

Reference No.: A09090308 Report No.:FCCA09090308

FCC ID: QSW122T Page: 1 of 24

Date: Sep. 12, 2009

Product Name:

Commercial Bikecomputer

Model Number:

122T

Applicant:

ZENTAN TECHNOLOGY CO., LTD

NO.92, HSING-SHENG RD., CHIA-LI CHENG, TAINAN

HSIEN, TAIWAN, R.O.C.

Date of Receipt:

Sep. 03, 2009

Finished date of Test: Sep. 11, 2009

Applicable Standards: 47 CFR Part 15, Subpart C

ANSI C63.4: 2003

We, Spectrum Research & Testing Laboratory Inc., hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By

Date: =

Approved By:

Lab Code: 200099-0 FMNG-059.10 REPORT



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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source from battery: DC power source, 4.5 Vdc, was used during the test.

1.3 EUT MODIFICATION

- No modification in SRT Lab.



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2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Commercial Bikecomputer
MODEL NO.	122T
CABLE	N/A
TYPE	Prototype
POWER SUPPLY	DC 4.5V, 0.5mA
FREQUENCY BAND	114.3KHz ~ 139.7KHz
NUMBER OF CHANNEL	1
CHANNEL SPACING	0
MODULATION TYPE	Pulse
DUTY CYCLE	0.8~5%
MODE OF OPERATION	simplex
BIT RATE OF TRANSMISSION	1k bit/sec
ANTENNA TYPE	Coil with ferrite bar
OPERATING TEMPERATURE RANGE	-10~55°C

NOTE: For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL#	FCC ID/DOC	REMARK
N/A				

2.3 DESCRIPTION OF TEST MODE

- 1. TX
- 2. Standby
- 3. Link



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2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL#	FCC ID / DOC	CABLE
1	Commercial Bikecomputer	Zentan	ST02 01 21	DOC	N/A

- **NOTE**: 1. For the actual test configuration, please refer to the photos of testing.
 - 2. For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

DESCRIPTION OF APPLIED STANDARDS

The EUT is a Commercial Bikecomputer and according to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

ANSI C63.4: 2003

All tests have been performed and recorded as per the above standards.



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RADIATED EMISSION TEST 4.

4.1 **RADIATED EMISSION LIMIT**

All emission from EUT, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

FCC Part 15, Subpart C Section 15.209.

FREQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (μV/m)
0.009 - 0.490	300	2400/F(kHz)
0.490 - 1.705	30	24000/F(kHz)
1.705 - 30.0	30	30
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
ABOVE 960	3	500

- **NOTE**: 1. In the emission tables above, the tighter limit applies at the band edges.
 - 2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.

According to the FCC Part 15, Subpart A Section 15.31(f)(2), the extrapolation factor of 40 dB/decade is used for measurement distances different then specified in with limits for frequencies below 30 MHz.



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4.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	20 MHz TO 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 2009 ETC
BI-LOG ANTENNA	30MHz to 2GHz	SCHFFNER	CBL6141A / 4128	MAY 2010 ETC
LOOP ANTENNA	9KHz TO 30MHz	R&S	HFH2-Z2/1162 1/2	MAR.2011 R&S
COAXIAL CABLE	30M	TIMES	LMR-400 / #30M	MAY 2010 ETC
FILTER	ER 2 LINE, 30A FIL.COIL FC-943 / 869			NRC
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	MAY 2010 SRT

NOTE:

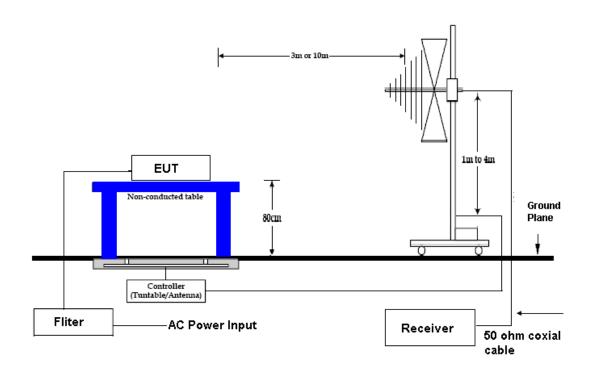
The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



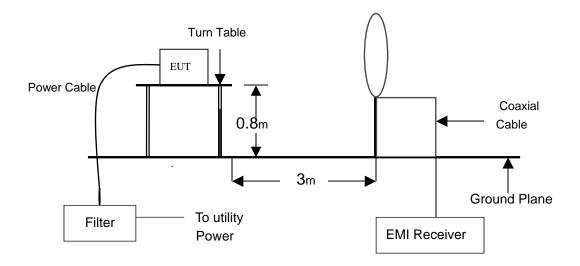
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4.3 TEST SET-UP 30MHz ~ 1GHz



9KHz ~ 30MHz



NOTE:

- 1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
- 2. For the actual test configuration, please refer to the photos of testing.



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4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4. The measurements were made at an open area test site with 3 meter measurement distance. The frequency spectrum measured started from 9 kHz. All readings were quasi-peak value with 200Hz resolution bandwidth at frequency below 150kHz, and with 9kHz resolution bandwidth between 150 kHz and 30MHz. Under 30MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver.

4.5 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at specific channel frequency.



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4.6 RADIATED EMISSION TEST RESULT

29 °C 57%RH Temperature: Humidity: Ferquency Range: 9kHz – 30MHz Measured Distance: 3m Spectrum Detector: Q.P. Test Mode: TX Sep. 11, 2009 Tested by Tested Date: Shunm Wang

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
0.1241(F)	0.006	20.14	49.1	69.25	105.73	-36.48
0.2482	0.122	20.1	20.3	40.52	99.71	-59.19
0.3723	0.152	20.09	21.5	41.74	96.19	-54.44
0.4964	0.178	20.08	15.3	35.56	93.69	-58.13
0.6205	0.223	20.06	*	*	91.75	*
0.7446	0.247	20.07	*	*	90.17	*
0.8687	0.266	20.07	*	*	88.83	*
0.9928	0.279	20.08	*	*	87.67	*
1.1169	0.295	20.09	*	*	86.64	*
1.2410	0.295	20.09	*	*	85.73	*

- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
- 4. Limit(dBuV/m)=20log{2400/F(kHz)}(The measurement distance at 300m)+40log(300/3)(The measurement distance at 3m)-20log(377)
- 5. The field strength of other emission frequencies were very low against the limit.
- 6. (F): Fundamental frequency of transmitter.



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Temperature:29 °CHumidity:57%RHFerquency Range:30 – 1000 MHzMeasured Distance:3mSpectrum Detector:Q.P.Test Mode:TX

Tested Date: Sep. 11, 2009 Tested by Shunm Wang

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
46.4900	0.93	15.88	13.5	30.3	40.0	-9.7
62.9800	1.05	9.12	16.1	26.3	40.0	-13.7
80.4400	1.18	8.00	12.9	22.1	40.0	-17.9
145.4300	1.57	12.30	11.2	25.1	43.5	-18.4
169.6800	1.68	11.19	9.8	22.7	43.5	-20.8
192.5500	1.81	10.98	15.4	28.2	43.5	-15.3

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
46.4900	0.93	15.88	15.2	32.0	40.0	-8.0
62.9800	1.05	9.12	17.5	27.7	40.0	-12.3
145.4300	1.57	12.30	11.9	25.8	43.5	-17.7
169.6800	1.68	11.19	10.7	23.6	43.5	-19.9
193.9300	1.81	11.07	14.2	27.1	43.5	-16.4
313.2400	2.47	14.23	10.5	27.2	46.0	-18.8

- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
- 4. The field strength of other emission frequencies were very low against the limit.
- 5. (F): Fundamental frequency of transmitter.
- 6.(*):The emission always below noise.



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Temperature: 29 °C Humidity: 57%RH 9kHz – 30MHz Measured Distance: Ferquency Range: 3m Spectrum Detector: Q.P. Test Mode: Standby **Tested Date:** Sep. 11, 2009 Tested by Shunm Wang

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
0.4288	0.175	20.08	23.5	43.76	94.96	-51.20
0.7287	0.234	20.07	19.6	39.90	90.35	-50.45
1.2086	0.295	20.09	15.1	35.49	85.96	-50.47
1.4485	0.295	20.09	20.1	40.49	84.39	-43.90
4.2677	0.525	20.05	13.2	33.78	75.00	-41.23
4.5676	0.572	20.05	10.5	31.12	74.41	-43.29
12.7851	0.696	19.7	9.7	30.10	65.47	-35.37
19.9230	0.981	19.7	12.9	33.58	61.62	-28.04
25.5010	1.145	19.85	8.5	29.50	59.47	-29.98

- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
- 4. Limit(dBuV/m)=20log{2400/F(kHz)}(The measurement distance at 300m)+40log(300/3)(The measurement distance at 3m)-20log(377)
- 5. The field strength of other emission frequencies were very low against the limit.
- 6. (F): Fundamental frequency of transmitter.



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Temperature: 29 °C Humidity: 57%RH

Ferquency Range: 30 – 1000 MHz Measured Distance: 3m

Spectrum Detector: Q.P. Test Mode: Standby

Tested Date: Sep. 11, 2009 Tested by Shunm Wang

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
46.4900	0.93	15.88	12.9	29.7	40.0	-10.3
62.9800	1.05	9.12	15.7	25.9	40.0	-14.1
80.4400	1.18	8.00	12.5	21.7	40.0	-18.3
145.4300	1.57	12.30	11.0	24.9	43.5	-18.6
169.6800	1.68	11.19	9.7	22.6	43.5	-20.9
192.5600	1.81	10.98	15.2	28.0	43.5	-15.5

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
43.5800	0.91	17.44	13.1	31.4	40.0	-8.6
53.2800	0.99	12.51	14.5	28.0	40.0	-12.0
145.4300	1.57	12.30	11.6	25.5	43.5	-18.0
169.6800	1.68	11.19	10.4	23.3	43.5	-20.2
193.9300	1.81	11.07	14.0	26.9	43.5	-16.6
218.1800	1.91	13.00	11.0	25.9	46.0	-20.1

- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
- 4. The field strength of other emission frequencies were very low against the limit.
- 5. (F): Fundamental frequency of transmitter.
- 6.(*):The emission always below noise.



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Temperature: 29 °C Humidity: 57%RH

Ferquency Range: 30 – 1000 MHz Measured Distance: 3m

Spectrum Detector: Q.P. Test Mode: Link

Tested Date: Sep. 11, 2009 Tested by Shunm Wang

Antenna Polarization: Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
36.7900	0.84	20.84	12.6	34.3	40.0	-5.7
56.1900	1.01	11.22	14.9	27.1	40.0	-12.9
62.9800	1.05	9.12	14.5	24.7	40.0	-15.3
145.4300	1.57	12.30	11.5	25.4	43.5	-18.1
169.6800	1.68	11.19	10.2	23.1	43.5	-20.4
192.5800	1.81	10.98	15.6	28.4	43.5	-15.1

Antenna Polarization: Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
62.9800	1.05	9.12	17.2	27.4	40.0	-12.6
80.4400	1.18	8.00	16.3	25.5	40.0	-14.5
159.9800	1.64	12.02	14.1	27.8	43.5	-15.7
169.6800	1.68	11.19	11.0	23.9	43.5	-19.6
192.5600	1.81	10.98	13.2	26.0	43.5	-17.5
284.1300	2.20	13.34	10.2	25.7	46.0	-20.3

- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
- 4. The field strength of other emission frequencies were very low against the limit.
- 5. (F): Fundamental frequency of transmitter.
- 6.(*):The emission always below noise.



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5. CONDUCTED EMISSION TEST FOR POWER PORT

The test item was not performed, because the EUT uses 4.5Vdc battery as power source.



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6 TIME DOMAIN AND DUTY CYCLE TEST

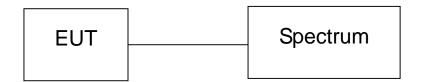
6.1 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	0kH- 40CH-	ROHDE &	FSP40/	SEP. 2009
	9kHz-40GHz	SCHWARZ	100093	ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

6.2 TEST SET-UP



6.3 TEST PROCEDURE

The EUT was transmitting continuously. The spectrum recorded signal values. The simulator's signal was imitated for normal use mode. The number of hearbeat is 130 times at one minute during the test.

6.4 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at specific channel frequency.



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6.5 TIME DOMAIN AND DUTY CYCLE TEST RESULT

Temperature: 25 °C Humidity: 53%RH

Tested by Shunm Wang Tested Date: Sep. 10, 2009

TIME DOMAIN:

Time on (ms)	Period (ms)	Duty cycle (%)	PASS/FAIL
24.2	2016	1.2003	PASS

Time on:

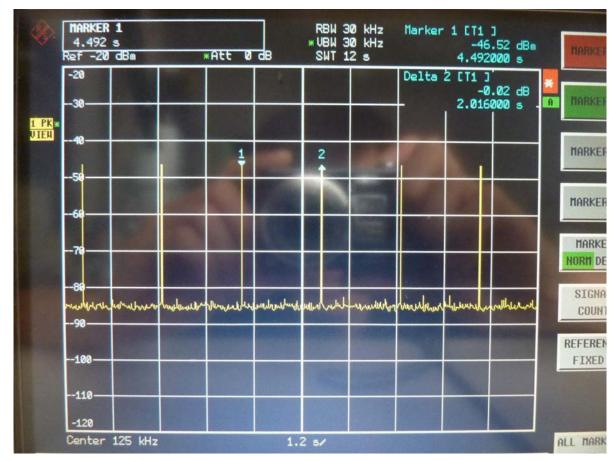




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Total time:





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7. BAND EDGE TEST

7.1 LIMIT

FCC Part15, Subpart C Section 15.209 (c), the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

7.2 TEST EQUIPMENT

Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-40GHz	ROHDE &	FSP40/	SEP. 2009
SPECIRUM		SCHWARZ	100093	ETC

7.3 TEST SET-UP



The EUT was connected to the spectrum through a 50 Ω RF cable.

7.4 TEST PROCEDURE

The EUT was operating in controlled channel.

Printed out the test result from the spectrum by hard copy function.

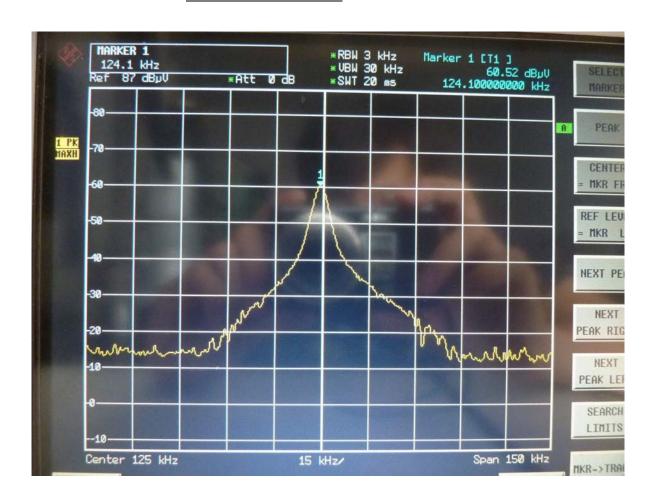


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7.5 TEST RESULT

Temperature:25°CHumidity:53%RHTested by:Shunm WangTested Date:Sep. 10, 2009Test Result:PASS





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9. TERMS OF ABRIVATION

AZ(°)	Turn table azimuth		
Correct.	Correction		
EL(m)	Antenna height (meter)		
EUT	Equipment Under Test		
Horiz.	Horizontal direction		
LISN	Line Impedance Stabilization Network		
NSA	Normalized Site Attenuation		
Q.P.	Quasi-peak detection		
SRT Lab	Spectrum Research & Testing Laboratory, Inc.		
Vert.	Vertical direction		