



Hong Kong

FCC / IC – Test report

Report Number : **60/790.13.021.01** Date of Issue: 07th Aug 2013

Model : **Node 1.1, Node 2.1**

Product Type : **Bicycle Computer**

Applicant : Dayton Industrial Co., Ltd.

Address : 2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong

Production Facility : Kendy Enterprise Ltd.

Address : 2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories, Hong Kong

Test Result : **Positive** **Negative**

Total pages including Appendices : 17

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Report Number: **60/790.13.021.01**

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Rev. no.: 2.1



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Hong Kong

2. Details about the Test Laboratory

Details about the Test Laboratory

Test site 1

Company name: TÜV SÜD HONG KONG LTD.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin
HK.

Telephone: 852 2776 1323

Fax: 852 2776 1372

Test site 2

Company name: TMC-Telecommunication Metrology Center of M.I.I.T
No 52 Hua Yuanbei Road, Haidian District, Beijing, P.R.China



3. Description of the Equipment Under Test

Description of the Equipment Under Test

Product:	Bicycle Computer
Model no.:	Node 1.1, Node 2.1
Serial number:	NIL
Options and accessories:	NIL
Rated Voltage:	3.0 VDC
Rated Current:	NIL
Rated Power:	NIL
Frequency:	NIL
RF Transmission Frequency:	2457MHz
Antenna gain:	0 dBi
No. of Operated Channel:	1
Modulation:	GFSK
Description of the EUT:	Battery operated – 1 x3.0V CR2032 battery



4. Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C, Intentional Radiators, 10-1-12 Edition	PART 15 – RADIO FREQUENCY DEVICES Subpart C – Intentional Radiators
RSS-Gen Issue 3 December 2010	General Requirements and Information for the Certification of Radio Apparatus
RSS-210 Issue 8 December 2010	RSS-210 — Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment



5. Summary of Test Standards and Results

Emission Tests					
Test Condition	Pages	Test site	Test Result		
			Pass	Fail	N/A
Conducted Emission (47 CFR 15.207 & RSS-GEN 7.2.4)	NIL	/	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Radiated Emission (47 CFR 15.249, 15.209 & RSS-210 A2.9, GEN 7.2.5 & RSS-GEN 6.1)	8	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20dB Bandwidth (47 CFR 15.215, RSSGEN 4.6.1)	16	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bandedge Emission (47 CFR 15.249)	18	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: O4GNODE and IC: 7666A-NODE complies with the FCC Part 15, Subpart C Rules.

All the configurations of the product were tested and only the worst test results are listed in the report.

Both Node 2.1 and Node 1.1 were performed per-test, but Node 2.1 was chosen to perform all tests, for it is the worse one.

SUMMARY:

All tests according to the regulations cited on page 5 were

- - Performed
- - **Not** Performed

The Equipment Under Test

- - **Fulfills** the general approval requirements.
- - **Does not** fulfill the general approval requirements.

Sample Received Date: 26th June 2013

Testing Start Date: 26th June 2013

Testing End Date: 05th July 2013

- TÜV SÜD HONG KONG LTD. -

Prepared by:



Edmond FUNG



Reviewed by:



CHAN Kwong Ngai

7. Emission Test Results

7.1 Radiated Emission Test (Fundamental)

Date of test : 05th July 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2457MHz

Remarks : NIL

Test Result

Passed

Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
2457.000	H	74.2	114.0	-39.8	Peak
2457.000	H	71.9	94.0	-22.1	Average
2457.000	V	77.5	114.0	-36.5	Peak
2457.000	V	75.9	94.0	-18.1	Average

Remark: The EUT was placed on the top of the turntable in test site area.
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable. The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

Radiated Emission Test (Spurious Emission)

Date of test : 05th July 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

Operating mode : Transmit mode

Frequency channel : 2457MHz

Remarks : 9kHz-25GHz

Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
88.080	H	20.1	43.50	-23.4	Quasi Peak
368.180	H	19.4	46.00	-26.6	Quasi Peak
490.880	H	24.5	46.00	-21.5	Quasi Peak
750.080	H	23.4	46.00	-22.6	Quasi Peak
3115.000	H	45.8	74.00	-28.2	Peak
3115.000	H	34.3	54.00	-19.7	Average
4914.000	H	45.5	74.00	-28.5	Peak
4914.000	H	36.6	54.00	-17.4	Average
7371.000	H	47.2	74.00	-26.8	Peak
7371.000	H	36.5	54.00	-17.5	Average
9828.000	H	51.9	74.00	-22.1	Peak
9828.000	H	41.6	54.00	-12.4	Average

Remark: “*” means the emission(s) appear within the restricted bands.
 The EUT was placed on the top of the turntable in test site area.
 The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
 For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
 The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
 Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
 Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

Radiated Emission Test (Spurious Emission)

Date of test : 05th July 2013
 Test requirement : FCC Part 15
 Test method : ANSI C63.4:2009
 Operating mode : Transmit mode
 Frequency channel : 2457MHz
 Remarks : 9kHz-25GHz

Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
188.360	V	24.8	43.50	-18.7	Quasi Peak
249.470	V	19.5	46.00	-26.5	Quasi Peak
322.480	V	20.8	46.00	-25.2	Quasi Peak
489.720	V	24.7	46.00	-21.3	Quasi Peak
3684.000	V	45.7	74.00	-28.3	Peak
3684.000	V	36.1	54.00	-17.9	Average
4914.000	V	52.1	74.00	-21.9	Peak
4914.000	V	47.3	54.00	-6.7	Average
7371.000	V	48.3	74.00	-25.7	Peak
7371.000	V	36.5	54.00	-17.5	Average
9828.000	V	51.2	74.00	-22.8	Peak
9828.000	V	40.9	54.00	-13.1	Average

Remark: “*” means the emission(s) appear within the restricted bands.
 The EUT was placed on the top of the turntable in test site area.
 The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
 For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
 The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
 Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
 Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

Test Equipment List

Radiated Emission Test

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2013.02.25	2014.02.24
Antenna	3117	00066577	2013.04.02	2014.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2012.09.25	2013.09.24
Spectrum Analyzer	FSP 40	100378	2012.12.23	2013.12.22
EMI Test Receiver	ESCI	100701	2012.08.04	2013.08.03
Spectrum Analyzer	FSV40	100903	2013.01.27	2014.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2013.02.18	2014.02.17
Amplifier	150A250	326446	2013.03.19	2014.03.18
Temp. & Humid. Chamber	FACT5-2.0	4166	2012.11.22	2013.11.21

7.2 20dB & 99% bandwidth measurement

Date of test : 05th July 2013

Test requirement : FCC Part 15

Test method : ANSI C63.4:2009

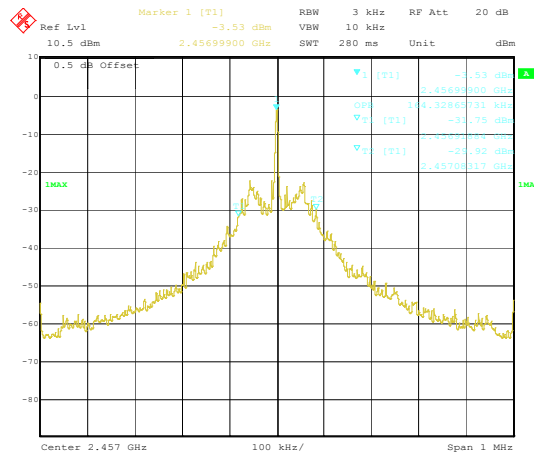
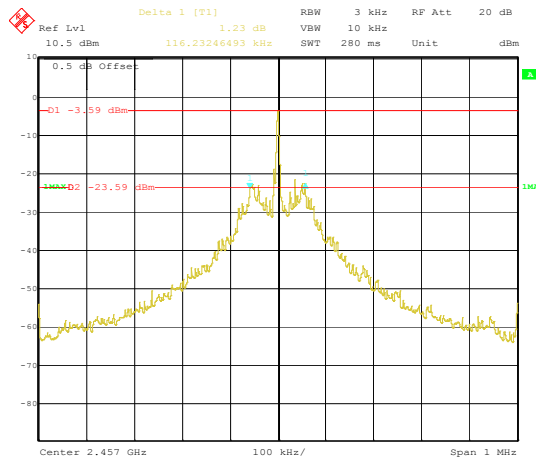
Operating mode : Transmit mode

Frequency channel : 2457MHz

Remarks : NIL

Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed

20 dB Bandwidth	99% OBW	Result
kHz	kHz	
116.232	164.329	Pass



Test Equipment List

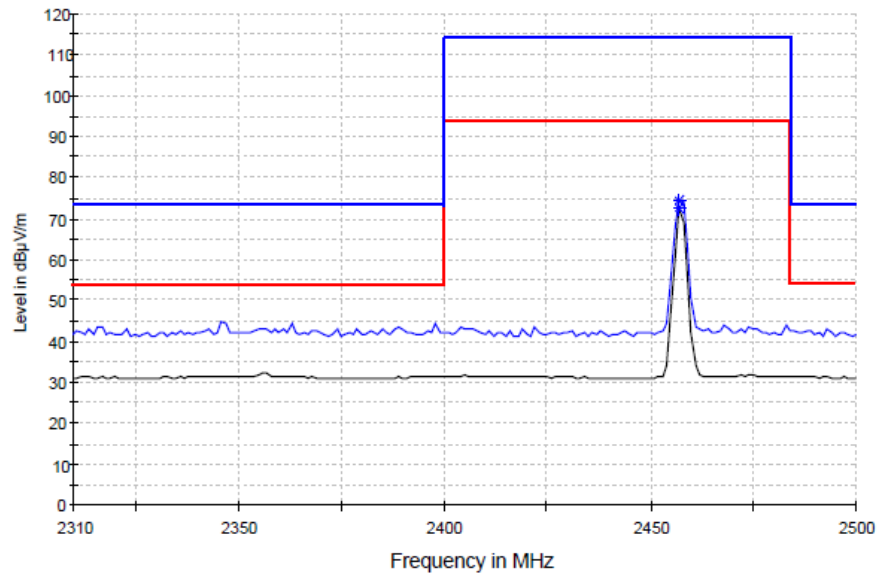
20dB & 99% bandwidth measurement

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2013.02.25	2014.02.24
Antenna	3117	00066577	2013.04.02	2014.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2012.09.25	2013.09.24
Spectrum Analyzer	FSP 40	100378	2012.12.23	2013.12.22
EMI Test Receiver	ESCI	100701	2012.08.04	2013.08.03
Spectrum Analyzer	FSV40	100903	2013.01.27	2014.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2013.02.18	2014.02.17
Amplifier	150A250	326446	2013.03.19	2014.03.18
Temp. & Humid. Chamber	FACT5-2.0	4166	2012.11.22	2013.11.21

7.3 Bandedge measurement

Date of test : 05th July 2013
 Test requirement : FCC Part 15
 Test method : ANSI C63.4:2009
 Operating mode : Transmit mode
 Frequency channel : 2457MHz
 Remarks : NIL

Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed



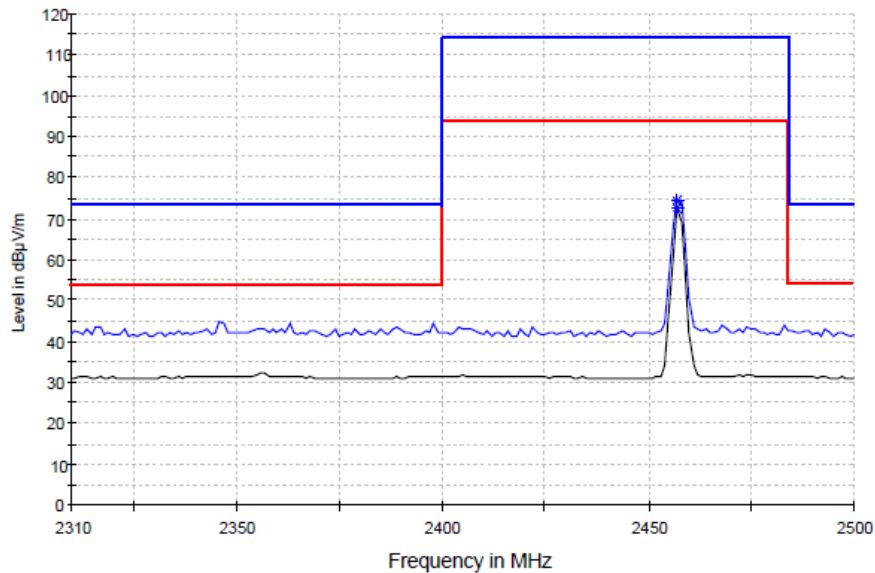
Frequency (MHz)	Reading (dBµV)	Corr. (dB/m)	Test result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2400.000	38.8	-3.8	42.6	74.0	-31.4	Peak
2400.000	27.7	-3.8	31.5	54.0	-22.5	Average

Remark: Use the following spectrum analyzer settings:
 Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
 RBW ≥ 1% of the span
 VBW ≥ RBW
 Sweep = auto
 Detector function = peak
 Trace = max hold

Bandedge measurement

Date of test : 05th July 2013
 Test requirement : FCC Part 15
 Test method : ANSI C63.4:2009
 Operating mode : Transmit mode
 Frequency channel : 2457MHz
 Remarks : NIL

Test Result	
<input checked="" type="checkbox"/>	Passed
<input type="checkbox"/>	Not Passed



Frequency (MHz)	Reading (dBµV)	Corr. (dB/m)	Test result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2483.500	39.6	-3.4	43.0	74.0	-31.0	Peak
2483.500	26.8	-3.4	30.2	54.0	-23.8	Average

Remark: Use the following spectrum analyzer settings:
 Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
 RBW ≥ 1% of the span
 VBW ≥ RBW
 Sweep = auto
 Detector function = peak
 Trace = max hold

Test Equipment List

Bandedge measurement

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2013.02.25	2014.02.24
Antenna	3117	00066577	2013.04.02	2014.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2012.09.25	2013.09.24
Spectrum Analyzer	FSP 40	100378	2012.12.23	2013.12.22
EMI Test Receiver	ESCI	100701	2012.08.04	2013.08.03
Spectrum Analyzer	FSV40	100903	2013.01.27	2014.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2013.02.18	2014.02.17
Amplifier	150A250	326446	2013.03.19	2014.03.18
Temp. & Humid. Chamber	FACT5-2.0	4166	2012.11.22	2013.11.21

8. System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

	Items	Extended Uncertainty
RE	Field strength (dB μ V/m)	U=3.59dB (9kHz-30MHz) U=5.08dB (30MHz-1GHz) U=4.56dB (1GHz-18GHz) U=4.42dB (18GHz-25GHz)
CE	Disturbance Voltage (dB μ V)	U=2.7dB