

FCC / IC – Test report

Report Number : **60/790.14.008.03** Date of Issue: April 25, 2014

Model : **Duotrap S**

Product Type : **Bike speed and cadence transmitter**

Applicant : Dayton Industrial Co., Ltd

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

Production Facility : Kendy Electronics (Dongguan) Co.Ltd,

Address : Xingsi Huangtang Village, Hengli Town, Dongguan City, Guangdong Province, P.R.China

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

Total pages including Appendices : 17

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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: Bike speed and cadence transmitter

Model no.: Duotrap S

Serial number: NIL

Options and accessories: NIL

FCC ID: O4GDUOTRAPS

IC: 7666A-DUOTRAPS

Rated Voltage: 3 VDC

Rated Current: NIL

Rated Power: NIL

Frequency: 2457MHz

RF Transmission Frequency: 2457MHz

Antenna gain: 0 dBi

No. of Operated Channel: 1

Modulation: GFSK

Description of the EUT: Battery operated – 1x 3.0V 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, 15.209 & 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)	9	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20dB Bandwidth (47 CFR 15.215)	16	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99% occupied bandwidth (RSS-GEN 4.6.1)	16	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bandedge Emission (47 CFR 15.249)	19	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Remark: Battery operated only.

6. General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: O4GDUOTRAPS complies with the FCC Part 15, Subpart C Rules.

This submittal(s) (test report) is intended for IC: 7666A-DUOTRAPS, complies with the IC RSS 210 and RSS-GEN Rules.

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

SUMMARY:

All tests according to the regulations cited on page 6 were

- Performed
- **Not** Performed

The Equipment Under Test

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

Sample Received Date: April 10, 2014

Testing Start Date: April 14, 2014

Testing End Date: April 28, 2014

- TÜV SÜD HONG KONG LTD. -

Reviewed by:


Edmond FUNG

Prepared by:


CHAN Kwong Ngai

7. Emission Test Results

7.1 Radiated Emission Test

Date of test : April 16, 2014
 Test requirement : FCC Part 15
 Test method : ANSI C63.4:2009
 Operating mode : Transmit mode
 Frequency channel : 2457MHz
 Remarks : Fundamental

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	87.4	114	-26.6	Peak
2457.000	H	86.1	94	-7.9	Average
2457.000	V	89.2	114	-24.8	Peak
2457.000	V	87.7	94	-6.3	Average

Remark: 1.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

Date of test : April 16, 2014
 Test requirement : FCC Part 15
 Test method : ANSI C63.4:2009
 Operating mode : Transmit mode
 Frequency channel : 2457MHz
 Remarks : 9kHz-25GHz

Test Result
 Passed
 Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
372.350	H	18.2	46.00	-27.8	Quasi Peak
495.371	H	25.8	46.00	-20.2	Quasi Peak
747.525	H	22.3	46.00	-23.7	Quasi Peak
989.140	H	25.4	54.00	-28.6	Quasi Peak
4914.000	H	51.4	74.00	-22.6	Peak
4914.000	H	49.2	54.00	-4.8	Average
7371.000	H	48.6	74.00	-25.4	Peak
7371.000	H	37.5	54.00	-16.5	Average

Remark: 1.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

Date of test : April 16, 2014
 Test requirement : FCC Part 15
 Test method : ANSI C63.4:2009
 Operating mode : Transmit mode
 Frequency channel : 2457MHz
 Remarks : 9kHz-25GHz

Test Result
 Passed
 Not Passed

Frequency (MHz)	Polarity (H/V)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
83.645	V	17.9	43.50	-25.6	Quasi Peak
211.280	V	17.3	43.50	-26.2	Quasi Peak
495.371	V	22.5	46.00	-23.5	Quasi Peak
659.623	V	27.8	46.00	-18.2	Quasi Peak
4914.000	V	51.0	74.00	-23.0	Peak
4914.000	V	50.2	54.00	-3.8	Average
7371.000	V	49.5	74.00	-24.5	Peak
7371.000	V	38.7	54.00	-15.3	Average

Remark: 1.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

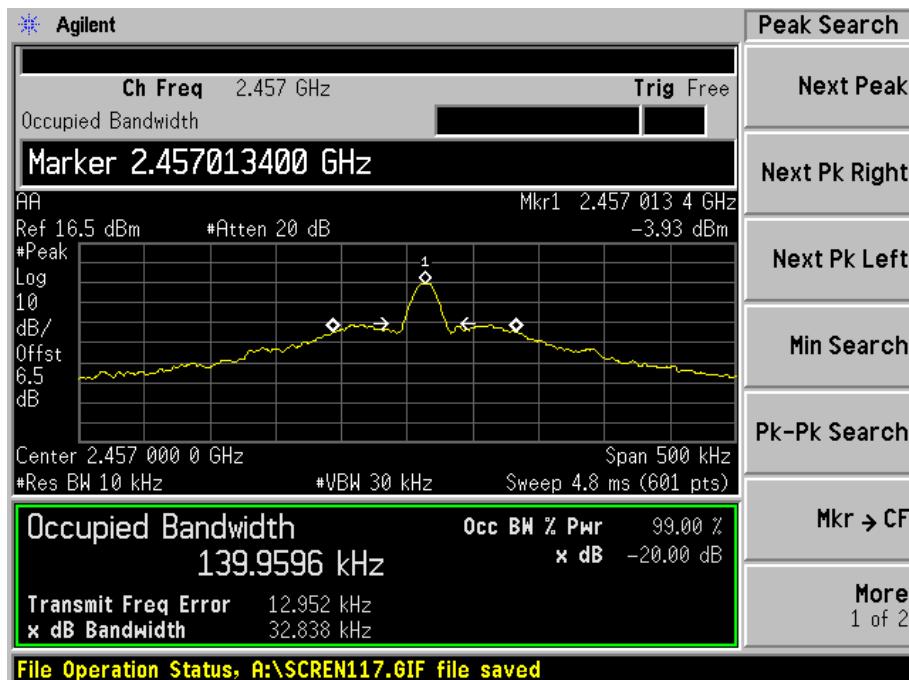
DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2014.02.25	2015.02.24
Antenna	3117	00066577	2014.04.02	2015.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2013.09.25	2014.09.24
Spectrum Analyzer	FSP 40	100378	2013.12.23	2014.12.22
EMI Test Receiver	ESCI	100701	2013.08.04	2014.08.03
Spectrum Analyzer	FSV40	100903	2014.01.27	2015.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2014.02.18	2015.02.17
Amplifier	150A250	326446	2014.03.19	2015.03.17
Temp. & Humid. Chamber	FACT5-2.0	4166	2013.11.22	2014.11.21

7.2 20dB & 99% bandwidth measurement

Date of test : April 16, 2014
 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

20 dB Bandwidth	99% OBW	Result
kHz	kHz	
32.8	140.0	Pass



Test Equipment List

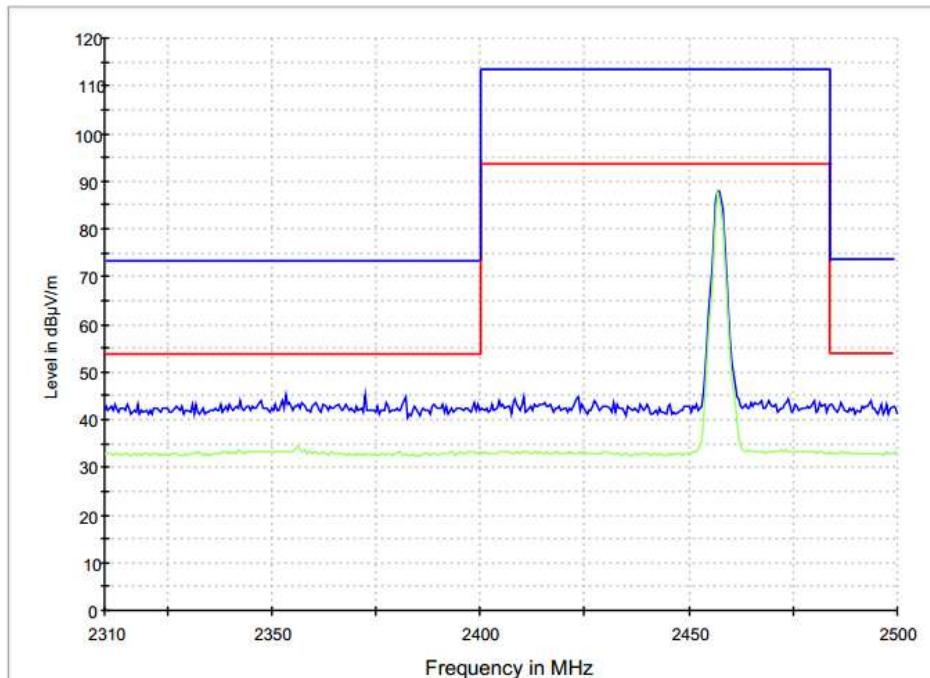
20dB & 99% bandwidth measurement

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Agilent	E4445A	MY46181814	2013.12.11	2014.12.10

7.3 Bandedge measurement

Date of test : April 16, 2014
 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



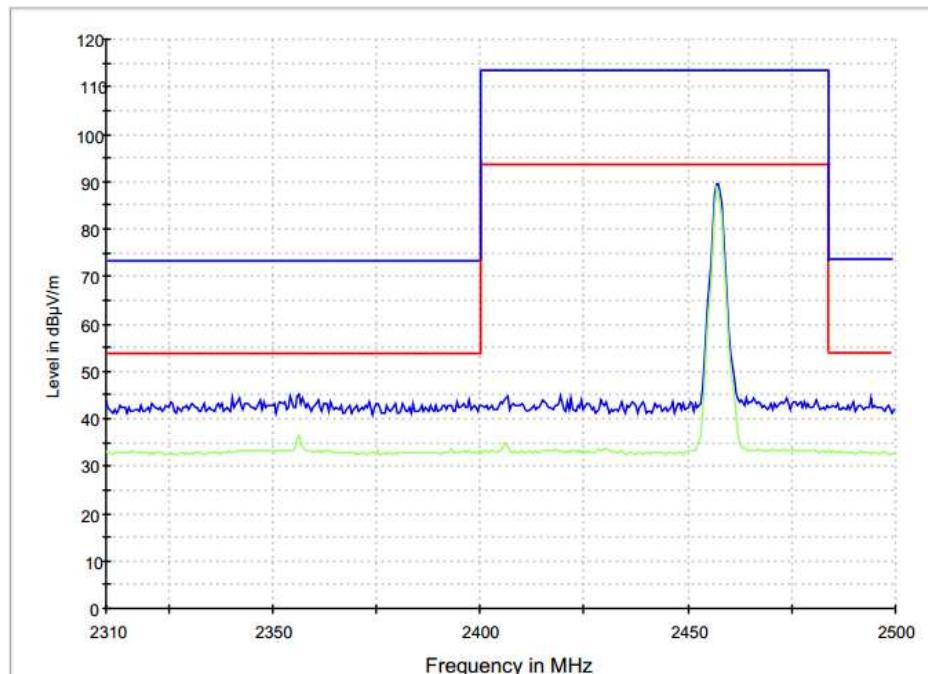
Band	Frequency (MHz)	Polarity (H/V)	Test result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
Low	2398.000	H	44.1	74.0	-29.9	Peak
	2398.000	H	33.2	54.0	-20.8	Average
High	2487.000	H	44.5	74.0	-29.5	Peak
	2487.000	H	33.0	54.0	-21.0	Average

Remark:

1. 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 \geq 1% of the span
 VBW \geq RBW
 Sweep = auto
 Detector function = peak

Date of test : April 16, 2014
 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



Band	Frequency (MHz)	Polarity (H/V)	Test result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
Low	2397.000	V	44.6	74.0	-29.4	Peak
	2397.000	V	33.5	54.0	-20.5	Average
High	2491.000	V	45.1	74.0	-28.9	Peak
	2491.000	V	33.3	54.0	-20.7	Average

Remark: 1. 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 \geq 1% of the span
 VBW \geq RBW
 Sweep = auto
 Detector function = peak

Test Equipment List

Bandedge measurement

DESCRIPTION	Type No.	Serial No.	Calibrated date	Calibrated until
Antenna	VULB9163	9163 330	2014.02.25	2015.02.24
Antenna	3117	00066577	2014.04.02	2015.04.01
Antenna	3160-09	00118388	2013.09.06	2014.09.05
Loop Antenna	6512	29604	2013.09.25	2014.09.24
Spectrum Analyzer	FSP 40	100378	2013.12.23	2014.12.22
EMI Test Receiver	ESCI	100701	2013.08.04	2014.08.03
Spectrum Analyzer	FSV40	100903	2014.01.27	2015.01.26
Test Cable	SUCOFLEX 104	MY2320/4	2014.02.18	2015.02.17
Amplifier	150A250	326446	2014.03.19	2015.03.17
Temp. & Humid. Chamber	FACT5-2.0	4166	2013.11.22	2014.11.21

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