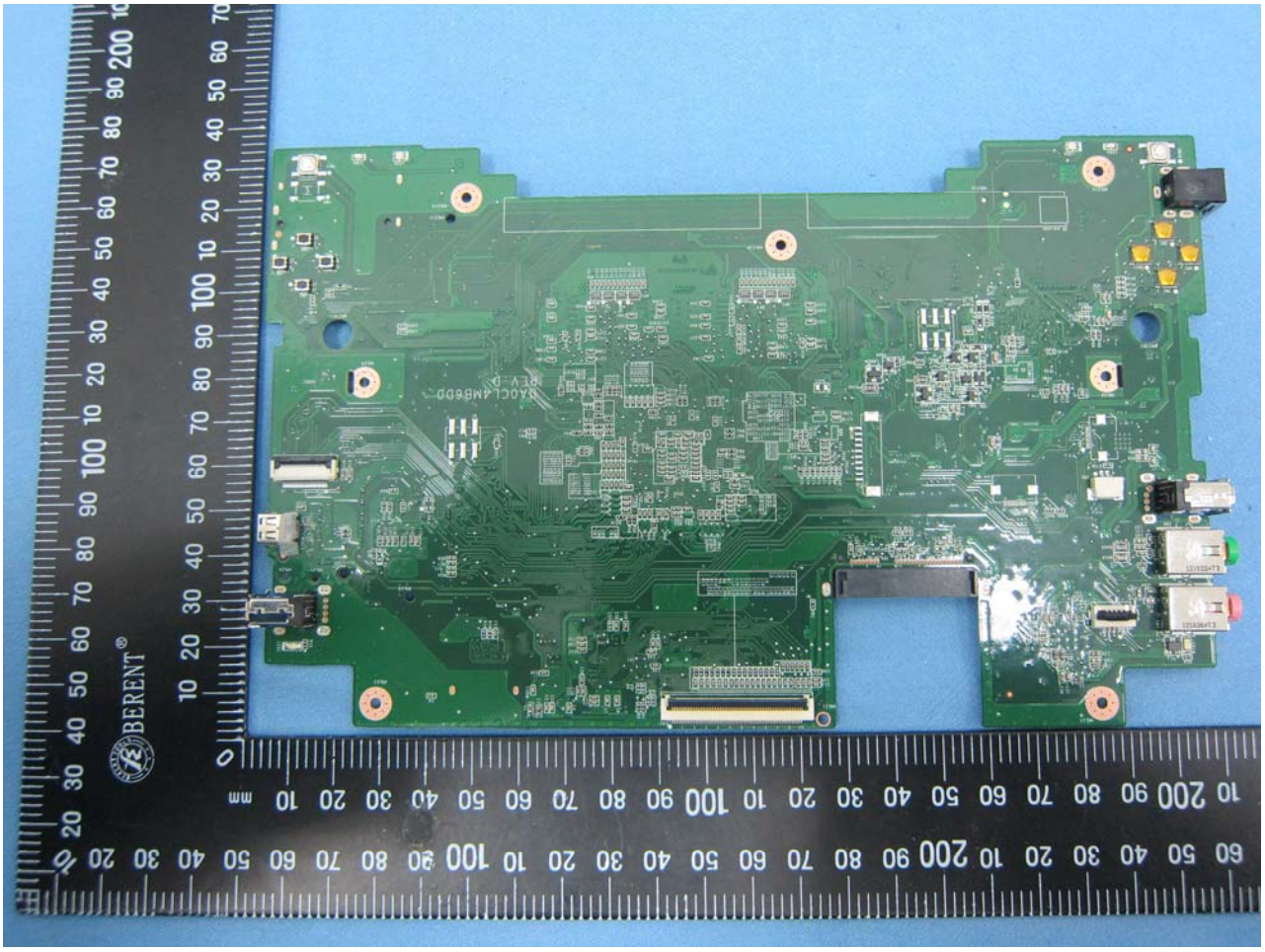
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



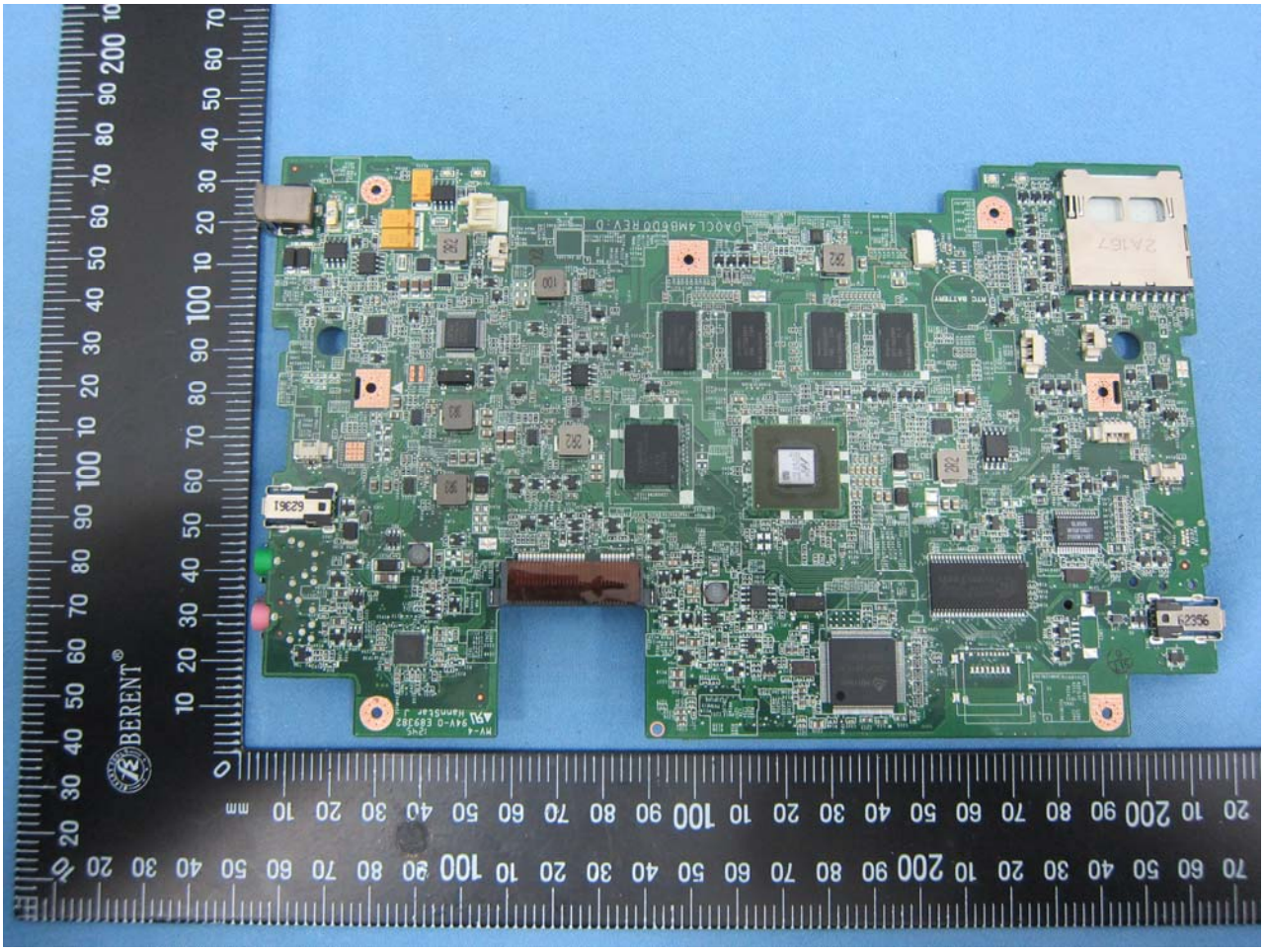
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



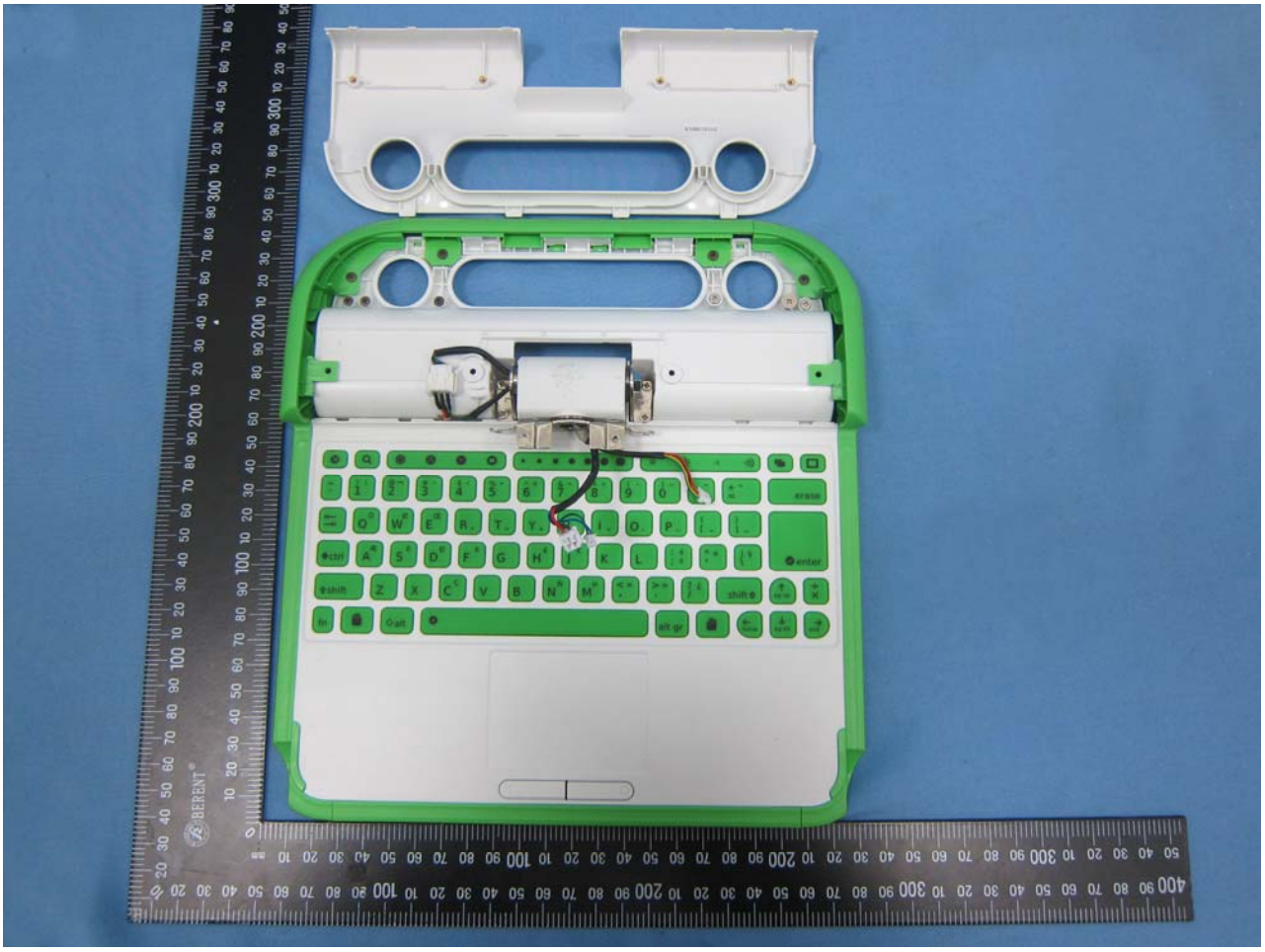
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



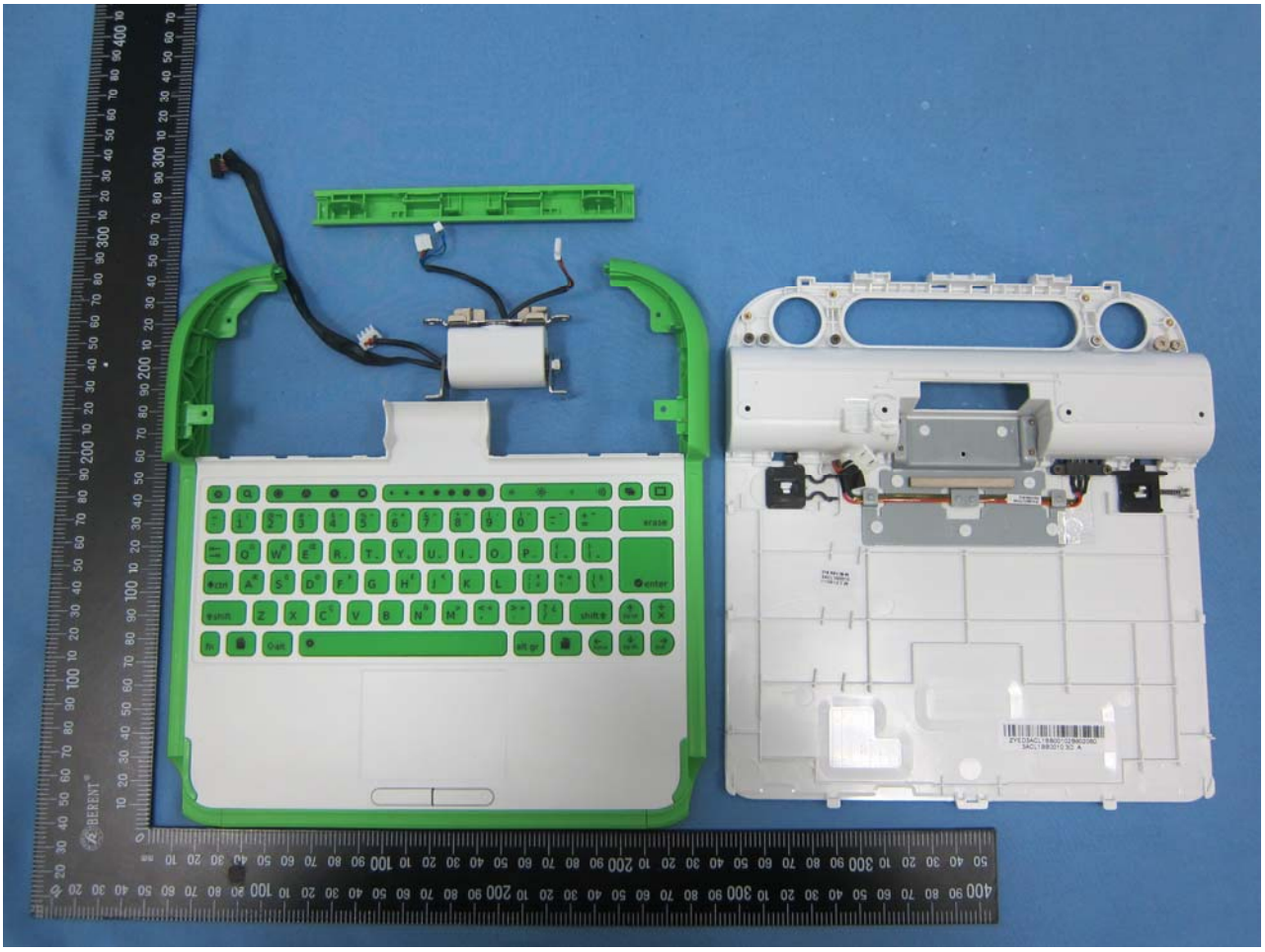
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



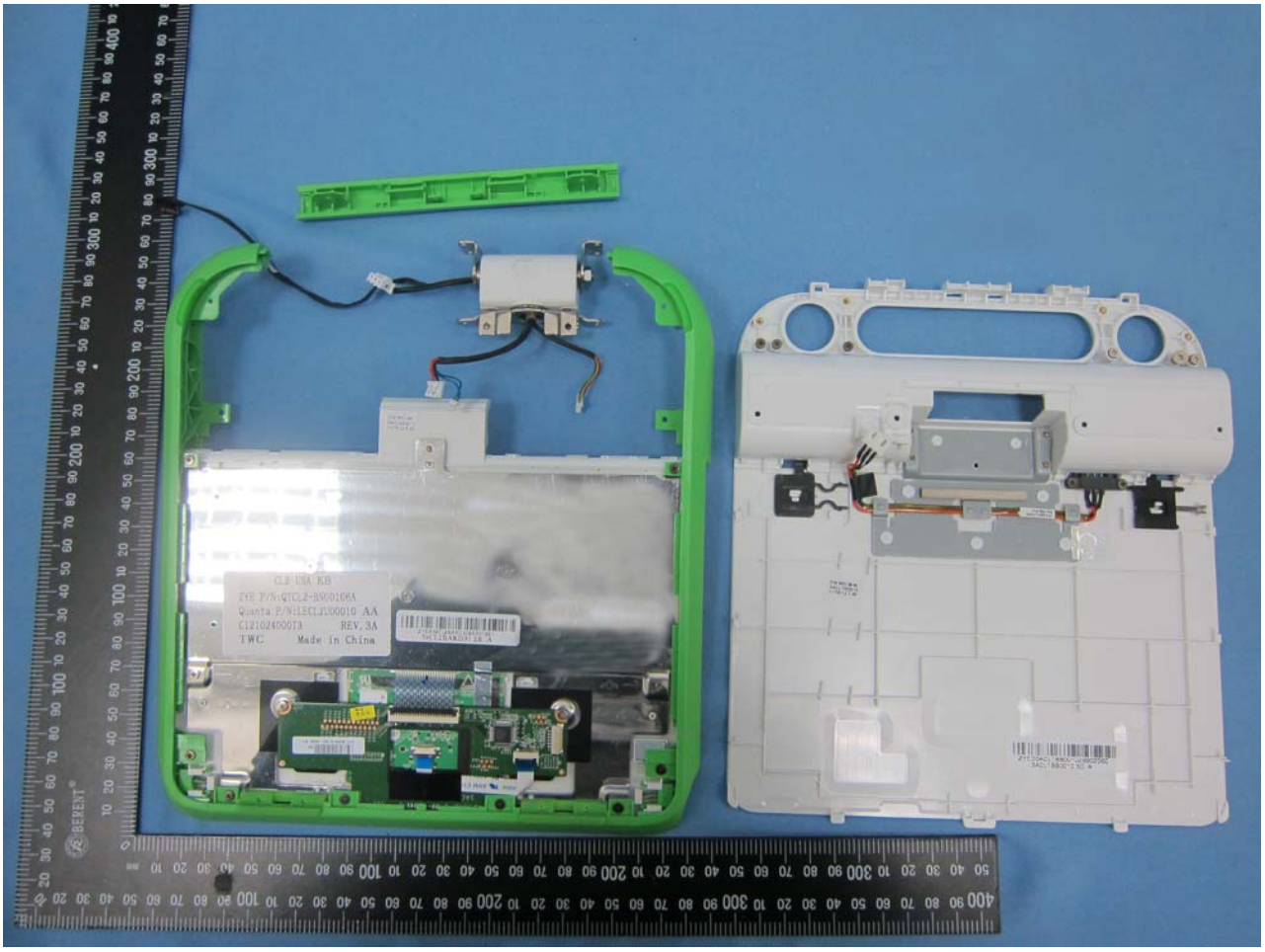
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

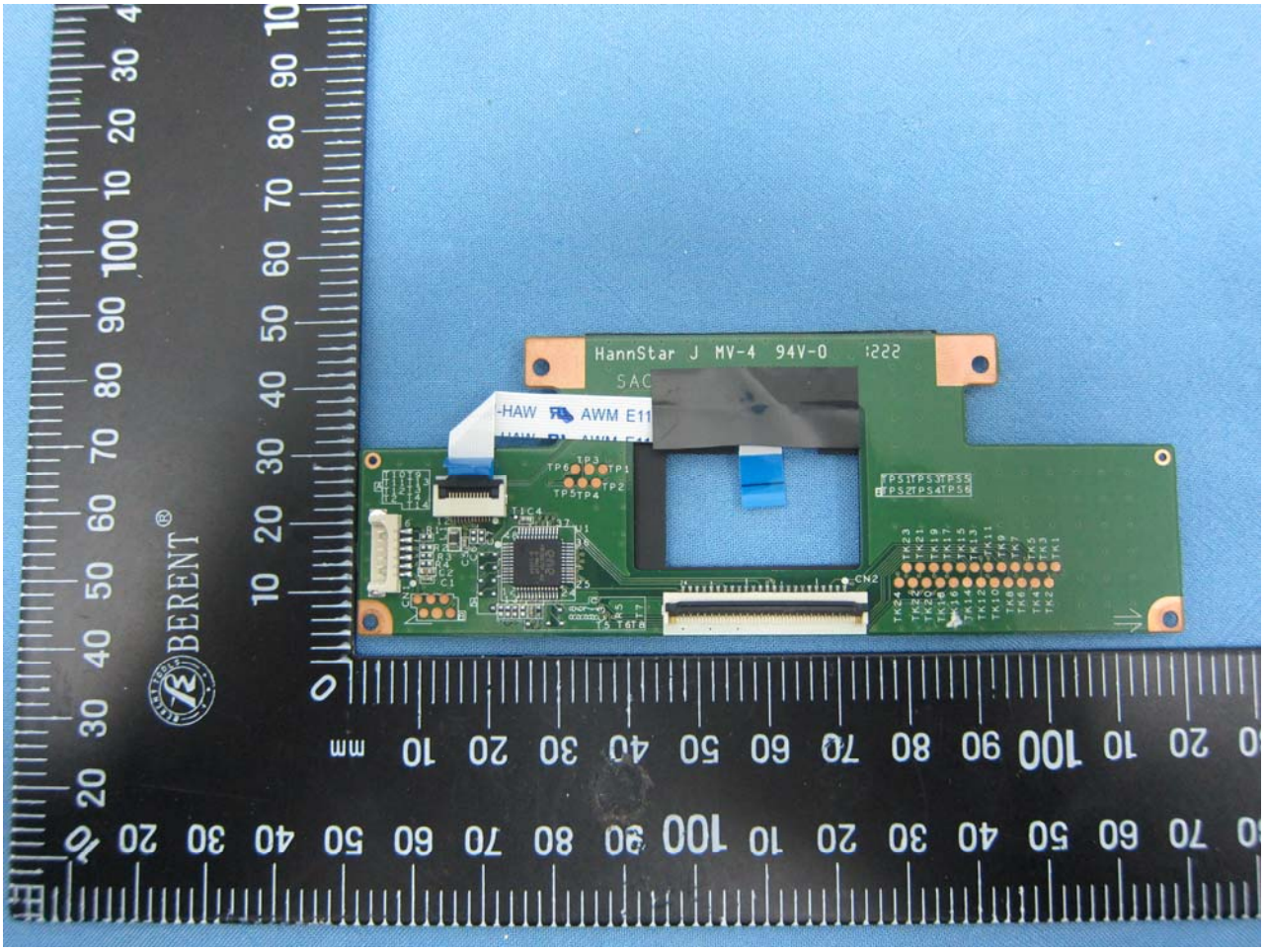


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



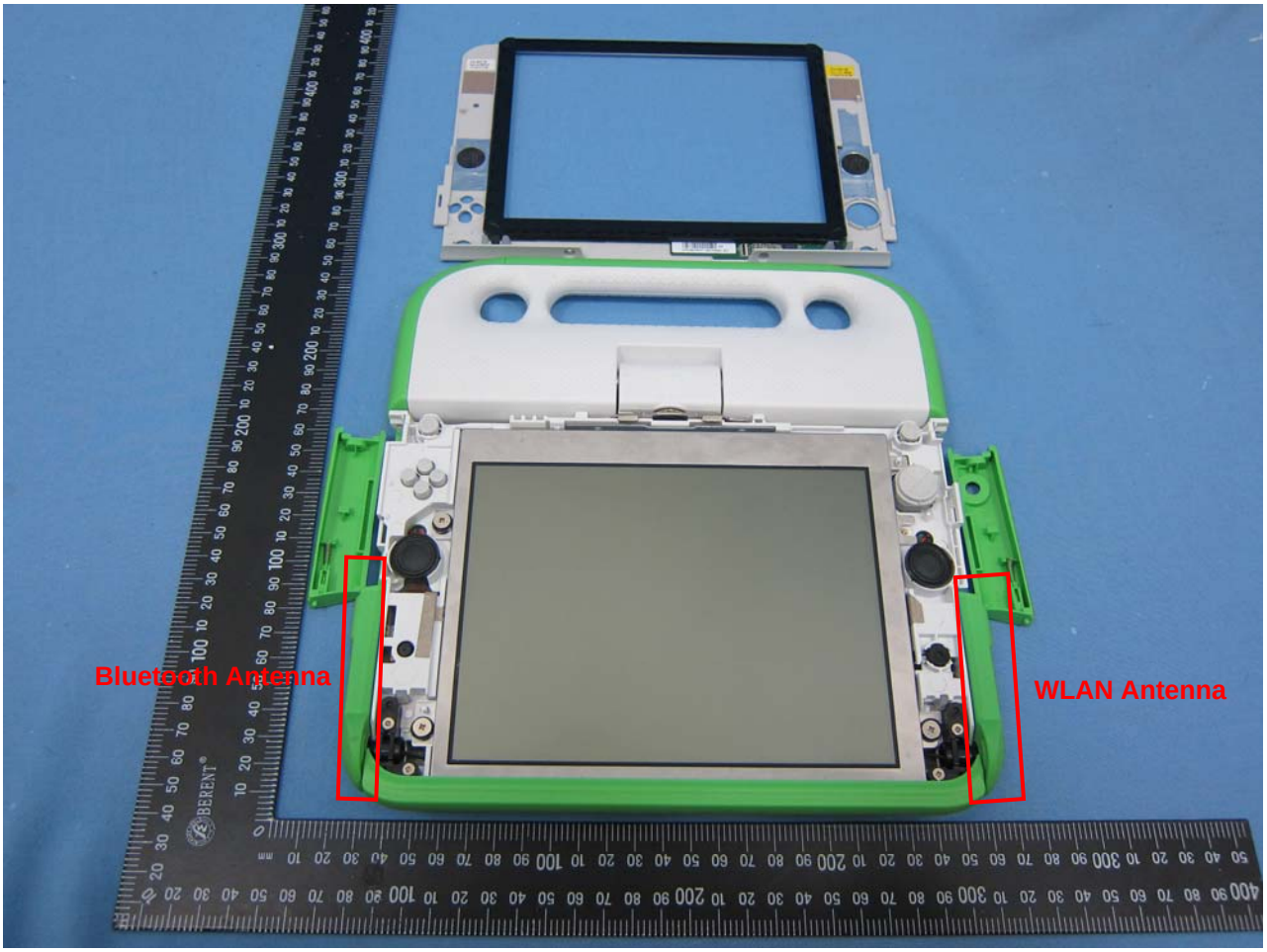
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



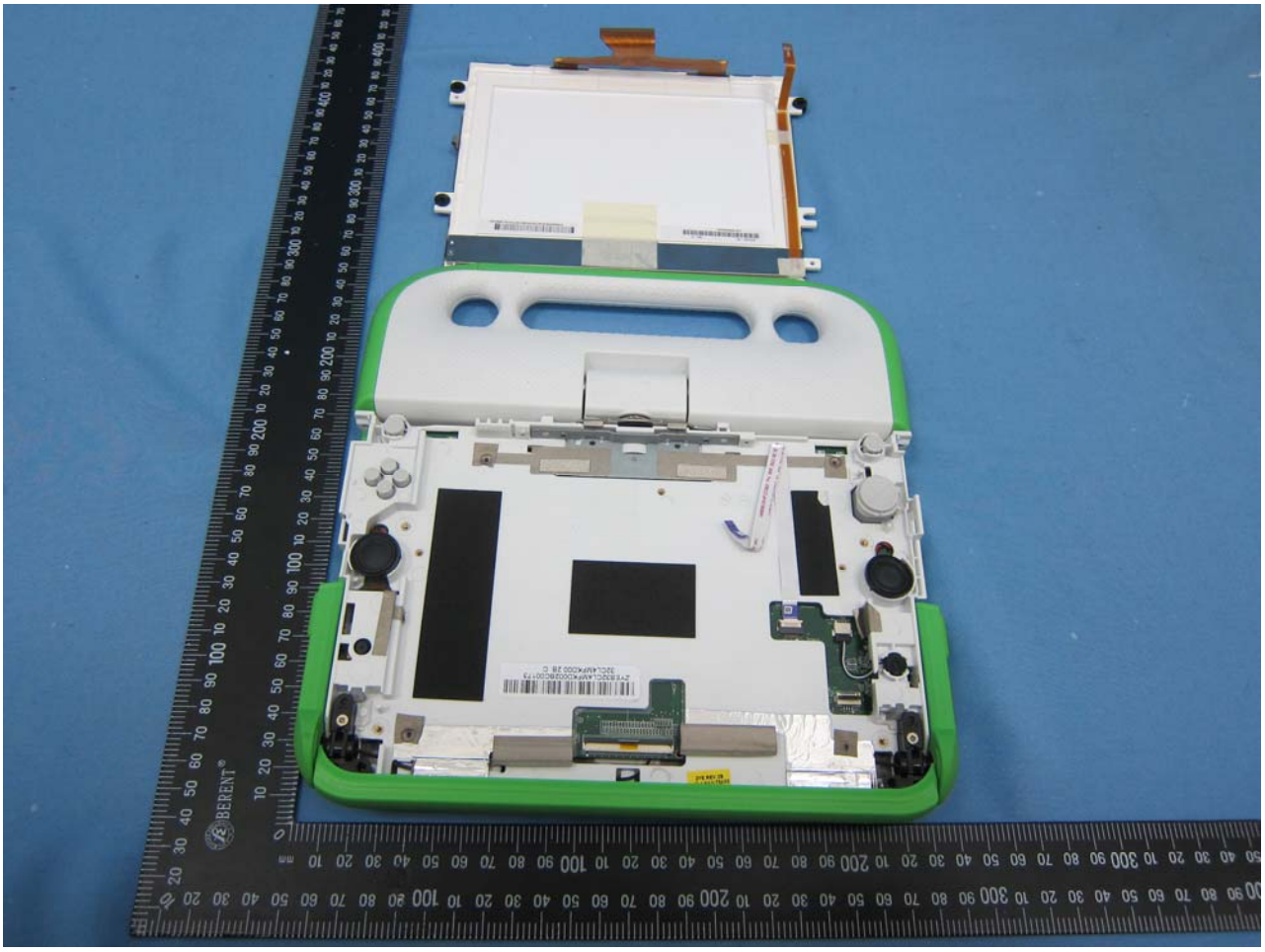
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



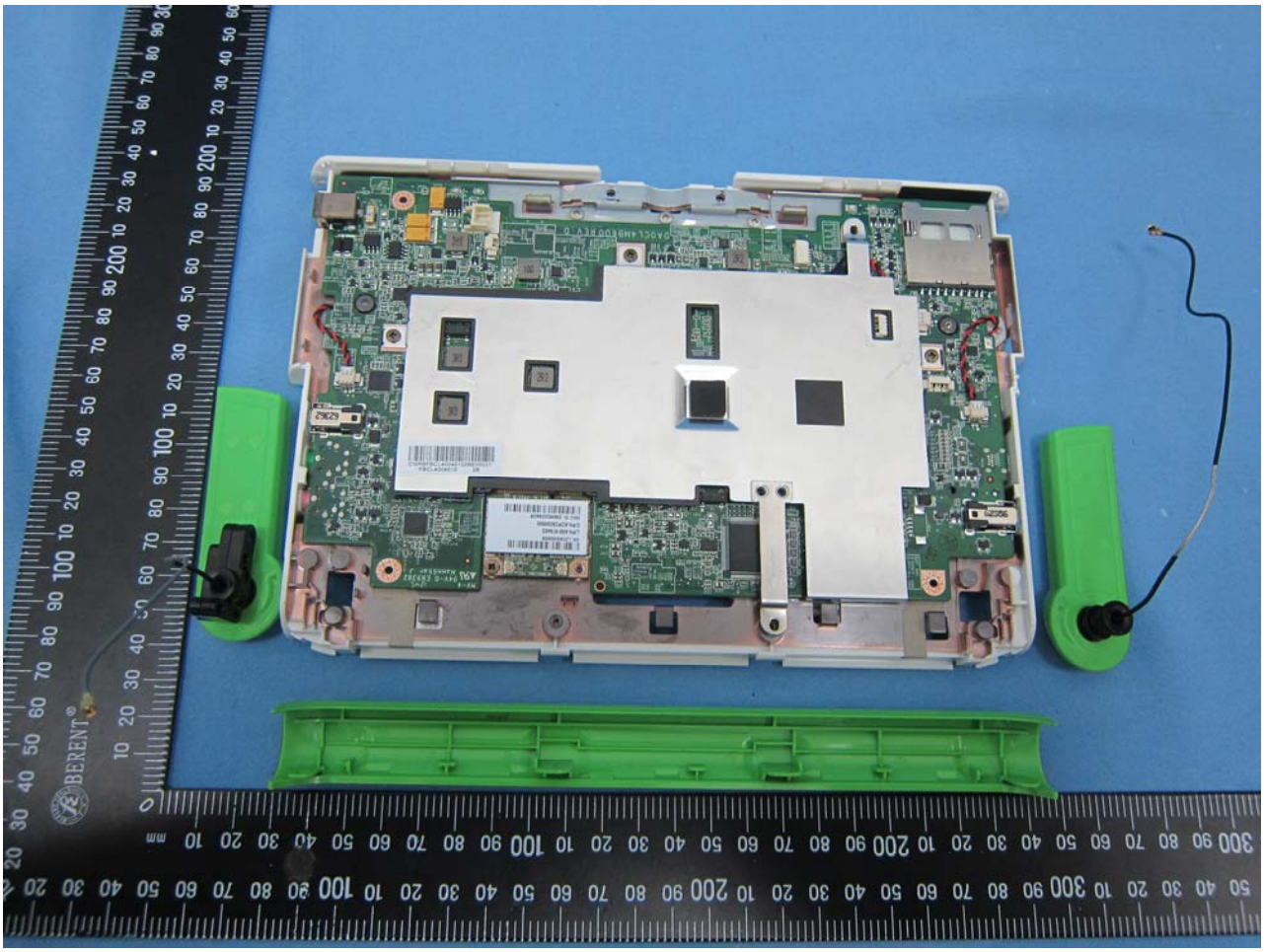
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

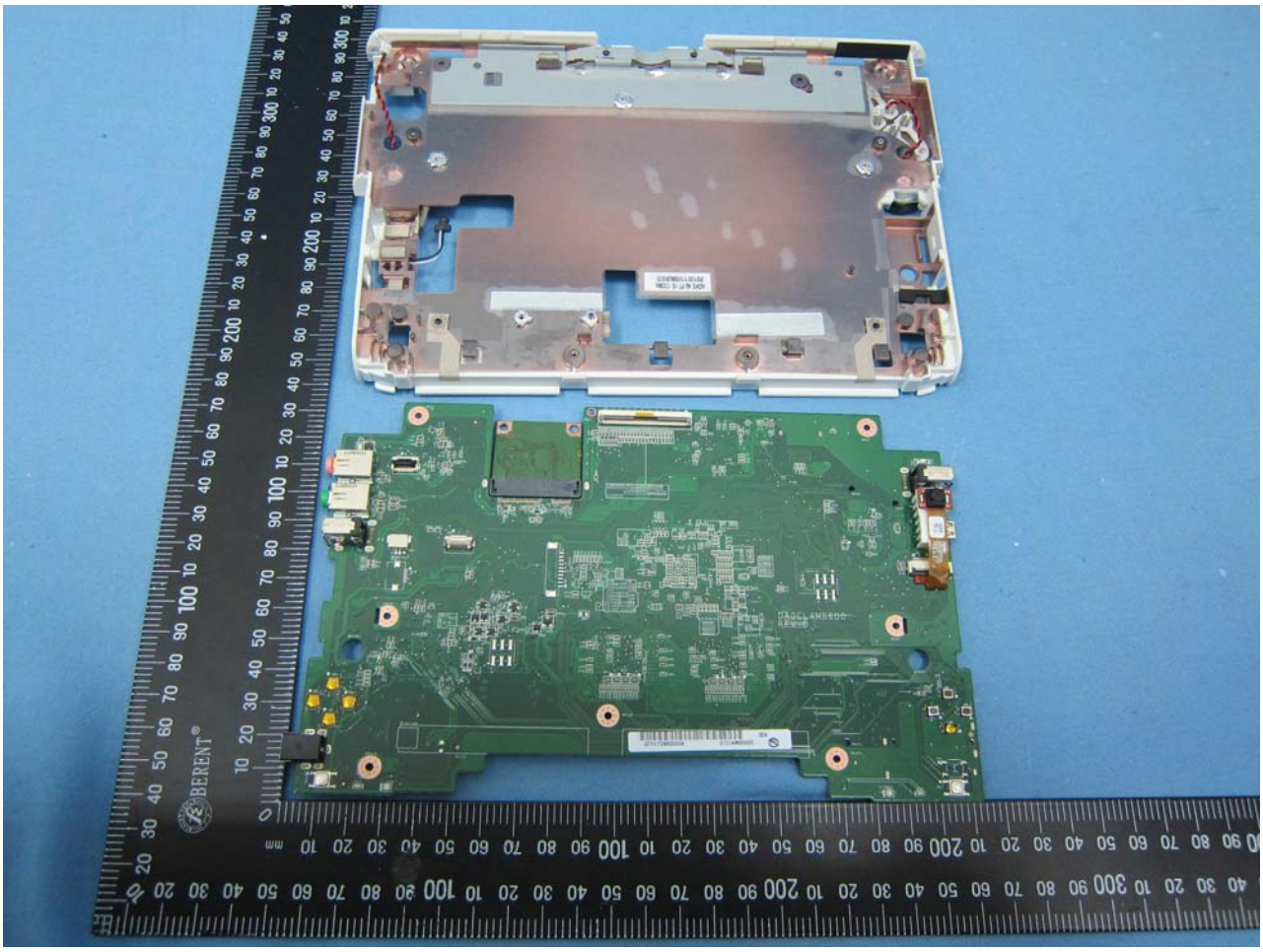


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

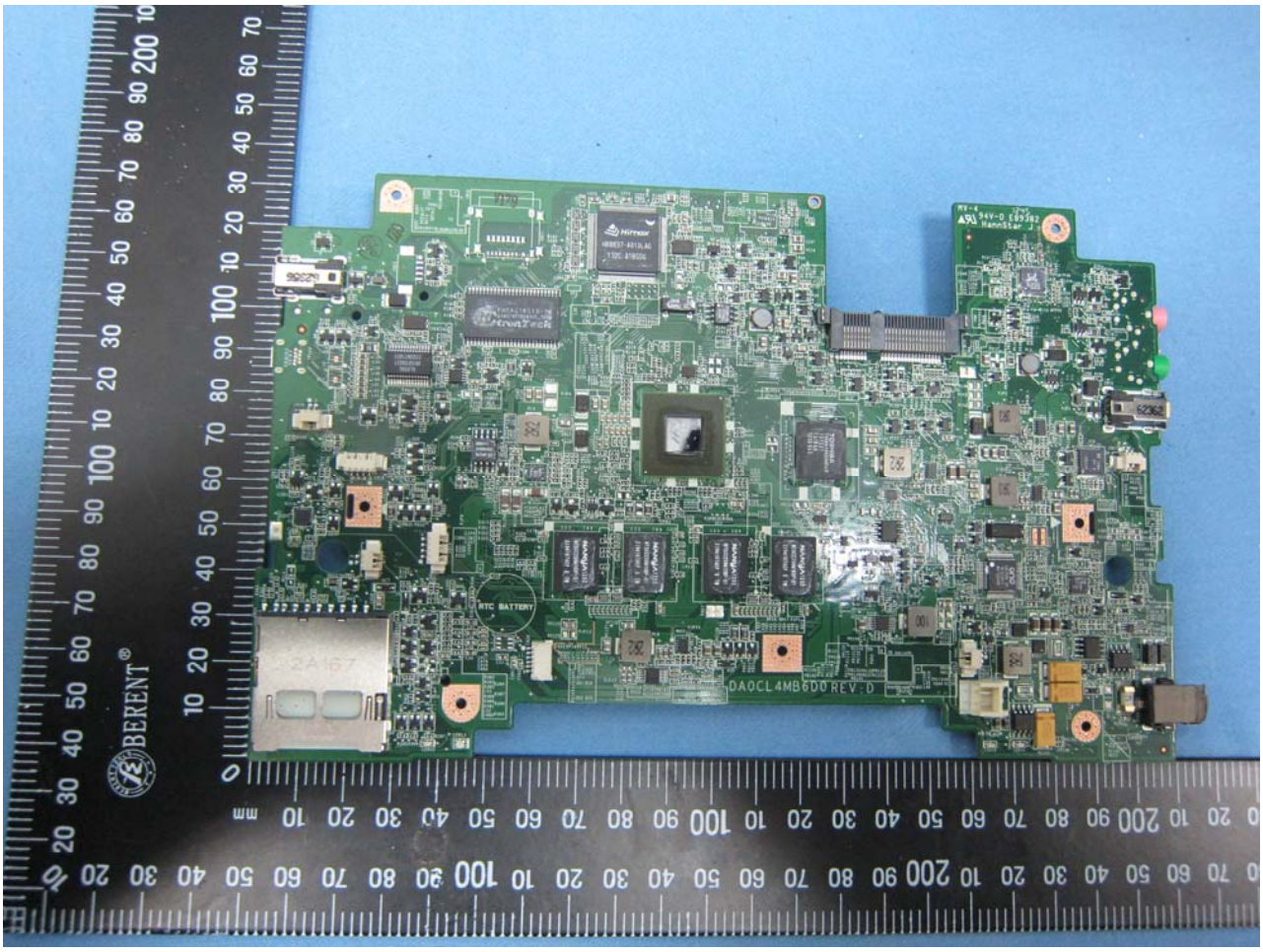
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



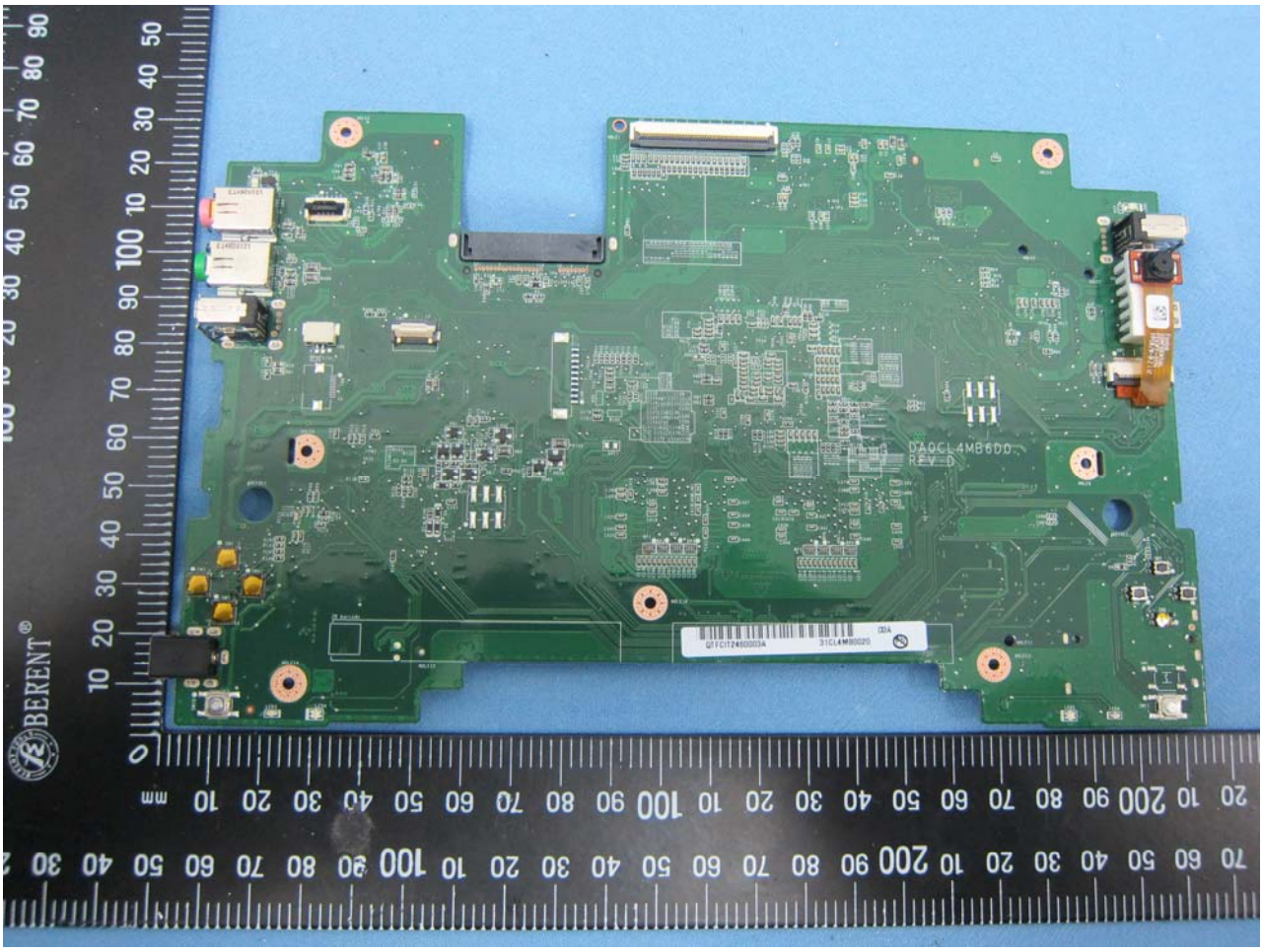
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



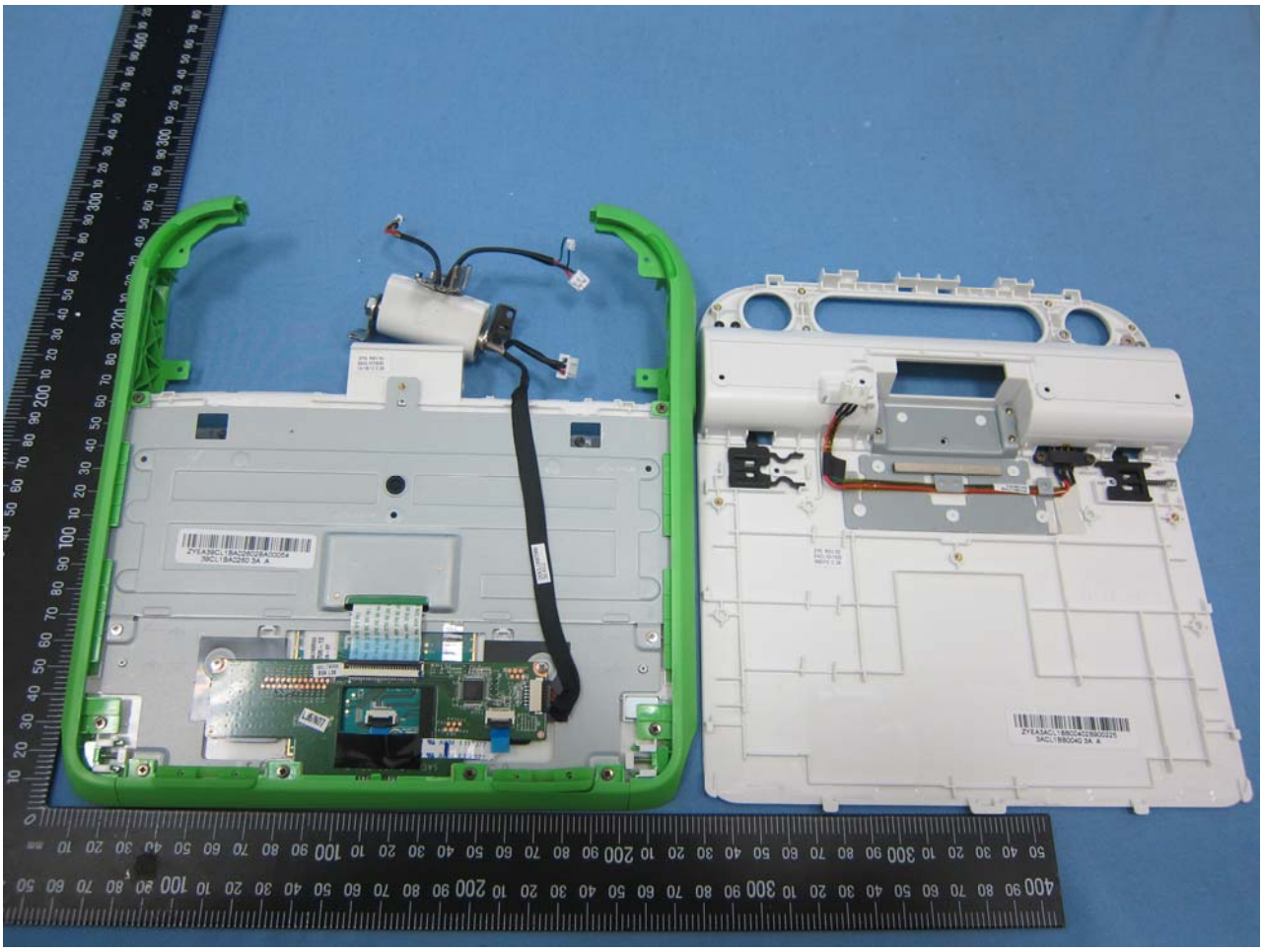
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



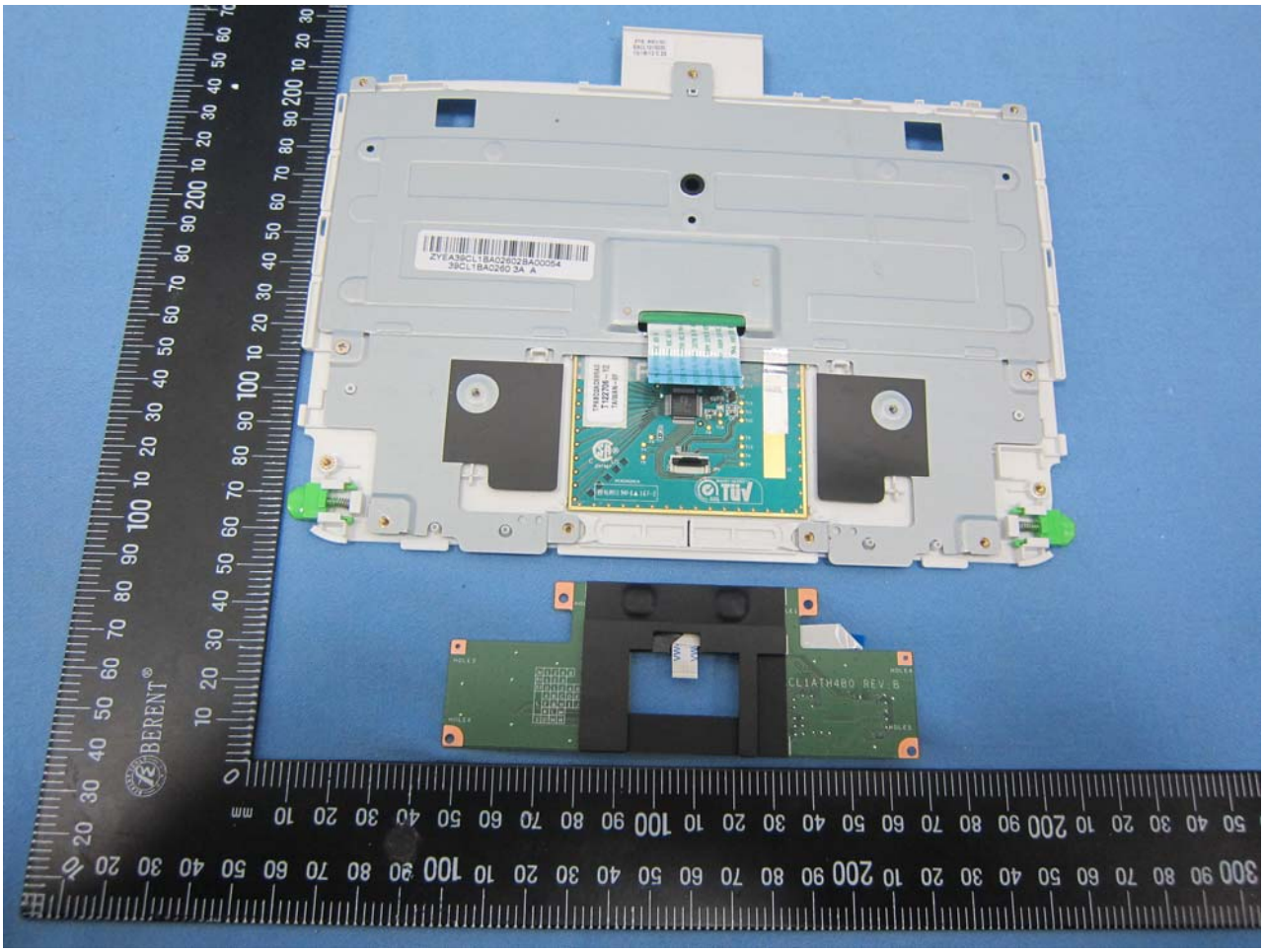
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



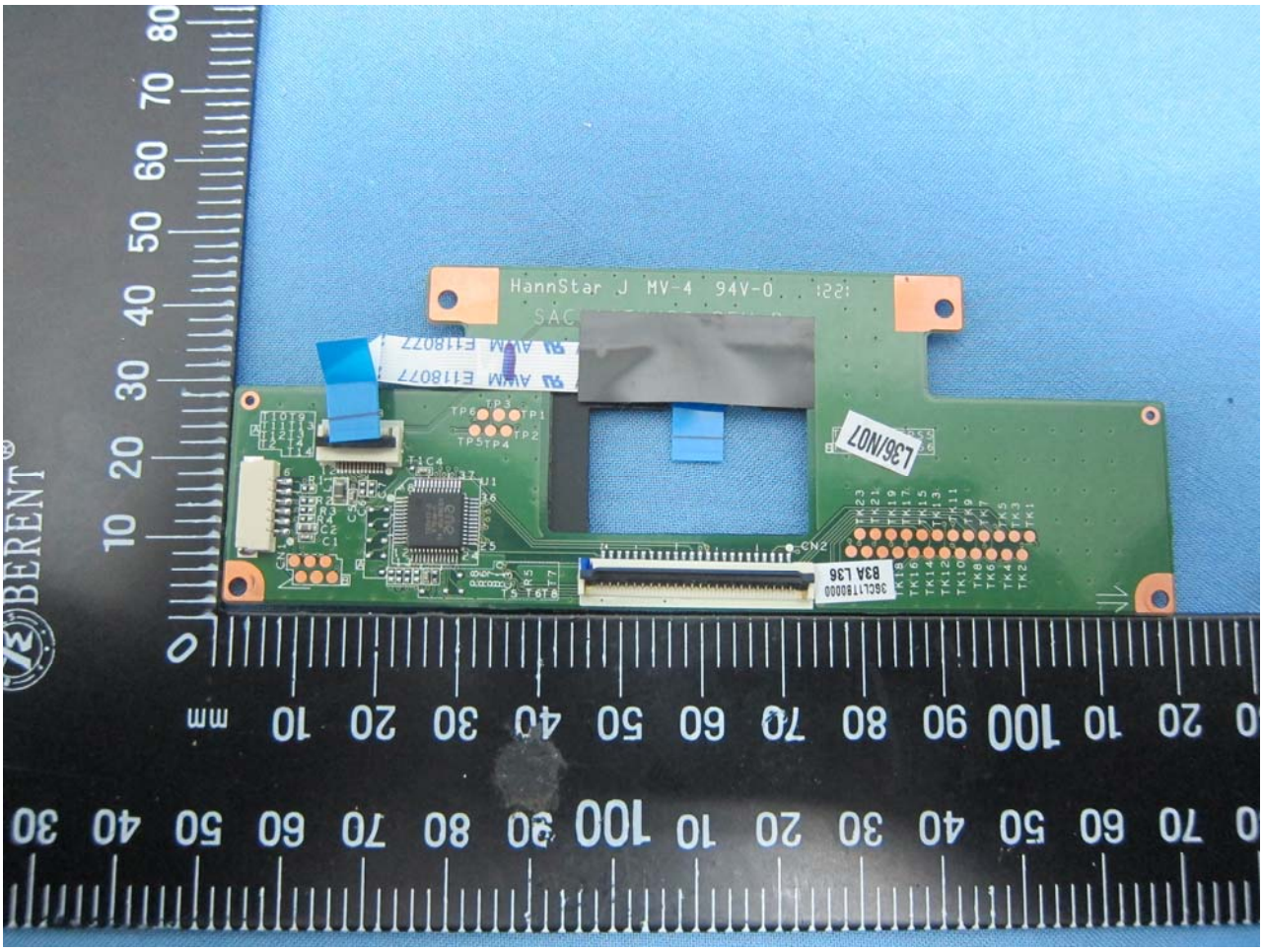
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

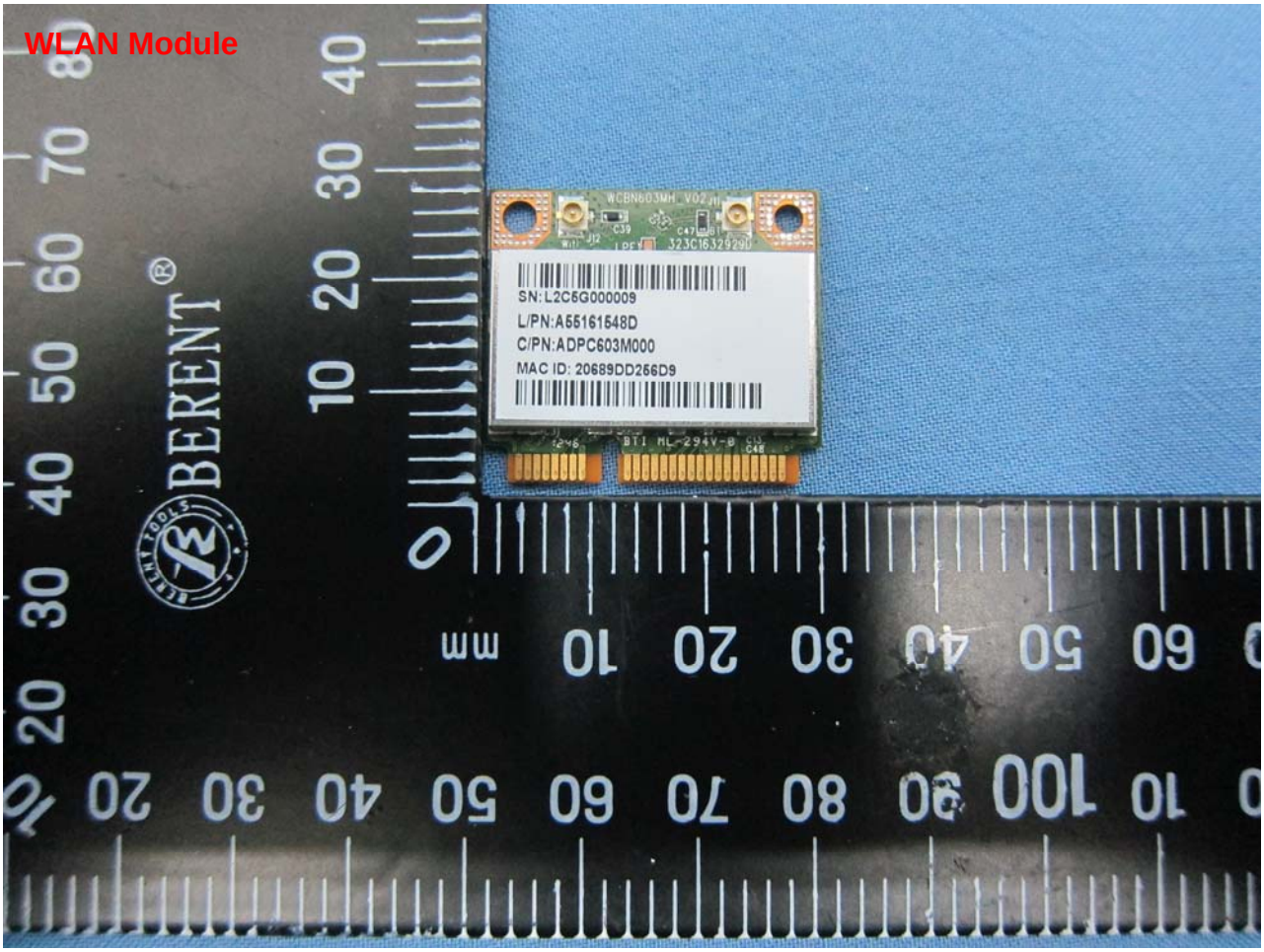
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



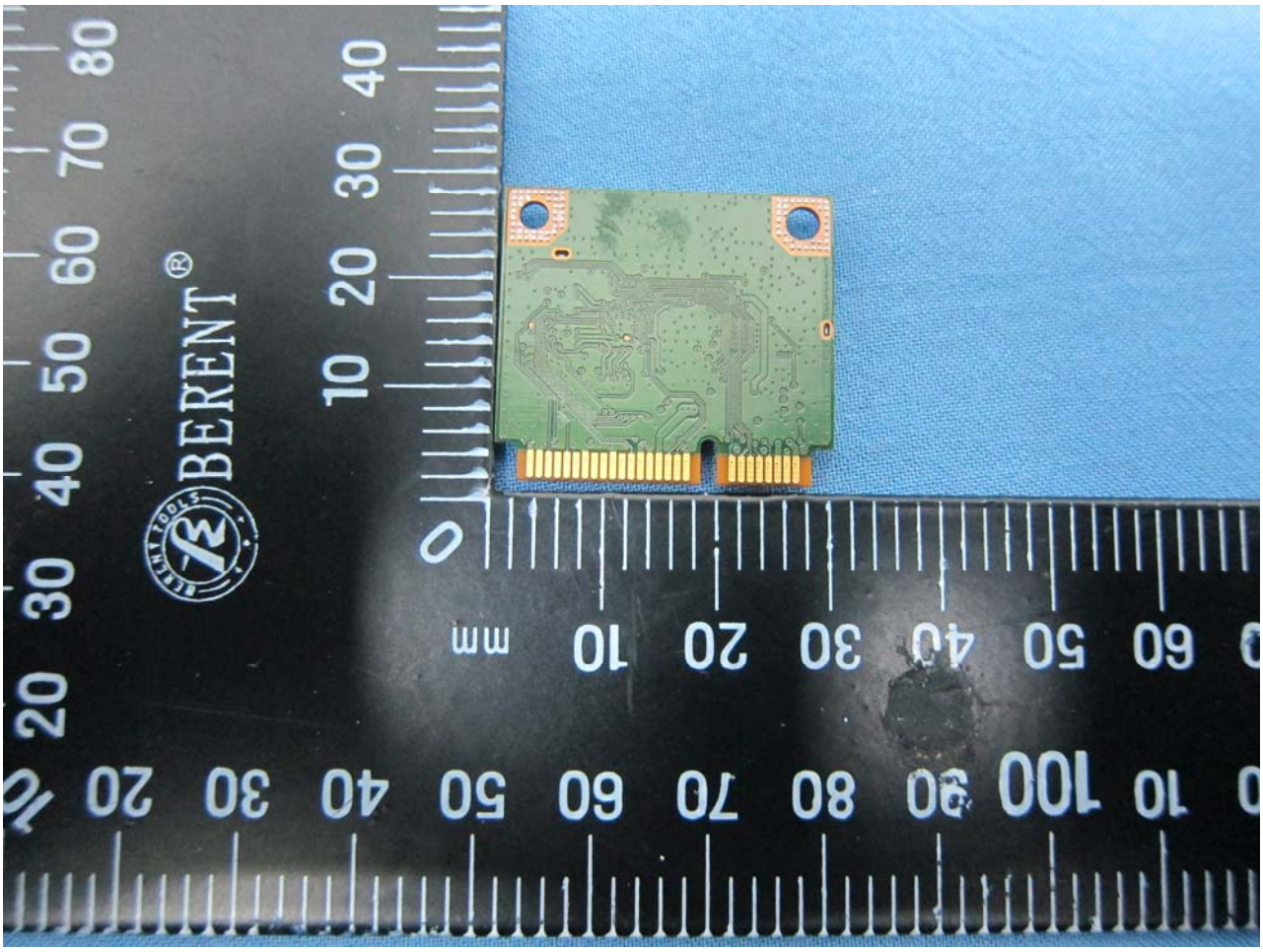
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



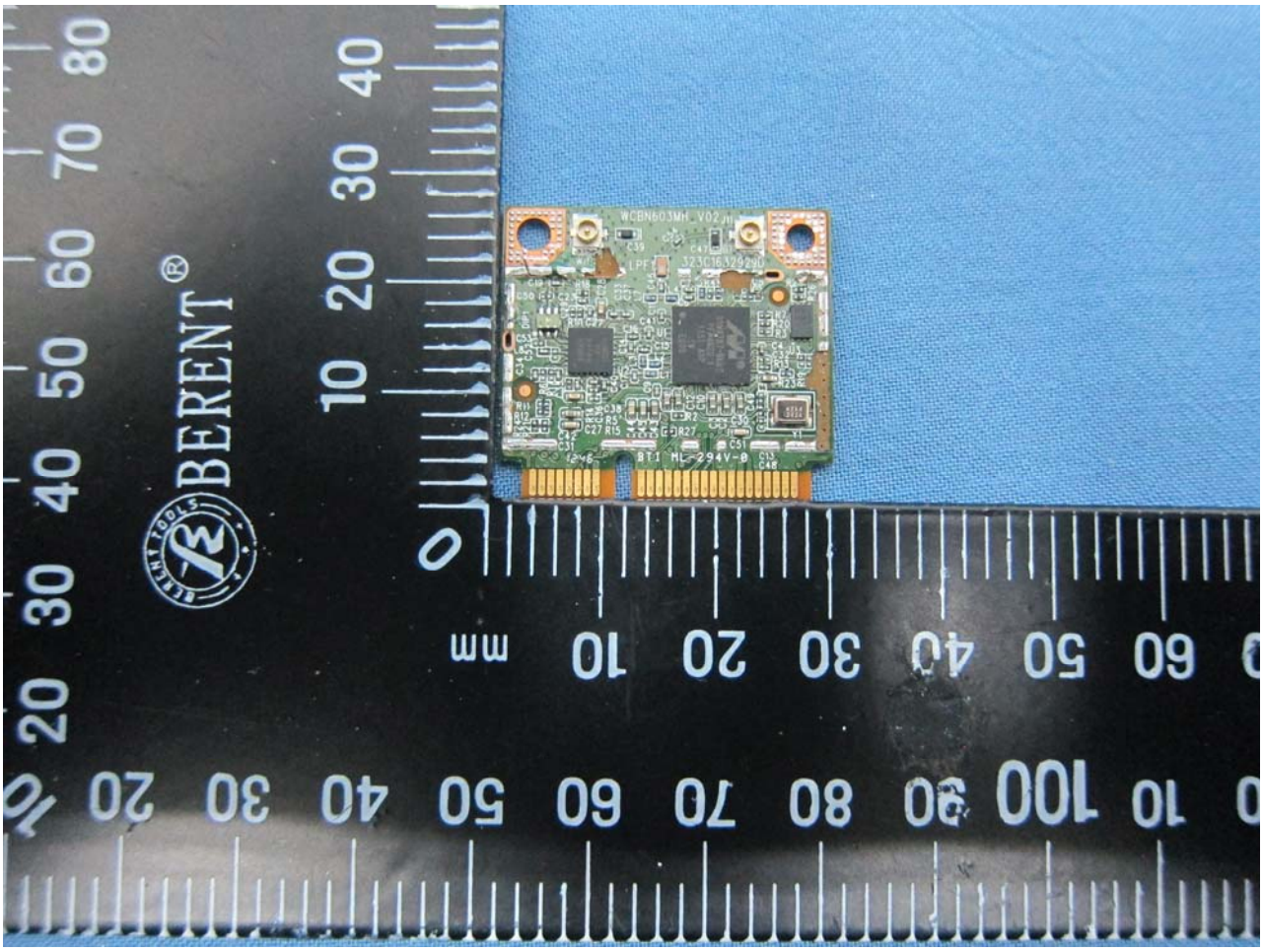
Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

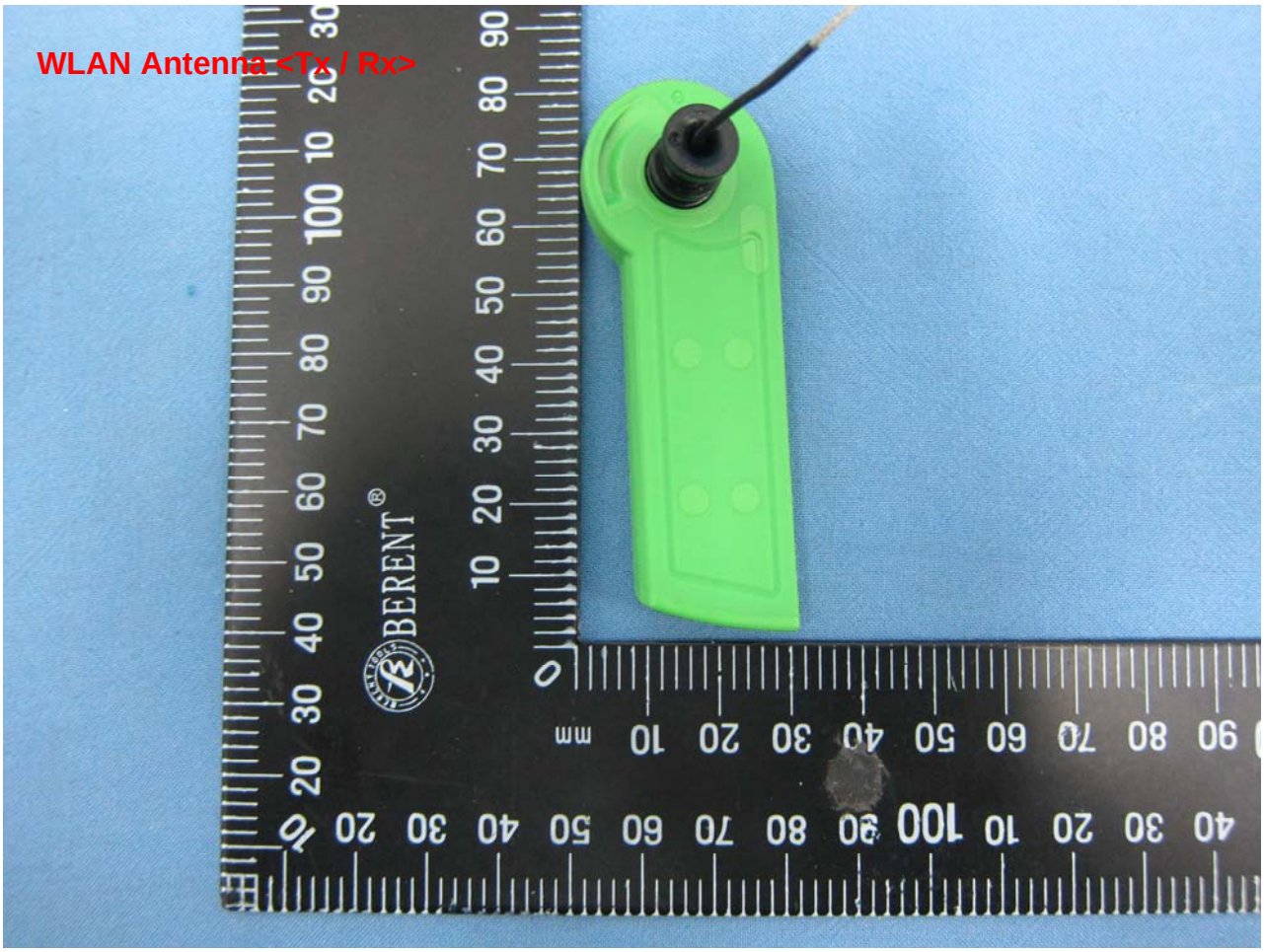


Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS

Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS



Brand Name: OLPC; Model Name: XO-4 Touch, XO-4 HS Touch, XO-4, XO-4 HS