



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

FCC Rules and Regulations / Intentional Radiators

Operational in the 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Bands

Part 15, Subpart C, Section 15.249

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name: TT1 (T-antenna revision 1) RF Module

Kind of Equipment: RF Module in 4 host units

Frequency Range: 2453 MHz - 2457 MHz

Test Configuration: Complete Indoor cycle; PowerBeam bicycle holding frame, bicycle hub and small user display (CPU) (Tested at 120 vac, 60 Hz)

Model Number(s): PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+

Model(s) Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+

Serial Number(s): PowerBeam S/N 58, Pro 300PT-T S/N 6xxx, PowerTap SL2.4 S/N 6xxxx & Computer+ S/N NA

Date of Tests: August 5, 6, 7, 8, & 11, 2008

Test Conducted For: Saris Cycling Group Inc
5253 Verona Rd
Madison, WI 53711

NOTICE: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

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Company:
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Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

SIGNATURE PAGE

Report By:

Arnorn C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager



TABLE OF CONTENTS

i. Cover Page 1

ii. Signature Page 2

iii. Table of Contents 3

iv. NVLAP Certificate of Accreditation 4

1.0 Summary of Test Report 5

2.0 Introduction 5

3.0 Object 5

4.0 Test Set-Up 6

5.0 Test Equipment 6

6.0 Ambient Measurements 7

7.0 Description of Test Sample 8

8.0 Additional Description of Test Sample 10

9.0 Photo Information and Test Set-Up 10

10.0 Radiated Photos Taken During Testing 11

10.0 Conducted Photos Taken During Testing 17

11.0 Results of Tests 18

12.0 Conclusion 18

TABLE 1 – EQUIPMENT LIST 19

Appendix A – Electric Field Radiated Emissions Test 20

1.0 Conducted Emission Measurements 21

1.0 AC Power Line Conducted Data and Graph(s) taken during testing 22

2.0 Restrict Band Compliance 27

3.0 Field Strength of Spurious Emission Measurements 28

3.0 Radiated Data taken for Fundamental & Spurious Measurements 30

4.0 Data and Graph(s) taken showing the Duty cycle correction factor 36

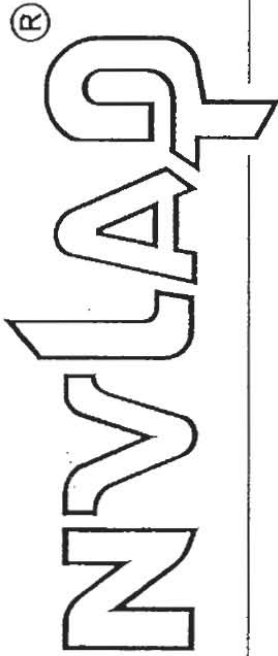


Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

2007-10-01 through 2008-09-30

Effective dates



Dolly S. Buess
For the National Institute of Standards and Technology

NVI AP-01C (REV. 2006-09-13)



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Model Tested:
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Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

1.0 SUMMARY OF TEST REPORT

It was found that the TT1 (T-antenna revision 1) RF Module, Model Number(s) PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+, **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.249 for operational in the 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Bands.

2.0 INTRODUCTION

On August 5, 6, 7, 8, & 11, 2008, a series of radio frequency interference measurements was performed on TT1 (T-antenna revision 1) RF Module, Model Number(s) PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+, Serial Number: PowerBeam S/N 58, Pro 300PT-T S/N 6xxx, PowerTap SL2.4 S/N 6xxxx & Computer+ S/N NA. The tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-2003. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Industry Canada, and VCCI.

Main Test Facility:

D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, Illinois 60090

O.A.T.S. Test Facility:

D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.35(b), 15.37(d), 15.209 & 15.249 for Intentional Radiators operating in the Bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24-24.25 GHz.



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the ANSI C63.4-2003, Annex H. The conducted tests were performed with the test item placed on a non-conductive table (table top equipment), located in the test room. Equipment normally operated on the floor was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface approximately 7mm thick. The power line supplied was connected to a dual line impedance stabilization network electrically bonded to the ground plane, located on the floor. The networks were constructed per the requirements of the ANSI C63.4-2003, Annex H.

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2003, Sections 6 and 8.

5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the ESI 26/40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Below 1000 MHz, final data was taken using the ESI 26/40 Fixed Tuned Receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the ESI 26/40 Fixed Tuned Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the Spectrum Analyzer.

The bandwidths shown below are specified by ANSI C63.4-2003, Section 4.2.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emissions that have the highest amplitude relative to the limit. These methods are performed to the specifications in ANSI C63.4-2003.



Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

1250 Peterson Dr., Wheeling, IL 60090

7.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 8.0)

7.1 Description:

The PowerBeam electronic trainer system is used in conjunction with any bicycle; a small frame holds the bicycle such that the rear wheel is driving a roller on the PowerBeam resistance unit. The resistance unit provides a similar experience to real riding conditions in a stationary environment; typically indoors. The resistance unit controls the resistance and measures roller speed and loading forces using magnetic eddy current braking. The display unit (computer+) mounts on the handle bars and displays the information to the user real time. The display unit calculate further parameters from the raw resistance unit data, speed in MPH, distance, ride time, Kilojoules.

The Hub measures parameters of the rear wheel; torque, wheel speed, rider cadence. The hub calculates power in watts and transmits the information at a predetermined periodic rate. The CPU receives the hub transmission and displays the information to the user real time.

The PowerTap system is install in any bicycle; the rear hub (or wheel) of the bicycle is replaced with the PowerTap SL2.4 hub and the CPU mounts on the handle bars.

The CPU calculates some parameters from the hub transmission; speed in MPH, distance, ride time etc

NOTE:

CW test mode is a special test condition that is not used for regular operation. The test mode is entered with a 4.5K resistor for 2.453GHz or 43.2K resistor for 2.457GHz (connected to a test point; it configures the radio for CW and loops (no end). The receiver function is tested with the same resistor; only an additional input line is shorted to ground in indicate Rx and open to indicate Tx.

The computer can be placed into the same test modes using the user interface.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

PowerBeam = 9.6" x 7" x 6.7"

Pro 300PT-T = 150mm (axle) x 120mm flange diameter

PowerTapSL2.4 = 141mm x 70mm flange diameter

Computer+ = 5.3" x 3.6 " x 1.30 "



Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

1250 Peterson Dr., Wheeling, IL 60090

7.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 8.0)

7.3 LINE FILTER USED:

None - 24V DC power PowerBeam ONLY batteries only;
Pro300PT-T, PowerTapSL2.4, Computer+

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

PowerBeam 0.032768, 8.000, 16.000 MHz
Pro 300PT-T & PowerTapSL2.4 0.03125, 0.032768, 1.000, 4.000, 16.000 MHz
Computer+ 0.032768, 4.000, 16.000

Clock Frequencies:

N/A

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

- | | |
|--|------------------------|
| 1. PowerBeam electronics; main circuit board | PN: 17022 revision 3 |
| 2. PowerBeam electronics; RF circuit board | PN: 17709 revision 3 |
| 3. Pro 300PT-T electronics; main circuit board | PN: 16748 revision E |
| 4. Pro 300PT-t electronics; RF circuit board | PN: 17709 revision 3 |
| 5. PowerTapSL2.4 electronics; main circuit board | PN: 16748 revision E |
| 6. PowerTapSL2.4 electronics; RF circuit board | PN: 17709 revision 3 |
| 7. Computer+; main circuit board | PN: 17177 revision 3.4 |
| 8. Computer+ electronics; RF circuit board | PN: 17709 revision 3 |



Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

1250 Peterson Dr., Wheeling, IL 60090

8.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 7.0)

1: There were no additional descriptions noted at the time of test.

NOTE:

Continuous Transmit.
Continuous Receive.

9.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 TT1 (T-antenna revision 1) RF Module

Model Number: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+

Serial Number: PowerBeam S/N 58, Pro 300PT-T S/N 6xxx, PowerTap SL2.4 S/N 6xxxx
&Computer+ S/N NA

Item 1 David Power power supply (used with Power Beam unit only)

Model Number: DP30B-241250, Serial Number None

Item 2 (NOT EUT) Lab-built test box to put EUT into special test modes. (power beam only)

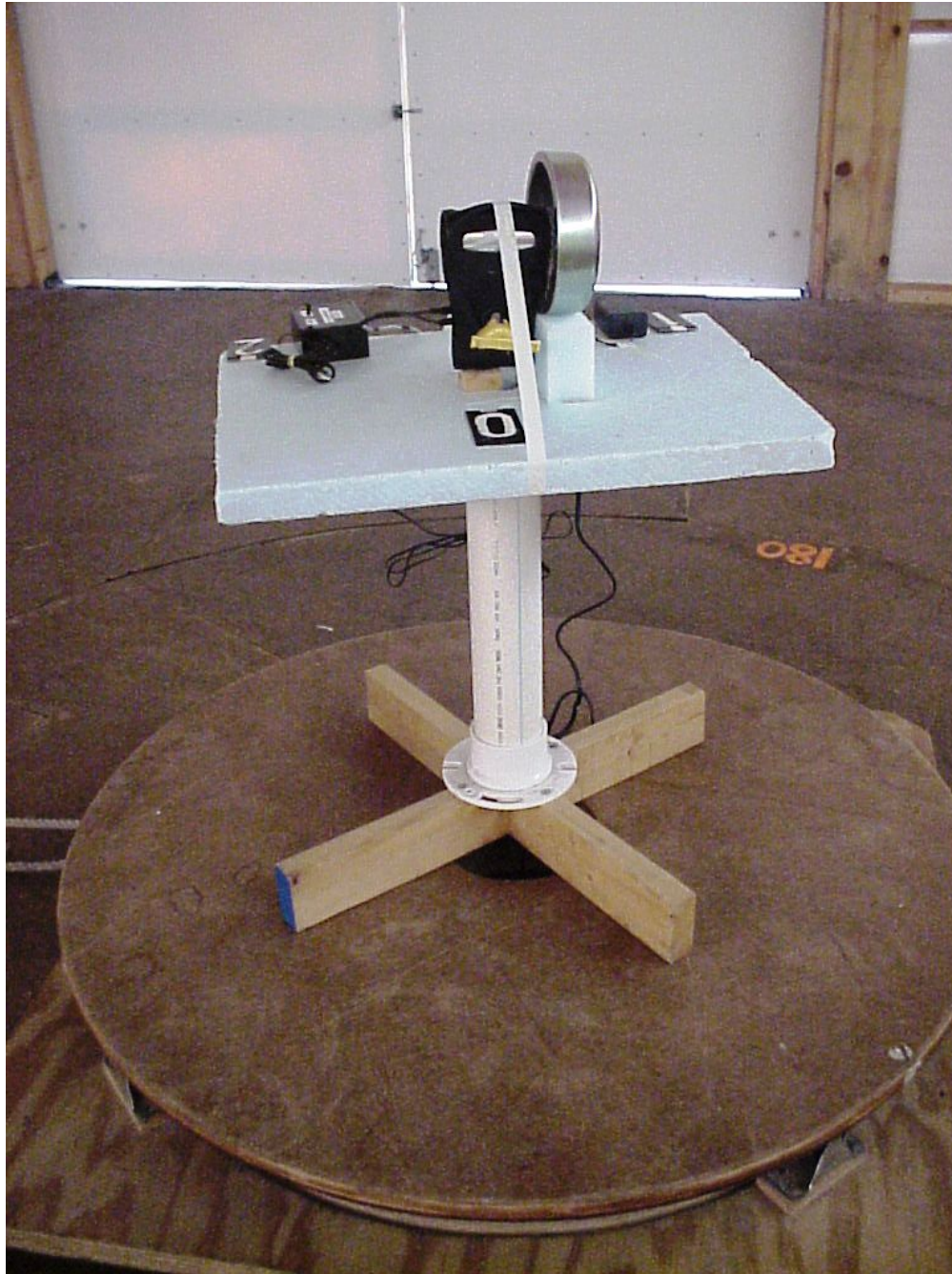


Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING



POWER BEAM RAD FRONT



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



POWER BEAM RAD BACK

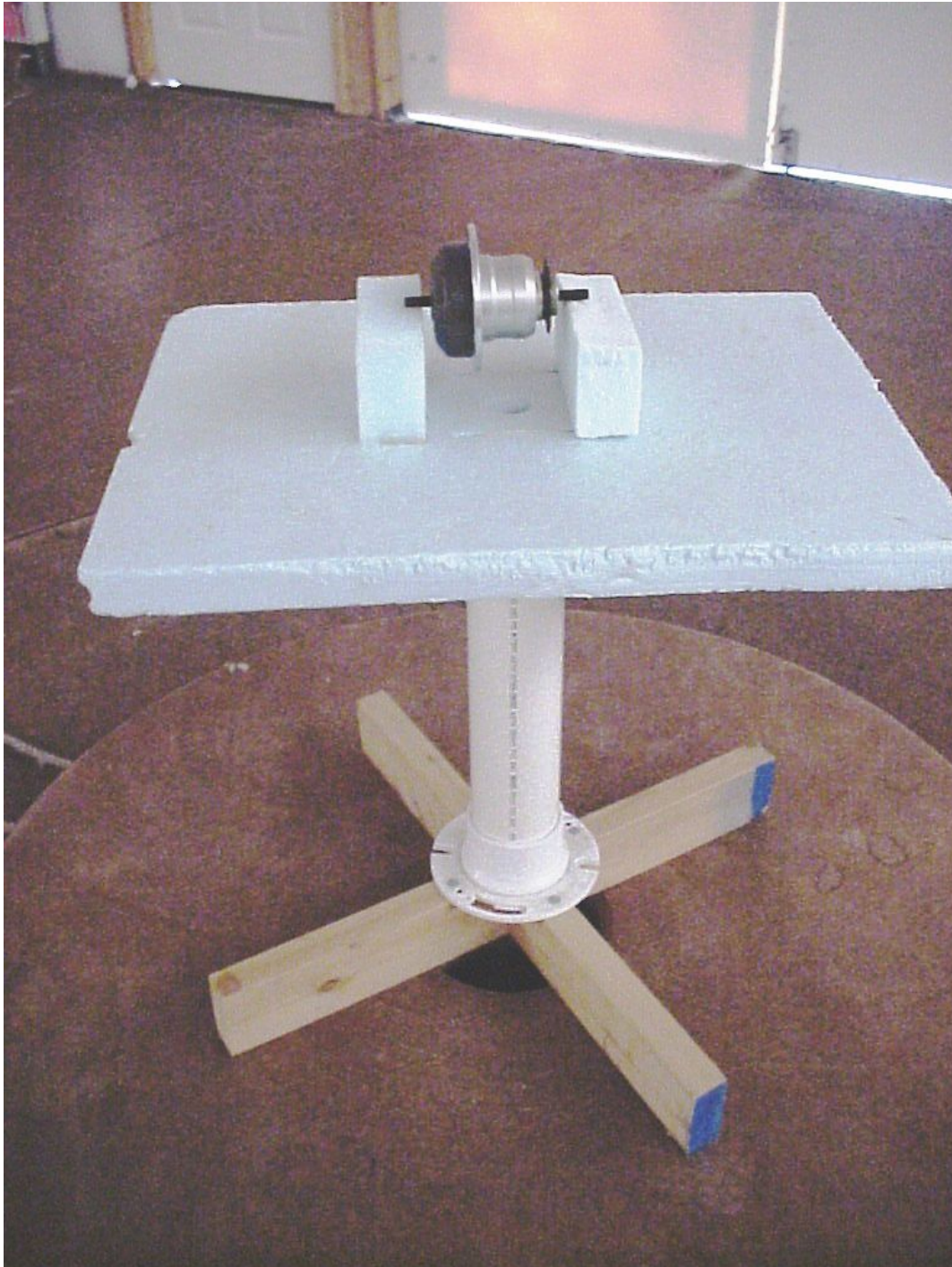


Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



PRO300PT SETUP

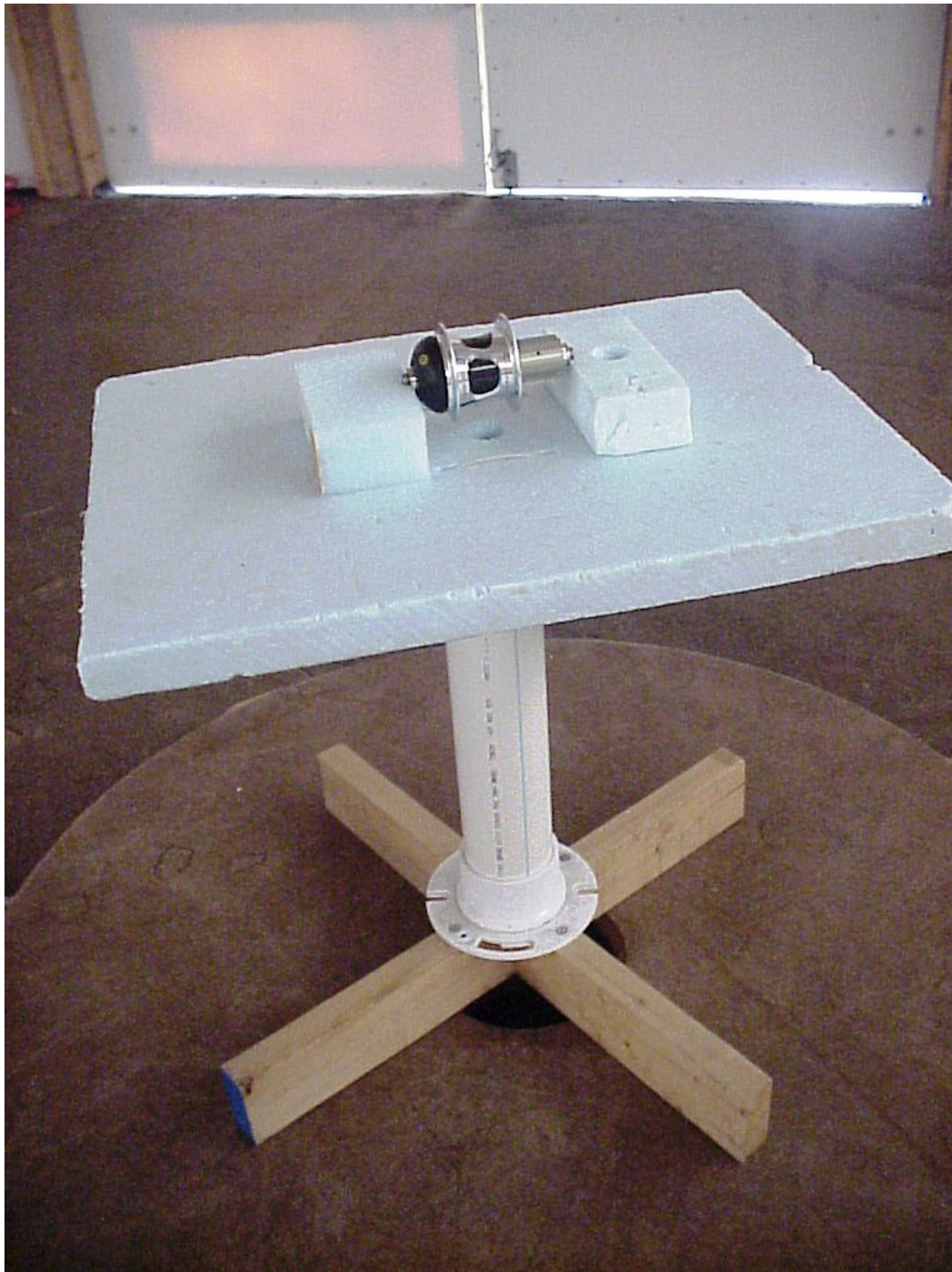


1250 Peterson Dr., Wheeling, IL 60090

Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



HUB SETUP



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



COMPUTER+ SETUP 1



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



COMPUTER+ SETUP 2



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

10.0 CONDUCTED PHOTOS TAKEN DURING TESTING



POWER BEAM AC LINE CONDUCTED



Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

1250 Peterson Dr., Wheeling, IL 60090

11.0 RESULTS OF TESTS

The radio interference emission charts can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report.

12.0 CONCLUSION

It was found that the TT1 (T-antenna revision 1) RF Module, Model Number(s) PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+ **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.249 for operational in the 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Bands.



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
RF Tuned Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz-40 GHz	3/24/2009
RF Tuned Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz-26 GHz	12/27/2008
RF Preamp	Miteq	AMF-6D-100200-50	313936	1-10 GHz	5/8/2009
RF Preamp	Miteq	AMF-6D-010100-50	213976	10-18 GHz	5/8/2009
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	NA	18-26 GHz	9/18/2008
RF Preamp	Rohde & Schwarz	TS-PR10	032001/005		3/10/2009
RF 20dB Fixed Attenuator	Aeroflex/weinschel	75A-20-12	1071	DC – 40 GHz	7/28/2009
Biconical Antenna	EMCO	3104C	9701-4785	20-220 MHz	4/21/2009
Log Periodic Antenna	EMCO	3146	9702-4895	200 MHz-1 GHz	4/21/2009
Horn Antenna	EMCO	3115	9903-5731	1-18 GHz	6/12/2009
Horn Antenna	EMCO	3116	2549	18-40 GHz	6/12/2009
High Pass Filter	Q Microwave, Inc.	100462	1	4.2 GHz	5/8/2009
High Pass Filter	Solar Electronics Co.	7930-10	921541	12 kHz	1/9/2009
LISN	Solar Electronics Co.	9252-50-R-24-BNC	961019		7/18/2009
RF Limiter, Transient	Electro-Metrics	EM7600	706		1/9/2009

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



1250 Peterson Dr., Wheeling, IL 60090

Company:
Model Tested:
Report Number:

Saris Cycling Group Inc
PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
14614

APPENDIX A

TEST PROCEDURE

Part 15, Subpart C, Section 15.249(a)(c)(d)(e)

Operation within the Bands 902-928 MHz,

2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

APPENDIX A

1.0 CONDUCTED EMISSION MEASUREMENTS

Conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in FCC Part 15, Subpart C, Section 15.207 & ANSI C63.4-2003. Since the device is operated from the public utility lines, the 120 Vac, 60 Hz power leads, high (hot) and low (neutral) sides, were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. During the test, the cables were placed and items moved (when appropriate) to maximize emissions. All signals were then recorded. The allowed levels for Intentional Radiators which is designed to connected to the public utility (AC) power line cannot exceed the following:

Frequency of Emissions (MHz)	Conducted Limits (dBuV)	
	Quasi Peak	Average
.15 to .5	66 to 56	56 to 46
.5 to 5	56	46
5 to 30	60	50

NOTE:

All test measurements were made at a screen room temperature of **74°F** at **48%** relative humidity.



1250 Peterson Dr., Wheeling, IL 60090

Company:	Saris Cycling Group Inc
Model Tested:	PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number:	14614

APPENDIX A

AC POWER LNE CONDUCTED DATA AND GRAPH(S) TAKEN DURING TESTING

PART 15.207

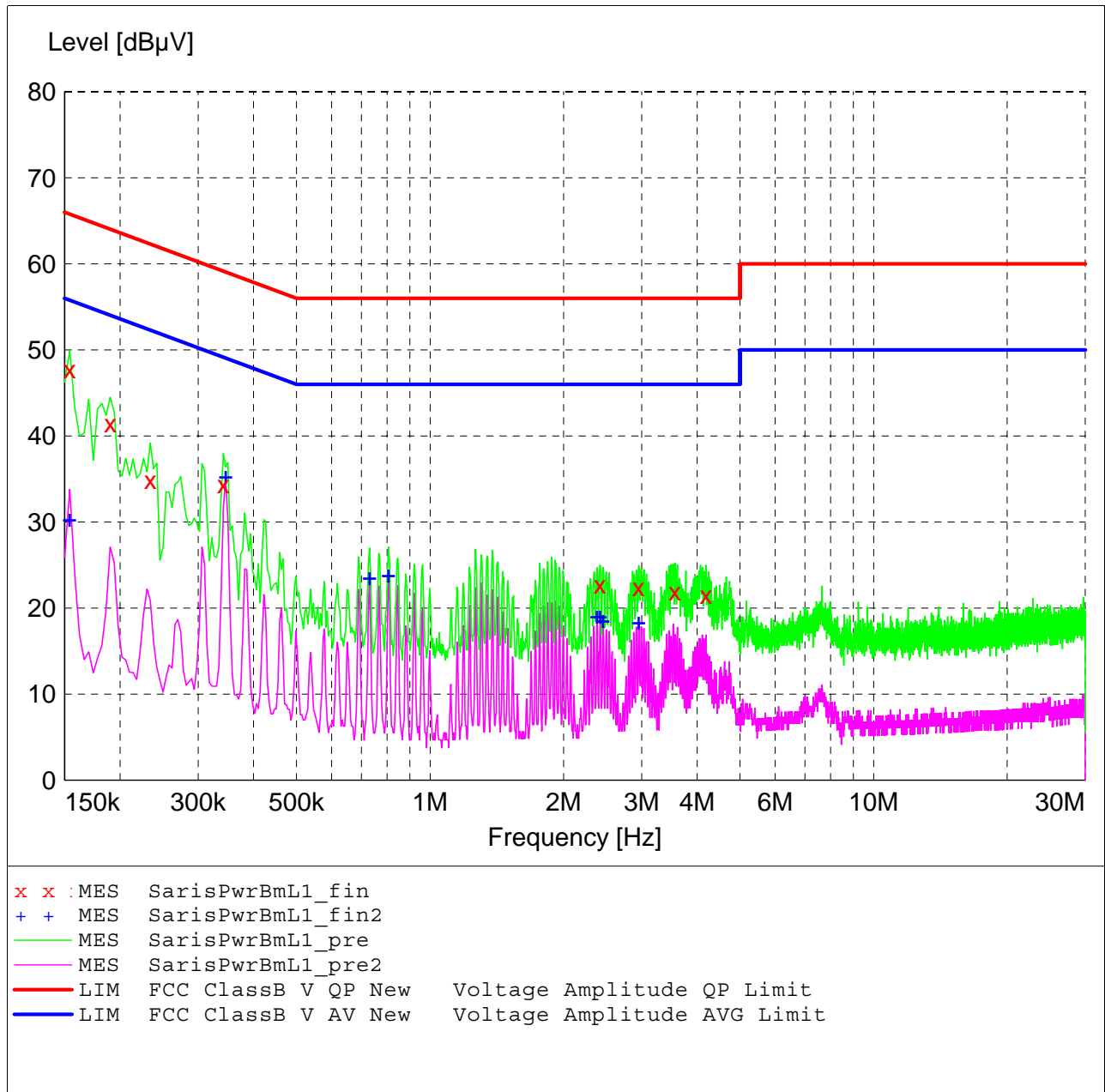
FCC Part 15 Class B

Voltage Mains Test

EUT: PowerBeam with TT1 module
 Manufacturer: Saris Cycling Group
 Operating Condition: 74 deg. F, 48% R.H.
 Test Site: DLS O.F. Site 1 (Screenroom)
 Operator: Adam A
 Test Specification: 120 V, 60 Hz
 Comment: Line 1
 Date: 08-08-2008

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:		Line Conducted Emissions					Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	2.0 s	9 kHz	LISN DLS#128	
CISPR AV							



MEASUREMENT RESULT: "SarisPwrBmL1_fin"

8/8/2008 8:48AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154000	47.70	11.4	66	18.1	QP	---	---
0.190000	41.40	11.1	64	22.6	QP	---	---
0.234000	34.90	10.7	62	27.4	QP	---	---
0.342000	34.40	10.4	59	24.8	QP	---	---
2.418000	22.70	10.4	56	33.3	QP	---	---
2.954000	22.40	10.5	56	33.6	QP	---	---
3.566000	21.90	10.5	56	34.1	QP	---	---
4.186000	21.50	10.4	56	34.5	QP	---	---

MEASUREMENT RESULT: "SarisPwrBmL1_fin2"

8/8/2008 8:48AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154000	30.40	11.4	56	25.4	CAV	---	---
0.346000	35.40	10.4	49	13.7	CAV	---	---
0.730000	23.60	10.2	46	22.4	CAV	---	---
0.806000	23.90	10.2	46	22.1	CAV	---	---
2.378000	19.10	10.4	46	26.9	CAV	---	---
2.418000	19.10	10.4	46	26.9	CAV	---	---
2.454000	18.60	10.4	46	27.4	CAV	---	---
2.954000	18.40	10.5	46	27.6	CAV	---	---

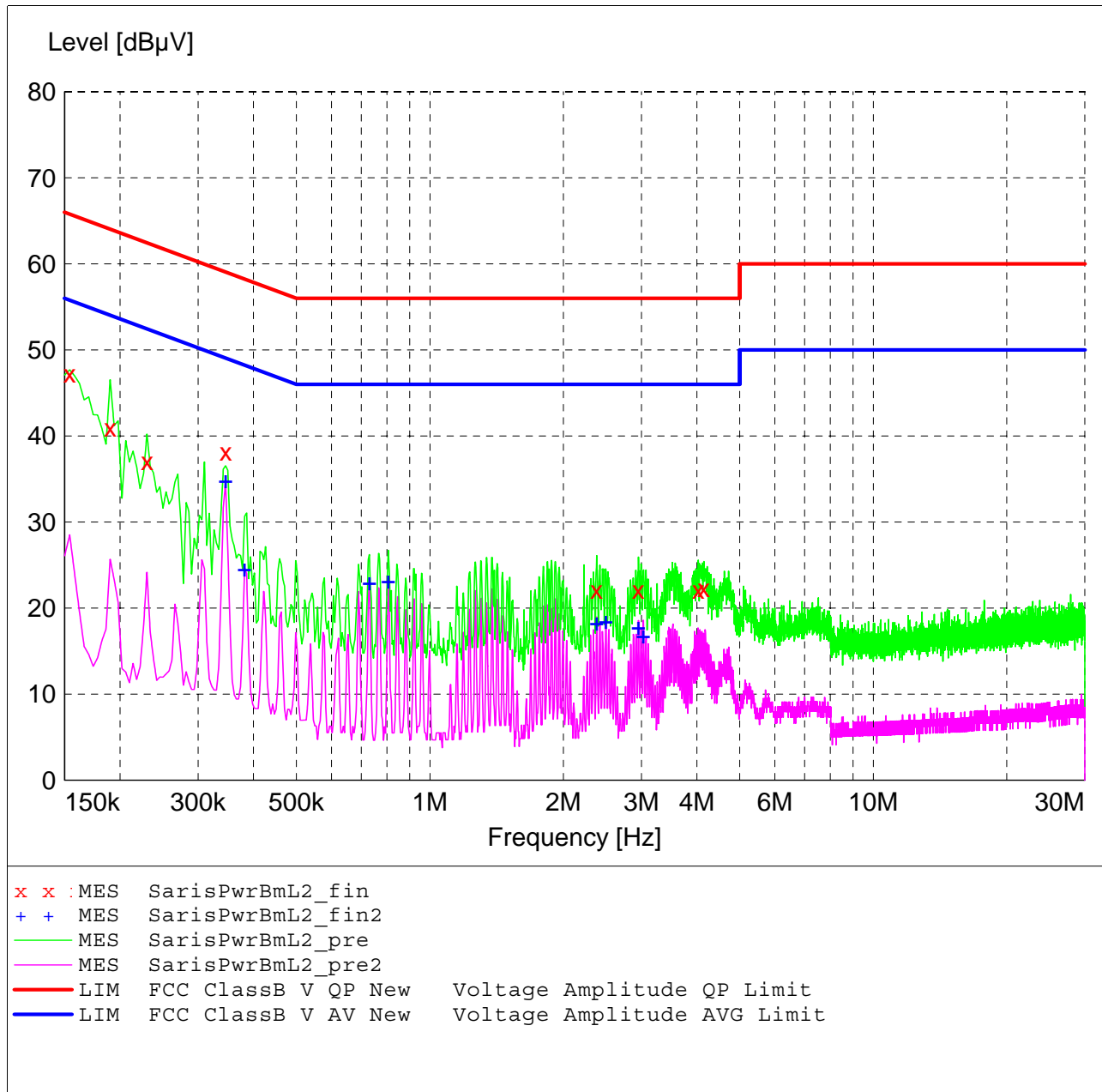
FCC Part 15 Class B

Voltage Mains Test

EUT: PowerBeam with TT1 module
 Manufacturer: Saris Cycling Group
 Operating Condition: 74 deg. F, 48% R.H.
 Test Site: DLS O.F. Site 1 (Screenroom)
 Operator: Adam A
 Test Specification: 120 V, 60 Hz
 Comment: Line 2
 Date: 08-08-2008

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:		Line Conducted Emissions				Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	2.0 s	9 kHz	LISN DLS#128
CISPR AV						



MEASUREMENT RESULT: "SarisPwrBmL2_fin"

8/8/2008 8:54AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154000	47.20	11.4	66	18.6	QP	---	---
0.190000	40.90	11.1	64	23.1	QP	---	---
0.230000	37.10	10.7	62	25.3	QP	---	---
0.346000	38.20	10.4	59	20.9	QP	---	---
2.378000	22.10	10.4	56	33.9	QP	---	---
2.954000	22.10	10.5	56	33.9	QP	---	---
4.030000	22.10	10.4	56	33.9	QP	---	---
4.150000	22.30	10.4	56	33.7	QP	---	---

MEASUREMENT RESULT: "SarisPwrBmL2_fin2"

8/8/2008 8:54AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.346000	34.90	10.4	49	14.2	CAV	---	---
0.382000	24.60	10.4	48	23.6	CAV	---	---
0.730000	23.00	10.2	46	23.0	CAV	---	---
0.806000	23.20	10.2	46	22.8	CAV	---	---
2.378000	18.30	10.4	46	27.7	CAV	---	---
2.494000	18.50	10.4	46	27.5	CAV	---	---
2.954000	17.80	10.5	46	28.2	CAV	---	---
3.030000	16.80	10.5	46	29.2	CAV	---	---



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

APPENDIX A

2.0 RESTRICTED BAND COMPLIANCE

The field strength of any emissions appearing outside the 902 to 928 MHz band shall not exceed the general radiated emissions limits as stated Section 15.209. The fundamental from the TT1 (T-antenna revision 1) RF Module transmitter shall not be inside the restricted band 960 to 1240 MHz.

As stated in Section 15.205a, the fundamental emission from the TT1 (T-antenna revision 1) RF Module shall not fall within any of the bands listed below:

Frequency in MHz	Frequency in MHz	Frequency in MHz	Frequency in GHz
.0900 to .1100	162.0125 to 167.17	2310.0 to 2390	9.30 to 9.50
.4900 to .5100	167.7200 to 173.20	2483.5 to 2500	10.60 to 12.70
2.1735 to 2.1905	240.000 to 285.00	2655.0 to 2900	13.25 to 13.40
8.362 to 8.3660	322.200 to 335.40	3260.0 to 3267	14.47 to 14.50
13.36 to 13.410	399.900 to 410.00	3332.0 to 3339	15.35 to 16.20
25.50 to 25.670	608.000 to 614.00	3345.8 to 3358	17.70 to 21.40
37.50 to 38.250	960.000 to 1240.00	3600.0 to 4400	22.01 to 23.13
73.00 to 75.500	1300.000 to 1427.00	4500.0 to 5250	23.60 to 24.00
108.00 to 121.94	1435.000 to 1626.50	5350.0 to 5450	31.20 to 31.80
123.00 to 138.00	1660.000 to 1710.00	7250.0 to 7750	36.43 to 36.50
149.90 to 150.00	1718.800 to 1722.20	8025.0 to 8500	ABOVE 38.60
156.70 to 156.90	2200.000 to 2300.00	9000.0 to 9200	

NOTE:

The noise floor within the Restricted Bands for the EMC Receiver will typically lay 20 dB below the limit.

NOTE:

See the page(s) 32 – 36 for the data made showing compliance for the Restricted Band



1250 Peterson Dr., Wheeling, IL 60090

Company:	Saris Cycling Group Inc
Model Tested:	PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number:	14614

APPENDIX A

3.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (SECTION 15.249a-d)

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the TT1 (T-antenna revision 1) RF Module, Model Number: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+, are shown in tabulated and graph form. Preliminary radiation measurements were performed at a 3 meter test distance with the limits adjusted linearly when required. The frequency range from 30 MHz to over 960 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the TT1 (T-antenna revision 1) RF Module were made up to 13000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 2453 & 2457 MHz. For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 30 MHz, up to at least the tenth harmonic of the highest fundamental frequency or 10 GHz, whichever is lower. At those frequencies where significant signals were detected, measurements were made over the entire frequency range specified in FCC Part 15, Subpart C, Section 15.249 at the open field test site, located at Genoa City, Wisconsin, FCC file number **31040/SIT**. When required, levels were extrapolated from 10 meters to 3 meters using a linear extrapolation.

All signals in the frequency range of 30 MHz to 2000 MHz were measured with a Biconical Antenna or tuned dipoles and from 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used. From 1000 MHz to 10 GHz Horn Antennas were used. During the test the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level of emissions. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. The EUT, peripheral equipment and cables were configured to meet the conditions in ANSI C63.4-2003, Clauses 6 & 8. Tests were made with the receive antenna(s) in both the horizontal and vertical planes of polarization. In each case, the table was rotated to find the maximum emissions.



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

APPENDIX A

3.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (CON'T)

For operation in the bands 902 to 928 MHz, 2400 to 2483.5 MHz, 5725 to 5875 MHz, and 24.0 to 24.25 GHz the field strength of any emissions within this band shall not exceed the field strength levels specified in the following table as stated in FCC, Part 15, Section 15.249(a).

Frequency range in MHz	Field Strength of Fundamental millivolts/meter	Field Strength of Fundamental dBuV/meter	Field Strength of Harmonics microvolts/meter	Field Strength of Harmonics dBuV/meter
902 to 928	50	93.98	500	53.98
2400 to 2483.5	50	93.98	500	53.98
5725 to 5875	50	93.98	500	53.98
24000 to 24250	250	107.96	2500	67.96

Field strength limits are at a distance of 3 meters. The emission limits shown are based on measurement instrumentation employing an average detector.

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

Preliminary radiated emission measurements were performed at a 3 meter test distance. The frequency range from 30 MHz to 1000 MHz was automatically scanned and plotted at various angles.

NOTE:

All radiated emissions measurements were made at a test room temperature of 72°F at 65% relative humidity.



1250 Peterson Dr., Wheeling, IL 60090

Company:	Saris Cycling Group Inc
Model Tested:	PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number:	14614

APPENDIX A

RADIATED DATA TAKEN FOR
FUNDAMENTAL, HARMONIC & SPURIOUS
EMISSIONS MEASUREMENTS

PART 15.249



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

Radiated Fundamental and Spurious Emissions – 30 MHz to 25 GHz

Tested at a 3 Meter Distance (30 MHz to 10 GHz) and Tested at a 1 Meter Distance (10 GHz to 25 GHz)

EUT: PowerBeam with TT1 module
Manufacturer: Saris Cycling Group
Operating Condition: 73 deg F; 69% R.H.
Test Site: Site 3
Operator: Craig B
Test Specification: FCC Part 15.249, Part 15.205 and Part 15.209
Comment: Continuous Transmit
 Channel: 2.453 GHz
Date: 08/06/2008

- Notes:** (1) The EUT was measured in 3 orthogonal axis and placed in the worst case axis for the following measurements.
 (2) All other emissions at least 20 dB under the FCC Part 15.209 limits
 (3) No emissions were found at the upper and lower band-edges

Frequency (MHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Height (m)	EUT Angle (deg)	Comment
2453	Max Peak	Vert	63.96	28.60	3.8	96.4	---	96.4	114	17.6	1.2	180	Fundamental
2453	Average	Vert	63.96	28.60	3.8	96.4	-58.3	38.1	94	55.9	1.2	180	Fundamental
2453	Max Peak	Horz	66.39	28.60	3.8	98.8	---	98.8	114	15.2	1.0	250	Fundamental
2453	Average	Horz	66.39	28.60	3.8	98.8	-58.3	40.5	94	53.5	1.0	250	Fundamental
4906	Max Peak	Vert	56.64	33.01	-32.4	57.3	---	57.3	74	16.8	1.1	210	Res. Band
4906	Average	Vert	56.64	33.01	-32.4	57.3	-58.3	-1.1	54	55.1	1.1	210	Res. Band
4906	Max Peak	Horz	56.12	33.01	-32.4	56.7	---	56.7	74	17.3	1.3	225	Res. Band
4906	Average	Horz	56.12	33.01	-32.4	56.7	-58.3	-1.6	54	55.6	1.3	225	Res. Band
7359	Max Peak	Vert	56.72	36.05	-30.5	62.3	---	62.3	74	11.7	1.5	340	Res. Band
7359	Average	Vert	56.72	36.05	-30.5	62.3	-58.3	4.0	54	50.0	1.5	340	Res. Band
7359	Max Peak	Horz	55.67	36.05	-30.5	61.2	---	61.2	74	12.8	1.0	180	Res. Band
7359	Average	Horz	55.67	36.05	-30.5	61.2	-58.3	2.9	54	51.1	1.0	180	Res. Band



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

Radiated Fundamental and Spurious Emissions – 30 MHz to 25 GHz

Tested at a 3 Meter Distance (30 MHz to 10 GHz) and Tested at a 1 Meter Distance (10 GHz to 25 GHz)

EUT: Pro 300PT-T with TT1 module
Manufacturer: Saris Cycling Group
Operating Condition: 70 deg F; 62% R.H.
Test Site: Site 3
Operator: Craig B
Test Specification: FCC Part 15.249, Part 15.205 and Part 15.209
Comment: Continuous Transmit
 Channel: 2.453 GHz
Date: 08/11/2008

- Notes:** (1) The EUT was measured in 3 orthogonal axis and placed in the worst case axis for the following measurements.
 (2) All other emissions at least 20 dB under the FCC Part 15.209 limits
 (3) No emissions were found at the upper and lower band-edges

Frequency (MHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Height (m)	EUT Angle (deg)	Comment
2453	Max Peak	Vert	56.91	28.60	3.8	89.3	---	89.3	114	24.7	1.0	270	Fundamental
2453	Average	Vert	56.91	28.60	3.8	89.3	-58.3	31.0	94	63.0	1.0	270	Fundamental
2453	Max Peak	Horz	63.03	28.60	3.8	95.4	---	95.4	114	18.6	1.0	190	Fundamental
2453	Average	Horz	63.03	28.60	3.8	95.4	-58.3	37.1	94	56.9	1.0	190	Fundamental
4906	Max Peak	Vert	57.17	33.01	-32.4	57.8	---	57.8	74	16.2	1.1	290	Res. Band
4906	Average	Vert	57.17	33.01	-32.4	57.8	-58.3	-0.5	54	54.5	1.1	290	Res. Band
4906	Max Peak	Horz	56.25	33.01	-32.4	56.9	---	56.9	74	17.1	1.1	270	Res. Band
4906	Average	Horz	56.25	33.01	-32.4	56.9	-58.3	-1.4	54	55.4	1.1	270	Res. Band
7359	Max Peak	Vert	59.18	36.05	-30.5	64.7	---	64.7	74	9.3	1.4	270	Res. Band
7359	Average	Vert	59.18	36.05	-30.5	64.7	-58.3	6.4	54	47.6	1.4	270	Res. Band
7359	Max Peak	Horz	59.95	36.05	-30.5	65.5	---	65.5	74	8.5	1.3	270	Res. Band
7359	Average	Horz	59.95	36.05	-30.5	65.5	-58.3	7.2	54	46.8	1.3	270	Res. Band
9812	Max Peak	Vert	54.07	38.07	-29.8	62.3	---	62.3	74	11.7	1.1	315	Harmonic
9812	Average	Vert	54.07	38.07	-29.8	62.3	-58.3	4.0	54	50.0	1.1	315	Harmonic
9812	Max Peak	Horz	54.88	38.07	-29.8	63.2	---	63.2	74	10.9	1.0	350	Harmonic
9812	Average	Horz	54.88	38.07	-29.8	63.2	-58.3	4.9	54	49.2	1.0	350	Harmonic



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

Radiated Fundamental and Spurious Emissions – 30 MHz to 25 GHz

Tested at a 3 Meter Distance (30 MHz to 10 GHz) and Tested at a 1 Meter Distance (10 GHz to 25 GHz)

EUT: PowerTap SL2.4 with TT1 module
Manufacturer: Saris Cycling Group
Operating Condition: 75 deg F; 65% R.H.
Test Site: Site 3
Operator: Craig B
Test Specification: FCC Part 15.249, Part 15.205 and Part 15.209
Comment: Continuous Transmit
 Channel: 2.453 GHz
Date: 08/05/2008

- Notes:** (1) The EUT was measured in 3 orthogonal axis and placed in the worst case axis for the following measurements.
 (2) All other emissions at least 20 dB under the FCC Part 15.209 limits
 (3) No emissions were found at the upper and lower band-edges

Frequency (MHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Height (m)	EUT Angle (deg)	Comment
2453	Max Peak	Vert	58.63	28.60	3.8	91.0	---	91.0	114	23.0	1.1	250	Fundamental
2453	Average	Vert	58.63	28.60	3.8	91.0	-58.3	32.7	94	61.3	1.1	250	Fundamental
2453	Max Peak	Horz	63.22	28.60	3.8	95.6	---	95.6	114	18.4	1.0	290	Fundamental
2453	Average	Horz	63.22	28.60	3.8	95.6	-58.3	37.3	94	56.7	1.0	290	Fundamental
4906	Max Peak	Vert	57.85	33.01	-32.4	58.5	---	58.5	74	15.5	1.0	225	Res. Band
4906	Average	Vert	57.85	33.01	-32.4	58.5	-58.3	0.2	54	53.8	1.0	225	Res. Band
4906	Max Peak	Horz	57.46	33.01	-32.4	58.1	---	58.1	74	15.9	1.0	240	Res. Band
4906	Average	Horz	57.46	33.01	-32.4	58.1	-58.3	-0.2	54	54.2	1.0	240	Res. Band
7359	Max Peak	Vert	53.70	36.05	-30.5	59.3	---	59.3	74	14.8	1.4	160	Res. Band
7359	Average	Vert	53.70	36.05	-30.5	59.3	-58.3	1.0	54	53.1	1.4	160	Res. Band
7359	Max Peak	Horz	56.09	36.05	-30.5	61.6	---	61.6	74	12.4	1.5	290	Res. Band
7359	Average	Horz	56.09	36.05	-30.5	61.6	-58.3	3.3	54	50.7	1.5	290	Res. Band
9812	Max Peak	Vert	53.81	38.07	-29.8	62.1	---	62.1	74	11.9	1.2	270	Harmonic
9812	Average	Vert	53.81	38.07	-29.8	62.1	-58.3	3.8	54	50.2	1.2	270	Harmonic
9812	Max Peak	Horz	53.94	38.07	-29.8	62.2	---	62.2	74	11.8	1.3	270	Harmonic
9812	Average	Horz	53.94	38.07	-29.8	62.2	-58.3	3.9	54	50.1	1.3	270	Harmonic



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

Radiated Fundamental and Spurious Emissions – 30 MHz to 25 GHz

Tested at a 3 Meter Distance (30 MHz to 10 GHz) and Tested at a 1 Meter Distance (10 GHz to 25 GHz)

EUT: Computer+ with TT1 module
Manufacturer: Saris Cycling Group
Operating Condition: 75 deg F; 65% R.H.
Test Site: Site 3
Operator: Craig B
Test Specification: FCC Part 15.249, Part 15.205 and Part 15.209
Comment: Continuous Transmit Channel: 2.453 GHz
Date: 08/05/2008

- Notes:**
- (1) The EUT was measured in 3 orthogonal axis and placed in the worst case axis for the following measurements.
 - (2) All other emissions at least 20 dB under the FCC Part 15.209 limits
 - (3) No emissions were found at the upper and lower band-edges
 - (4) Investigated with and without USB cable. Worst case was determined to be without the USB cable connected.

Frequency (MHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Height (m)	EUT Angle (deg)	Comment
2453	Max Peak	Vert	64.35	28.60	3.8	96.8	---	96.8	114	17.3	1.0	280	Fundamental
2453	Average	Vert	64.35	28.60	3.8	96.8	-58.3	38.5	94	55.6	1.0	280	Fundamental
2453	Max Peak	Horz	62.62	28.60	3.8	95.0	---	95.0	114	19.0	1.1	220	Fundamental
2453	Average	Horz	62.62	28.60	3.8	95.0	-58.3	36.7	94	57.3	1.1	220	Fundamental
4906	Max Peak	Vert	52.27	33.01	-32.4	52.9	---	52.9	74	21.1	1.0	35	Res. Band
4906	Average	Vert	52.27	33.01	-32.4	52.9	-58.3	-5.4	54	59.4	1.0	35	Res. Band
4906	Max Peak	Horz	49.99	33.01	-32.4	50.6	---	50.6	74	23.4	1.2	270	Res. Band
4906	Average	Horz	49.99	33.01	-32.4	50.6	-58.3	-7.7	54	61.7	1.2	270	Res. Band
7359	Max Peak	Vert	59.40	36.05	-30.5	65.0	---	65.0	74	9.1	1.3	20	Res. Band
7359	Average	Vert	59.40	36.05	-30.5	65.0	-58.3	6.7	54	47.4	1.3	20	Res. Band
7359	Max Peak	Horz	58.76	36.05	-30.5	64.3	---	64.3	74	9.7	1.5	0	Res. Band
7359	Average	Horz	58.76	36.05	-30.5	64.3	-58.3	6.0	54	48.0	1.5	0	Res. Band
9812	Max Peak	Vert	53.31	38.07	-29.8	61.6	---	61.6	74	12.4	1.3	100	Harmonic
9812	Average	Vert	53.31	38.07	-29.8	61.6	-58.3	3.3	54	50.7	1.3	100	Harmonic
9812	Max Peak	Horz	Noise Floor										
9812	Average	Horz	Noise Floor										



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
 Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
 Report Number: 14614

Radiated Fundamental and Spurious Emissions – 30 MHz to 25 GHz

Tested at a 3 Meter Distance (30 MHz to 10 GHz) and Tested at a 1 Meter Distance (10 GHz to 25 GHz)

EUT: Computer+ with TT1 module
Manufacturer: Saris Cycling Group
Operating Condition: 75 deg F; 59% R.H.
Test Site: Site 3
Operator: Craig B
Test Specification: FCC Part 15.249, Part 15.205 and Part 15.209
Comment: Continuous Transmit
 Channel: 2.457 GHz
Date: 08/07/2008

- Notes:** (1) The EUT was measured in 3 orthogonal axis and placed in the worst case axis for the following measurements.
 (2) All other emissions at least 20 dB under the FCC Part 15.209 limits
 (3) No emissions where found at the upper and lower band-edges
 (4) Investigated with and without USB cable. Worst case was determined to be without the USB cable connected.

Frequency (MHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Height (m)	EUT Angle (deg)	Comment
2457	Max Peak	Vert	64.36	28.61	3.8	96.8	---	96.8	114	17.2	1.0	270	Fundamental
2457	Average	Vert	64.36	28.61	3.8	96.8	-58.3	38.5	94	55.5	1.0	270	Fundamental
2457	Max Peak	Horz	64.09	28.61	3.8	96.5	---	96.5	114	17.5	1.1	200	Fundamental
2457	Average	Horz	64.09	28.61	3.8	96.5	-58.3	38.2	94	55.8	1.1	200	Fundamental
4914	Max Peak	Vert	53.19	33.03	-32.4	53.8	---	53.8	74	20.2	1.0	80	Res. Band
4914	Average	Vert	53.19	33.03	-32.4	53.8	-58.3	-4.5	54	58.5	1.0	80	Res. Band
4914	Max Peak	Horz	52.39	33.03	-32.4	53.0	---	53.0	74	21.0	1.1	170	Res. Band
4914	Average	Horz	52.39	33.03	-32.4	53.0	-58.3	-5.3	54	59.3	1.1	170	Res. Band
7371	Max Peak	Vert	58.94	36.09	-30.4	64.6	---	64.6	74	9.4	1.3	10	Res. Band
7371	Average	Vert	58.94	36.09	-30.4	64.6	-58.3	6.3	54	47.7	1.3	10	Res. Band
7371	Max Peak	Horz	58.43	36.09	-30.4	64.1	---	64.1	74	9.9	1.5	0	Res. Band
7371	Average	Horz	58.43	36.09	-30.4	64.1	-58.3	5.8	54	48.2	1.5	0	Res. Band



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

DUTY CYCLE CORRECTION FACTOR

DATA AND GRAPH(S)

PART 15.249



1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

Test Date: 08-05-2008
Company: Saris Cycling Group
EUT: TT1 module
Test: Duty Cycle (FCC Part 15.35)
Operator: Craig B
Comment: Total ON Time during 100 ms = 0.20441 ms

$$20 \log (0.20441 / 100) = -53.8$$

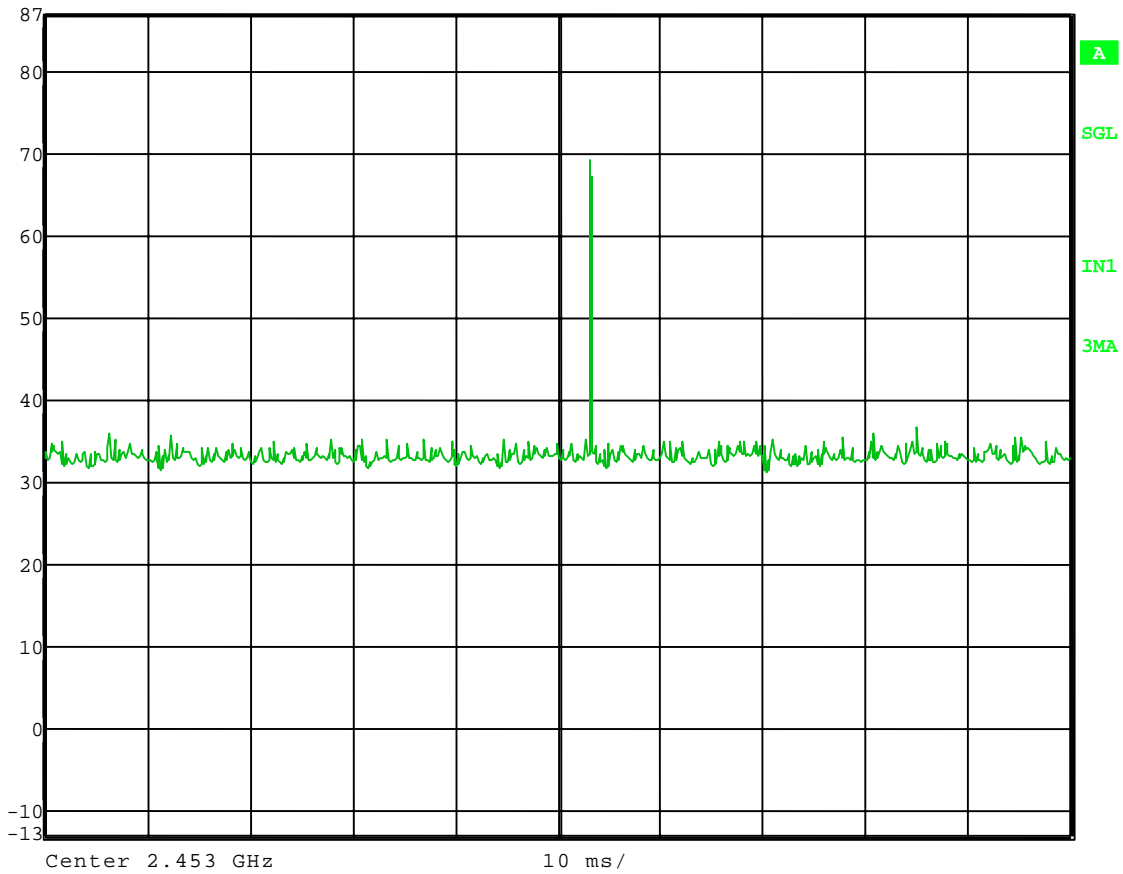
Duty cycle correction factor = 53.8 dB

100 ms sweep:



Ref Lvl
87 dBμV

RBW 1 MHz RF Att 10 dB
VBW 3 MHz
SWT 100 ms Unit dBμV



Date: 5.AUG.2008 12:49:12



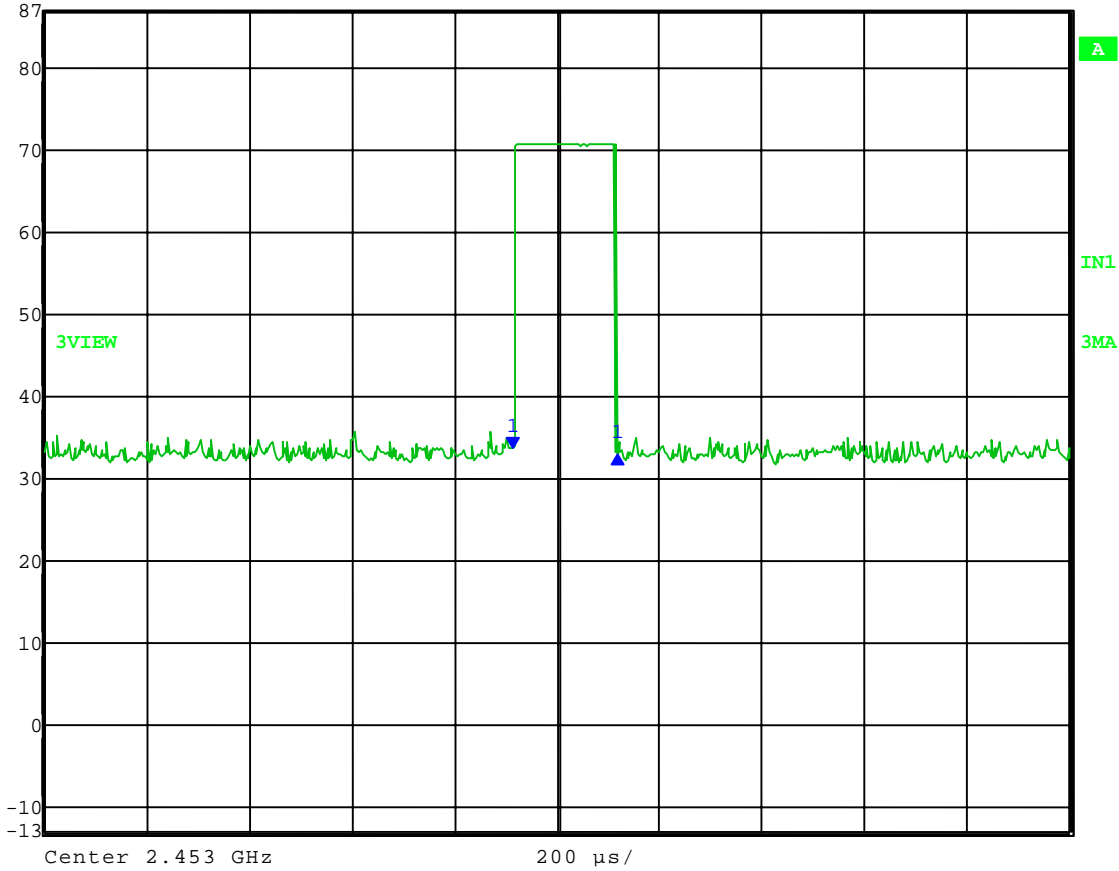
1250 Peterson Dr., Wheeling, IL 60090

Company: Saris Cycling Group Inc
Model Tested: PowerBeam, Pro 300PT-T, PowerTap SL2.4 & Computer+
Report Number: 14614

Test Date: 08-05-2008
Company: Saris Cycling Group
EUT: TT1 module
Test: Duty Cycle (FCC Part 15.35)
Operator: Craig B
Comment:

Duration of one pulse:

	Delta 1 [T3]	RBW	1 MHz	RF Att	10 dB
	Ref Lvl	-0.72 dB	VBW	3 MHz	
	87 dBμV	204.408818 μs	SWT	2 ms	Unit dBμV



Date: 5.AUG.2008 12:52:44