ACMA Radio Test Report

APPLICANT	**:**	**Quanta Computer Inc**
EQUIPMENT	**:**	**Laptop Computer**
BRAND NAME	**:**	**OLPC**
MODEL NAME	**:**	**XO-1.75; XO-1.75HS**
STANDARD	**:**	**AS/NZS 4268:2012**
TEST DATE(S)	**:**	**Jan. 23, 2013 ~ Jan. 25, 2013**

The product was integrated the WLAN Module (Brand Name: Lite-On / Model Name: WN6301MH) during the test.

The measurements shown in this test report were made in accordance with the Standard AS/NZS 4268:2012.

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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
AR310902B	Rev. 01	Initial issue of report	Jan. 25, 2013

SUMMARY OF TEST RESULIT

CLAUSE	TEST PARAMETER	PASS/FAIL	REMARK
Transmitter Parameters			
8.1	Maximum EIRP	PASS	-
8.2	Transmitter Spurious Emissions	PASS	Under limit 4.40 dB at 4824.000 MHz
8.3	Emission Bandwidth	PASS	-
8.4	Transmitter Frequency Range	PASS	-
8.4	Radiated Power Spectral Density	PASS	-
8.4	Band Edges	PASS	-
Receiver Parameters			
9.1	Receiver Emissions	PASS	Under limit 1.18 dB at 241.410 MHz

1. General Description of Equipment under Test

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-1.75; XO-1.75HS
Tx / Rx Frequency Range	802.11b/g : 2400 MHz ~ 2483.5 MHz
Number of Channels	802.11b/g : 13
Channel Spacing	802.11b/g : 5 MHz
Maximum EIRP Average Power	802.11b : 19.32 dBm 802.11g : 17.36 dBm
Duty Cycle	802.11b : 100.00% 802.11g : 100.00%
Antenna Type	PIFA Antenna
Antenna Gain	3.15 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g : OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The difference between sample 1(XO-1.75HS) and sample 2 (XO-1.75) is only for keyboard. The others are the same including circuit design, PCB board, structure and all components. It is special to declare. After pre-scan two types of EUT, there is no any difference for RF performance, so we only choose sample 1 (XO-1.75HS) to all test.

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 that for different market)
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 Appendix A.

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 comply with the requirements of **AS/NZS 4268:2012.**

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.	DC Power Supply	GW	GPS-30300	N/A	N/A	Unshielded, 1.8 m

1.7 Test Condition

Normal Voltage	DC 6.5V
Extreme Voltage	DC 5.4V and DC 7.5V
Normal Temperature	25℃
Extreme Temperature	-10℃ and 50℃

Note: The manufacturer declared that the EUT could work properly between voltage 5.4V~7.5V.

2. Test Configuration of Equipment under Test

2.1 RF Power

a. During testing, the interface cables and equipment positions were varied according to AS/NZS 4268:2012.

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	**15.90**	15.85	15.70	15.69
CH 07	2442 MHz	15.65	15.01	15.55	15.20
CH 13	2472 MHz	15.86	15.43	15.82	15.14
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	13.40	13.27	13.28	13.31	13.19	13.30	9.37	13.34
CH 07	2442 MHz	13.48	13.45	13.47	13.45	13.42	13.39	13.27	13.11
CH 13	2472 MHz	**13.58**	13.54	13.55	13.51	13.55	13.52	13.44	13.37
Duty cycle (%)		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

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 were set in 1Mbps for 802.11b and 6Mbps for 802.11g due to the highest RF output power.

2.2 Test Mode

Frequency range of radiation was investigated from 25 MHz to 12750 MHz.

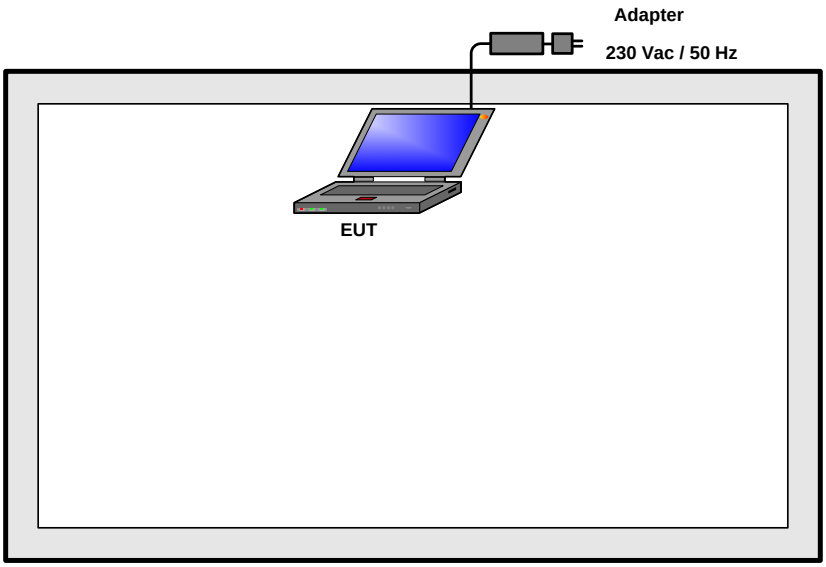
Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

Test Modes		
RF	**802.11b (2400 MHz ~ 2483.5 MHz) DSSS**	**802.11g (2400 MHz ~ 2483.5 MHz) OFDM**
Tx	**Mode 1: CH01 (2412MHz) in Laptop Mode** Mode 2: CH13 (2472MHz) in Laptop Mode **Mode 3: CH01 (2412MHz) in Tablet Mode**	**Mode 4: CH01 (2412MHz) in Laptop Mode** Mode 5: CH13 (2472MHz) in Laptop Mode **Mode 6: CH01 (2412MHz) in Tablet Mode**
Rx	**Mode 1: CH01 (2412MHz) in Laptop Mode** Mode 2: CH13 (2472MHz) in Laptop Mode Mode 3: CH01 (2412MHz) in Tablet Mode	Mode 4: CH01 (2412MHz) in Laptop Mode Mode 5: CH13 (2472MHz) in Laptop Mode Mode 6: CH13 (2472MHz) in Tablet Mode

Remark:

1. The worse cases of the Transmitter Radiated Spurious Emission (RSE) were 802.11b CH01 in Laptop Tx Mode, 802.11b CH01 in Tablet Tx Mode, 802.11g CH01 in Laptop Tx Mode and 802.11g CH01 in Tablet Tx Mode; 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 802.11b CH01 in Laptop Rx mode was reported.

2.3 Connection Diagram of Test System



2.4 Test Software

For WLAN function, open “cl2_sd8686_RF_21021o2.tgz” on the EUT, programmed RF utility, “CMD” installed in the PC provides functions like channel selection and power level for continuous transmitting and receiving signals.

3. Transmitter Parameters

3.1 Equivalent Isotropic Radiated Power (SUBCLAUSE 8.1)

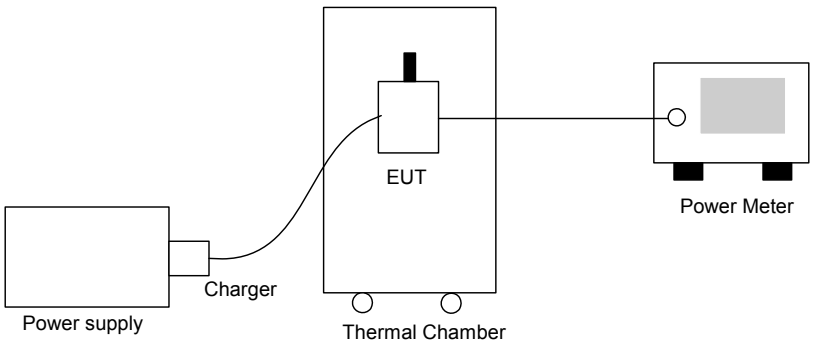
3.1.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.2 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 value.
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.

3.1.3 Test Setup Layout



3.1.4 Test Results

EUT Mode :	802.11b	**Temperature :**	21~22℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	43~46%
Antenna Gain :	3.15 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	19.05	18.80	19.01
T min (℃)	-10	V max(V)	7.5	19.21	18.78	19.03
		V min(V)	5.4	19.32	18.87	19.07
T max (℃)	50	V max(V)	7.5	18.81	18.70	18.78
		V min(V)	5.4	18.84	18.75	18.83
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 = 3.15 dBi at Ch01, 2412MHz, EIRP = 15.90 dBm (measured average power) + 3.15 dBi (antenna gain) = 19.05 dBm

LIMITS: SUBCLAUSE 8.1.1.1

Under all Test Conditions	36dBm

Limit kept Yes V No

EUT Mode :	802.11g	**Temperature :**	21~22℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	43~46%
Antenna Gain :	3.15 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	16.55	16.63	16.73
T min (℃)	-10	V max(V)	7.5	17.33	17.21	17.13
		V min(V)	5.4	17.36	17.25	17.17
T max (℃)	50	V max(V)	7.5	16.06	16.32	16.39
		V min(V)	5.4	16.08	16.35	16.44
Measurement uncertainty				1.5dB		

LIMITS: SUBCLAUSE 8.1.1.1

Under all Test Conditions	36dBm

Limit kept Yes [V] No [ ]

3.2 Transmitter Spurious Emissions (SUBCLAUSE 8.2)

3.2.1 Measuring Instruments

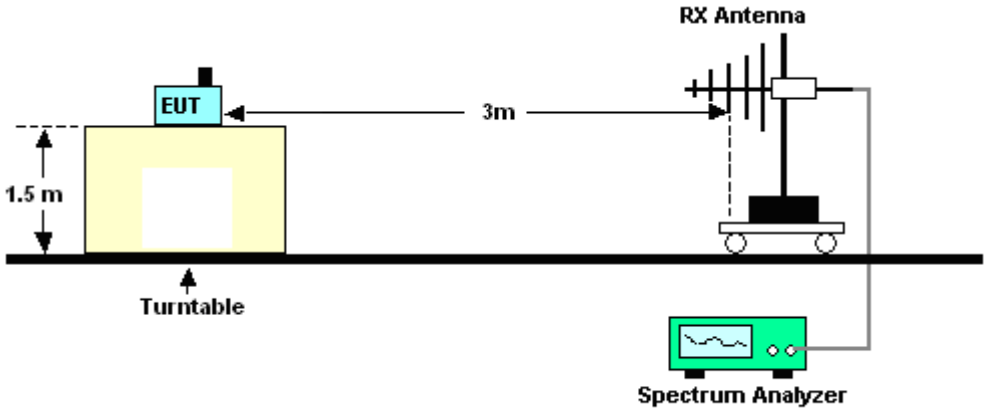
See list of measuring instruments of this test report.

3.2.2 Test Procedures

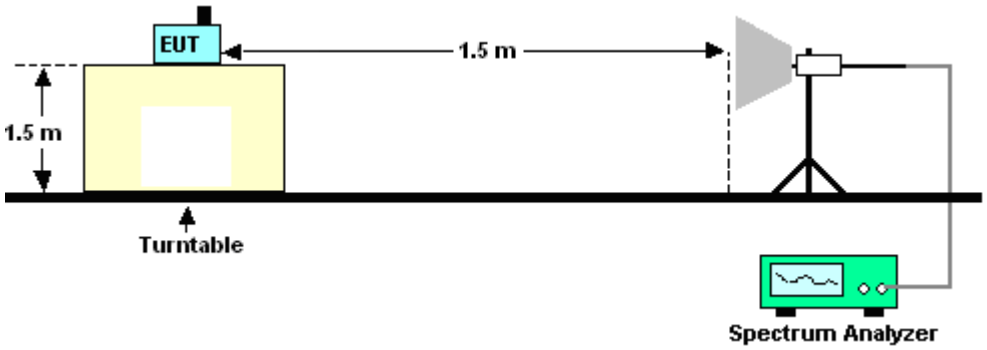
1. The EUT was placed on a rotatable table with 1.5m height.
2. The receiving antenna with horizontal and vertical polarization is 3m away from EUT and keeps the antenna height at 1.5m.
3. Setting EUT in continuous Tx.
4. The table was rotated to search the highest radiation.
5. Repeating step 3 and 4 for different channel.

3.2.3 Test Setup

<Below 1GHz>

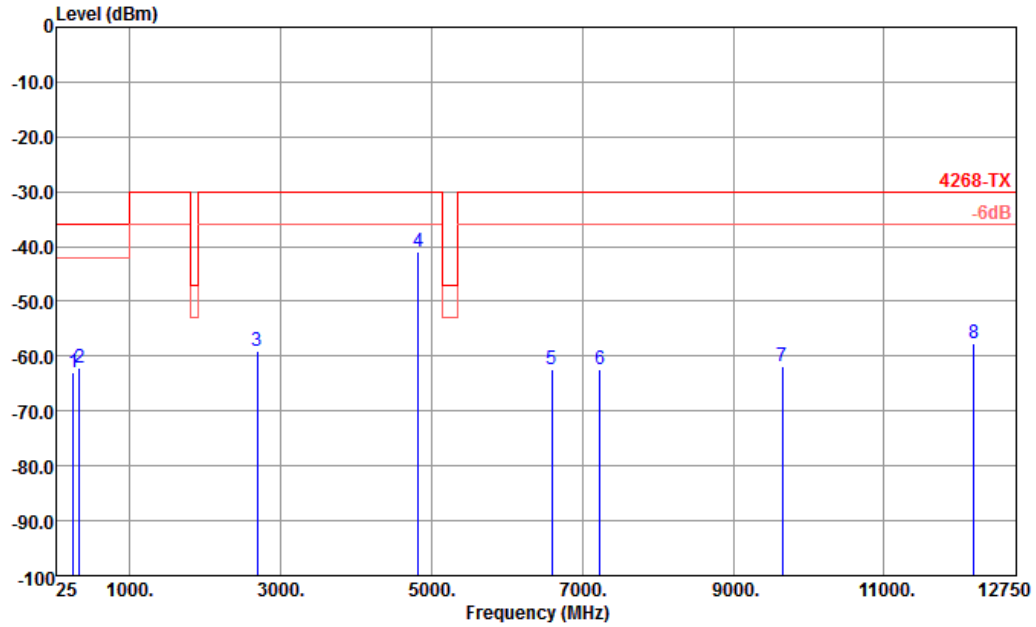


<Above 1GHz>



3.2.4 Test Result

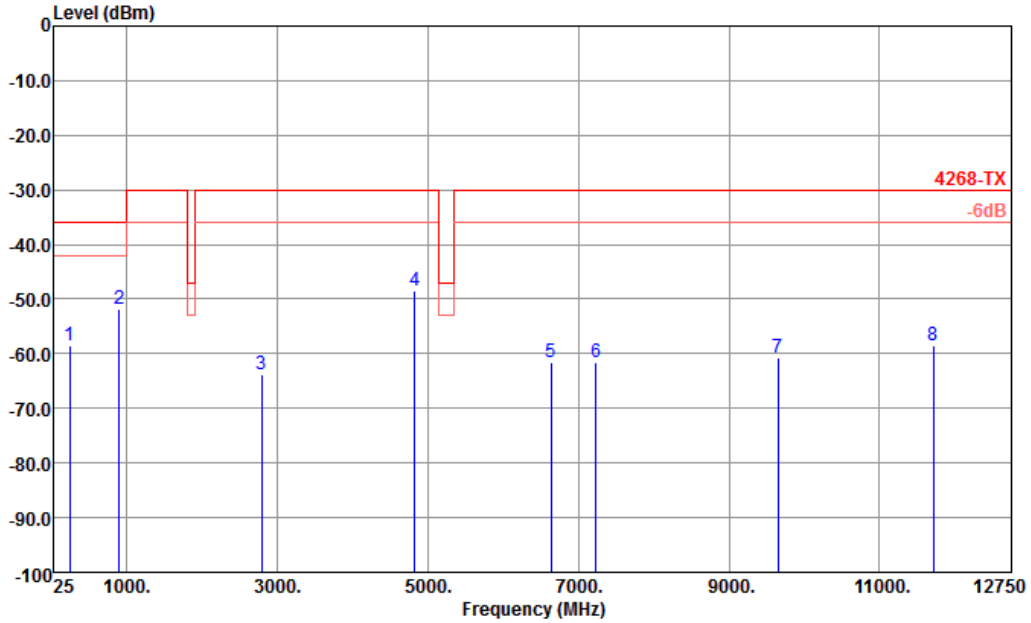
Test Mode :	Mode 1: CH01 (2412MHz) in Laptop Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	248.97	-63.03	-27.03	-36.00	-61.41	-1.62
2	335.00	-62.14	-26.14	-36.00	-61.82	-0.32
3	2694.00	-59.15	-29.15	-30.00	-67.64	8.49
4 p	4824.00	-40.93	-10.93	-30.00	-52.65	11.72
5	6598.00	-62.51	-32.51	-30.00	-76.25	13.74
6	7237.00	-62.33	-32.33	-30.00	-75.80	13.47
7	9649.00	-61.82	-31.82	-30.00	-76.89	15.07
8	12186.25	-57.58	-27.58	-30.00	-77.08	19.50

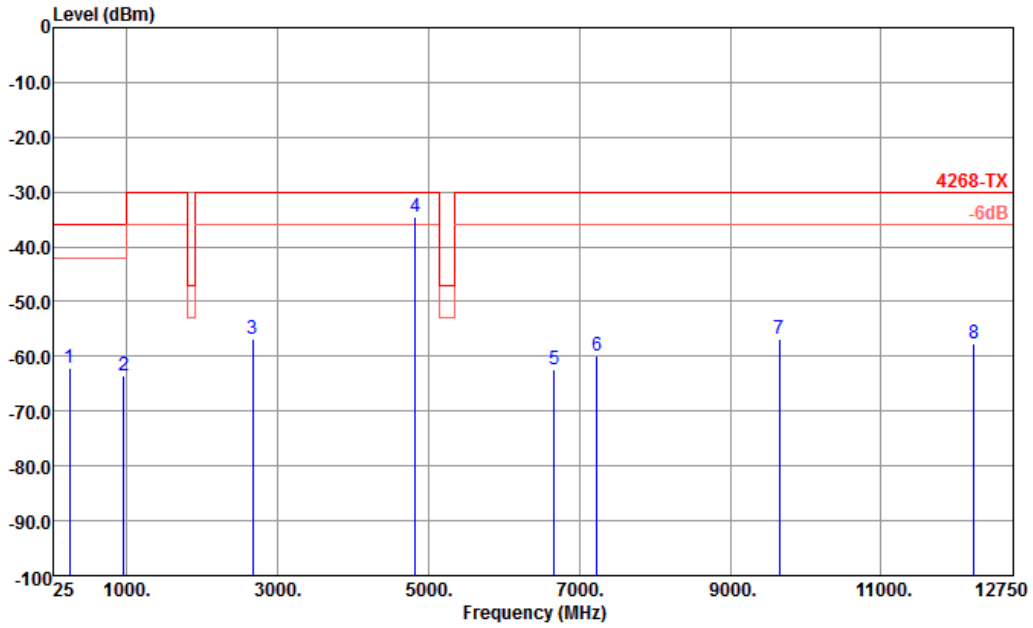
Test Mode :	Mode 1: CH01 (2412MHz) in Laptop Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Vertical



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 VERTICAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	240.33	-58.38	-22.38	-36.00	-56.52	-1.86
2 p	898.50	-51.85	-15.85	-36.00	-58.41	6.56
3	2792.00	-63.85	-33.85	-30.00	-72.17	8.32
4	4824.00	-48.38	-18.38	-30.00	-60.20	11.82
5	6634.00	-61.59	-31.59	-30.00	-75.33	13.74
6	7234.00	-61.67	-31.67	-30.00	-75.00	13.33
7	9649.00	-60.63	-30.63	-30.00	-75.68	15.05
8	11710.50	-58.61	-28.61	-30.00	-77.40	18.79

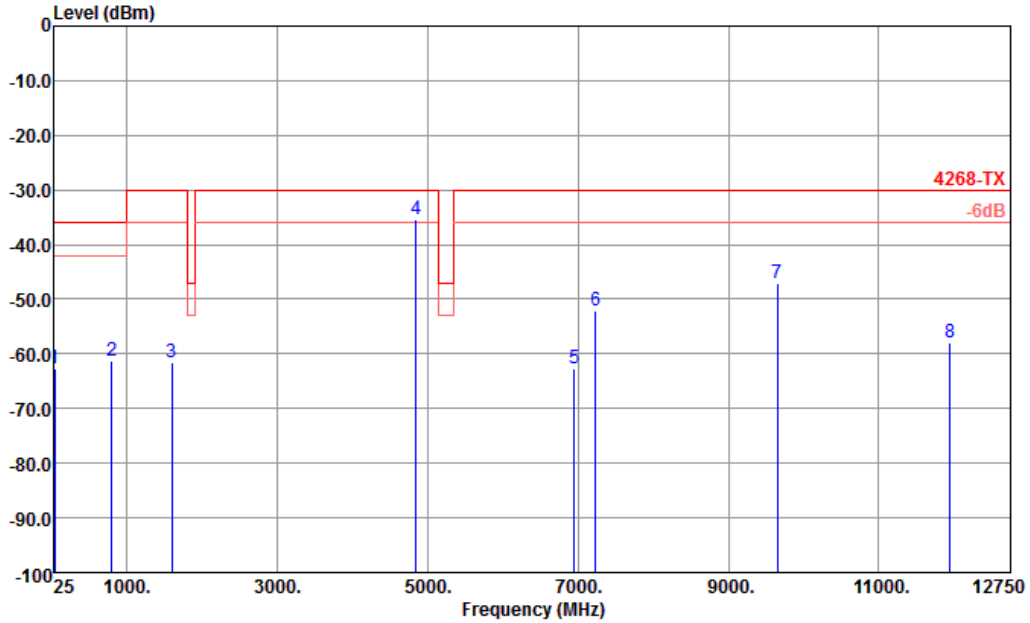
Test Mode :	Mode 3: CH01 (2412MHz) in Tablet Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	246.54	-62.06	-26.06	-36.00	-60.36	-1.70
2	962.20	-63.54	-27.54	-36.00	-71.42	7.88
3	2668.00	-56.93	-26.93	-30.00	-65.35	8.42
4 p	4824.00	-34.40	-4.40	-30.00	-46.12	11.72
5	6664.00	-62.37	-32.37	-30.00	-76.08	13.71
6	7234.00	-59.83	-29.83	-30.00	-73.31	13.48
7	9649.00	-56.80	-26.80	-30.00	-71.87	15.07
8	12227.50	-57.74	-27.74	-30.00	-77.35	19.61

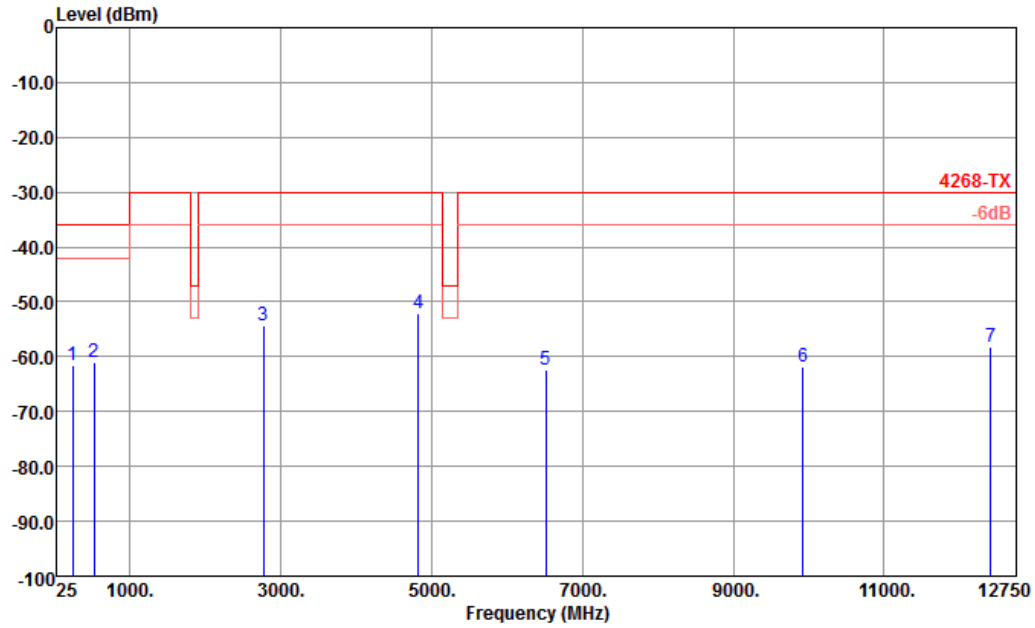
Test Mode :	Mode 3: CH01 (2412MHz) in Tablet Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Vertical



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 VERTICAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.13	-62.59	-26.59	-36.00	-66.42	3.83
2	797.70	-61.20	-25.20	-36.00	-66.60	5.40
3	1594.00	-61.69	-31.69	-30.00	-65.55	3.86
4 p	4844.00	-35.35	-5.35	-30.00	-47.18	11.83
5	6950.00	-62.55	-32.55	-30.00	-75.95	13.40
6	7237.00	-52.22	-22.22	-30.00	-65.54	13.32
7	9649.00	-47.10	-17.10	-30.00	-62.15	15.05
8	11949.75	-57.82	-27.82	-30.00	-76.87	19.05

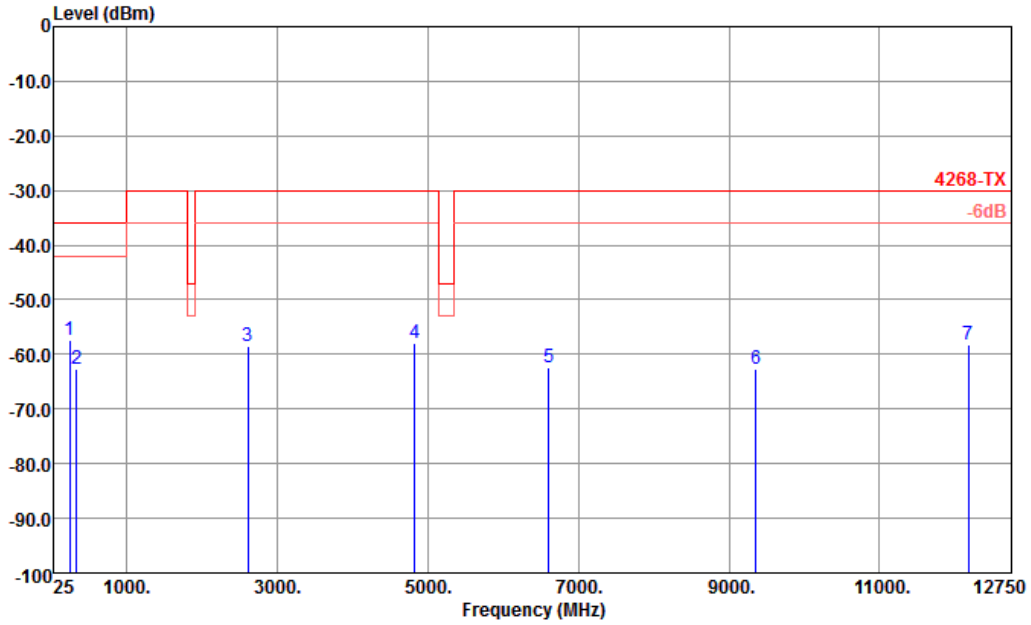
Test Mode :	Mode 4: CH01 (2412MHz) in Laptop Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	243.84	-61.58	-25.58	-36.00	-59.83	-1.75
2	526.10	-61.01	-25.01	-36.00	-64.45	3.44
3	2772.00	-54.37	-24.37	-30.00	-62.91	8.54
4 p	4824.00	-52.15	-22.15	-30.00	-63.87	11.72
5	6514.00	-62.53	-32.53	-30.00	-76.30	13.77
6	9925.00	-61.96	-31.96	-30.00	-77.25	15.29
7	12406.25	-58.10	-28.10	-30.00	-78.18	20.08

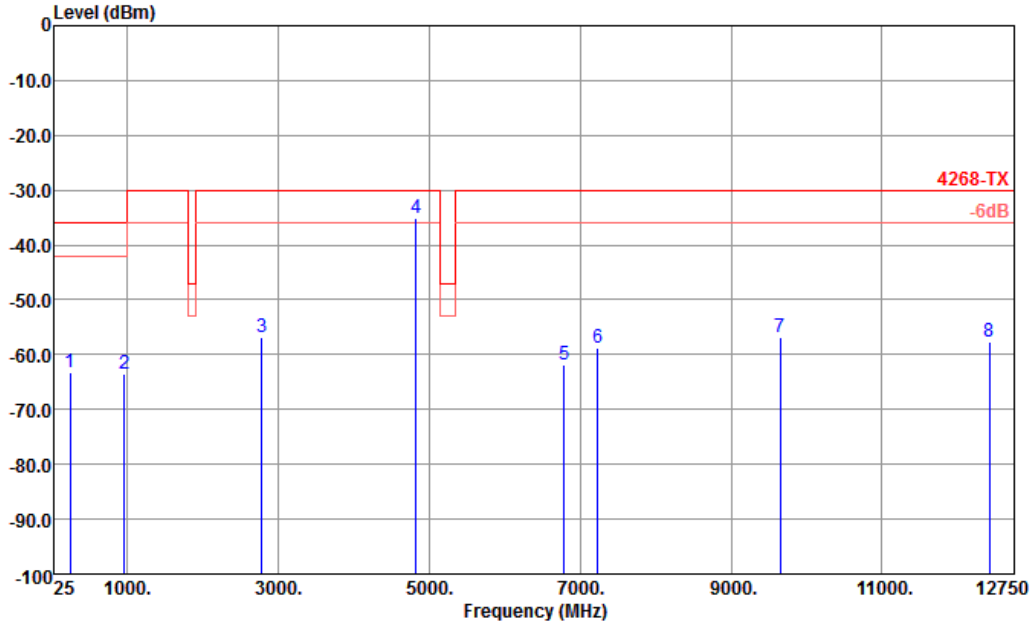
Test Mode :	Mode 4: CH01 (2412MHz) in Laptop Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Vertical



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 VERTICAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 p	241.68	-57.46	-21.46	-36.00	-55.65	-1.81
2	337.80	-62.62	-26.62	-36.00	-62.40	-0.22
3	2610.00	-58.53	-28.53	-30.00	-66.72	8.19
4	4822.00	-58.03	-28.03	-30.00	-69.85	11.82
5	6610.00	-62.30	-32.30	-30.00	-76.07	13.77
6	9361.00	-62.59	-32.59	-30.00	-77.50	14.91
7	12180.75	-58.08	-28.08	-30.00	-77.54	19.46

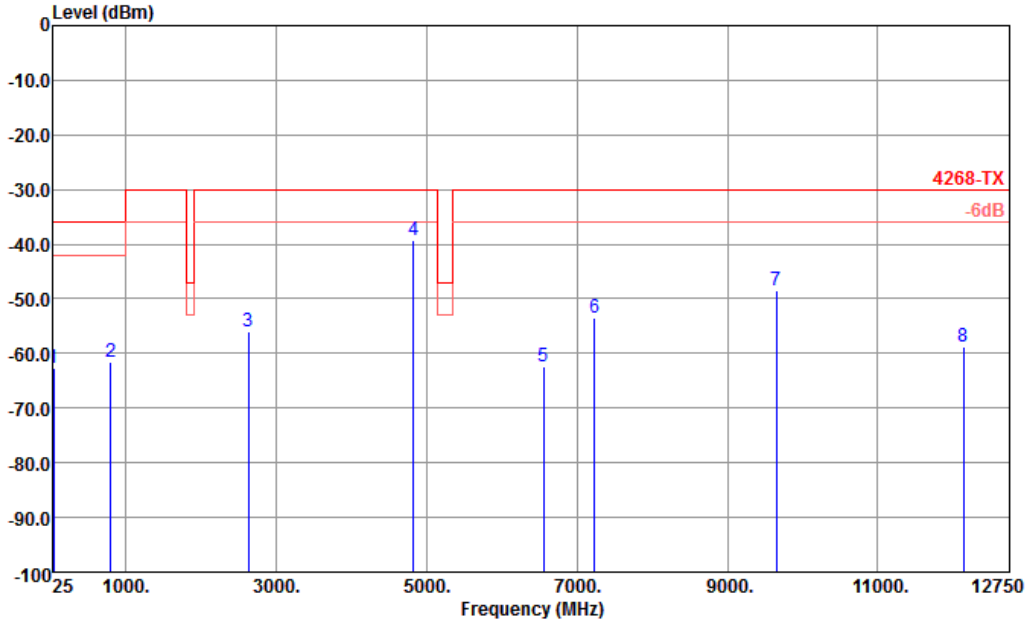
Test Mode :	Mode 6: CH01 (2412MHz) in Tablet Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	242.76	-63.14	-27.14	-36.00	-61.33	-1.81
2	962.20	-63.57	-27.57	-36.00	-71.45	7.88
3	2786.00	-56.94	-26.94	-30.00	-65.49	8.55
4 p	4824.00	-35.13	-5.13	-30.00	-46.85	11.72
5	6784.00	-61.89	-31.89	-30.00	-75.53	13.64
6	7234.00	-58.67	-28.67	-30.00	-72.15	13.48
7	9649.00	-56.82	-26.82	-30.00	-71.89	15.07
8	12422.75	-57.62	-27.62	-30.00	-77.71	20.09

Test Mode :	Mode 6: CH01 (2412MHz) in Tablet Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Vertical



Site : 05CH01-KS
Condition : 4268-TX LF EIRP_090504 VERTICAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1	35.13	-62.71	-26.71	-36.00	-66.54	3.83
2	797.70	-61.52	-25.52	-36.00	-66.92	5.40
3	2626.00	-55.92	-25.92	-30.00	-64.11	8.19
4 p	4824.00	-39.32	-9.32	-30.00	-51.14	11.82
5	6550.00	-62.45	-32.45	-30.00	-76.26	13.81
6	7234.00	-53.35	-23.35	-30.00	-66.68	13.33
7	9649.00	-48.60	-18.60	-30.00	-63.65	15.05
8	12136.75	-58.74	-28.74	-30.00	-78.08	19.34

LIMITS: Clause 8.2

Narrowband spurious emission:

Frequency Range	Limit when operating
47MHz to 74MHz 87.5MHz to 118MHz 174MHz to 230MHz 470MHz to 862MHz	-54dBm
Below 1GHz	-36dBm
Above 1GHz	-30dBm

Limit kept Yes [V] No [ ]

3.3 Emission Bandwidth (SUBCLAUSE 8.3)

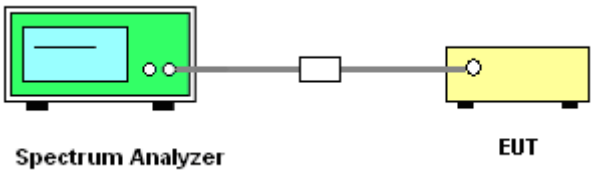
3.3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.3.2 Test Procedure

- **For WLAN (6dB Bandwidth Measurement)**
  1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
  2. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW).Set the Video bandwidth (VBW) ≥ 3 * RBW. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz.
  3. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

3.3.3 Test Setup Layout

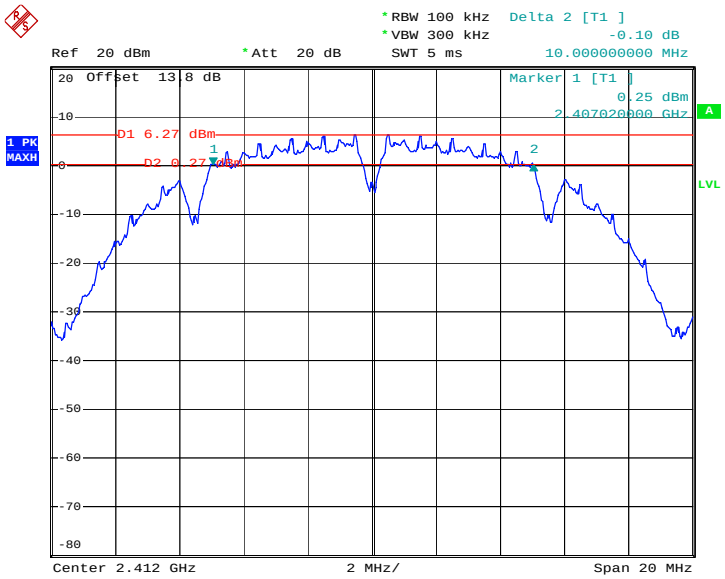


3.3.4 Test Result of Emission Bandwidth

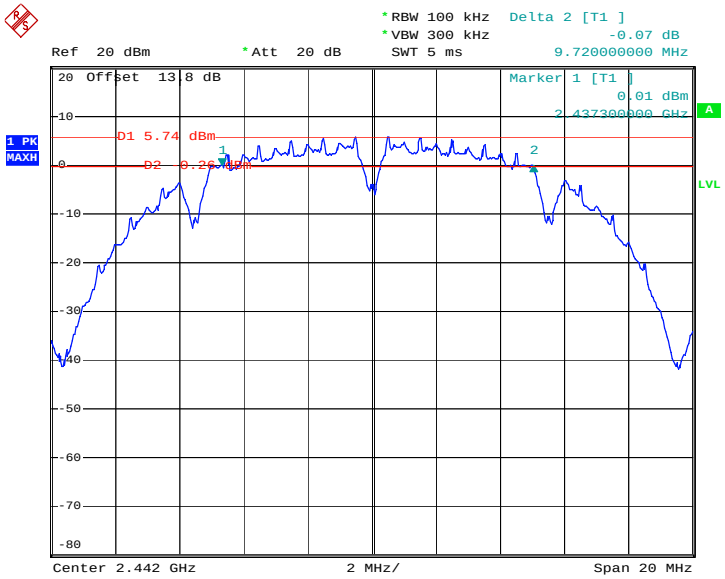
EUT Mode :	802.11b	Temperature :	21~22℃
Test Engineer :	Zhi Lu	Relative Humidity :	43~46%
Antenna Gain :	3.15 dBi	Duty Cycle :	100.00%

Channel	Measured Frequency (MHz)	6 dB Bandwidth (MHz)	Limit
CH 01	2412 MHz	10.00	> 0.5MHz
CH 07	2442 MHz	9.72	> 0.5MHz
CH 13	2472 MHz	9.72	> 0.5MHz

6 dB Bandwidth Plot on 802.11b Channel 01

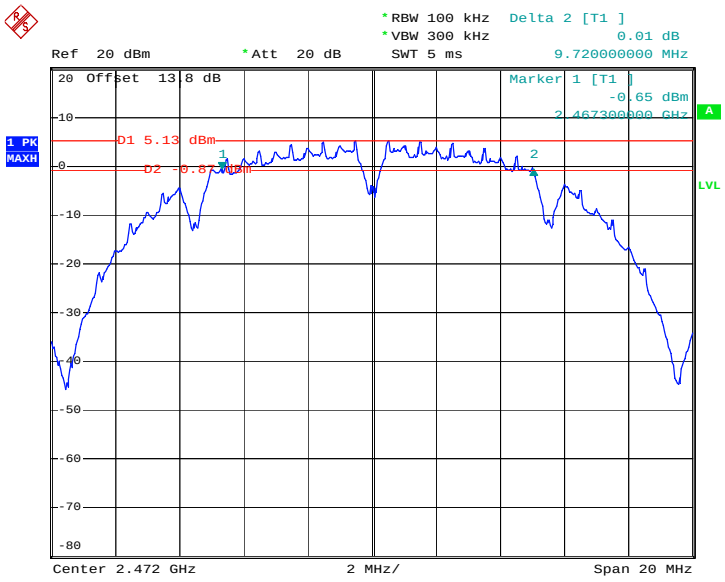


6 dB Bandwidth Plot on 802.11b Channel 07



Date: 23.JAN.2013 23:13:53

6 dB Bandwidth Plot on 802.11b Channel 13

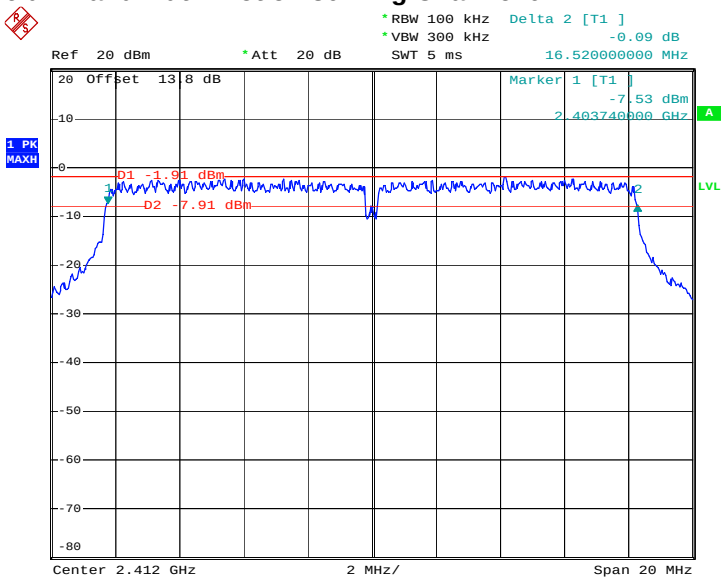


Date: 23.JAN.2013 23:18:05

EUT Mode :	802.11g	Temperature :	21~22℃
Test Engineer :	Zhi Lu	Relative Humidity :	43~46%
Antenna Gain :	3.15 dBi	Duty Cycle :	100.00%

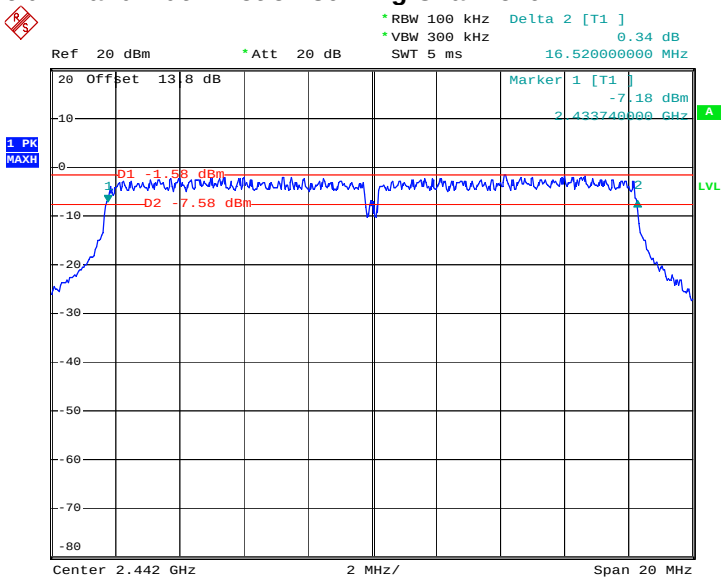
Channel	Measured Frequency (MHz)	6 dB Bandwidth (MHz)	Limit
CH 01	2412 MHz	16.52	> 0.5MHz
CH 07	2442 MHz	16.52	> 0.5MHz
CH 13	2472 MHz	16.52	> 0.5MHz

6 dB Bandwidth Plot on 802.11g Channel 01



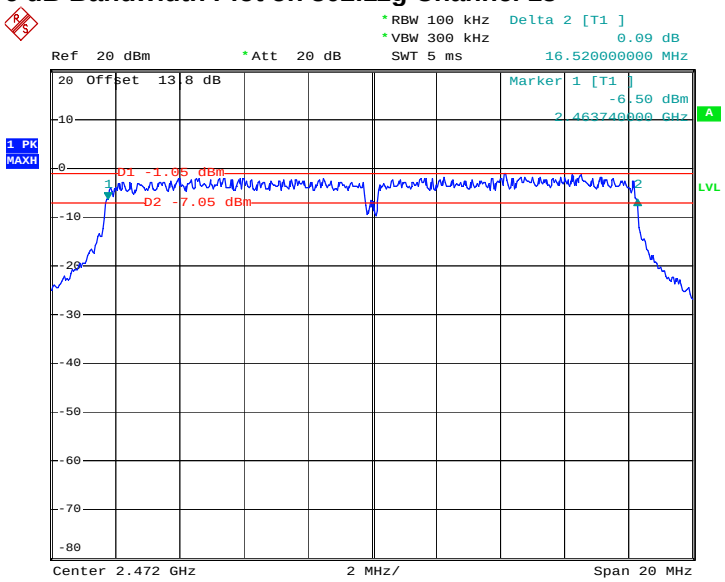
Date: 23.JAN.2013 23:22:59

6 dB Bandwidth Plot on 802.11g Channel 07



Date: 23.JAN.2013 23:26:53

6 dB Bandwidth Plot on 802.11g Channel 13



Date: 23.JAN.2013 23:30:22

3.4 Transmitter Frequency Range (SUBCLAUSE 8.4)

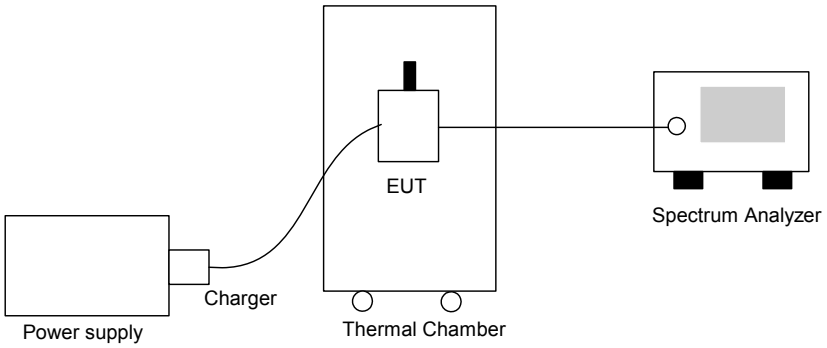
3.4.1 Measuring Instruments

See list of measuring instruments of this test report.

3.4.2 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 8.4.
7. Repeating step 5 and 6 at different conditions and different channel.

3.4.3 Test Setup Layout:



3.4.4 Test Result of Transmitter Frequency Range

EUT Mode :	802.11b	**Temperature :**	21~22℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	43~46%
Antenna Gain :	3.15 dBi	**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	2403.06	2480.82
T min (℃)	-10	V max (V)	7.5	2403.18	2480.76
		V min (V)	5.4	2403.24	2480.76
T max (℃)	50	V max (V)	7.5	2403.30	2480.64
		V min (V)	5.4	2403.24	2480.64
Measured frequencies (lowest and highest)				f_L = 2403.06	f_H = 2480.82
Measurement uncertainty				1×10^{-5}	

LIMITS : SUBCLAUSE 8.4.1.1

Under all Test Conditions	f_L > 2400.0 MHz f_H < 2483.5 MHz

Limit kept Yes V No

EUT Mode :	802.11g	**Temperature :**	21~22℃
Test Engineer :	Zhi Lu	**Relative Humidity :**	43~46%
Antenna Gain :	3.15 dBi	**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	2401.50	2482.32
T min (℃)	-10	V max (V)	7.5	2402.28	2481.72
		V min (V)	5.4	2402.28	2481.72
T max (℃)	50	V max (V)	7.5	2402.52	2481.66
		V min (V)	5.4	2402.52	2481.60
Measured frequencies (lowest and highest)				f_L = 2401.50	f_H = 2482.32
Measurement uncertainty				1×10^{-5}	

LIMITS : SUBCLAUSE 8.4.1.1

Under all Test Conditions	f_L > 2400.0 MHz f_H < 2483.5 MHz

Limit kept Yes V No

3.5 Radiated Power Spectral Density (SUBCLAUSE 8.4)

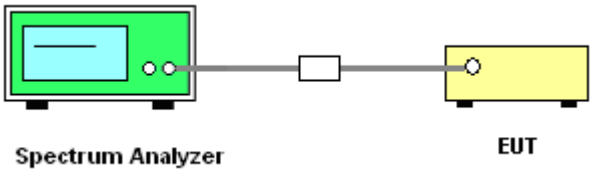
3.5.1 Measuring Instruments

See list of measuring instruments of this test report.

3.5.2 Test Procedure

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
4. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
5. Measure and record the results in the test report.

3.5.3 Test Setup Layout



3.5.4 Test Result of Radiated Power Spectral Density

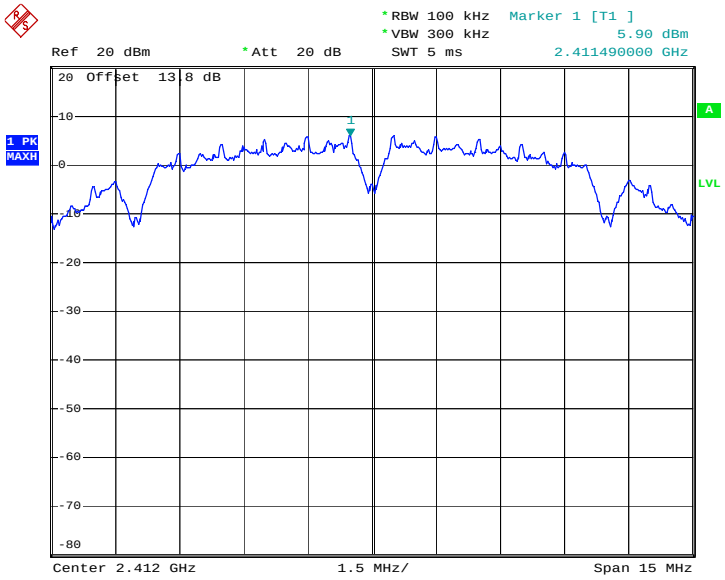
EUT Mode :	802.11b	Temperature :	21~22℃
Test Engineer :	Zhi Lu	Relative Humidity :	43~46%
Antenna Gain :	3.15 dBi	Duty Cycle :	100.00%
Cable loss	13.80dB	Duty Factor :	0.00dB

Channel	Measured Frequency (MHz)	Measured PSD/100kHz (dBm)	Measured PSD/3kHz (dBm)	Radiated Peak Power Spectral Density (e.i.r.p) (dBm)	Limit (e.i.r.p)
CH 01	2412 MHz	5.90	-12.15	-9.00	< 14dBm per 3kHz
CH 07	2442 MHz	5.35	-12.78	-9.63	< 14dBm per 3kHz
CH 13	2472 MHz	4.77	-13.33	-10.18	< 14dBm per 3kHz

Note:

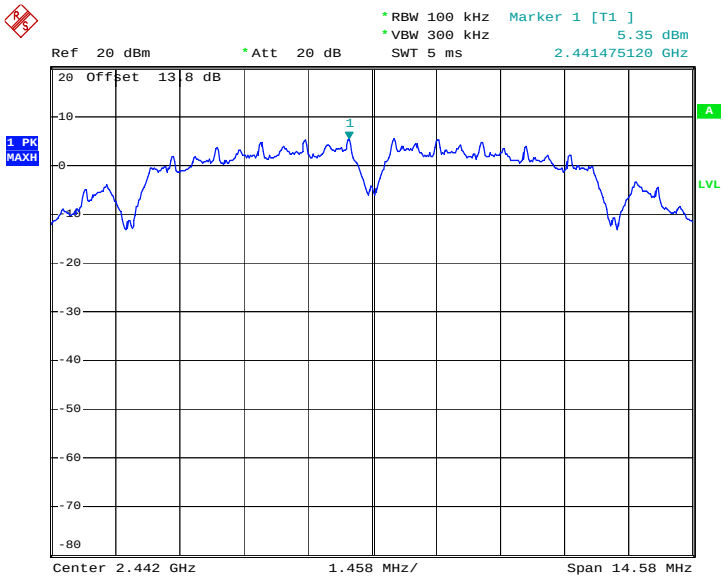
1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100kHz is reference level and used as 20dBc down for Conducted Band Edges limit line.*
3. *Radiated Peak Power Spectral Density (e.i.r.p) (dBm)) = Measured PSD/3kHz (dBm) + Antenna gain (dBi).*

PSD 100kHz Plot on 802.11b Channel 01



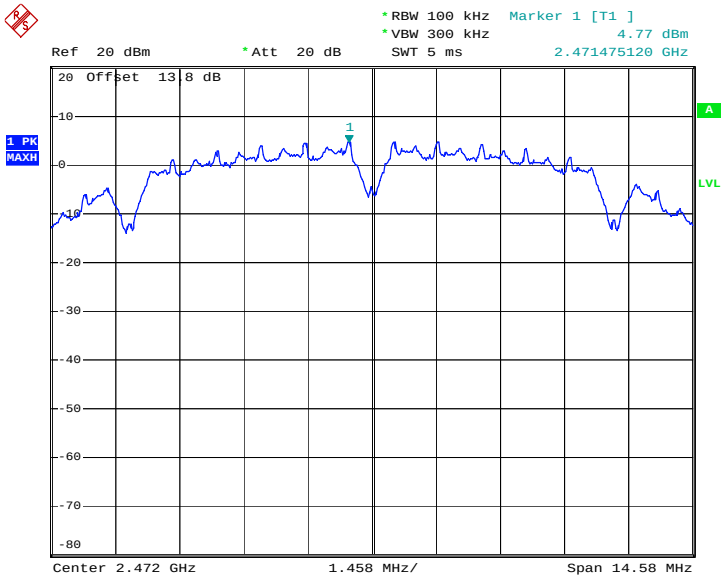
Date: 23.JAN.2013 23:08:32

PSD 100kHz Plot on 802.11b Channel 07



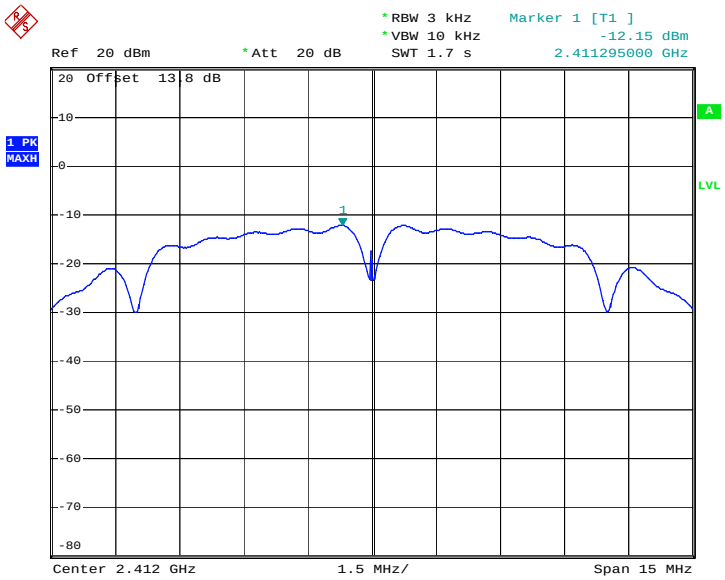
Date: 23.JAN.2013 23:14:22

PSD 100kHz Plot on 802.11b Channel 13



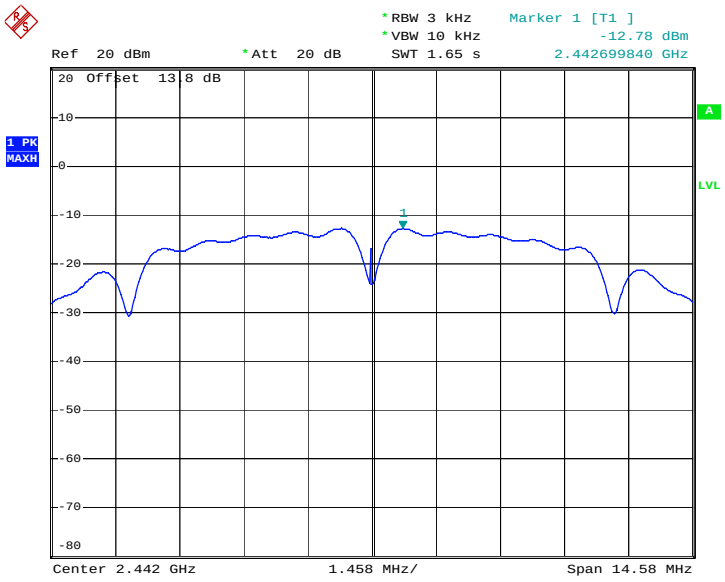
Date: 23.JAN.2013 23:18:34

PSD 3kHz Plot on 802.11b Channel 01



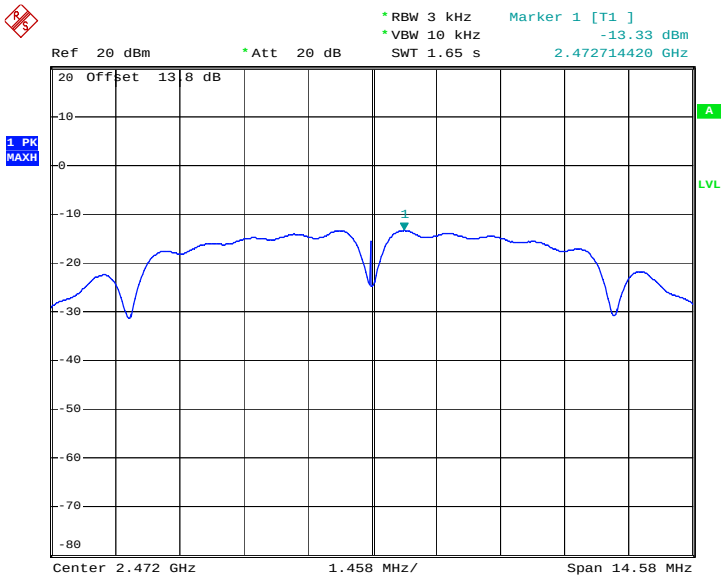
Date: 23.JAN.2013 23:08:22

PSD 3kHz Plot on 802.11b Channel 07



Date: 23.JAN.2013 23:14:12

PSD 3kHz Plot on 802.11b Channel 13



Date: 23.JAN.2013 23:18:24

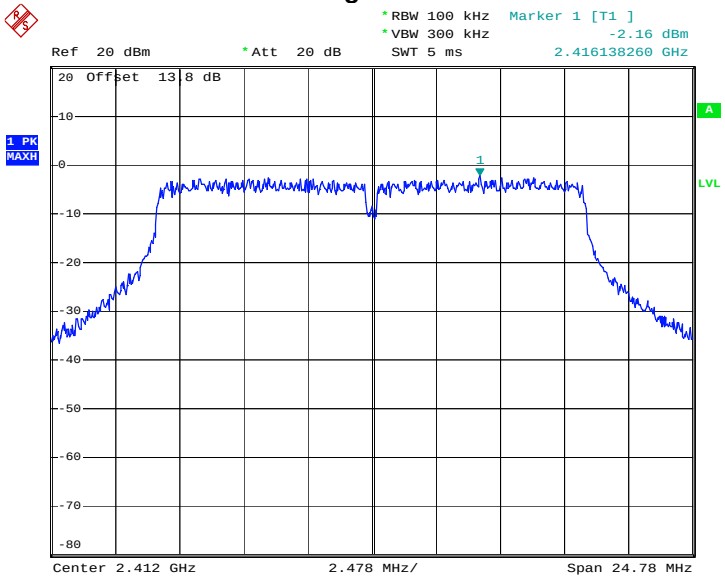
EUT Mode :	802.11g	Temperature :	21~22℃
Test Engineer :	Zhi Lu	Relative Humidity :	43~46%
Antenna Gain :	3.15 dBi	Duty Cycle :	100.00%
Cable loss	13.80dB	Duty Factor :	0.00dB

Channel	Measured Frequency (MHz)	Measured PSD/100kHz (dBm)	Measured PSD/3kHz (dBm)	Radiated Peak Power Spectral Density (e.i.r.p) (dBm)	Limit (e.i.r.p)
CH 01	2412 MHz	-2.16	-15.05	-11.90	< 14dBm per 3kHz
CH 07	2442 MHz	-2.00	-13.75	-10.60	< 14dBm per 3kHz
CH 13	2472 MHz	-1.73	-12.77	-9.62	< 14dBm per 3kHz

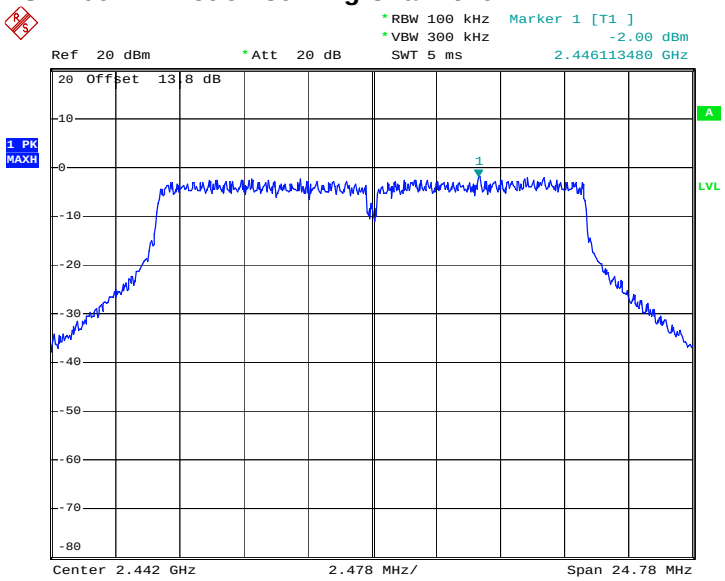
Note:

1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100kHz is reference level and used as 20dBc down for Conducted Band Edges limit line.*
3. *Radiated Peak Power Spectral Density (e.i.r.p) (dBm)) = Measured PSD/3kHz (dBm) + Antenna gain (dBi).*

PSD 100kHz Plot on 802.11g Channel 01

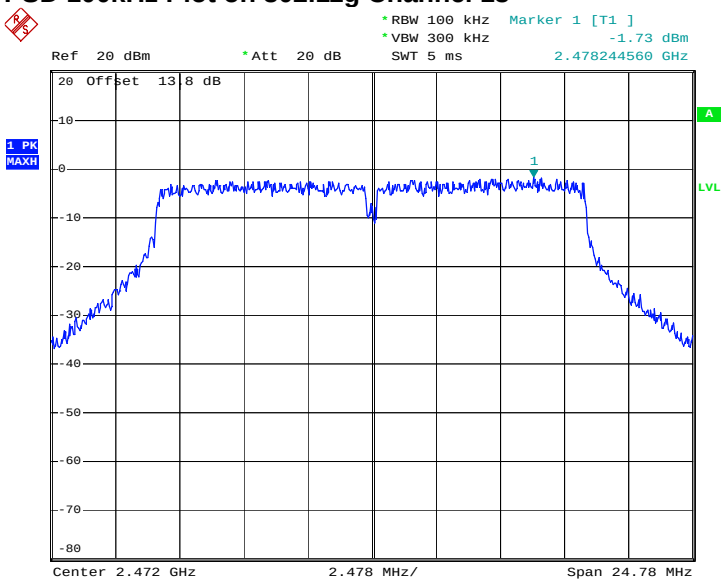


PSD 100kHz Plot on 802.11g Channel 07



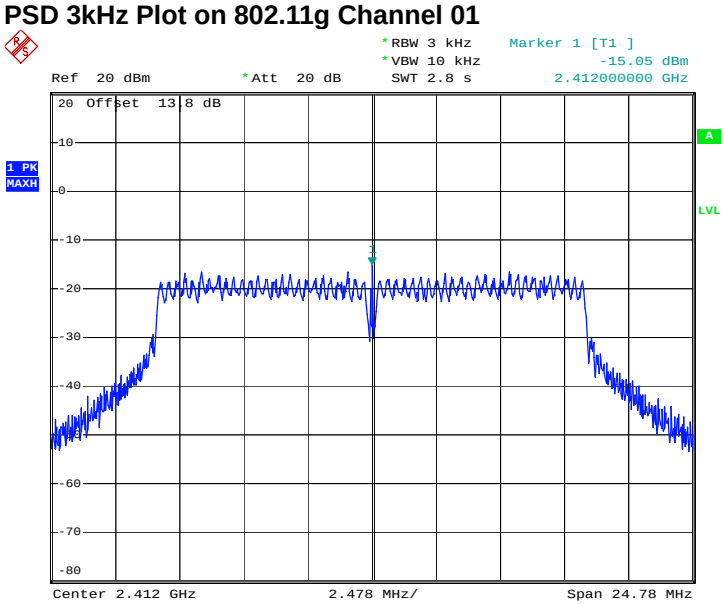
Date: 23.JAN.2013 23:27:23

PSD 100kHz Plot on 802.11g Channel 13



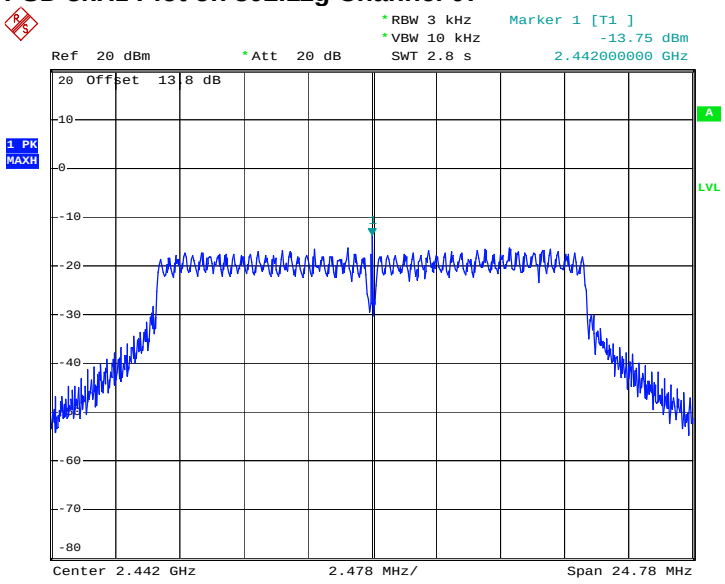
Date: 23.JAN.2013 23:30:53

PSD 3kHz Plot on 802.11g Channel 01



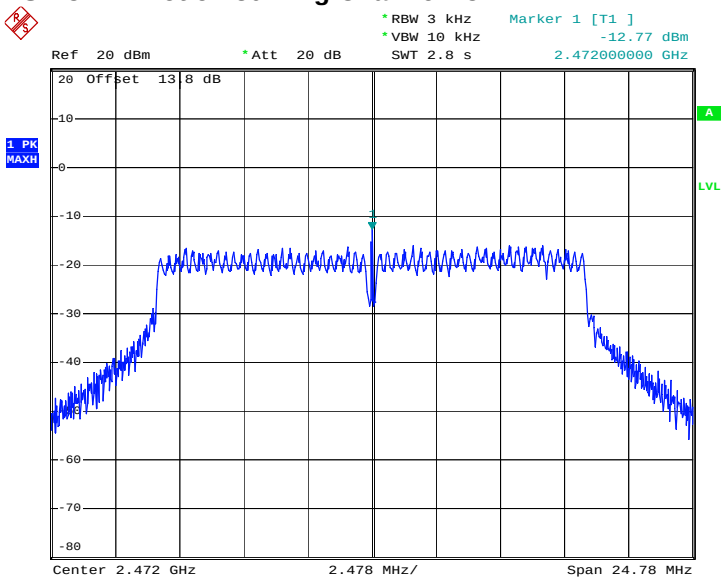
Date: 23.JAN.2013 23:23:20

PSD 3kHz Plot on 802.11g Channel 07



Date: 23.JAN.2013 23:27:13

PSD 3kHz Plot on 802.11g Channel 13



Date: 23.JAN.2013 23:30:43

3.6 Additional Requirements (Table 1 AUSTRALIAN REQUIREMETS NOTES)

3.6.1 Band Edges Measurement

3.6.1.1 Measuring Instruments

See list of measuring instruments of this test report.

3.6.1.2 Test Procedure

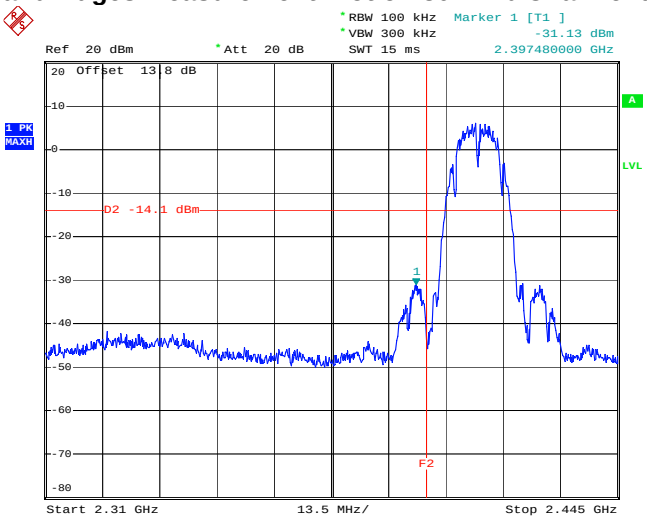
1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set both RBW / VBW of spectrum analyzer to 100 / 300 kHz with suitable frequency span including 100 kHz bandwidth from band edge.
3. The band edges was measured and recorded.

3.6.1.3 Test Result

EUT Mode :	802.11b	Temperature :	21~22℃
Test Engineer :	Zhi Lu	Relative Humidity :	43~46%

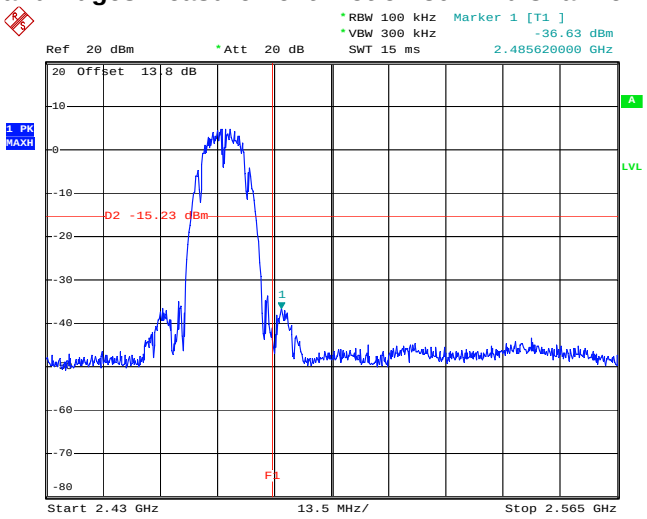
Channel	Measured Frequency (MHz)	Fundamental Signal (dBm)	Mark 1 (dBm)	Frequency of Mark 1 (MHz)
CH 01	2412 MHz	5.90	2397.48	-31.13
CH 13	2472 MHz	4.77	2485.62	-36.63

Band Edges Measurement Plot on 802.11b Channel 01



Date: 23.JAN.2013 23:08:48

Band Edges Measurement Plot on 802.11b Channel 13

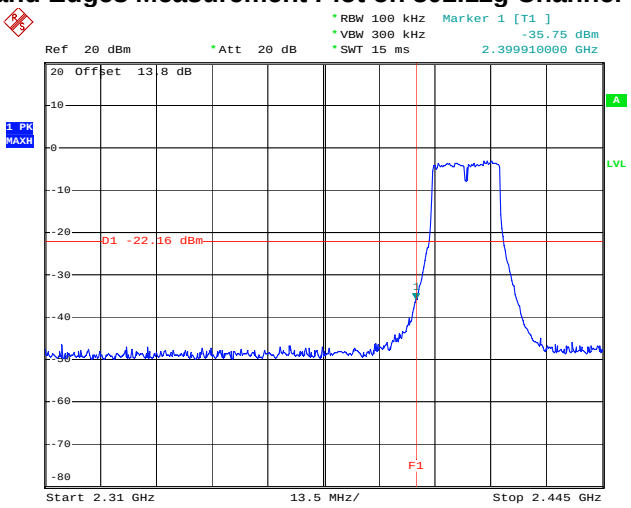


Date: 23.JAN.2013 23:18:50

EUT Mode :	802.11g	Temperature :	21~22℃
Test Engineer :	Zhi Lu	Relative Humidity :	43~46%

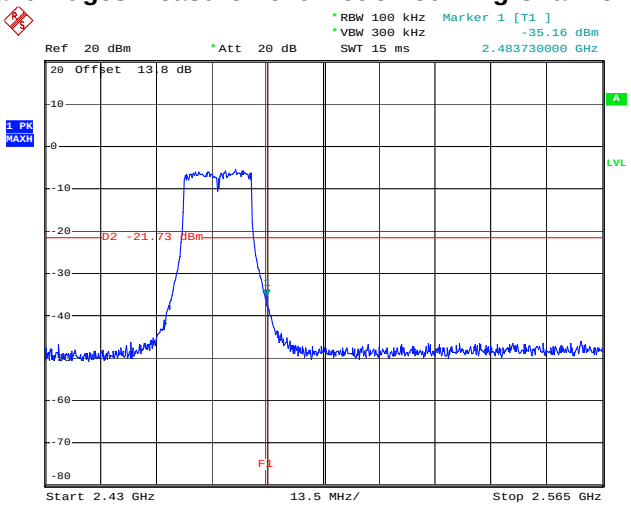
Channel	Measured Frequency (MHz)	Fundamental Signal (dBm)	Mark 1 (dBm)	Frequency of Mark 1 (MHz)
CH 01	2412 MHz	-2.16	2399.91	-35.75
CH 13	2472 MHz	-1.73	2483.73	-35.16

Band Edges Measurement Plot on 802.11g Channel 01



Date: 23.JAN.2013 23:52:52

Band Edges Measurement Plot on 802.11g Channel 13



Date: 24.JAN.2013 11:22:18

3.6.2 Number of Channel Measurement

3.6.2.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 75 channels.

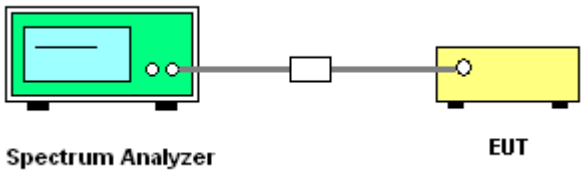
3.6.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.2.3 Test Procedure

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The modulation types of EUT are irrelevant to number of hopping channels deviation.
3. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
4. Span = the frequency band of operation; RBW ≥ 1% of the span; VBW ≥ RBW; Sweep = 500 ms; Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

3.6.2.4 Test Setup



3.6.2.5 Test Result of Number of Hopping Frequency

Remark: Number of Hopping Frequency is not applicable to DSSS/OFDM device.

3.6.3 Hopping Channel Separation Measurement

3.6.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

3.6.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3.3 Test Procedures

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The EUT should be transmitting at its maximum data rate as the worst cases.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels; RBW ≥ 1% of the span;VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
4. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

3.6.3.4 Test Setup

3.6.3.5 Test Result of Hopping Channel Separation

Remark: Hopping Channel Separation is not applicable to DSSS/OFDM device.

3.6.4 Dwell Time Measurement

3.6.4.1 Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

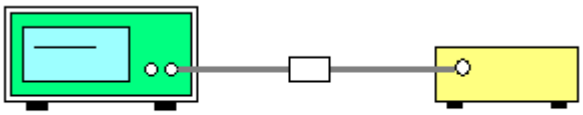
3.6.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.4.3 Test Procedures

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. The EUT should be transmitting at its maximum data rate as the worst cases.
3. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
   Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW ≥ RBW;
   Sweep = as necessary to capture the entire dwell time per hopping channel;
   Detector function = peak; Trace = max hold.
4. Use the marker-delta function to calculate the dwell time.

3.6.4.4 Test Setup



3.6.4.5 Test Result of Dwell Time

Remark: Dwell Time is not applicable to DSSS/OFDM device.

4. Receiver Parameters

4.1 Receiver Spurious Emissions (SUBCLAUSE 9.1)

4.1.1 Measuring Instruments

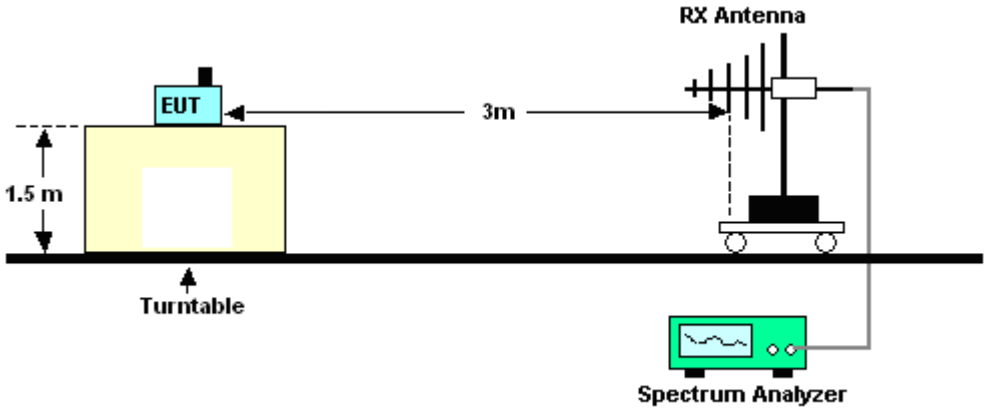
See list of measuring instruments of this test report.

4.1.2 Test Procedures

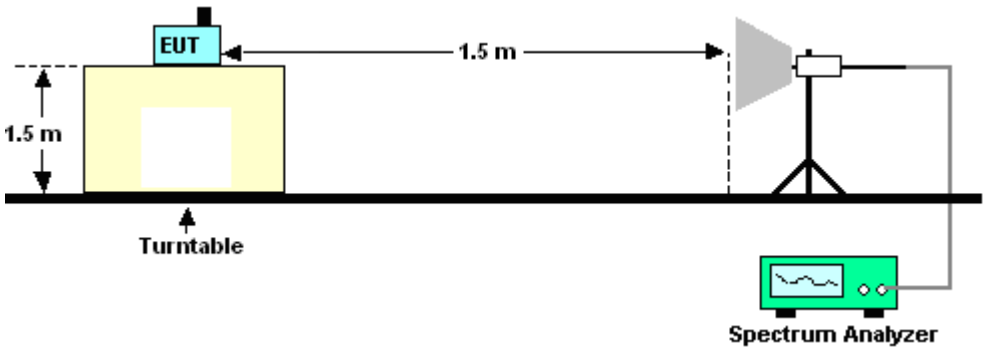
1. The EUT was placed on a turntable with 1.5m height.
2. The receiving antenna with horizontal and vertical polarization is 3m away from EUT and keeps the antenna height at 1.5m.
3. Setting EUT in continuous Rx.
4. The table was rotated to search the highest radiation.
5. Repeating set 3 and 4 for different channel.

4.1.3 Test Setup

<Below 1GHz>

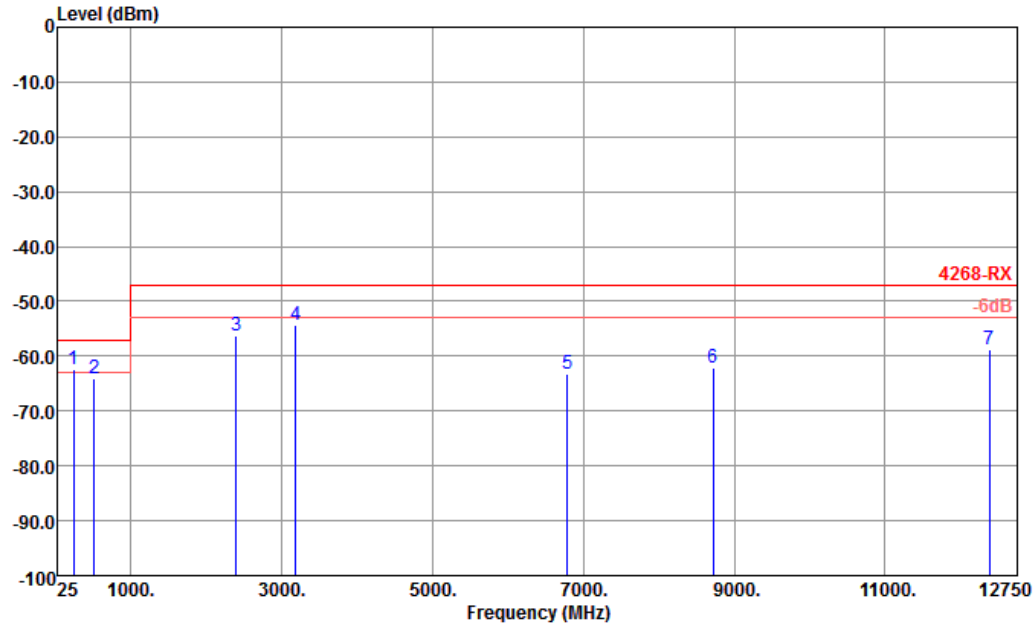


<Above 1GHz>



4.1.4 Test Result

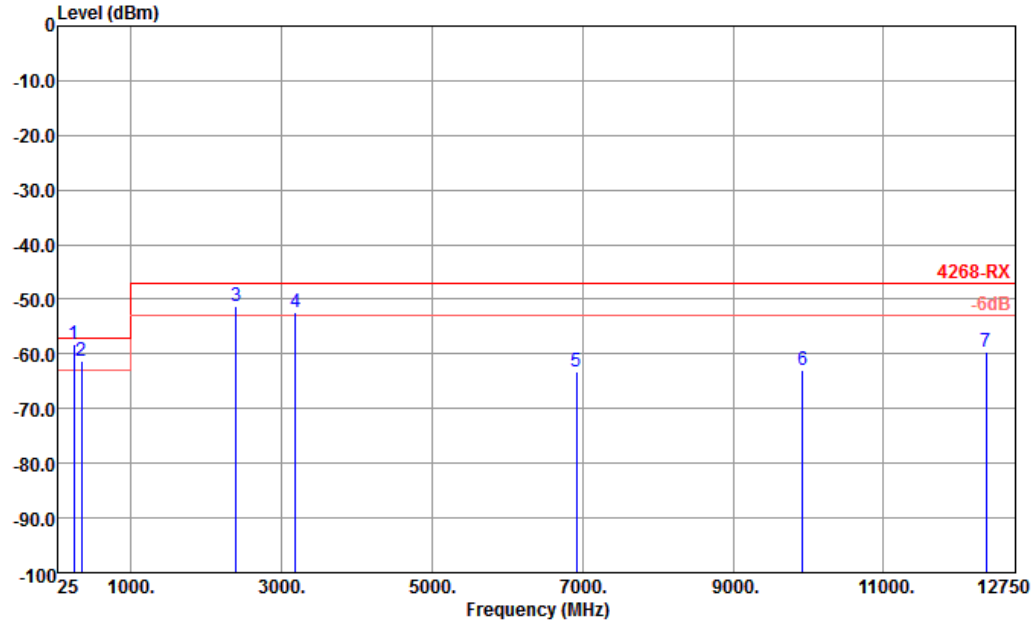
Test Mode :	Mode 1: CH01 (2412MHz) in Laptop Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Horizontal



Site : 05CH01-KS
Condition : 4268-RX LF EIRP_090504 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	Read Level	Factor
	MHz	dBm	dB	dBm	dBm	dB
1 p	242.49	-62.48	-5.48	-57.00	-60.67	-1.81
2	517.00	-64.10	-7.10	-57.00	-67.47	3.37
3	2392.00	-56.18	-9.18	-47.00	-64.17	7.99
4	3188.00	-54.21	-7.21	-47.00	-63.20	8.99
5	6788.00	-63.18	-16.18	-47.00	-76.36	13.18
6	8719.00	-62.20	-15.20	-47.00	-76.22	14.02
7	12376.00	-58.88	-11.88	-47.00	-78.10	19.22

Test Mode :	Mode 1: CH01 (2412MHz) in Laptop Mode	Temperature :	21~22℃
Test Engineer :	David Ye	Relative Humidity :	41~42%
Test Distance :	3m (Below 1GHz) 1.5m (Above 1GHz)	Polarization :	Vertical



Site : 05CH01-KS
Condition : 4268-RX LF EIRP_090504 VERTICAL

		Freq	Level	Over Limit	Limit Line	Read Level	Factor
		MHz	dBm	dB	dBm	dBm	dB
1	p	241.41	-58.18	-1.18	-57.00	-56.37	-1.81
2	!	339.20	-61.24	-4.24	-57.00	-61.11	-0.13
3	!	2392.00	-51.37	-4.37	-47.00	-59.20	7.83
4	!	3188.00	-52.25	-5.25	-47.00	-61.16	8.91
5		6918.00	-63.21	-16.21	-47.00	-76.19	12.98
6		9919.00	-63.04	-16.04	-47.00	-77.89	14.85
7		12365.00	-59.72	-12.72	-47.00	-78.73	19.01

LIMITS : Clause 9.1.1

Narrowband spurious emission:

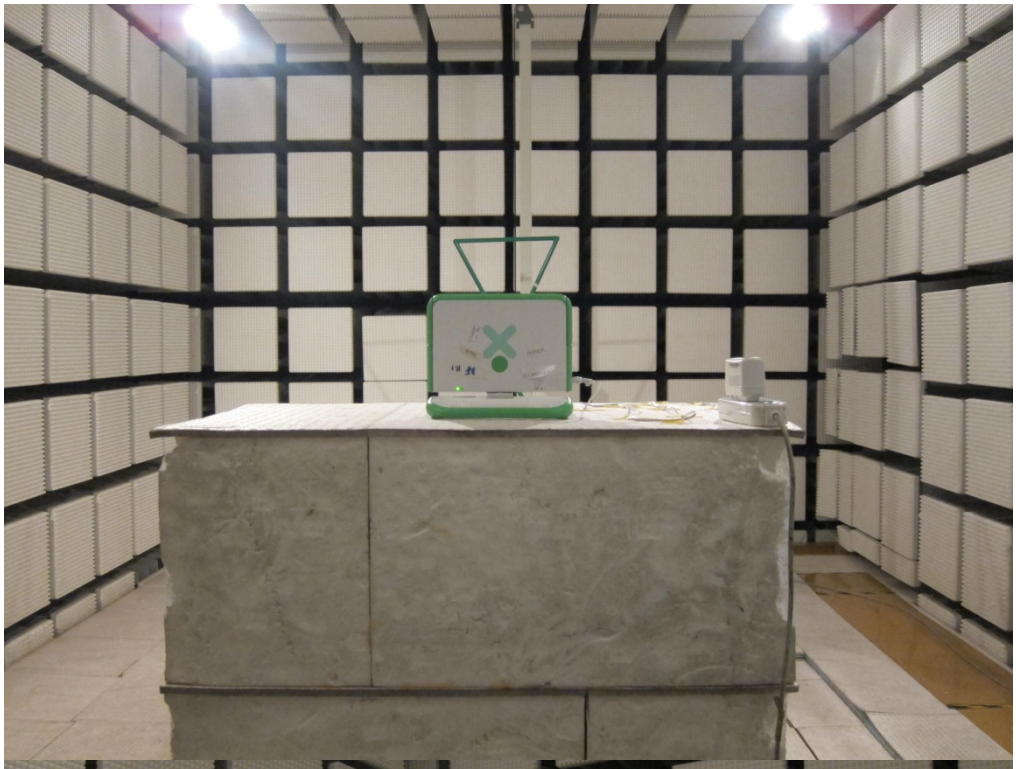
Frequency Range	Limit when in received mode
30MHz to 1 GHz	-57dBm
Above 1 GHz to 12,75 GHz	-47dBm

Limit kept Yes [V] No [ ]

5. Setup Photographs of Radiated Emission Test

For Laptop Mode

LF



HF

For Tablet Mode

LF

HF

6. 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. 23, 2013~ Jan. 24, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Power Meter	Agilent	E4416A	MY45101555	N/A	Aug. 22, 2012	Jan. 23, 2013~ Jan. 24, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Power Sensor	Agilent	E9327A	MY44421198	N/A	Aug. 22, 2012	Jan. 23, 2013~ Jan. 24, 2013	Aug. 21, 2013	Conducted (TH01-KS)
DC Power Supply	GWINSTEK	GPS-3030D	E1884515	N/A	Aug. 22, 2012	Jan. 23, 2013~ Jan. 24, 2013	Aug. 21, 2013	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Dec. 29, 2012	Jan. 23, 2013~ Jan. 24, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	100845	9kHz – 30GHz	Nov. 06, 2012	Jan. 25, 2013	Nov. 05, 2013	Radiation (05CH01-KS)
Bilog Antenna	TESEQ	CBL6112D	23183	25MHz~2GHz	Dec. 07, 2012	Jan. 25, 2013	Dec. 06, 2013	Radiation (05CH01-KS)
DRG	ETS-Lindgren	1908/7/13	00075957	1GHz~18GHz	Dec. 07, 2012	Jan. 25, 2013	Dec. 06, 2013	Radiation (05CH01-KS)
Amplifier	Wireless	FPA-6592G	060004	9kHz~2GHz	Dec. 29, 2012	Jan. 25, 2013	Dec. 28, 2013	Radiation (05CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 07, 2012	Jan. 25, 2013	Dec. 06, 2013	Radiation (05CH01-KS)

7. Uncertainty Evaluation

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.15	Normal (k=2)	0.08
Antenna Factor Calibration	1.12	Normal (k=2)	0.56
Cable Loss Calibration	0.12	Normal (k=2)	0.06
Pre-Amplifier Gain Calibration	0.13	Normal (k=2)	0.07
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	2.10	Rectangular	1.21
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	**1.58**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.16**		

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

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

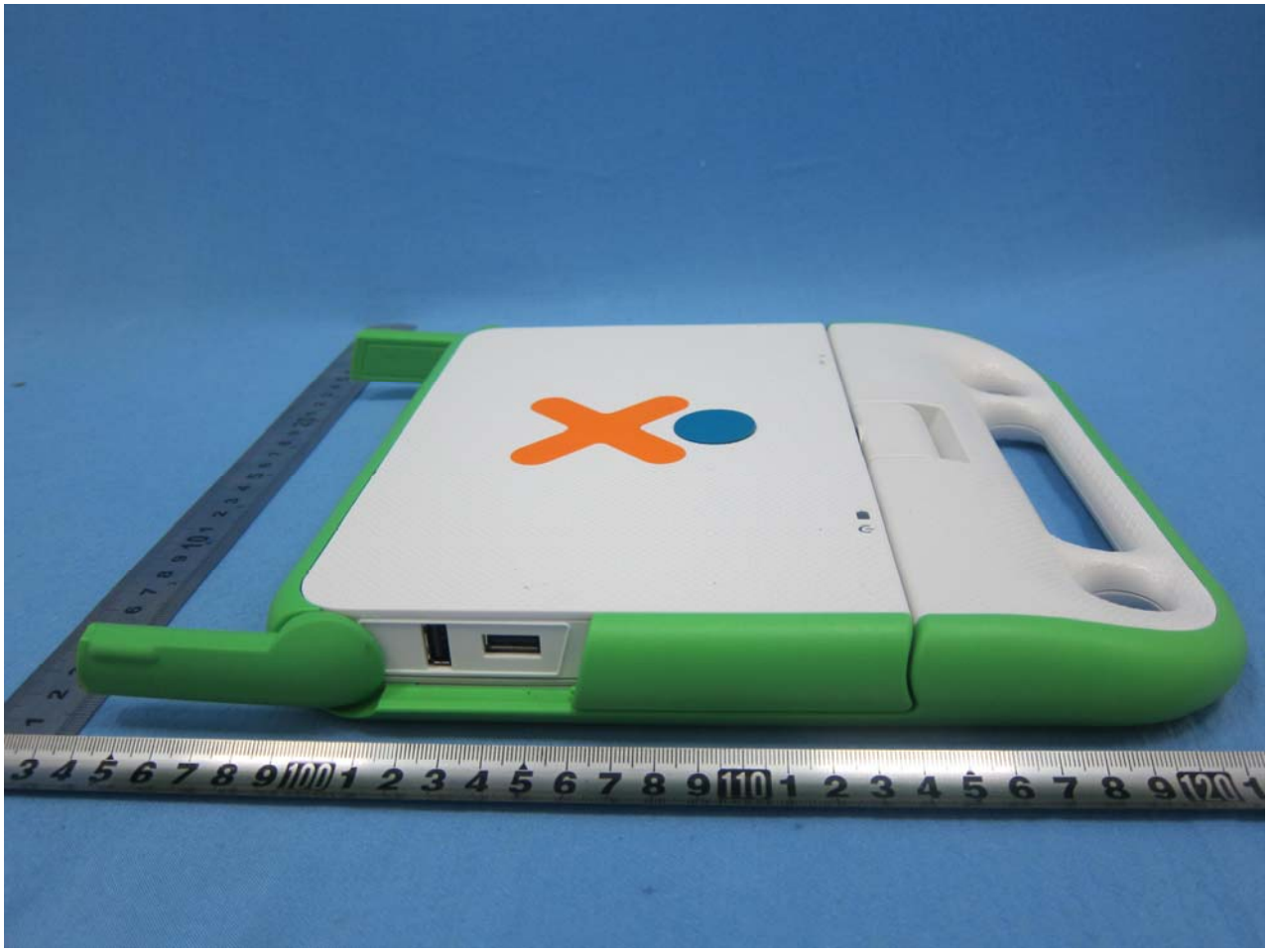
Appendix A. Photographs of EUT

Please refer to Sporton report number EP310902B as below.

1. External Photograph of EUT

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

2. Photograph of Accessory

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

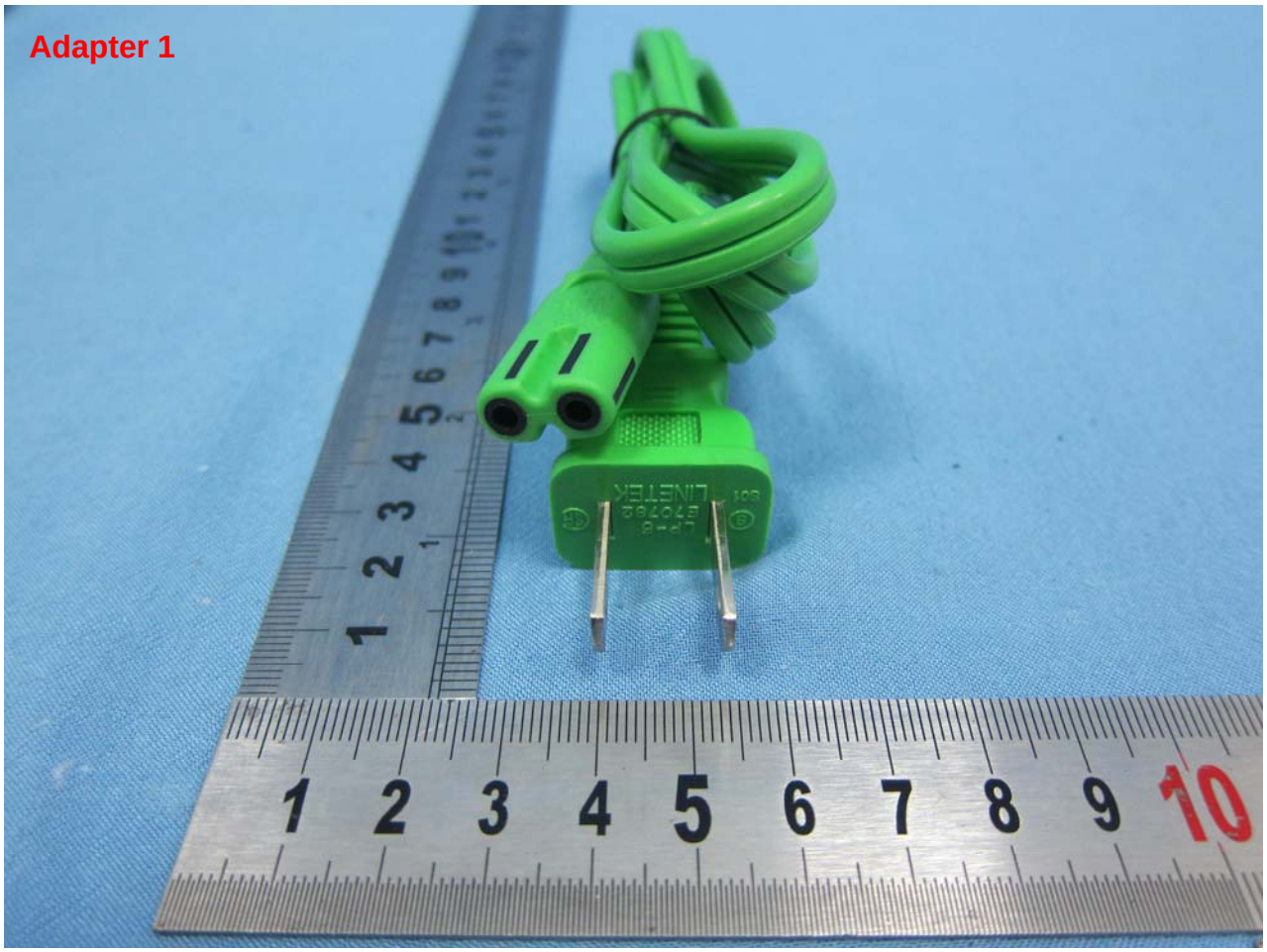
List of Accessory:

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 that for different market)
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-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

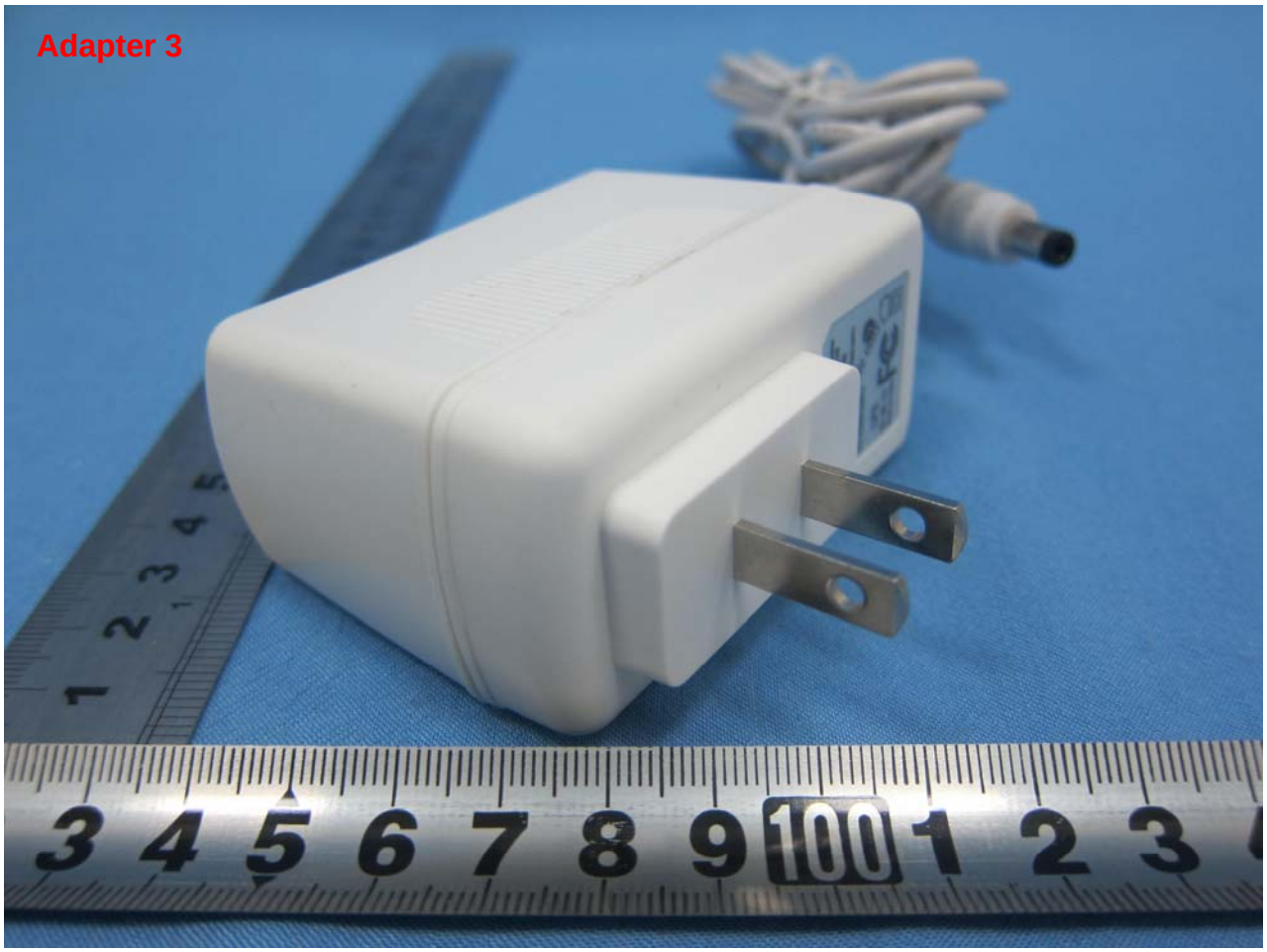
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

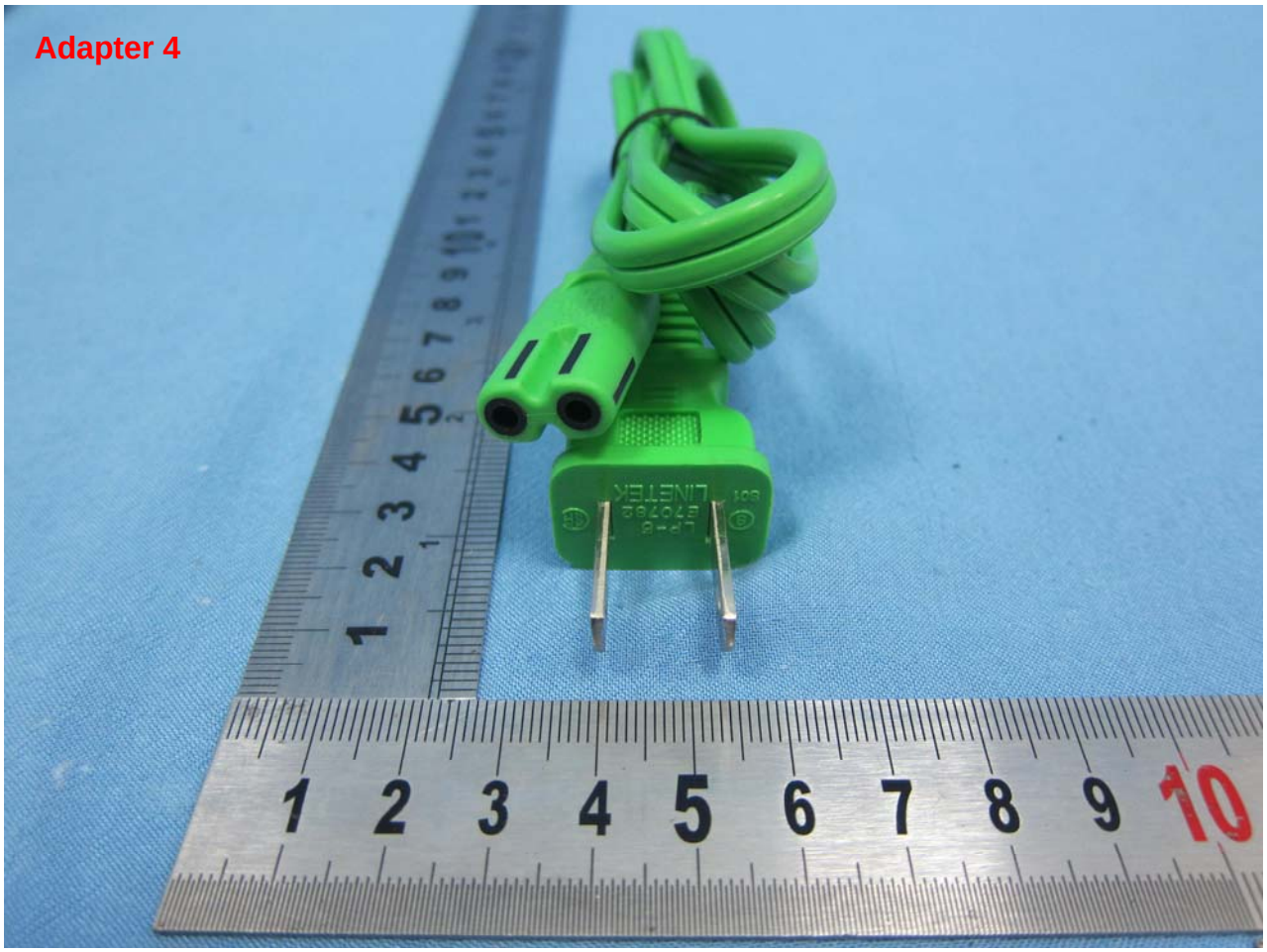
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



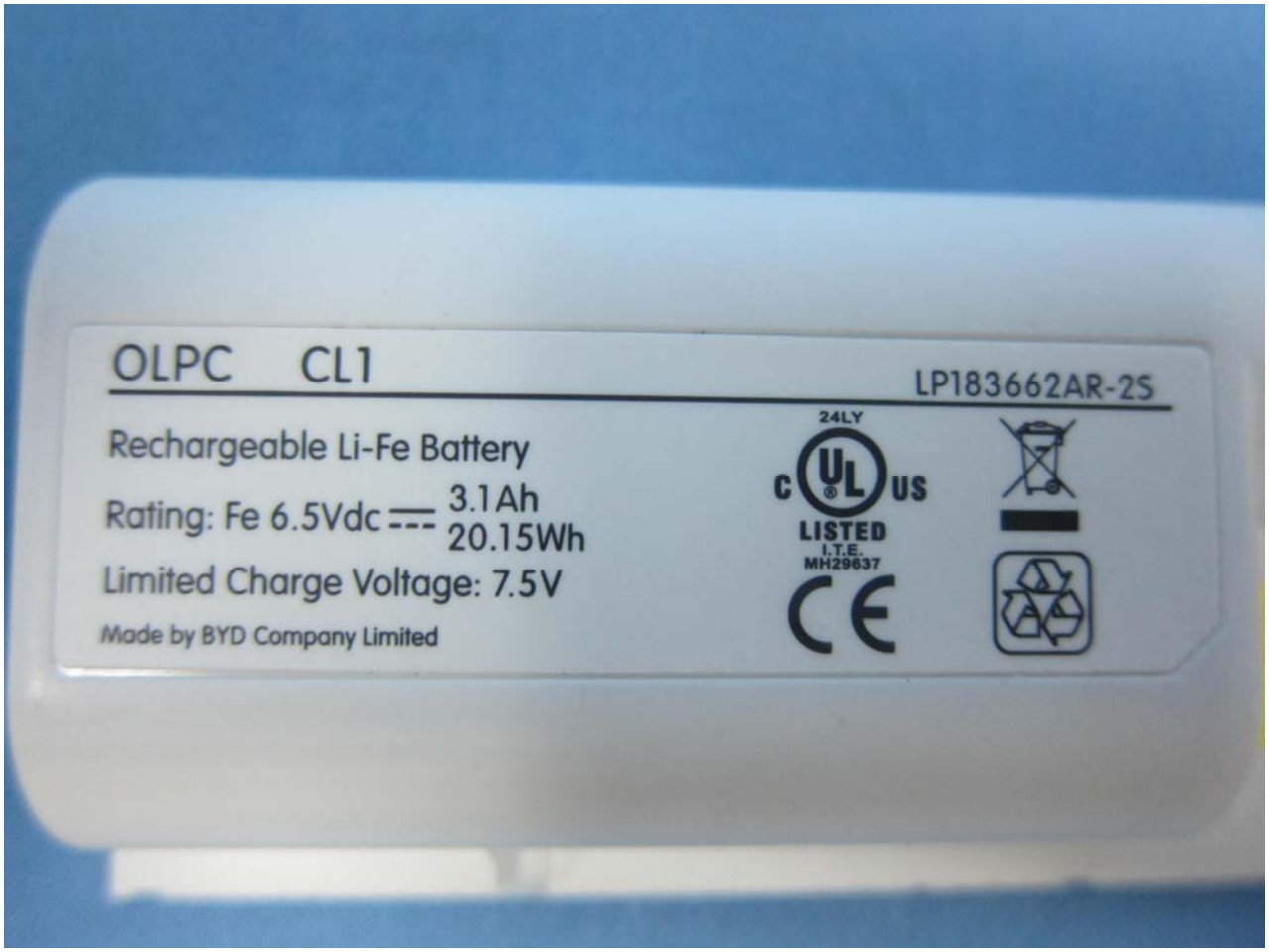
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

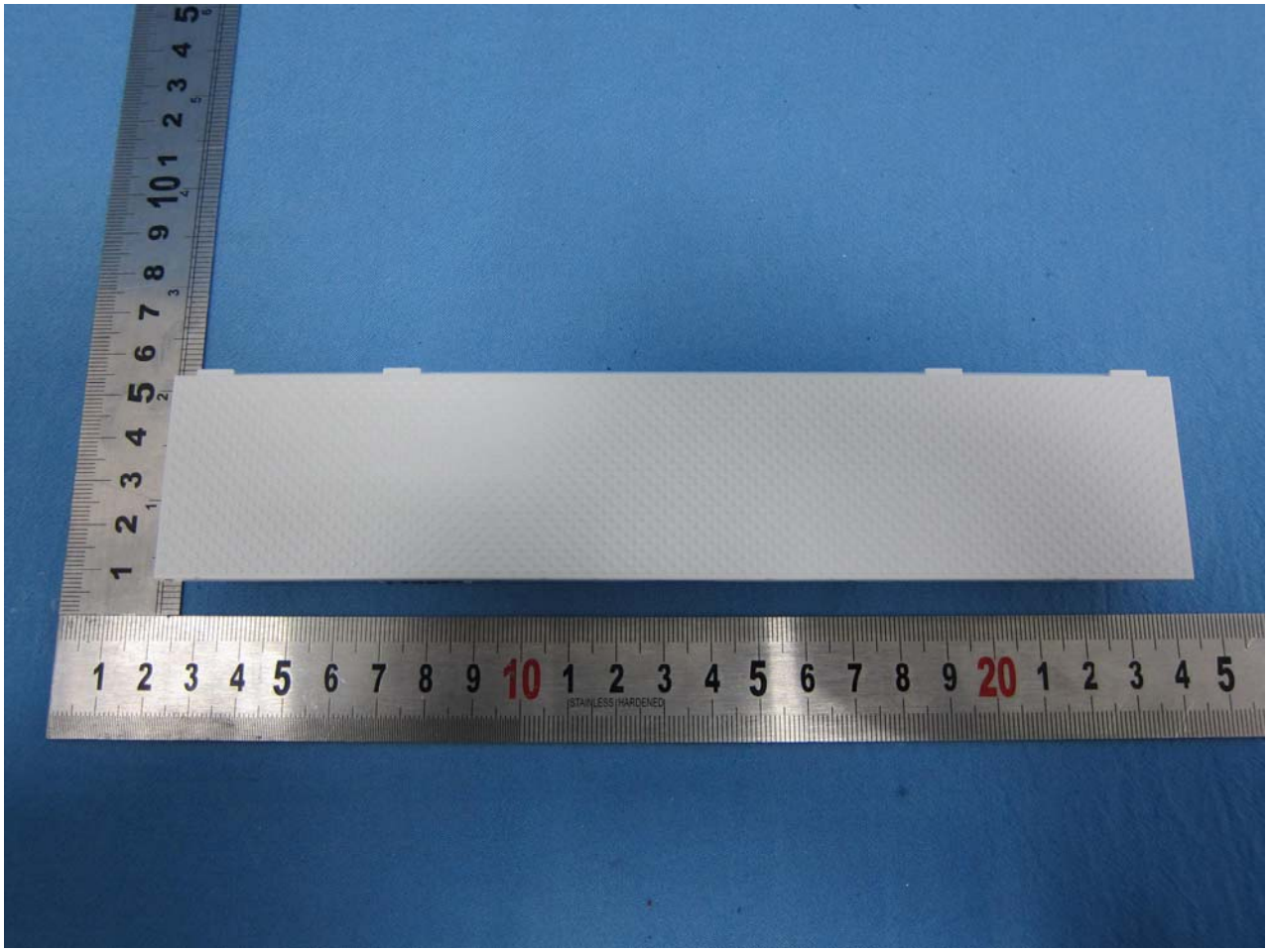
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



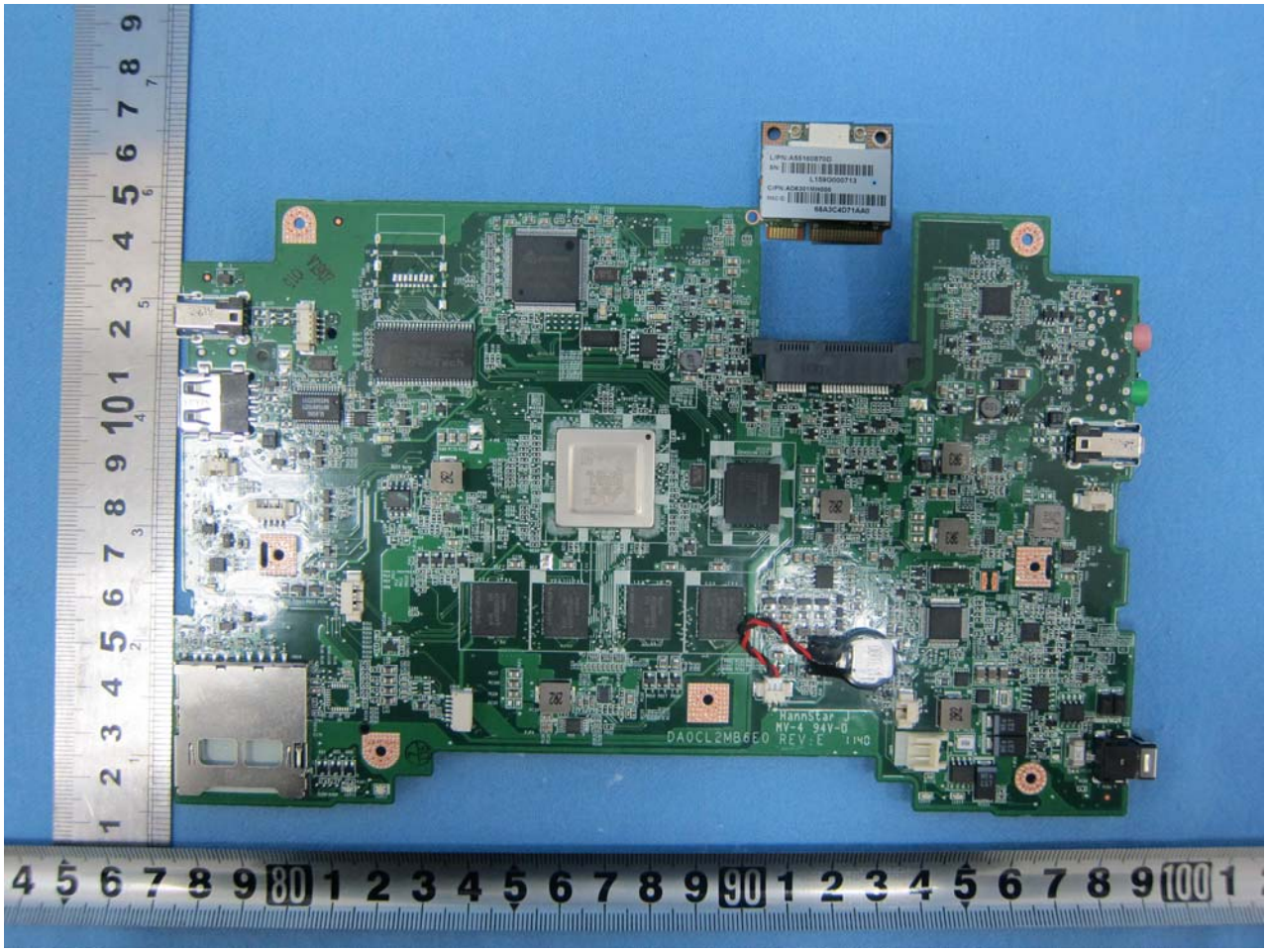
3. Internal Photograph of EUT

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

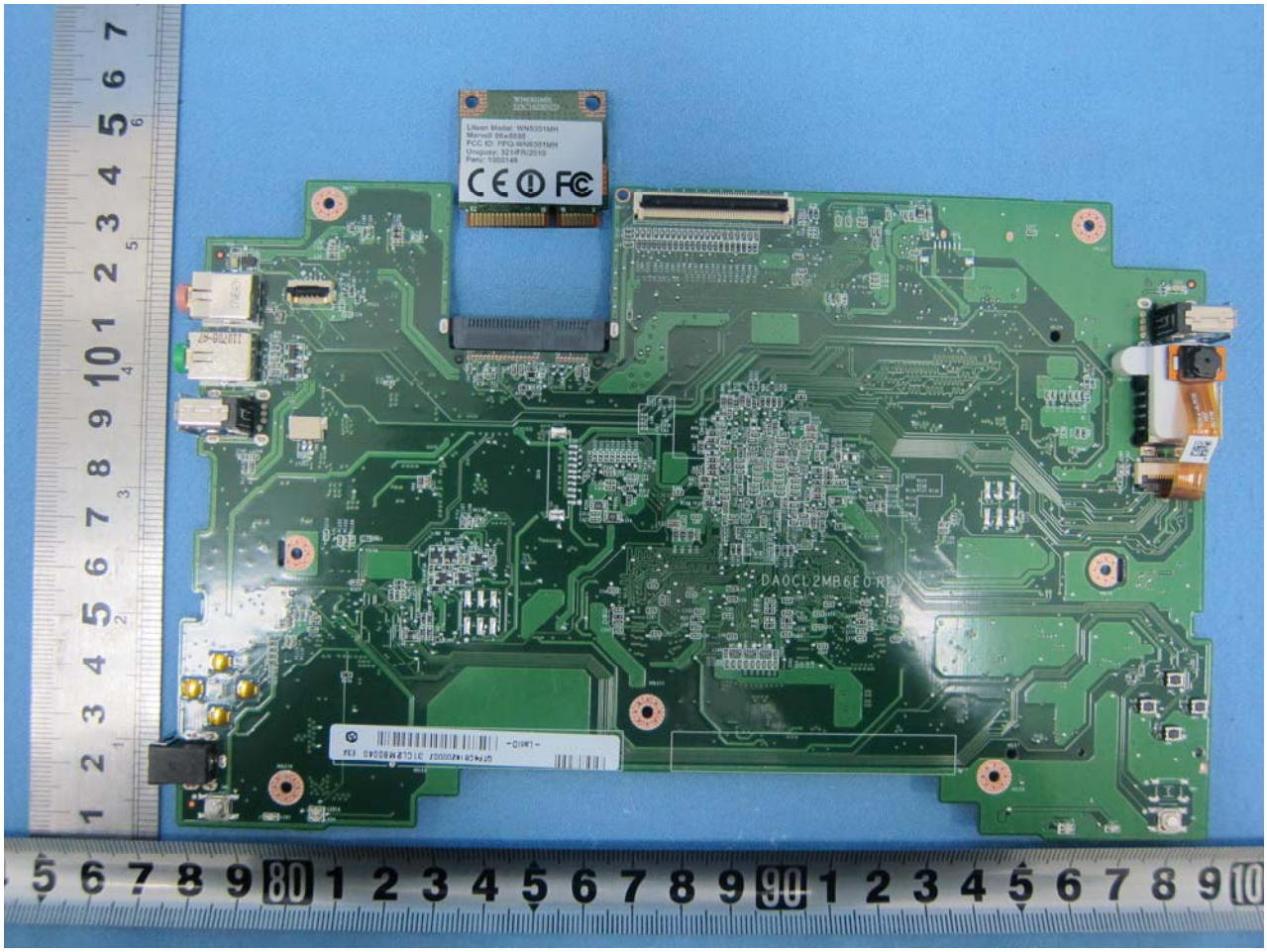
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

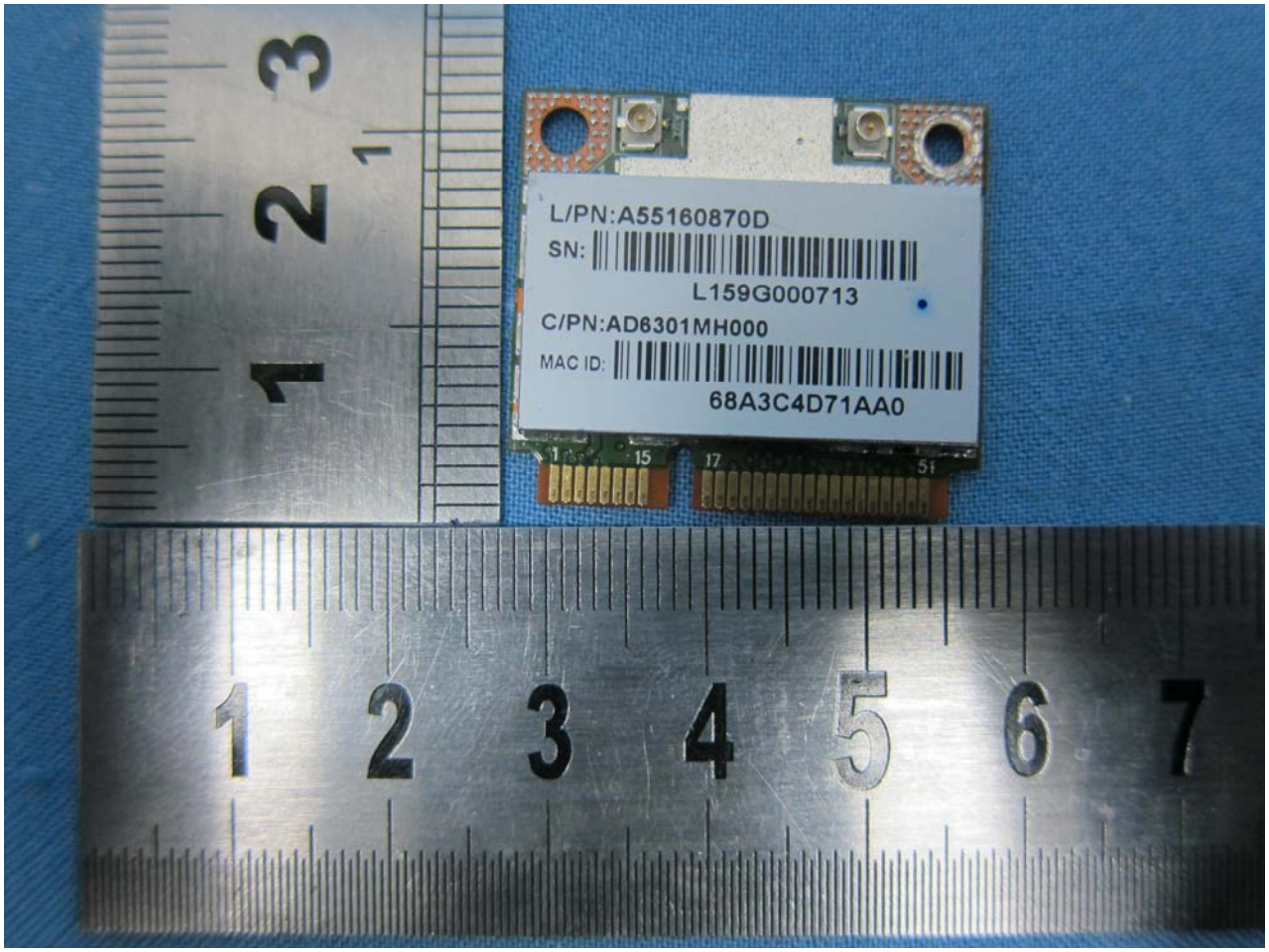


Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

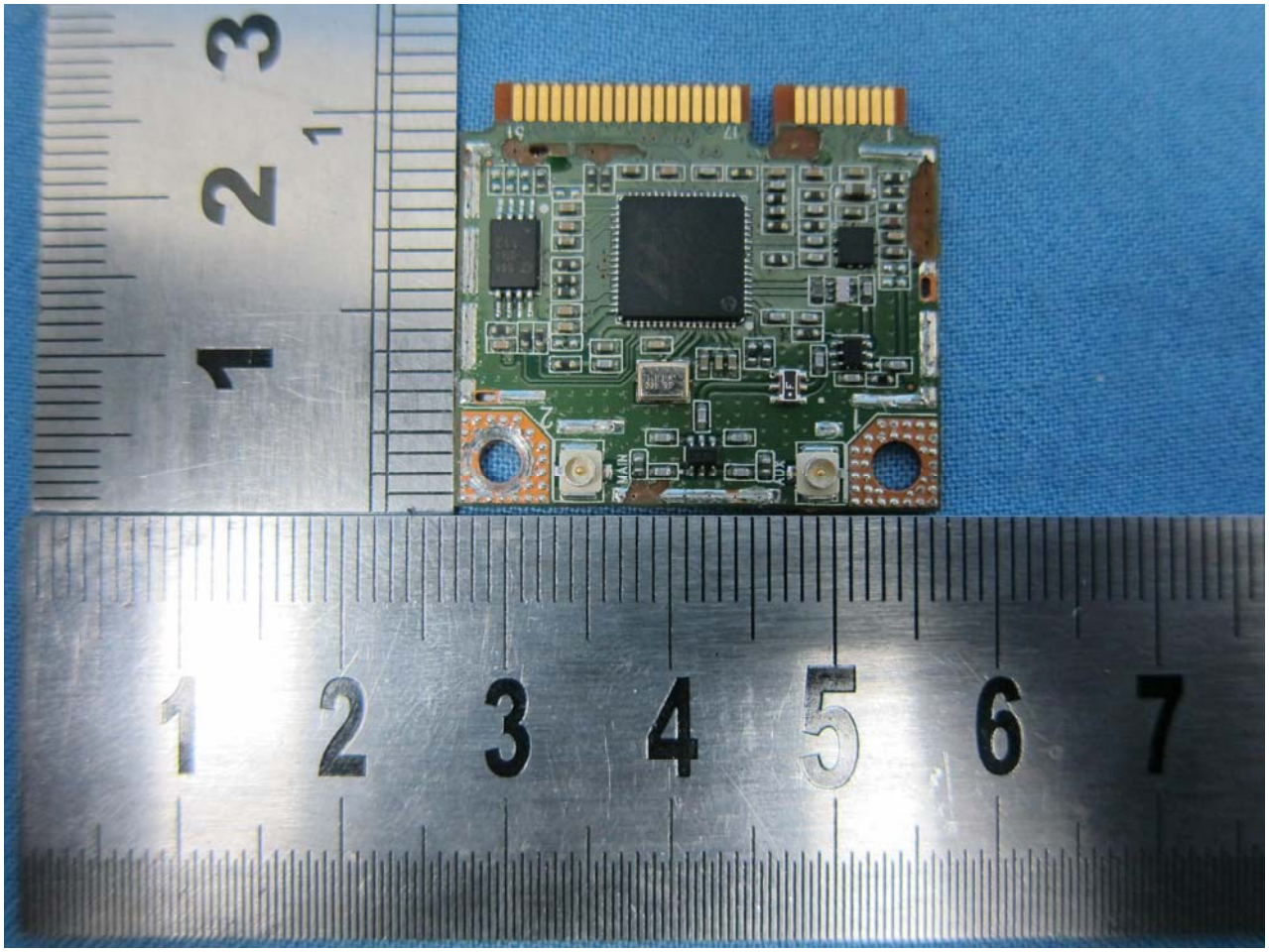


Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS

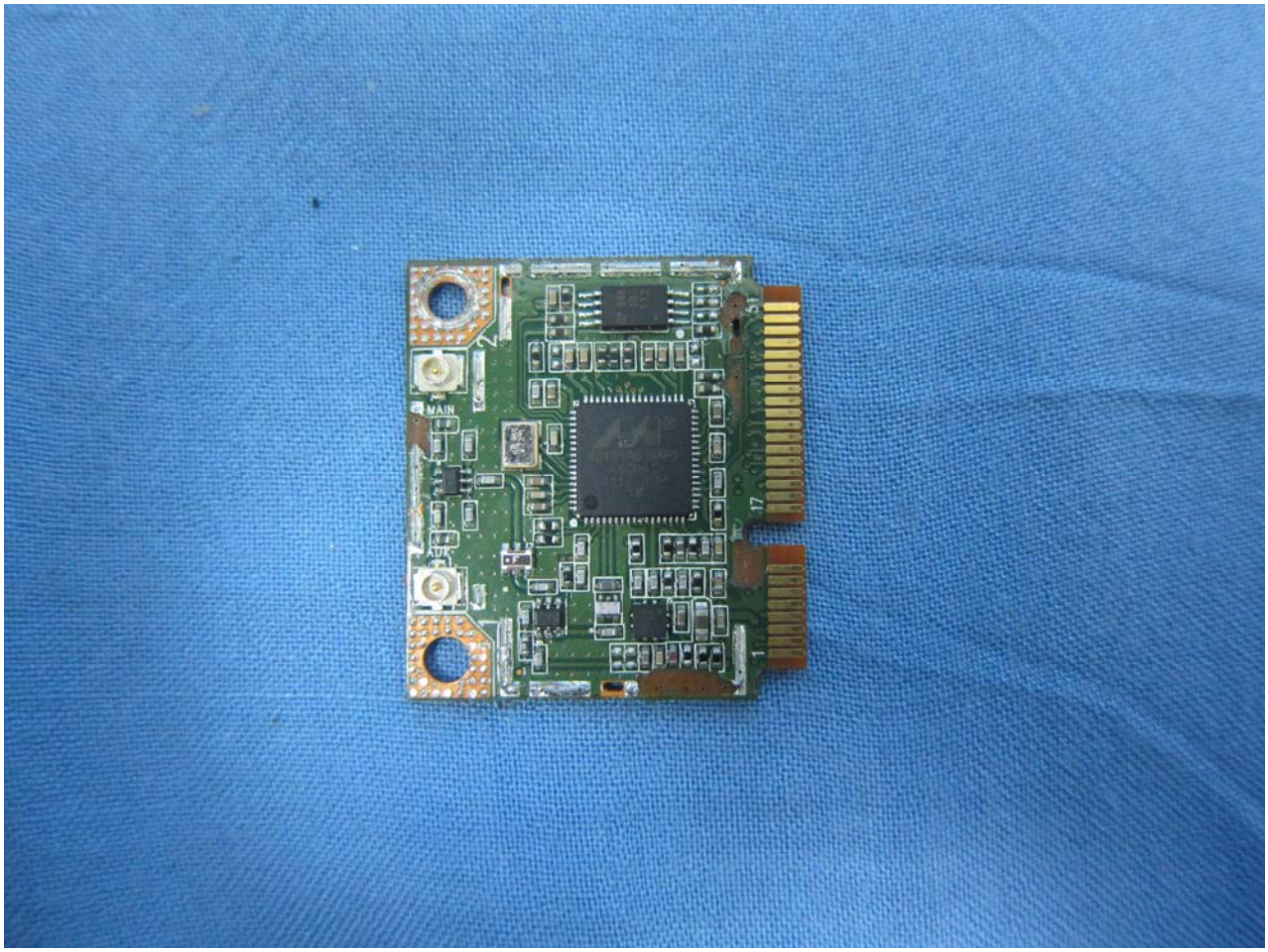
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



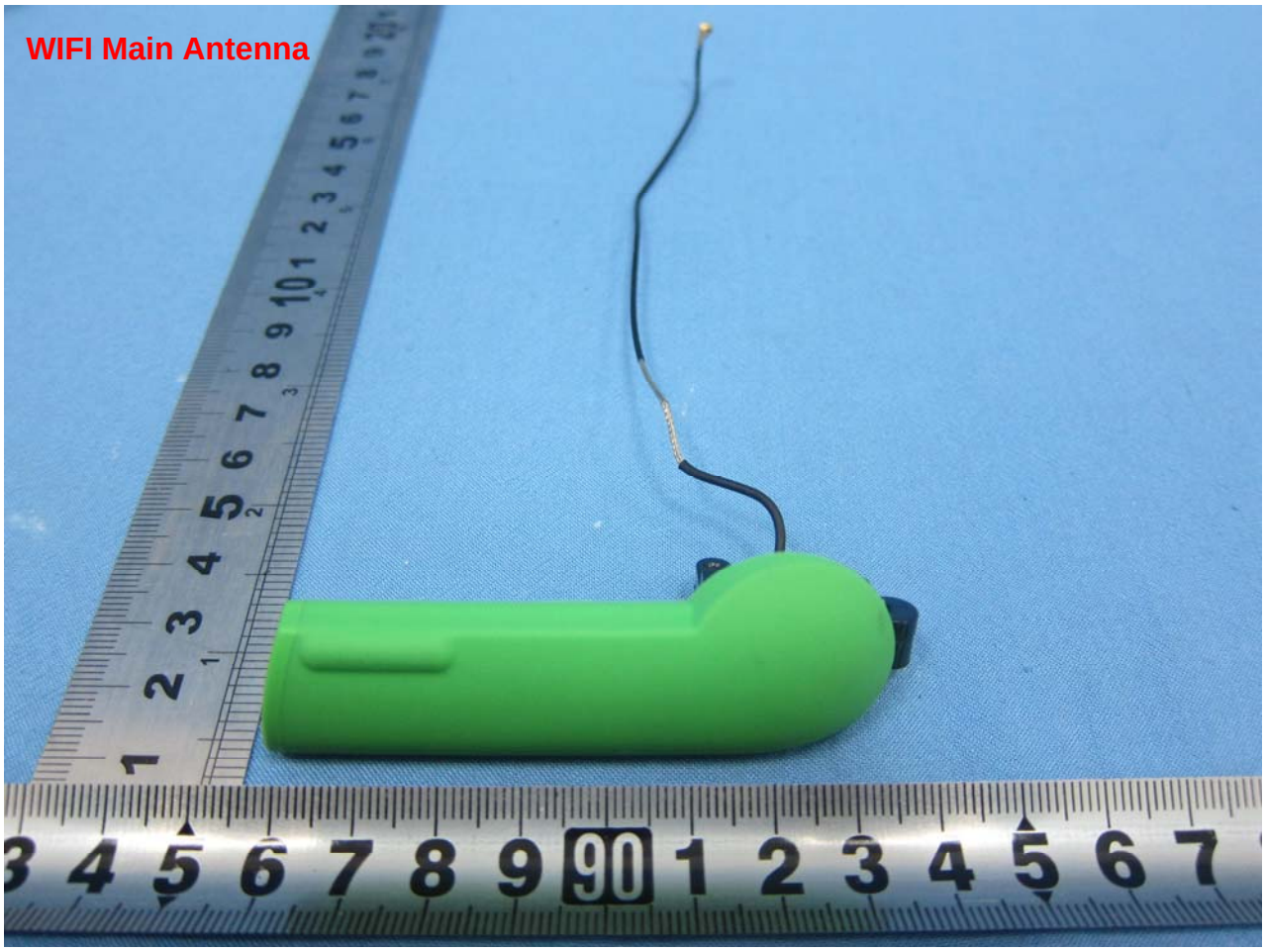
Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS



Brand Name: OLPC / Model Name: XO-1.75; XO-1.75HS