Test Report No. 7191004565-EEC11/03
dated 04 May 2011

PSB Singapore

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FORMAL REPORT ON TESTING IN ACCORDANCE WITH
47 CFR FCC Parts 15B & C : 2011
OF A
miCoach CONNECT
[Model : V42037]
[FCC ID : ZLGIPHDONGLE]

TEST FACILITY	TÜV SÜD PSB Pte Ltd, Electrical & Electronics Centre (EEC), Product Services, No. 1 Science Park Drive, Singapore 118221
FCC REG. NO.	99142 (3m and 10m Semi-Anechoic Chamber, Science Park)
IND. CANADA REG. NO.	2932I-1 (3m and 10m Semi-Anechoic Chamber, Science Park)
PREPARED FOR	PCA Technology Ltd #03-01 Loyang Industrial Estate Blk 4 Loyang Lane Singapore 508914 Tel : +65 6545 4542 Fax : +65 6545 4832
QUOTATION NUMBER	219127919
JOB NUMBER	7191004565
TEST PERIOD	13 Apr 2011 – 27 Apr 2011

PREPARED BY

Quek Keng Huat
Associate Engineer

APPROVED BY

Lim Cher Hwee
Assistant Vice President

TÜV SÜD PSB

ilac-MRA ACCREDITED LABORATORY SAC-SINGLAS

LA-2007-0380-A
LA-2007-0380-A-1
LA-2007-0381-F
LA-2007-0382-B
LA-2007-0383-G
LA-2007-0384-G
LA-2007-0385-E
LA-2007-0386-C

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme. Tests/Calibrations marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our laboratory.

Laboratory:
TÜV SÜD PSB Pte. Ltd.
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Singapore 118221

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The Franklin, Singapore 118223

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TEST SUMMARY

The product was tested in accordance with the customer's specifications.

Test Results Summary

Test Standard	Description	Pass / Fail
47 CFR FCC Part 15: 2011		
15.107(a), 15.207	Conducted Emissions	Not Tested *See Note 5
15.109(a), 15.205, 15.209	Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement)	Pass
15.249(a)	Radiated Emissions (Fundamental and Harmonics)	Pass

Notes

1. Three channels as listed below, which respectively represent the lower, middle and upper channels of the Equipment Under Test (EUT) were chosen and tested. For each channel, the EUT was configured to operate in the test mode.

Transmit Channel	Frequency (MHz)
Channel 0	2.402
Channel 3	2.457
Channel 7	2.480

2. The EUT is a Class B device when in non-transmitting state and meets the 47 CFR FCC Part15B Class B requirements.

3. All test measurement procedures are according to ANSI C63.4: 2003.

4. The maximum measured RF power of the Equipment Under Test is -24.1dBm.

5. The Equipment Under Test (EUT) is a battery operated device and contains no provision for public utility connections.

6. The EUT was tested using a fully charged Apple iPOD.

Modifications

No modifications were made.

PRODUCT DESCRIPTION

Description	:	The Equipment Under Test (EUT) is a **miCoach Connect (for iPod/iPhone)** with a 2.4GHz Transceiver with ANT + communication link.
Factor (ies)	:	PCA Technology (M) Sdn Bhd 12 & 12B Jalan Bayu, Kawasan Perindustrian Hasil 81200 Johor Bahru, Johor Malaysia
Manufacturer	:	Adidas AG World Of Sports, Adi-Dassler-Straβe 1, D-91074 Herzogenaurach Germany Tel +49 9132 84 2687 Fax +91 9132 84 5773
Model Number(s)	:	V42037
Serial Number(s)	:	Nil
Microprocessor(s)	:	Microchip PIC18LF45K22T-I/MV
Operating Frequency	:	Low (Channel 0) 2.402GHz Mid (Channel 3) 2.457GHz High (Channel 7) 2.480GHz
Clock / Oscillator Frequency	:	16MHz for RF IC and 12MHz for microprocessor
Modulation	:	Gaussian Frequency Shift Keying (GFSK)
Antenna Gain	:	5dBi
Port / Connectors	:	Apple 30pin Male Connector
Rated Input Power	:	Max power provided by iPod is 100mA @ 3.3V. 330mW rated input power
Accessories (Optional)	:	i. HRM ii. SDM iii. Chest Strip iv. Addias Shoe

SUPPORTING DESCRIPTION DESCRIPTION

Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
HP Probook Laptop	M/N: 442IS S/N: CNF0461FYW FCC ID: DoC	2.00m unshielded power cable
HP Power Adapter (Laptop)	M/N: PPP012H-S S/N: F12941039209960 FCC ID: DoC	2.00m unshielded power cable
Garmin Wireless USB Stick	M/N: USB-1 S/N: Nil FCC ID: 06RUSB-A	Nil
Apple iPOD	M/N: 3G 8Gb S/N: 1D0284J175J FCC ID: BCGA1288	Nil
Apple iPOD	M/N: 4G 8Gb S/N: C3XDFQBYDCP7 FCC ID: BCG-E2407	Nil

EUT OPERATING CONDITIONS

47 CFR FCC Part 15
1. Radiated Emissions (Spurious Emissions inclusive Restricted Bands Requirement) **2. Radiated Emissions (Fundamental and Harmonics)**
The EUT was exercised by operating in maximum continuous transmission in test mode, i.e transmitting at lower, middle and upper channels respectively at one time.

47 CFR FCC Part 15.205 Restricted Bands

MHz			MHz			MHz			GHz		
0.090	-	0.110	16.42	-	16.423	399.9	-	410	4.5	-	5.15
0.495	-	0.505	16.69475	-	16.69525	608	-	614	5.35	-	5.46
2.1735	-	2.1905	16.80425	-	16.80475	960	-	1240	7.25	-	7.75
4.125	-	4.128	25.5	-	25.67	1300	-	1427	8.025	-	8.5
4.17725	-	4.17775	37.5	-	38.25	1435	-	1626.5	9.0	-	9.2
4.20725	-	4.20775	73	-	74.6	1645.5	-	1646.5	9.3	-	9.5
6.215	-	6.218	74.8	-	75.2	1660	-	1710	10.6	-	12.7
6.26775	-	6.26825	108	-	121.94	1718.8	-	1722.2	13.25	-	13.4
6.31175	-	6.31225	123	-	138	2200	-	2300	14.47	-	14.5
8.291	-	8.294	149.9	-	150.05	2310	-	2390	15.35	-	16.2
8.362	-	8.366	156.52475	-	156.52525	2483.5	-	2500	17.7	-	21.4
8.37625	-	8.38675	156.7	-	156.9	2690	-	2900	22.01	-	23.12
8.41425	-	8.41475	162.0125	-	167.17	3260	-	3267	23.6	-	24.0
12.29	-	12.293	167.72	-	173.2	3332	-	3339	31.2	-	31.8
12.51975	-	12.52025	240	-	285	3345.8	-	3358	36.43	-	36.5
12.57675	-	12.57725	322	-	335.4	3600	-	4400	Above 38.6		
13.36	-	13.41									

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Limits

Frequency Range (MHz)	Quasi-Peak Limit Values (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*
* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.	

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1 (Ref)	ESMI	849182/003 848926/007	28 Feb 2012
Schaffner Preamplifier (9kHz-2GHz)	CPA9231A	18775	26 Apr 2012
Teseq Preamplifier (9kHz-1GHz)	LNA6901	72267	23 Jun 2011
Teseq Preamplifier (1GHz-18GHz) (PA17)	LNA6018	70215	08 Feb 2012
Schaffner Bilog Antenna(30MHz-2GHz) – BL4	CBL6112B	2593	15 Jun 2011
EMCO Horn Antenna (1GHz-18GHz)- H2	3115	9403-4250	11 Jun 2011

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Setup

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Test Method

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from 30MHz to 10th harmonics of the EUT fundamental frequency, using the Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

Sample Calculation Example

At 300 MHz Q-P limit (Class B) = 200 μV/m = 46.0 dBμV/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV/m (Calibrated level including antenna factors & cable losses)
Therefore, Q-P margin = 40.0 - 46.0 = -6.0 i.e. 6 dB below Q-P limit

Radiated Emissions Test Setup (Front View)

Radiated Emissions Test Setup (Rear View)

47 CFR FCC Parts 15.109(a) and 15.209 Radiated Emission Results

Test Input Power	Powered by iPOD	Temperature	22°C
Test Distance	3m	Relative Humidity	52%
		Atmospheric Pressure	1030mbar
		Tested By	Chelmin Li

Spurious Emissions ranging from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Margin (dB)	Azimuth (Degrees)	Height (cm)	Polarisation (H/V)	Channel
40.0150	17.8	-22.2	0	400	H	0
97.9730	25.6	-17.9	355	240	V	0
175.2680	11.4	-32.1	36	295	H	0
196.2300	17.1	-26.4	62	376	V	0
224.2600	7.7	-38.3	91	267	H	0
279.8630	8.8	-37.2	308	154	V	0

Spurious Emissions above 1GHz

Frequency (GHz)	Peak Value (dBµV/m)	Peak Margin (dB)	Average Value (dBµV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Channel
1077.6640	51.9	-22.1	43.0	-11.0	0	180	V	3
1358.2790	52.7	-21.3	44.7	-9.3	194	241	V	3
1541.8500	52.1	-21.9	42.5	-11.5	193	133	V	3
1739.8030	51.2	-22.8	43.1	-10.9	279	374	H	3
2127.5430	52.0	-22.0	43.2	-10.8	310	307	H	3
5000.7240	51.2	-22.8	42.2	-11.8	156	100	H	3

Notes

1. All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. The EUT was found to be in the worst case condition when it was orientated in a horizontal position.
3. Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by measuring the absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
4. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
5. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
   30MHz - 1GHz
   RBW: 120kHz VBW: 1MHz
   >1GHz
   RBW: 1MHz VBW: 1MHz
6. The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
7. The channel in the table refers to the transmit channel of the EUT.
8. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is ±4.6dB.

RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Limits

Fundamental Frequency (MHz)	Field Strength of Fundamental Limit Values @ 3m (dBµV/m) *	Field Strength of Harmonics Limit Values @ 3m (dBµV/m) *
902 - 928	94.0	54.0
2400 - 2483.5	94.0	54.0
5725 - 5875	94.0	54.0
24000 - 24250	108.0	68.0
* Quasi peak detector was employed for frequency up to 1GHz. For above 1GHz frequency, average detector was used. A peak limit of 20dB above the average limit does apply.		

47 CFR FCC Parts 15.249(a) Radiated Emission (Fundamental and Harmonics) Test Instrumentation

Instrument	Model	S/No	Cal Due Date
R&S Test Receiver (20Hz –26.5GHz) – ESMI1 (Ref)	ESMI	849182/003 848926/007	28 Feb 2012
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RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Test Setup

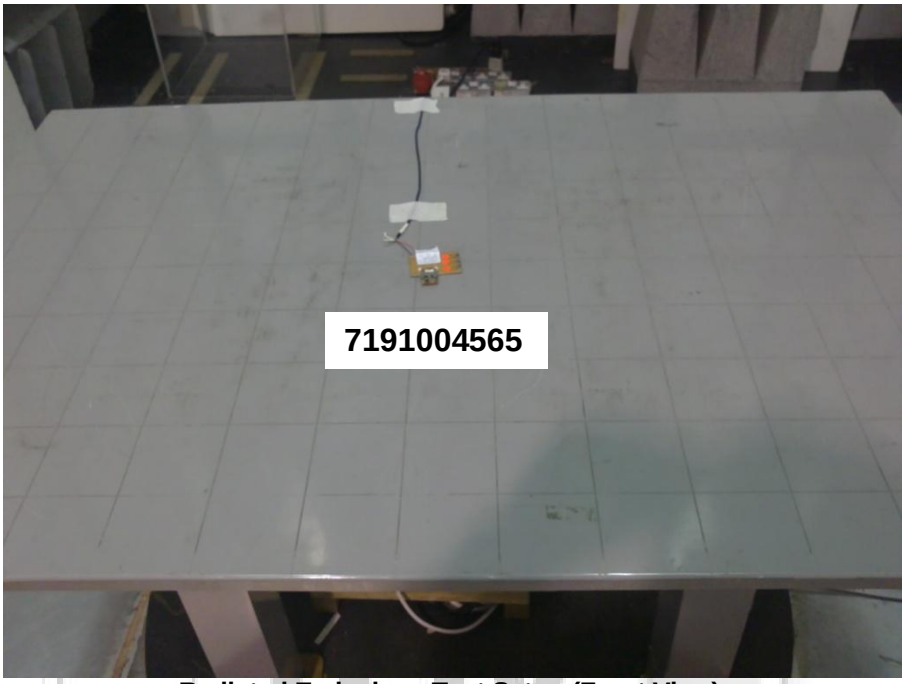
1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m X 1.0m X 0.8m high, non-metallic table.
2. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.
3. The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Test Method

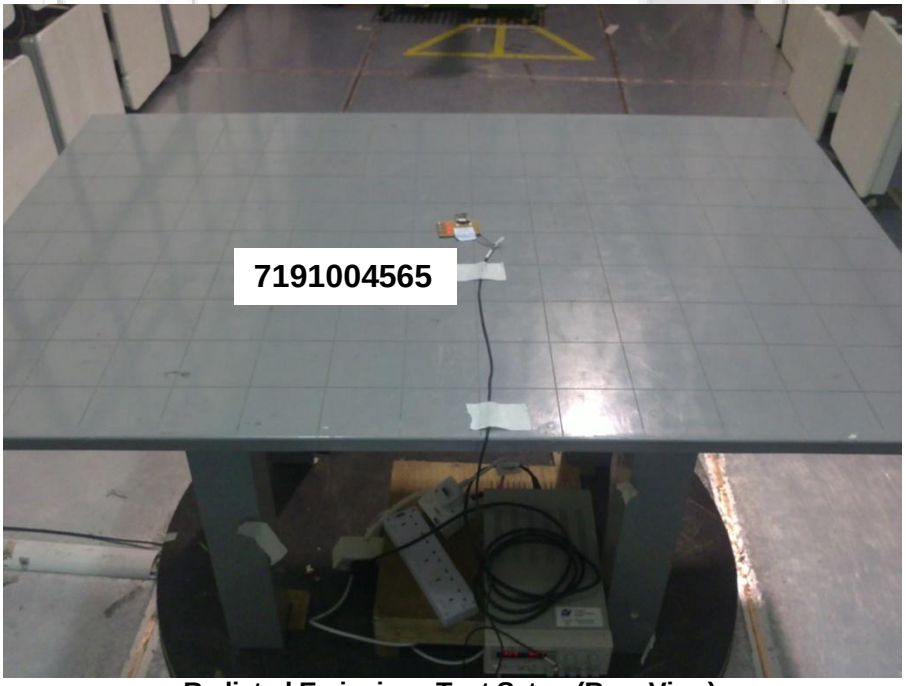
1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. A prescan was carried out to pick the fundamental and harmonics emission frequencies from the EUT. For EUT which is a portable device, the prescan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.
3. The test was carried out at the selected frequency points obtained from the prescan in step 2. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
4. A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.
5. Steps 3 and 4 were repeated for the next frequency point, until all selected frequency points were measured.
6. The frequency range covered was from the EUT fundamental frequency until its 10^{th} harmonics, using the Bi-log antenna for frequencies from 30MHz up to 1GHz, and the Horn antenna above 1GHz.

Sample Calculation Example

At 300 MHz Q-P limit (Class B) = 200 μV/m = 46.0 dBμV/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV/m (Calibrated level including antenna factors & cable losses)
Therefore, Q-P margin = 40.0 - 46.0 = -6.0 i.e. 6 dB below Q-P limit



Radiated Emissions Test Setup (Front View)



Radiated Emissions Test Setup (Rear View)

RADIATED EMISSION (FUNDAMENTAL AND HARMONICS) TEST

47 CFR FCC Part 15.249(a) Radiated Emission (Fundamental and Harmonics) Results

Test Input Power	Powered by iPOD	Temperature	24°C
Test Distance	3m	Relative Humidity	58%
		Atmospheric Pressure	1030mbar
		Tested By	Dylan Lin

Fundamental and harmonics field strength above 1GHz (Channel 0)

Frequency (GHz)	Peak Value (dBµV/m)	Average Value (dBµV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Note
2.4020	61.7	50.1	-43.9	7	118	H	Fundamental
4.8055	36.1	24.0	-30.0	317	162	H	Harmonics
7.2055	46.3	29.9	-24.1	149	219	H	Harmonics
9.6000	45.4	30.5	-23.5	290	194	H	Harmonics
12.0200	44.0	29.2	-24.8	27	177	H	Harmonics

Fundamental and harmonics field strength above 1GHz (Channel 3)

Frequency (GHz)	Peak Value (dBµV/m)	Average Value (dBµV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Note
2.4570	64.8	50.8	-43.2	2	200	H	Fundamental
4.9533	40.6	22.6	-31.4	312	200	H	Harmonics
7.3160	35.7	26.1	-27.9	305	200	H	Harmonics
9.8333	44.3	33.8	-20.2	43	100	H	Harmonics
12.2444	44.5	30.4	-23.6	49	100	H	Harmonics

Fundamental and harmonics field strength above 1GHz (Channel 7)

Frequency (GHz)	Peak Value (dBµV/m)	Average Value (dBµV/m)	Average Margin (dB)	Azimuth (Degrees)	Height (cm)	Pol (H/V)	Note
2.4800	61.6	50.5	-43.5	31	100	H	Fundamental
4.9333	35.4	24.6	-29.4	302	100	H	Harmonics
7.4911	42.4	30.3	-23.7	348	400	V	Harmonics
9.9388	43.6	32.8	-21.2	37	100	H	Harmonics
12.4644	43.0	30.0	-24.0	27	200	H	Harmonics

Notes

1. All possible modes of operation were investigated. Only the worst case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2. The EUT was found to be in the worst case condition when it was orientated in a horizontal position.
3. Quasi-peak measurement was used for frequency measurement up to 1GHz. Average and peak measurements were used for emissions above 1GHz. The average measurement was done by measuring the absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
4. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
5. EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings:
   30MHz - 1GHz
   RBW: 120kHz VBW: 1MHz
   >1GHz
   RBW: 1MHz VBW: 1MHz
6. The upper frequency of radiated emission investigations was according to requirements stated in Section 15.33(a) for intentional radiators & Section 15.33(b) for unintentional radiators.
7. The channel in the table refers to the transmit channel of the EUT.
8. Radiated Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2, in the range 30MHz – 25GHz is ±4.6dB.

This Report is issued under the following conditions:

1. Results of the testing/calibration in the form of a report will be issued immediately after the service has been completed or terminated.

2. Unless otherwise requested, this report shall contain only technical results carried out by TÜV SÜD PSB. Analysis and interpretation of the results and professional opinion and recommendations expressed thereupon, if required, shall be clearly indicated and additional fee paid for, by the Client.

3. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.

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9. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.

10. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

March 2010

PSB Singapore

EUT PHOTOGRAPHS / DIAGRAMS **ANNEX A**

ANNEX A

EUT PHOTOGRAPHS / DIAGRAMS

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EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

EUT PHOTOGRAPHS

Front View

Rear View

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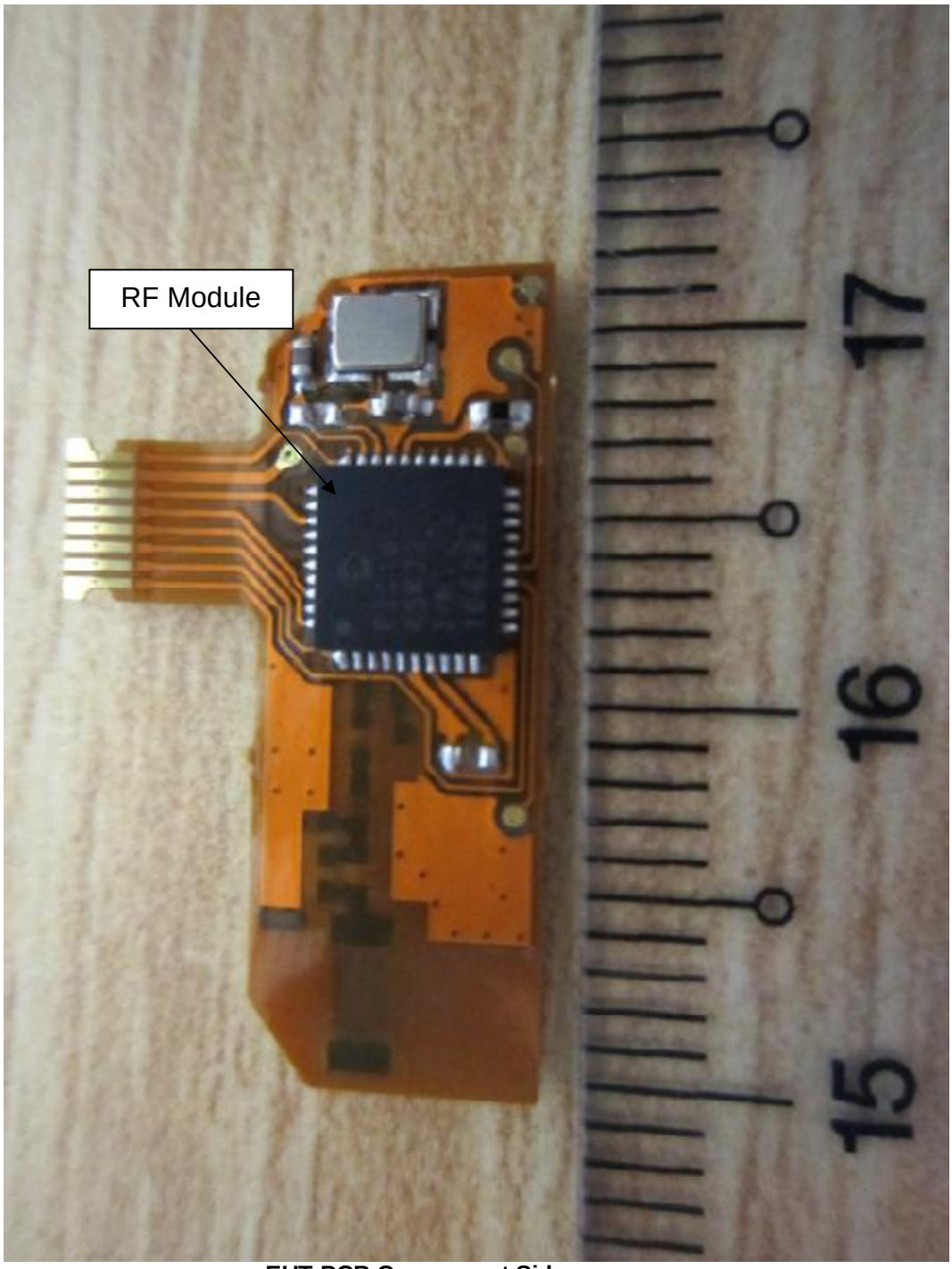
EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

EUT PHOTOGRAPHS



EUT PCB Component Side

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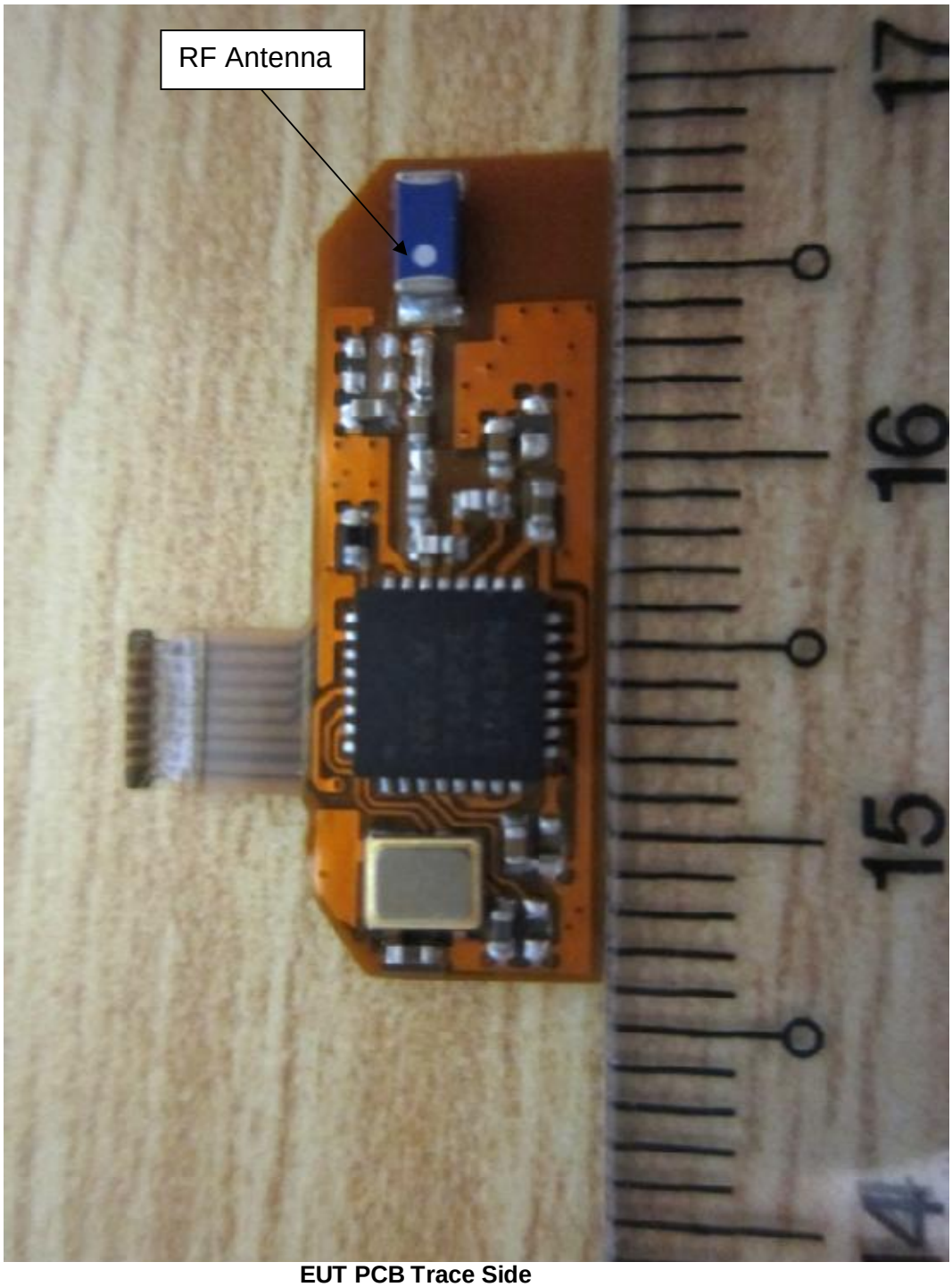
EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

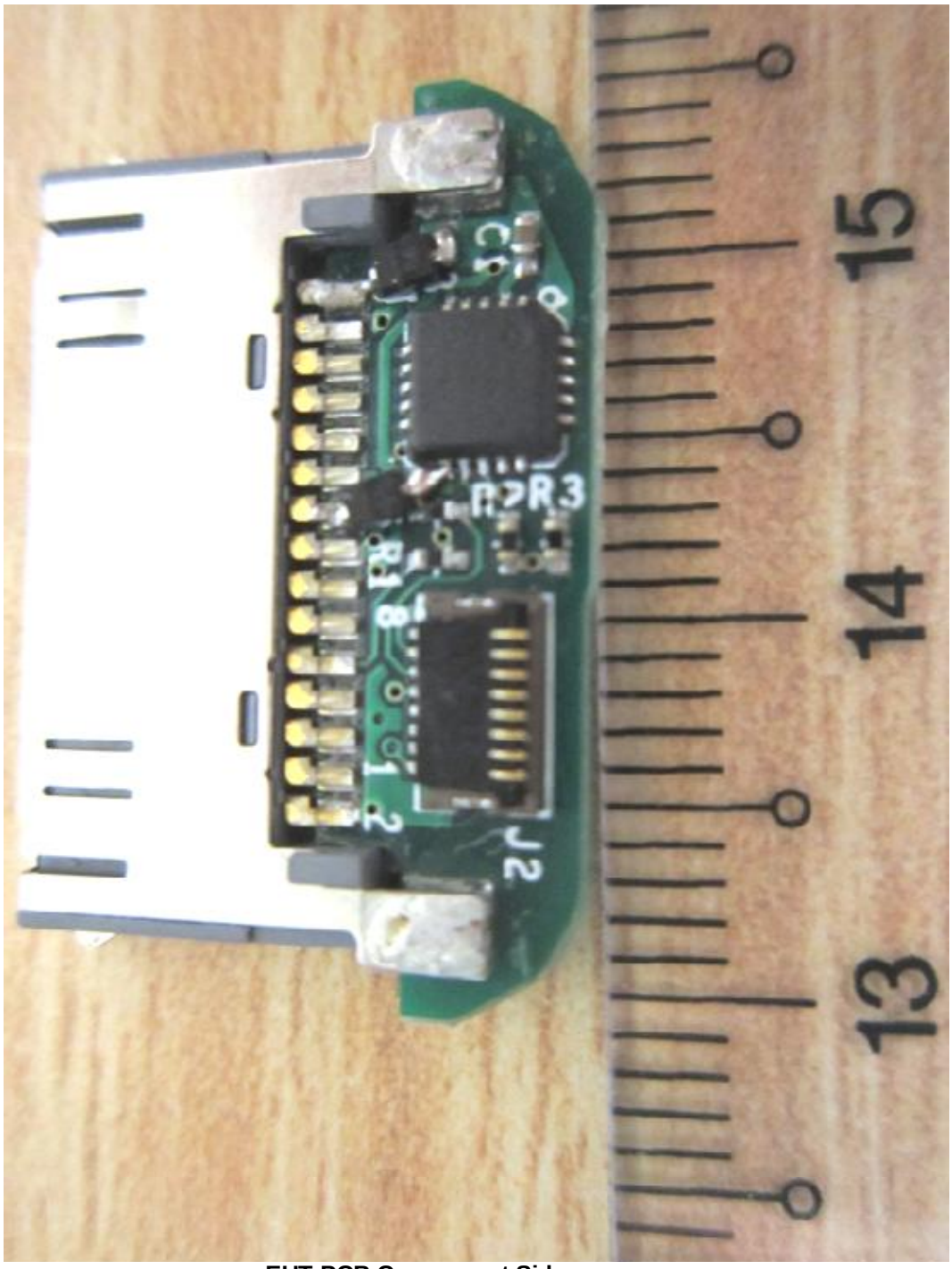
EUT PHOTOGRAPHS



EUT PCB Trace Side

EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

EUT PHOTOGRAPHS



EUT PCB Component Side

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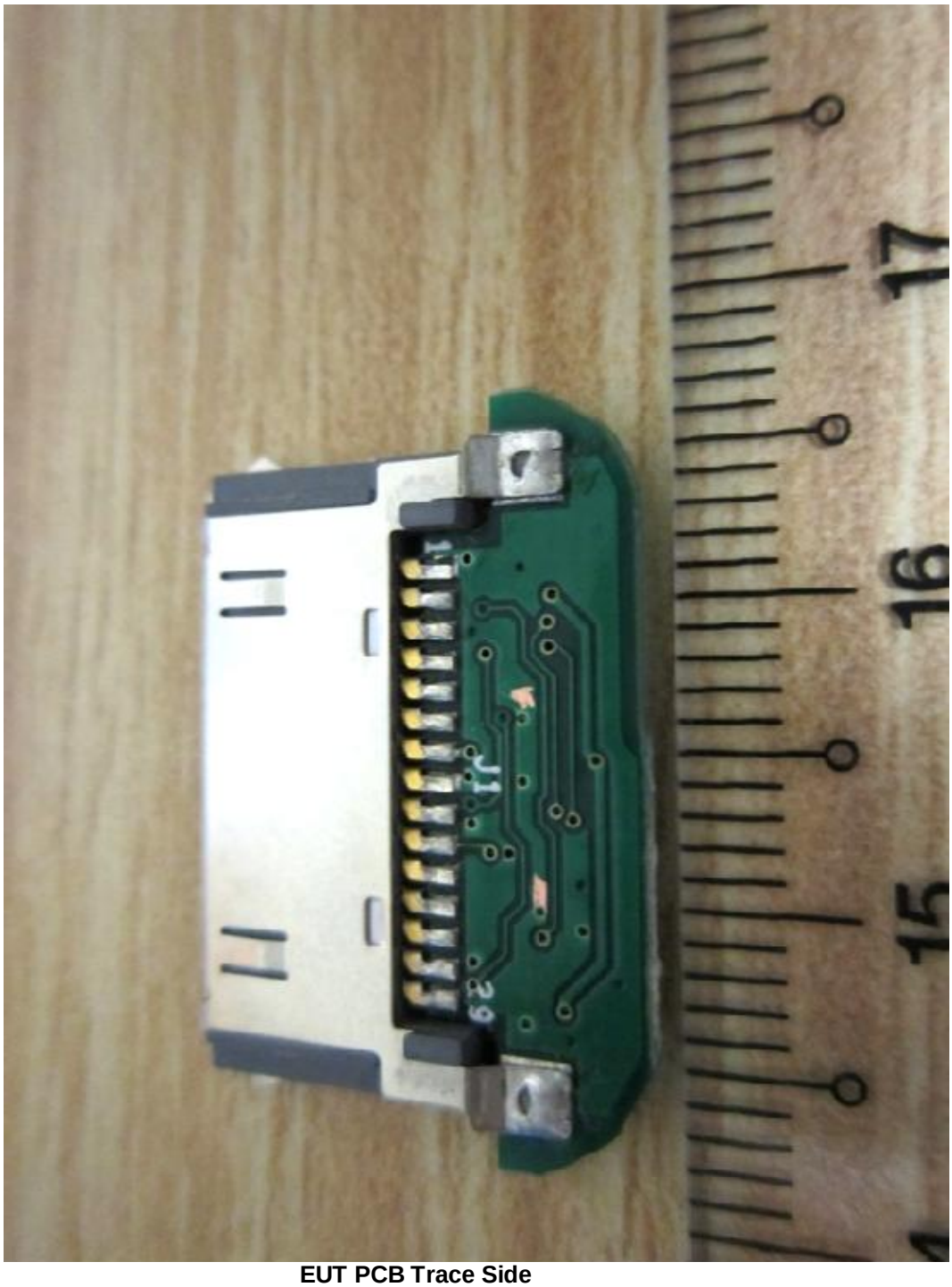
EUT PHOTOGRAPHS / DIAGRAMS — ANNEX A

EUT PHOTOGRAPHS



EUT PCB Trace Side

ANNEX B

FCC LABEL & POSITION

(Due to the size of the EUT, the label will be inserted in the user manual.
Please refer to manufacturer for details)

USER MANUAL TECHINCAL DESCRIPTION BLOCK & CIRCUIT DIAGRAM **ANNEX C**

ANNEX C

USER MANUAL
TECHNICAL DESCRIPTION
BLOCK & CIRCUIT DIAGRAMS

(Please refer to manufacturer for details)