FCC TEST REPORT
for
Virtual DSP Corporation

RazBee
Model No.: ZFX-226

Prepared for	:	Virtual DSP Corporation
Address	:	4119 125th ST SE, EVERETT, Washington 98208, United States

Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number	:	201301835F
Date of Test	:	Jan. 18~ Jun. 30, 2013
Date of Report	:	Jul. 18, 2013

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Test Report

TEST REPORT

Applicant	:	Virtual DSP Corporation
Manufacturer	:	Smartmanu, Inc.
EUT	:	RazBee
Model No.	:	ZFX-226
Serial No.	:	N/A
Rating	:	AC 100-240V, 47-63Hz, 0.12A for the host
Trade Mark	:	RazBeeTM

Measurement Procedure Used:
FCC Part15 Subpart C, Paragraph 15.249 & 15.209

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.
This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Jan. 18~ Jun. 30, 2013

Prepared by : Rock zeng
(Tested Engineer / Rock Zeng)

Reviewer : Sally. zhang
(Project Manager / Sally Zhang)

Approved & Authorized Signer : Tom Chen
(Manager / Tom Chen)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	: RazBee
Model Number	: ZFX-226
Test Power Supply	: AC 120V/60Hz for the host
Switching Power Supply	: Model: MUS5-0501000UC Input: AC 100-240V, 47-63Hz, 0.12A Output: DC 5V, 1000mA
Frequency	: 2405~2480MHz
Antenna Specification	: Printed Antenna:0dBi
Application Address	Virtual DSP Corporation : 4119 125th ST SE, EVERETT, Washington 98208, United States
Manufacturer Address	: Smartmanu, Inc. Suite 2310, Jinhui Bldg., Nanhai Blvd., Shenzhen, P.O.518054, China
Date of receiver	: Jan. 18, 2013
Date of Test	: Jan. 18~ Jun. 30, 2013

1.2.Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503
Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021
Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, Jul. 10, 2013.

IC-Registration No.: 8058A-1
Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, February 22, 2013.

Test Location
All Emissions tests were performed at
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.3.Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

2. Test Procedure

GENERAL: This report shall NOT be reproduced except in full without the written approval of Shenzhen Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2009 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:
Freq (MHz) METER READING + ACF = FS
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.
When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

3. Conducted Limits

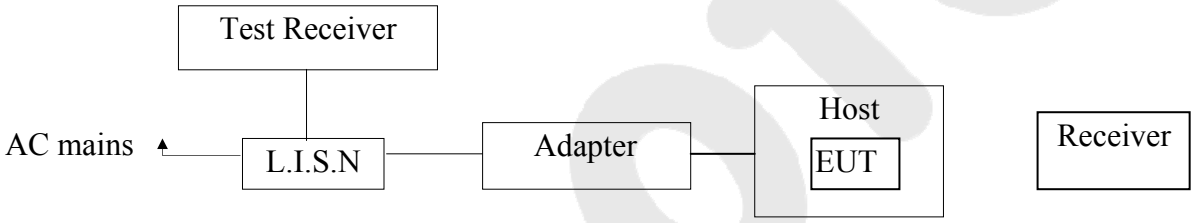
Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	10055	Apr. 23, 2013	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 23, 2013	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 23, 2013	1 Year

Conduction Uncertainty : Uc = 3.4dB

3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



(EUT: RazBee)

3.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

EUT	:	RazBee
Model Number	:	ZFX-226
Applicant	:	Virtual DSP Corporation

3.4. Operating Condition of EUT

3.4.1. Setup the EUT and simulator as shown as Section 3.1.

3.4.2. Turn on the power of all equipment.

3.4.3. Let the EUT work in test mode (Charging) and measure it.

3.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 3.6.

3.6. Power Line Conducted Emission Measurement Results

PASS.

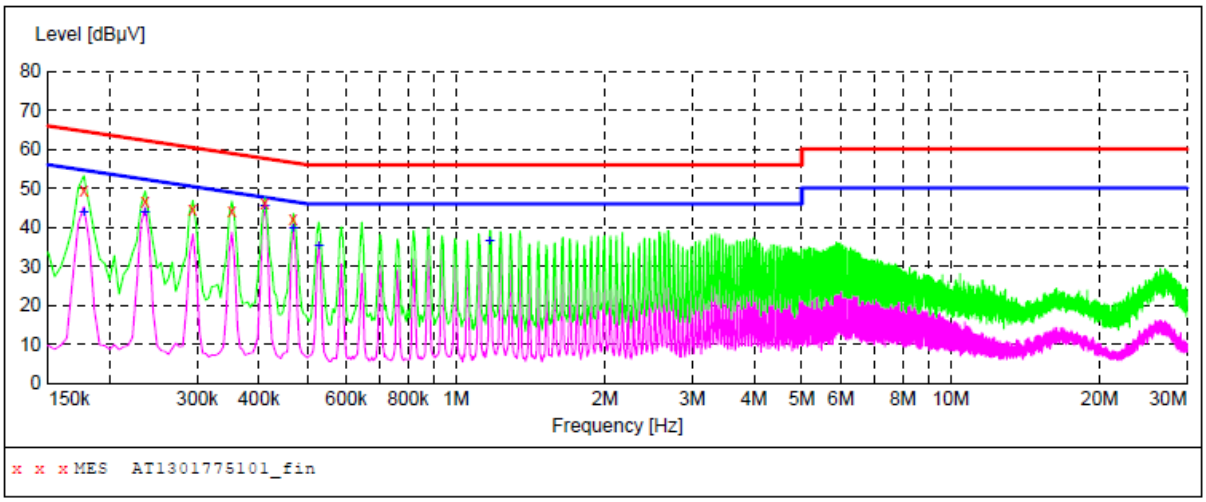
The frequency range from 150KHz to 30 MHz is investigated.

Please refer the following pages.

CONDUCTED EMISSION TEST DATA

EUT:	RazBee M/N: ZFX-226
Operating Condition:	Charging
Test Site:	1# Shielded Room
Operator:	Finley Li
Test Specification:	AC 120V/60Hz
Comment:	Live Line
	Tem:25℃ Hum:50%

SCAN TABLE: "Voltage(150K~30M)FIN"
Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "AT1301775101_fin"

6/19/2013 10:04AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	49.50	20.1	65	15.1	QP	L1	GND
0.235500	46.60	20.1	62	15.7	QP	L1	GND
0.294000	44.60	20.1	60	15.8	QP	L1	GND
0.352500	44.20	20.1	59	14.7	QP	L1	GND
0.411000	46.20	20.1	58	11.4	QP	L1	GND
0.469500	42.00	20.1	57	14.5	QP	L1	GND

MEASUREMENT RESULT: "AT1301775101_fin2"

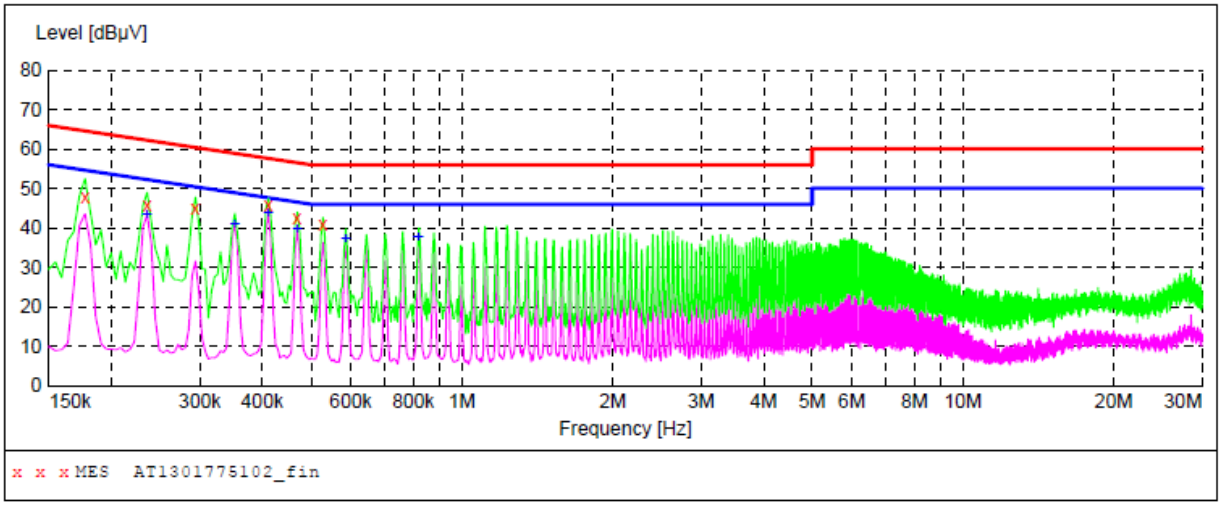
6/19/2013 10:04AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	43.90	20.1	55	10.7	AV	L1	GND
0.235500	43.90	20.1	52	8.4	AV	L1	GND
0.411000	45.30	20.1	48	2.3	AV	L1	GND
0.469500	39.80	20.1	47	6.7	AV	L1	GND
0.528000	35.40	20.1	46	10.6	AV	L1	GND
1.171000	36.30	20.2	46	9.7	AV	L1	GND

CONDUCTED EMISSION TEST DATA

EUT:	RazBee M/N: ZFX-226
Operating Condition:	Charging
Test Site:	1# Shielded Room
Operator:	Finley Li
Test Specification:	AC 120V/60Hz
Comment:	Neutral Line
	Tem:25℃ Hum:50%

SCAN TABLE: "Voltage(150K~30M)FIN"
Short Description: 150K-30M Disturbance Voltages



MEASUREMENT RESULT: "AT1301775102_fin"

6/19/2013 10:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	47.90	20.1	65	16.7	QP	N	GND
0.235500	45.90	20.1	62	16.4	QP	N	GND
0.294000	44.90	20.1	60	15.5	QP	N	GND
0.411000	45.80	20.1	58	11.8	QP	N	GND
0.469500	42.40	20.1	57	14.1	QP	N	GND
0.528000	41.10	20.1	56	14.9	QP	N	GND

MEASUREMENT RESULT: "AT1301775102_fin2"

6/19/2013 10:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.235500	43.20	20.1	52	9.1	AV	N	GND
0.352500	41.10	20.1	49	7.8	AV	N	GND
0.411000	43.80	20.1	48	3.8	AV	N	GND
0.469500	39.70	20.1	47	6.8	AV	N	GND
0.586500	37.10	20.1	46	8.9	AV	N	GND
0.820500	37.80	20.1	46	8.2	AV	N	GND

4. Radiation Interference

4.1. Requirements (15.249, 15.209):

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209 30 - 88 MHz	40 dBuV/m
902-928 MHZ		88 - 216 MHz	43.5
2.4-2.4835 GHz		216 - 960 MHz	46
94 dBμV/m @3m	54 dBμV/m @3m	ABOVE 960 MHz	54dBuV/m

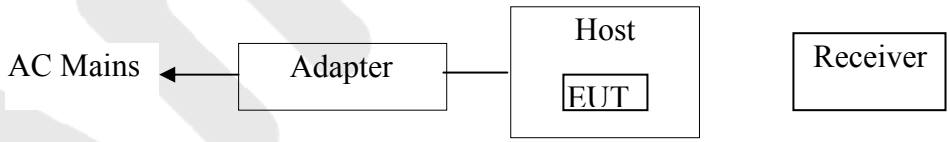
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

4.2. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 4.3.



4.3. Test Results

PASS.

Please refer the following pages.

Data:

Horizontal
CH Low(2405MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
239.98	1.58	13.50	38.90	57.46	33.66	46.00	-12.34	QP
2405.00	2.17	31.21	35.30	86.55	94.63	114.0	-19.37	Peak
2405.00	2.17	31.21	35.30	84.71	86.79	94.0	-8.21	AV
4810.10	2.56	34.01	34.71	41.15	43.01	74.0	-30.99	Peak
4810.10	2.56	34.01	34.71	38.26	40.12	54.0	-13.88	AV
7214.98	2.98	36.16	35.15	38.33	42.32	74.0	-31.68	Peak
7214.98	2.98	36.16	35.15	35.55	39.54	54.0	-14.46	AV
9620.00	---	---	---	---	---	---	---	---
12025.00	---	---	---	---	---	---	---	---
14430.00	---	---	---	---	---	---	---	---
16835.00	---	---	---	---	---	---	---	---
19240.00	---	---	---	---	---	---	---	---
21645.00	---	---	---	---	---	---	---	---
24050.00	---	---	---	---	---	---	---	---

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CH Middle(2440MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
312.18	1.60	13.52	38.82	56.41	32.71	46.00	-13.29	QP
2440.00	2.19	31.22	34.60	85.36	93.25	114.0	-20.75	Peak
2440.00	2.19	31.22	34.60	83.55	87.32	94.0	-6.68	AV
4880.08	2.57	35.00	34.58	39.62	42.61	74.0	-31.39	Peak
4880.08	2.57	35.00	34.58	37.47	40.46	54.0	-13.54	AV
7320.05	3.00	36.17	35.14	38.80	42.83	74.0	-31.17	Peak
7320.05	3.00	36.17	35.14	36.08	40.11	54.0	-13.89	AV
9760.00	---	---	---	---	---	---	---	---
12200.00	---	---	---	---	---	---	---	---
14640.00	---	---	---	---	---	---	---	---
17080.00	---	---	---	---	---	---	---	---
19520.00	---	---	---	---	---	---	---	---
21960.00	---	---	---	---	---	---	---	---
24400.00	---	---	---	---	---	---	---	---

CH High(2480MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
312.18	1.60	13.52	38.82	53.21	29.51	46.00	-16.49	QP
2480.00	2.20	31.65	36.00	92.77	90.62	114.0	-23.38	Peak
2480.00	2.20	31.65	36.00	89.51	87.36	94.0	-6.64	AV
4960.05	2.58	35.06	34.79	41.76	44.61	74.0	-29.39	Peak
4960.05	2.58	35.06	34.79	39.28	42.13	54.0	-11.87	AV
7439.97	3.02	36.19	34.90	39.53	43.84	74.0	-30.16	Peak
7439.97	3.02	36.20	35.20	37.40	41.42	54.0	-12.58	AV
9920.00	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14880.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---
19840.00	---	---	---	---	---	---	---	---
22320.00	---	---	---	---	---	---	---	---
24800.00	---	---	---	---	---	---	---	---

2356.8MHz （next section）

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
235.80	1.58	13.50	38.90	29.22	33.62	46.00	-12.38	QP
2356.80	2.17	31.21	35.30	39.54	40.63	114.0	-19.37	Peak
2356.80	2.17	31.21	35.30	38.71	39.79	94.0	-54.21	AV
4713.60	2.56	34.01	34.71	29.15	31.01	74.0	-42.99	Peak
4713.60	2.56	34.01	34.71	28.26	30.12	54.0	-23.88	AV
7070.40	2.98	36.16	35.15	30.33	32.32	74.0	-41.68	Peak
7070.40	2.98	36.16	35.15	30.55	32.54	54.0	-21.46	AV
9620.00	---	---	---	---	---	---	---	---
12025.00	---	---	---	---	---	---	---	---
14430.00	---	---	---	---	---	---	---	---
16835.00	---	---	---	---	---	---	---	---
19240.00	---	---	---	---	---	---	---	---
21645.00	---	---	---	---	---	---	---	---
24050.00	---	---	---	---	---	---	---	---

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Vertical
CH Low(2405MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
30.42	1.43	12.13	38.45	53.51	28.62	40.00	-11.38	QP
2405.00	2.17	31.21	35.30	84.23	90.34	114.0	-23.66	Peak
2405.00	2.17	31.21	35.30	81.85	86.93	94.0	-7.07	AV
4810.10	2.56	34.01	34.71	41.05	42.91	74.0	-31.09	Peak
4810.10	2.56	34.01	34.71	38.61	40.47	54.0	-13.53	AV
7207.93	2.98	36.16	35.15	37.46	41.45	74.0	-32.55	Peak
7207.93	2.98	36.16	35.15	34.50	38.49	54.0	-15.51	AV
9620.00	---	---	---	---	---	---	---	---
12025.00	---	---	---	---	---	---	---	---
14430.00	---	---	---	---	---	---	---	---
16835.00	---	---	---	---	---	---	---	---
19240.00	---	---	---	---	---	---	---	---
21645.00	---	---	---	---	---	---	---	---
24050.00	---	---	---	---	---	---	---	---

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CH Middle(2440MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
143.82	1.50	13.40	38.89	53.91	29.92	43.50	-13.58	QP
2440.01	2.19	31.22	34.60	82.35	91.16	114.0	-22.84	Peak
2440.01	2.19	31.22	34.60	81.01	86.82	94.0	-7.18	AV
4882.11	2.57	35.00	34.58	40.15	43.14	74.0	-30.86	Peak
4882.11	2.57	35.00	34.58	37.86	40.85	54.0	-13.15	AV
7320.05	3.00	36.17	35.14	38.70	42.73	74.0	-31.27	Peak
7320.05	3.00	36.17	35.14	36.01	40.04	54.0	-13.96	AV
9760.00	---	---	---	---	---	---	---	---
12200.00	---	---	---	---	---	---	---	---
14640.00	---	---	---	---	---	---	---	---
17080.00	---	---	---	---	---	---	---	---
19520.00	---	---	---	---	---	---	---	---
21960.00	---	---	---	---	---	---	---	---
24400.00	---	---	---	---	---	---	---	---

CH High(2480MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
408.80	1.62	13.54	38.45	51.17	27.82	46.00	-18.12	QP
2480.00	2.20	31.65	36.00	83.52	91.37	114.0	-22.63	Peak
2480.00	2.20	31.65	36.00	82.03	86.88	94.0	-7.12	AV
4960.10	2.58	35.06	34.79	40.08	42.93	74.0	-31.07	Peak
4960.10	2.58	35.06	34.79	38.10	40.95	54.0	-13.05	AV
7439.97	3.02	36.19	34.90	38.58	42.89	74.0	-31.11	Peak
7439.97	3.02	36.20	35.20	36.34	40.36	54.0	-13.64	AV
9920.00	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14880.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---
19840.00	---	---	---	---	---	---	---	---
22320.00	---	---	---	---	---	---	---	---
24800.00	---	---	---	---	---	---	---	---

2356.8MHz

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
235.92	1.43	12.13	38.45	53.51	28.98	40.00	-11.02	QP
2356.80	2.17	31.21	35.30	35.23	40.34	114.0	-73.66	Peak
2356.80	2.17	31.21	35.30	29.85	34.93	94.0	-50.07	AV
4713.60	2.56	34.01	34.71	31.05	32.91	74.0	-42.09	Peak
4713.60	2.56	34.01	34.71	32.61	34.47	54.0	-19.53	AV
7070.40	2.98	36.16	35.15	30.46	31.45	74.0	-42.55	Peak
7070.40	2.98	36.16	35.15	32.50	33.49	54.0	-20.51	AV
9620.00	---	---	---	---	---	---	---	---
12025.00	---	---	---	---	---	---	---	---
14430.00	---	---	---	---	---	---	---	---
16835.00	---	---	---	---	---	---	---	---
19240.00	---	---	---	---	---	---	---	---
21645.00	---	---	---	---	---	---	---	---
24050.00	---	---	---	---	---	---	---	---

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NOTE: " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5. Occupied Bandwidth

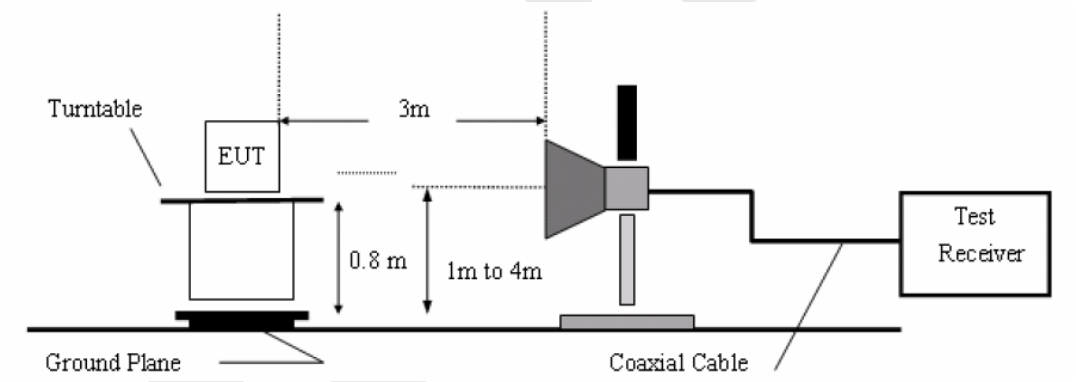
5.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

5.2. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

5.3. Test Configuration:

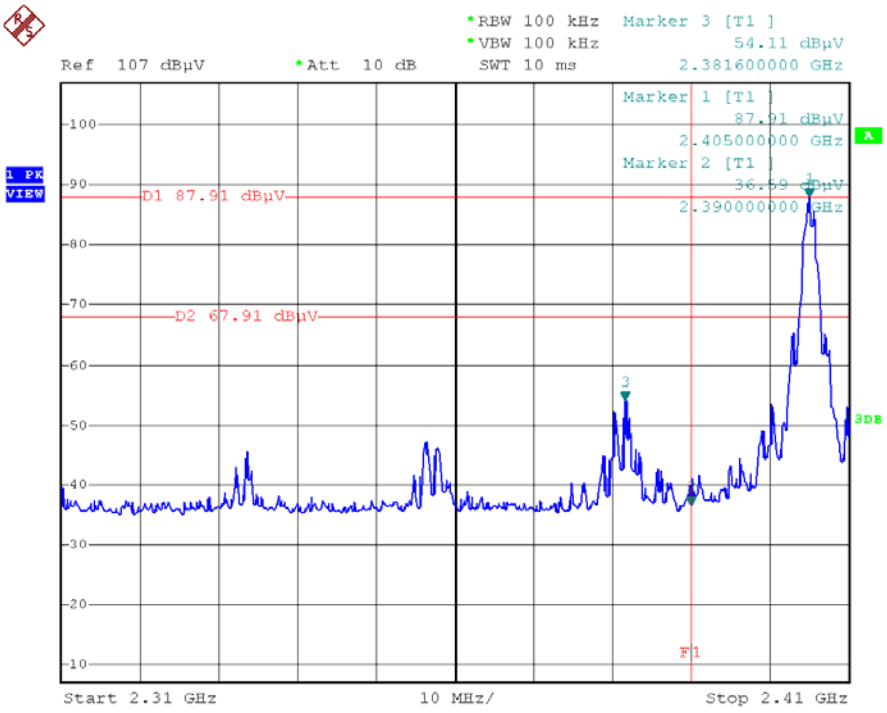


5.4. Test Results

Pass.

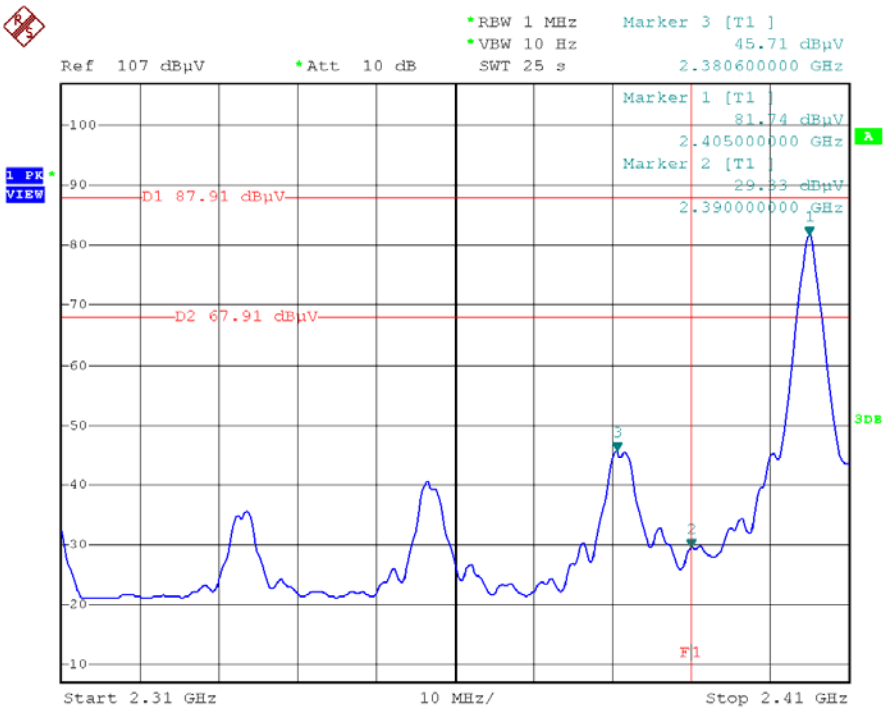
Please refer the following plot.

(Note: Marker 3 means the highest value in 2.39GHz~2.4GHz or 2.4835~2.5GHz)



Power

Date: 28.JAN.2013 11:08:50

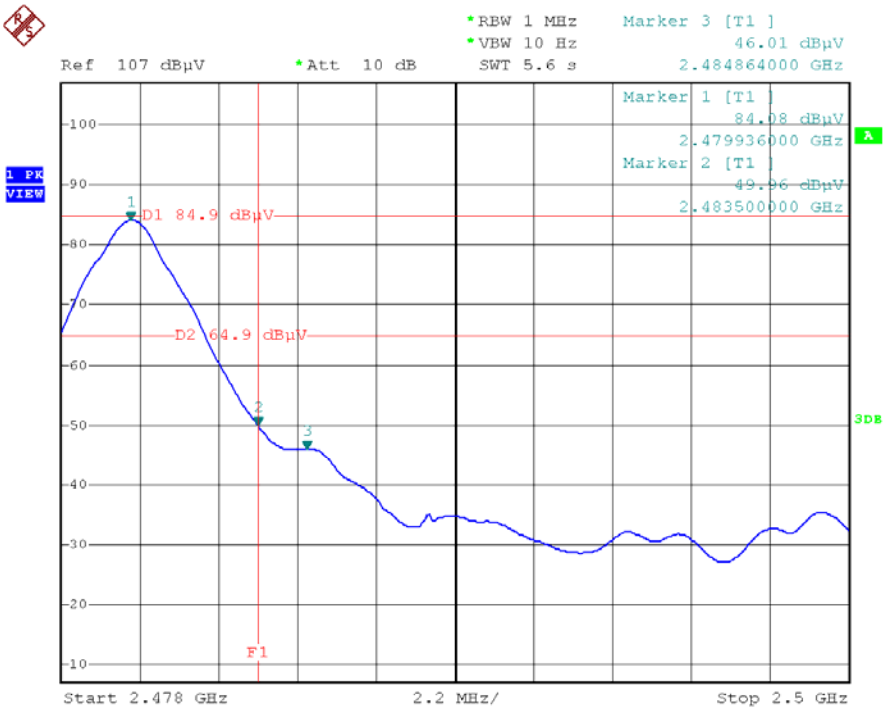


Power

Date: 28.JAN.2013 11:12:12

Power

Date: 28.JAN.2013 11:17:51



Power

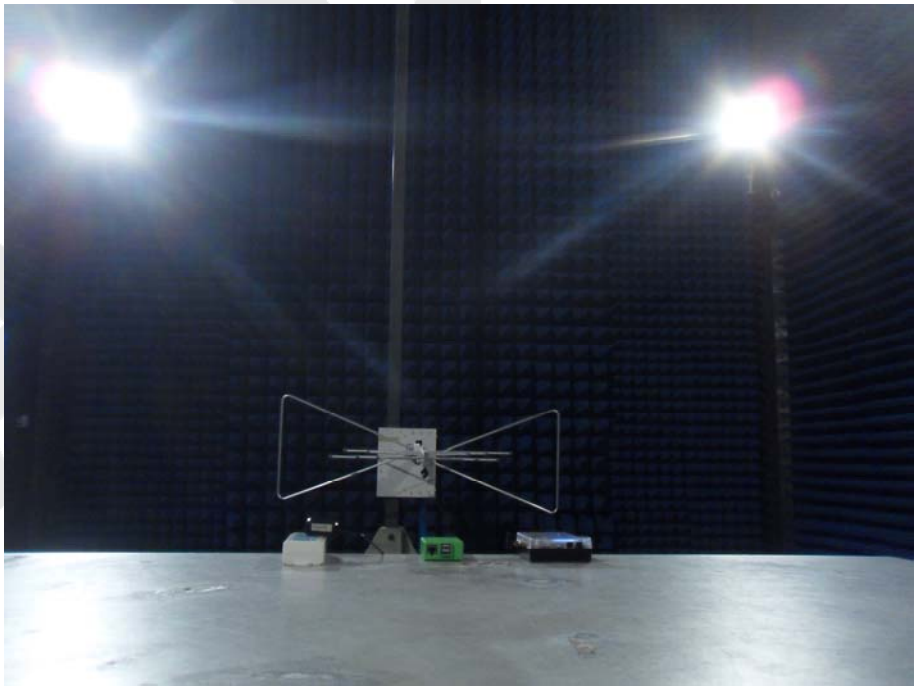
Date: 28.JAN.2013 11:20:03

6. PHOTOGRAPH

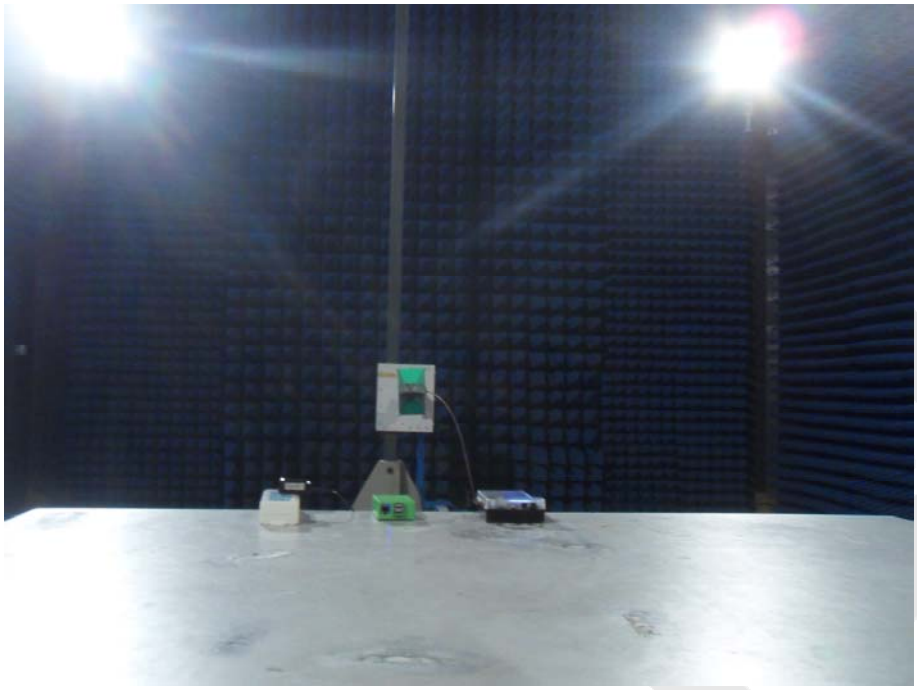
6.1. Photo of Conducted Emission Test

6.2. Photo of Radiated Emission Test

Below 1G



Above 1G



APPENDIX I (External Photos)

Figure 1
The Overall View

Figure 2
The Overall View

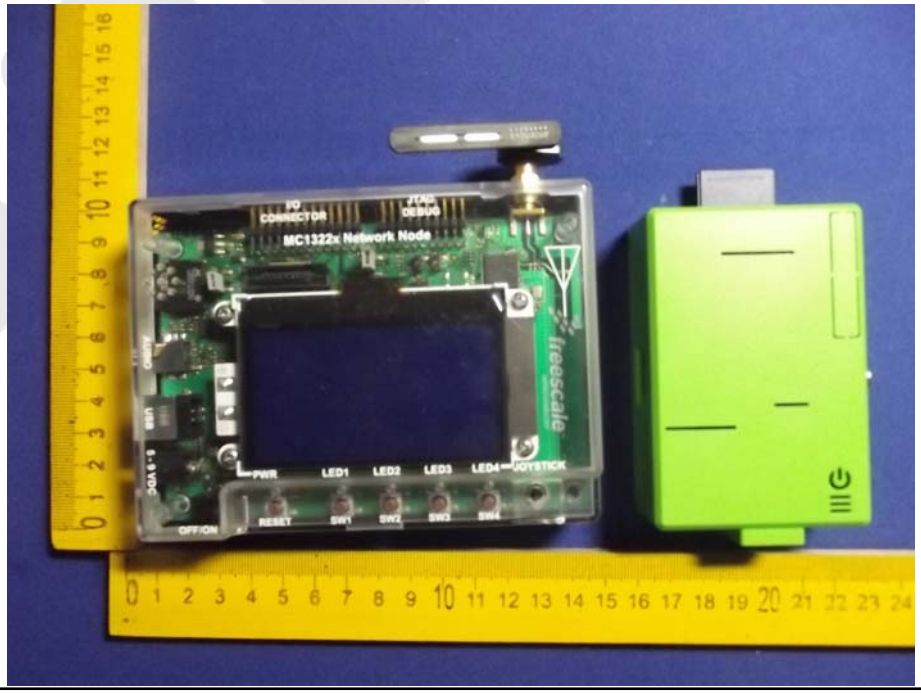


Figure 3
The Overall View

Figure 4
The Host-Front View

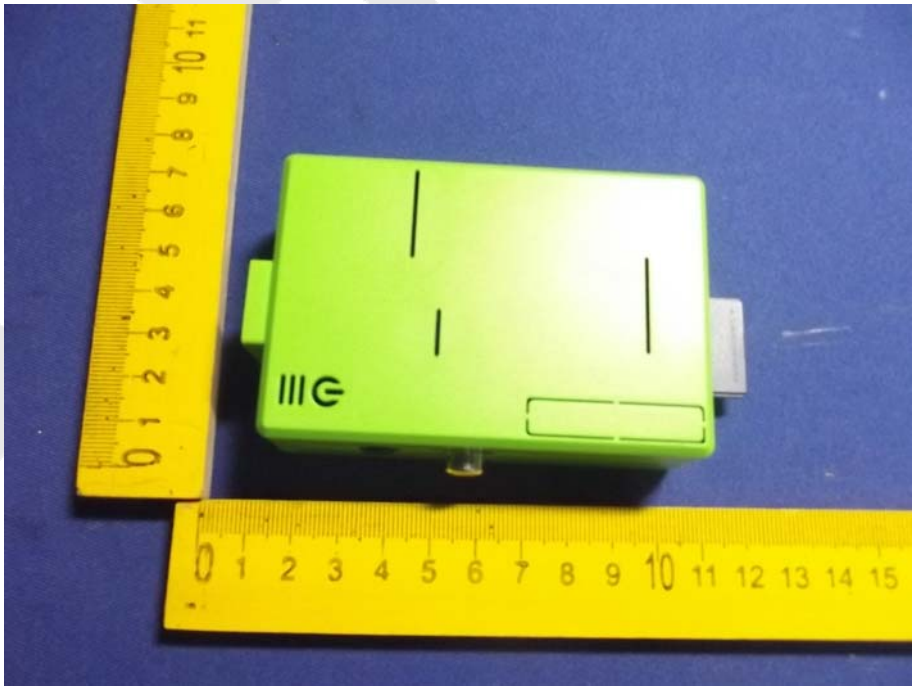
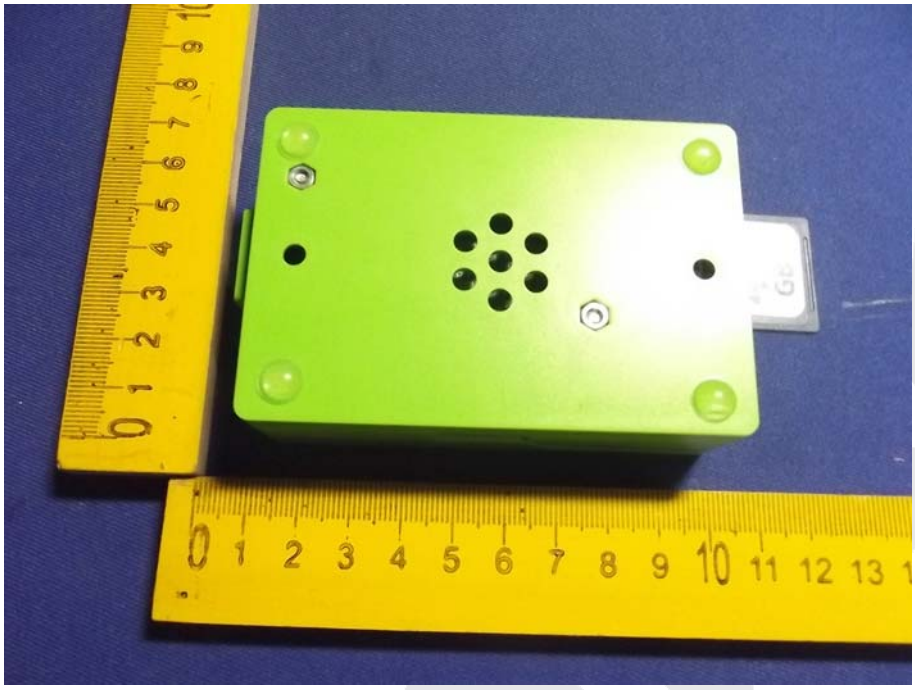


Figure 5
The Host-Back View



APPENDIX Ⅱ (Internal Photos)

Figure 6
The EUT-Inside View

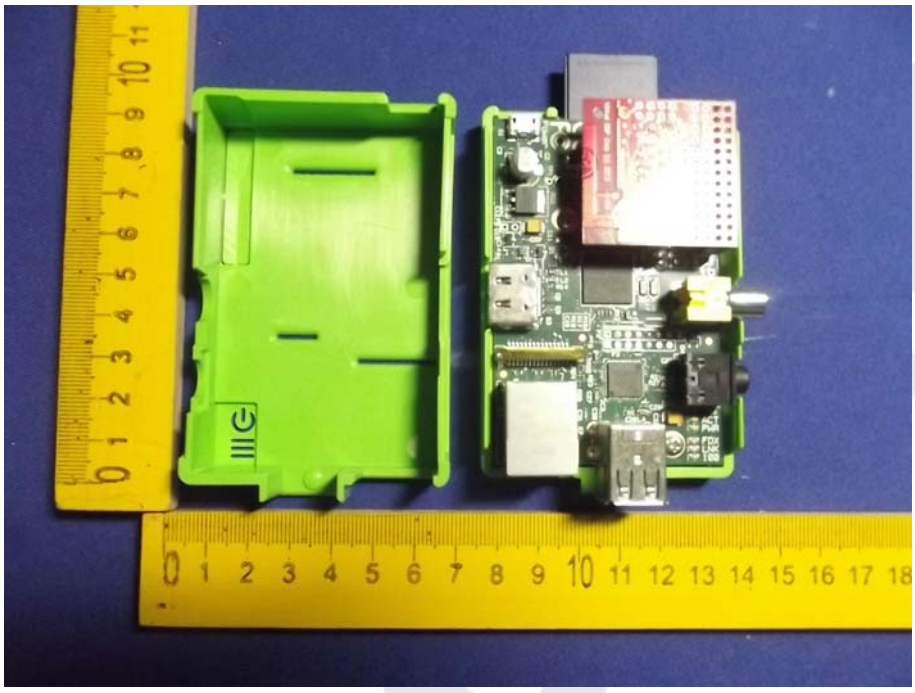


Figure 7
The EUT-Inside View

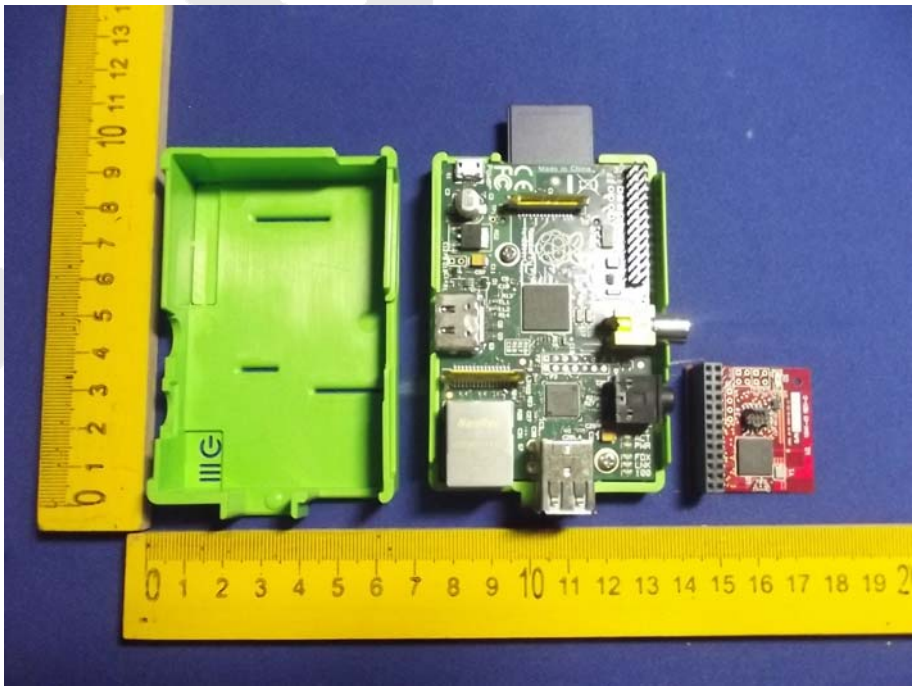


Figure 8
PCB of the EUT-Front View

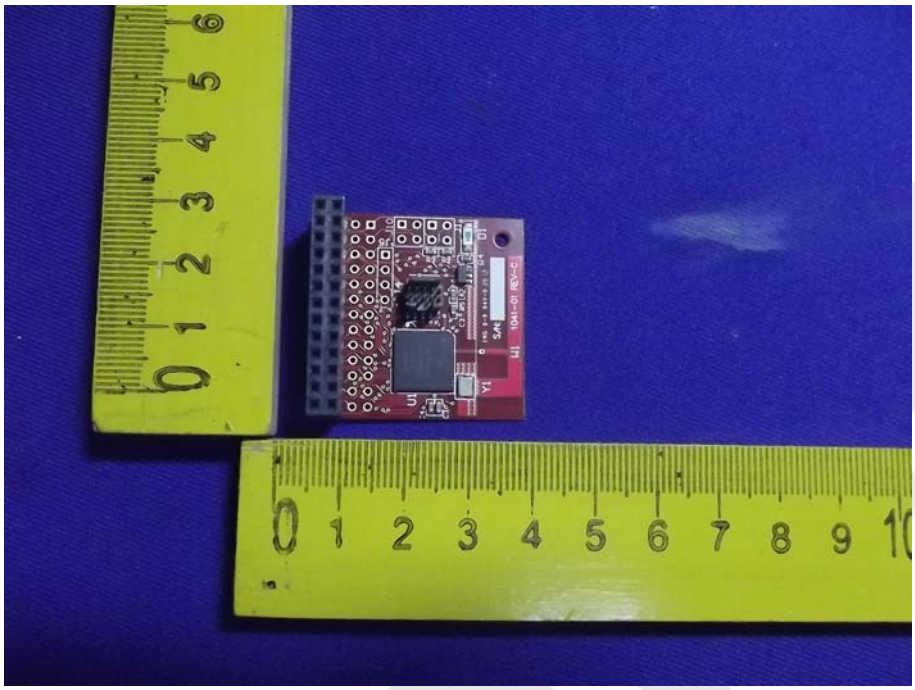


Figure 9
PCB of the EUT-Back View