



Company: Saris Cycling Group Inc.
Model Tested: J2CPUFT3
Report Number: 15663

1250 Peterson Dr., Wheeling, IL 60090

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: Joule 2.0
Kind of Equipment: Bicycle Computer
Frequency Range: 2405 MHz - 2480 MHz
Test Configuration: Handlebar Mounted (Tested at 3 vdc)
Model Number(s): J2CPUFT3
Model(s) Tested: J2CPUFT3
Serial Number(s): N/A
Date of Tests: September 9, 2009
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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SIGNATURE PAGE

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Reviewed By:

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Brian Mattson
General Manager



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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

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listed on the Scope of Accreditation, for:*

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*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
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2008-10-01 through 2009-09-30

Effective dates

Dolly J. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)



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1.0 SUMMARY OF TEST REPORT

It was found that the Joule 2.0, Model Number(s) J2CPUFT3 **meets** the radio interference 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. The AC Power Line conducted emissions test was not required because the Joule 2.0 is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

2.0 INTRODUCTION

On September 9, 2009, a series of radio frequency interference measurements was performed on Joule 2.0, Model Number(s) J2CPUFT3, Serial Number: N/A. 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
FCC Registration Number: 334127

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.



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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.



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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.



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

7.1 Description:

The Joule 2.0 is a bicycle computer that is mounted to bicycle handlebars or stem and is used to provide feedback to assist training. Typical cycling computer parameters such as speed and cadence can be displayed, as well as more advanced parameters such as power and grade. These values come from sensors that communicate wirelessly to the Joule 2.0. The Joule 2.0 displays these values in real-time and stores them in memory for later analysis.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

3in x 2in x 1in

7.3 LINE FILTER USED:

None

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

up to 1000 kHz (backlight driver)

Clock Frequencies:

48, 16 12, 0.032768 MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

- | | |
|------------------------------------|------------------|
| 1. Joule 2.0 Main Circuit Assembly | PN: 18189 Rev A4 |
| 2. USB Adapter Assembly | PN: 18800 Rev A |



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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:

The EUT was tested in continuous transmit and continuous receive modes. Testing was done at the lowest channel (2405 MHz), the middle channel (2441 MHz), and the highest channel (2480 MHz) that the EUT will operate at.

The On-Time of normal operation is only approximately 212us once every several minutes (see Duty Cycle plots). Therefore the device was set up to transmit a continuous carrier (unmodulated) for measurement purposes.

The EUT was also tested in charging mode. In this mode the EUT cannot transmit or receive.

9.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 Joule 2.0

Model Number: J2CPUFT3 Serial Number: N/A



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10.0 RADIATED PHOTOS TAKEN DURING TESTING



RADIATED POSITION 1



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10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



RADIATED POSITION 2



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10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



RADIATED POSITION 3



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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 Joule 2.0, Model Number(s) J2CPUFT3 **meets** the radio interference 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. The conducted emissions test was not required because the Joule 2.0 is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.



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TABLE 1 – EQUIPMENT LIST

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/10
Preamplifier	Rohde & Schwarz	TS-PR10	032001/005	9 kHz – 1 GHz	3/10
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	5/10
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	5/10
Preamp	Miteq	AMF-6D-100200-50	313936	1 GHz-10 GHz	5/10
Preamp	Miteq	AMF-6D-010100-50	213976	10 GHz-18 GHz	5/10
Horn Antenna	EMCO	3115	9903-5731	1-18 GHz	6/11
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	438727	18 GHz-26 GHz	8/10
Horn Antenna	EMCO	3116	2549	18 – 40 GHz	8/10

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



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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



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APPENDIX A

1a 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:

The conducted emissions test was not required because the Joule 2.0 is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.



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2a BAND EDGE AND RESTRICTED BAND COMPLIANCE

The field strength of any emissions appearing outside the 2405 MHz - 2480 MHz band shall not exceed the general radiated emissions limits as stated Section 15.209. The fundamental from the Joule 2.0 transmitter shall not be inside the restricted bands 2310 MHz – 2390 MHz, and 2483.5 MHz - 2500 MHz.

As stated in Section 15.205a, the fundamental emission from the Joule 2.0 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.

The spurious emissions measurements show all emissions are 20 dB under the FCC Part 15.209 limits. See the following page(s) for the graph(s) made showing compliance for Band Edge. Also see the table of measurements made for the Fundamental, Harmonic and Spurious emissions in paragraph 4 of this section.



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APPENDIX A

BAND EDGE DATA AND GRAPH(S)

PART 15.249



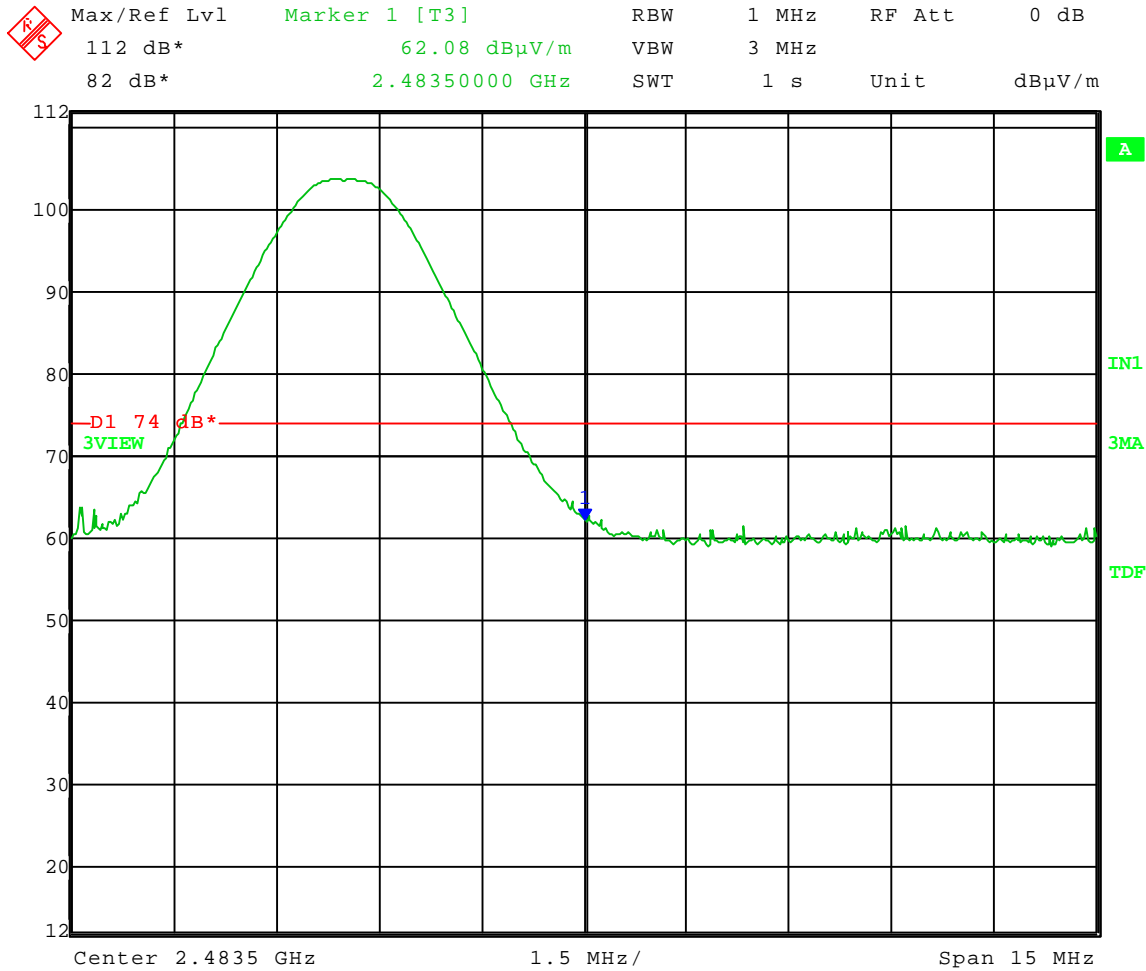
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APPENDIX A

Test Date: 09-08-2009
Company: Saris Cycling Group
EUT: Joule 2.0
Test: Band edge 2.4835 GHz (FCC Pt. 15.249, FCC Pt. 15.205, FCC Pt.15.209)
Operator: Craig B

Comment: 2.480 GHz Transmit Frequency
Horizontal (worst-case)
Peak Detector
Limit: 74 dB μ V/m at 3 meters



Date: 8.SEP.2009 10:15:52



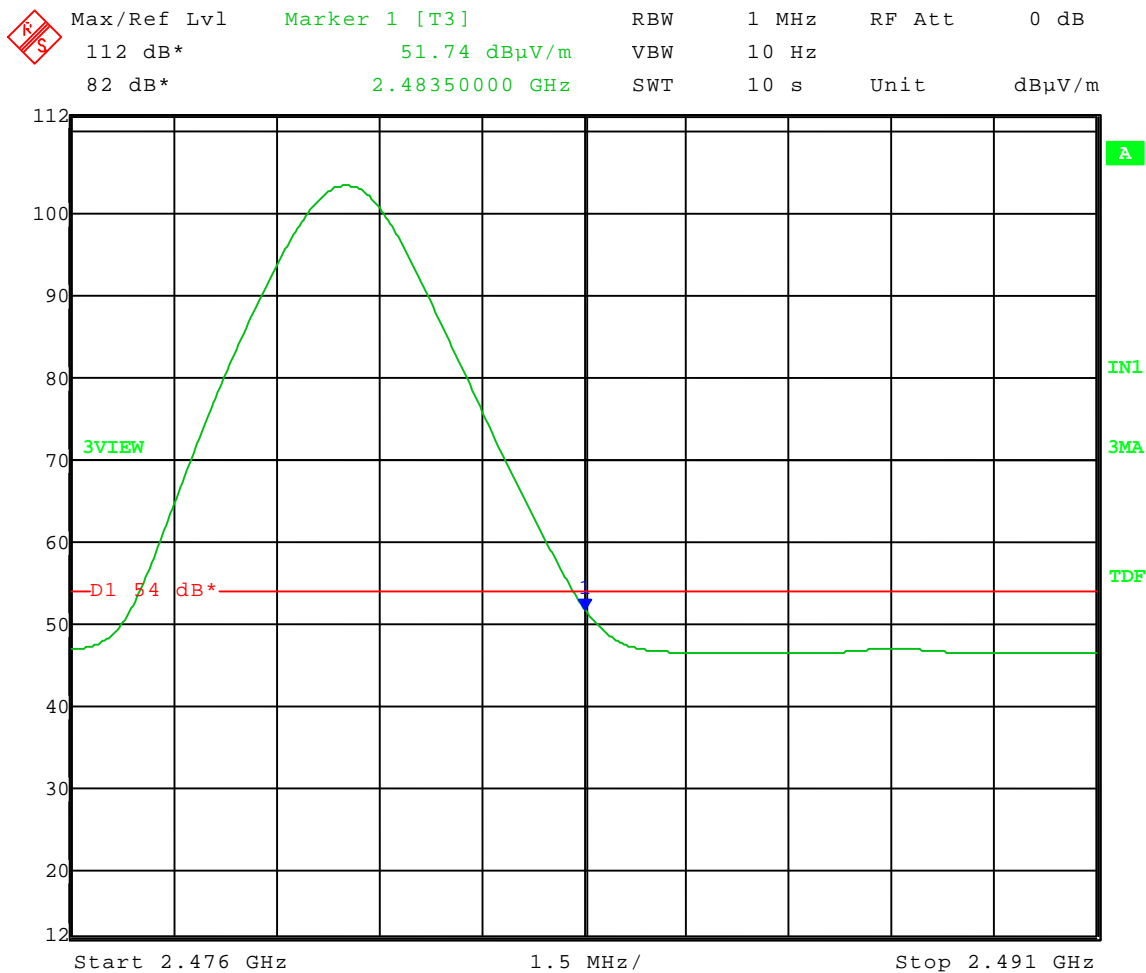
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APPENDIX A

Test Date: 09-08-2009
Company: Saris Cycling Group
EUT: Joule 2.0
Test: Band edge 2.4835 GHz (FCC Pt. 15.249, FCC Pt. 15.205, FCC Pt.15.209)
Operator: Craig B

Comment: 2.480 GHz Transmit Frequency
Horizontal (worst-case)
Average Detector
Limit: 54 dB μ V/m at 3 meters



Date: 8.SEP.2009 10:18:29



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3a ANTENNA CONNECTOR – 15.203

As stated in 15.203 the Joule 2.0 was designed to ensure that no antenna other than that furnished by Saris Cycling Group Inc will be used with the EUT. The use of a permanently attached antenna or antenna that uses an unique coupling to the intentional radiator was considered to comply with section 15.203.

4a FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (SECTION 15.249a-d)

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Joule 2.0, Model Number: J2CPUFT3, 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 Joule 2.0 were made up to 25000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 48 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.



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4a 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 75°F at 60% relative humidity.



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APPENDIX A

RADIATED DATA TAKEN FOR
FUNDAMENTAL, HARMONIC & SPURIOUS
EMISSIONS MEASUREMENTS
PART 15.249



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APPENDIX A

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: Joule 2.0
Manufacturer: Saris Cycling Group
Operating Condition: 70 deg F; 55% 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 – **Low Channel:** 2405 MHz
Date: 09-04-2009; 09-08-2009

Notes: (1) All other emissions at least 20 dB under the FCC Part 15.209 limits

Frequency (MHz)	Measurement Detector	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
2405	Max Peak	Vert	64.78	28.51	3.1	96.4	----	96.4	113.98 (Peak)	17.6	1.2	180	Fundamental
2405	Max Peak	Vert	64.78	28.51	3.1	96.4	20	76.4	93.98 (Avg)	17.6	1.2	180	Fundamental
2405	Max Peak	Horz	70.64	28.51	3.1	102.3	----	102.3	113.98 (Peak)	11.7	1.1	210	Fundamental
2405	Max Peak	Horz	70.64	28.51	3.1	102.3	20	82.3	93.98 (Avg)	11.7	1.1	210	Fundamental
4810	Max Peak	Vert	58.00	32.94	-33.5	57.4	----	57.4	74 (Peak)	16.6	1.2	250	Harmonic
4810	Max Peak	Vert	58.00	32.94	-33.5	57.4	20	37.4	54 (Avg)	16.6	1.2	250	Harmonic
4810	Max Peak	Horz	59.33	32.94	-33.5	58.8	----	58.8	74 (Peak)	15.2	1.3	190	Harmonic
4810	Max Peak	Horz	59.33	32.94	-33.5	58.8	20	38.8	54 (Avg)	15.2	1.3	190	Harmonic
7215	Max Peak	Vert	51.93	35.89	-33.6	54.2	----	54.2	74 (Peak)	19.8	1.1	270	Harmonic
7215	Max Peak	Vert	51.93	35.89	-33.6	54.2	20	34.2	54 (Avg)	19.8	1.1	270	Harmonic
7215	Max Peak	Horz	52.07	35.89	-33.6	54.4	----	54.4	74 (Peak)	19.6	1.2	270	Harmonic
7215	Max Peak	Horz	52.07	35.89	-33.6	54.4	20	34.4	54 (Avg)	19.6	1.2	270	Harmonic



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APPENDIX A

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: Joule 2.0
Manufacturer: Saris Cycling Group
Operating Condition: 68 deg F; 64% 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 – **Mid Channel**; 2441 MHz
Date: 09-08-2009

Notes: (1) All other emissions at least 20 dB under the FCC Part 15.209 limits

Frequency (MHz)	Measurement Detector	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
2441	Max Peak	Vert	64.41	28.61	3.1	96.1	----	96.1	113.98 (Peak)	17.9	1.1	180	Fundamental
2441	Max Peak	Vert	64.41	28.61	3.1	96.1	20	76.1	93.98 (Avg)	17.9	1.1	180	Fundamental
2441	Max Peak	Horz	70.80	28.61	3.1	102.5	----	102.5	113.98 (Peak)	11.5	1.1	200	Fundamental
2441	Max Peak	Horz	70.80	28.61	3.1	102.5	20	82.5	93.98 (Avg)	11.5	1.1	200	Fundamental
4882	Max Peak	Vert	55.83	33.07	-33.5	55.4	----	55.4	74 (Peak)	18.6	1.1	80	Harmonic
4882	Max Peak	Vert	55.83	33.07	-33.5	55.4	20	35.4	54 (Avg)	18.6	1.1	80	Harmonic
4882	Max Peak	Horz	57.66	33.07	-33.5	57.2	----	57.2	74 (Peak)	16.8	1.1	180	Harmonic
4882	Max Peak	Horz	57.66	33.07	-33.5	57.2	20	37.2	54 (Avg)	16.8	1.1	180	Harmonic
7323	Max Peak	Vert	51.98	36.19	-32.9	55.3	----	55.3	74 (Peak)	18.7	1.2	225	Harmonic
7323	Max Peak	Vert	51.98	36.19	-32.9	55.3	20	35.3	54 (Avg)	18.7	1.2	225	Harmonic
7323	Max Peak	Horz	52.79	36.19	-32.9	56.1	----	56.1	74 (Peak)	17.9	1.0	270	Harmonic
7323	Max Peak	Horz	52.79	36.19	-32.9	56.1	20	36.1	54 (Avg)	17.9	1.0	270	Harmonic



Company: Saris Cycling Group Inc.
 Model Tested: J2CPUFT3
 Report Number: 15663

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

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: Joule 2.0
Manufacturer: Saris Cycling Group
Operating Condition: 70 deg F; 55% 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 -- **High Channel**: 2480 MHz
Date: 09-04-2009; 09-08-2009

Notes: (1) All other emissions at least 20 dB under the FCC Part 15.209 limits

Frequency (MHz)	Measurement Detector	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
2480	Max Peak	Vert	65.32	28.73	3.1	97.2	----	97.2	113.98 (Peak)	16.8	1.1	180	Fundamental
2480	Max Peak	Vert	65.32	28.73	3.1	97.2	20	77.2	93.98 (Avg)	16.8	1.1	180	Fundamental
2480	Max Peak	Horz	71.06	28.73	3.1	102.9	----	102.9	113.98 (Peak)	11.1	1.1	210	Fundamental
2480	Max Peak	Horz	71.06	28.73	3.1	102.9	20	82.9	93.98 (Avg)	11.1	1.1	210	Fundamental
4960	Max Peak	Vert	57.12	33.20	-33.3	57.0	----	57.0	74 (Peak)	17.0	1.3	60	Harmonic
4960	Max Peak	Vert	57.12	33.20	-33.3	57.0	20	37.0	54 (Avg)	17.0	1.3	60	Harmonic
4960	Max Peak	Horz	57.63	33.20	-33.3	57.5	----	57.5	74 (Peak)	16.5	1.1	250	Harmonic
4960	Max Peak	Horz	57.63	33.20	-33.3	57.5	20	37.5	54 (Avg)	16.5	1.1	250	Harmonic
7440	Max Peak	Vert	52.40	36.51	-32.3	56.6	----	56.6	74 (Peak)	17.4	1.0	270	Harmonic
7440	Max Peak	Vert	52.40	36.51	-32.3	56.6	20	36.6	54 (Avg)	17.4	1.0	270	Harmonic
7440	Max Peak	Horz	52.67	36.51	-32.3	56.9	----	56.9	74 (Peak)	17.1	1.0	270	Harmonic
7440	Max Peak	Horz	52.67	36.51	-32.3	56.9	20	36.9	54 (Avg)	17.1	1.0	270	Harmonic



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Company: Saris Cycling Group Inc.
Model Tested: J2CPUFT3
Report Number: 15663

20 dB BANDWIDTH
DATA AND GRAPH(S)

PART 15.249

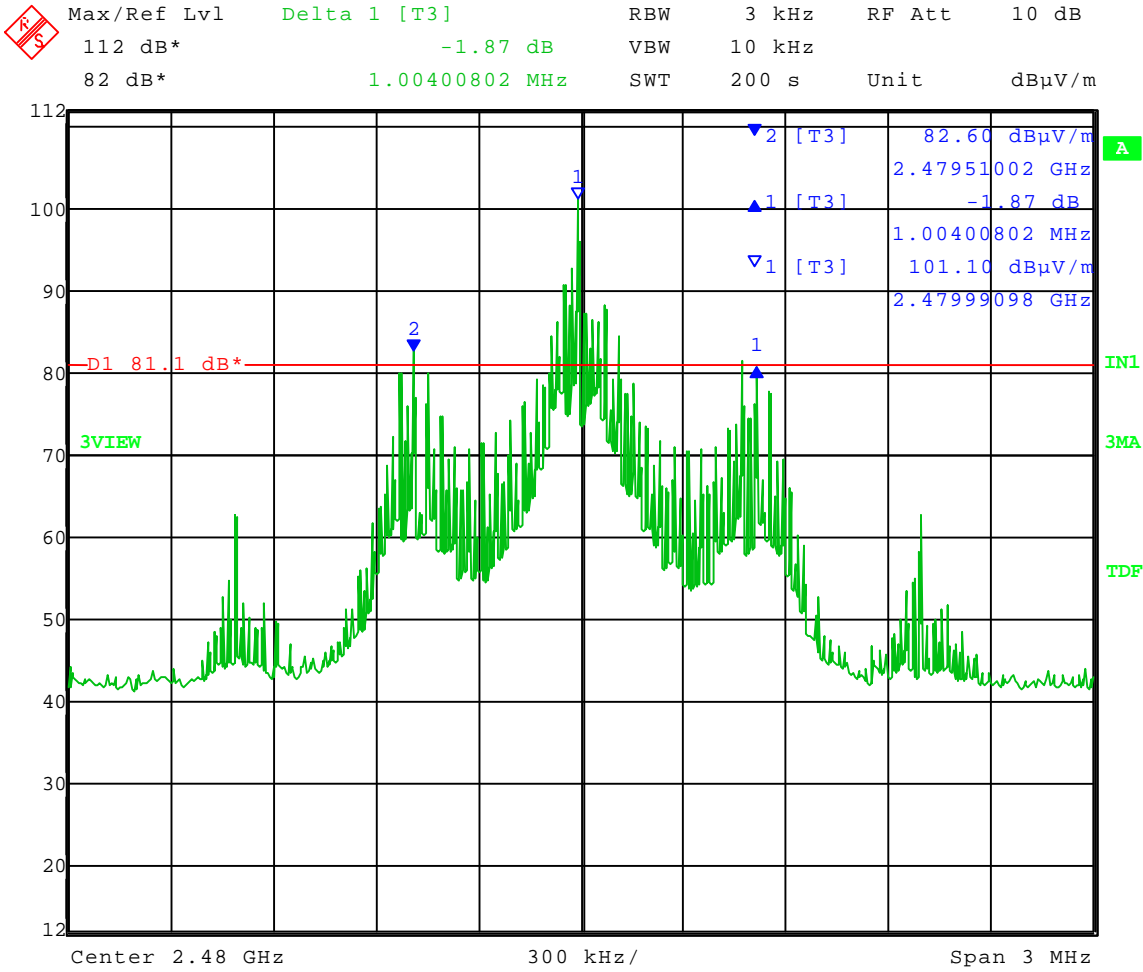


Company: Saris Cycling Group Inc.
 Model Tested: J2CPUFT3
 Report Number: 15663

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 09-08-2009
 Company: Saris Cycling Group
 EUT: Joule 2.0
 Test: 20 dB Bandwidth (FCC Part 15.249)
 Operator: Craig B
 Comment: Frequency - 2.480 GHz

20 dB Bandwidth = 1.004 MHz



Date: 8.SEP.2009 10:30:00



1250 Peterson Dr., Wheeling, IL 60090

Company:	Saris Cycling Group Inc.
Model Tested:	J2CPUFT3
Report Number:	15663

TRANSMITTER DUTY CYCLE GRAPHS

PART 15.35(c)



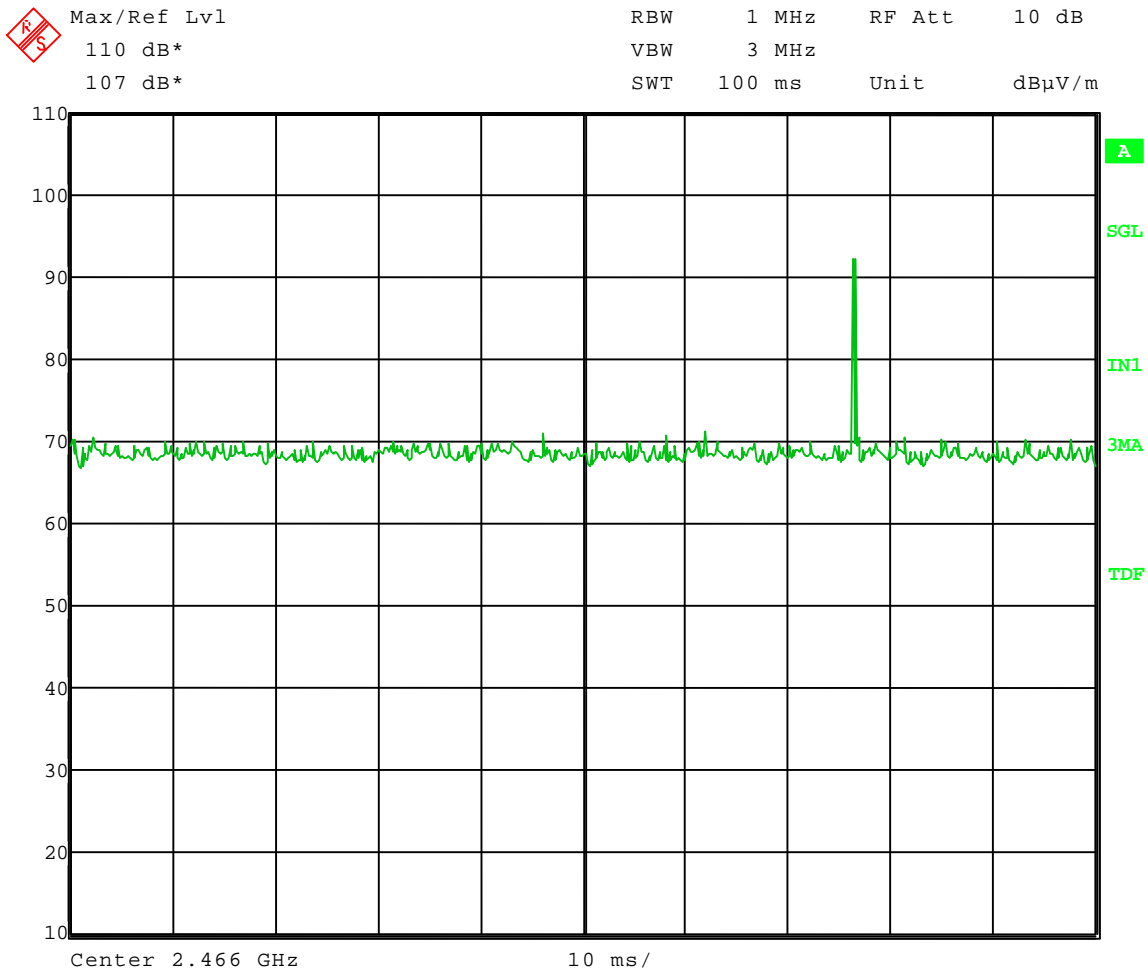
Company: Saris Cycling Group Inc.
Model Tested: J2CPUFT3
Report Number: 15663

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 9-10-2009
Company: Saris Cycling Group
EUT: Joule 2.0
Test: Duty Cycle (FCC Part 15.249)
Operator: Adam A

Comment: Duty Cycle Correction: $20\log(.2124/100) = -53.5$
Duty Cycle Correction factor: 53.5 dB
Maximum Duty Cycle Correction: **20 dB**

100 ms sweep:



Date: 10.SEP.2009 14:00:04



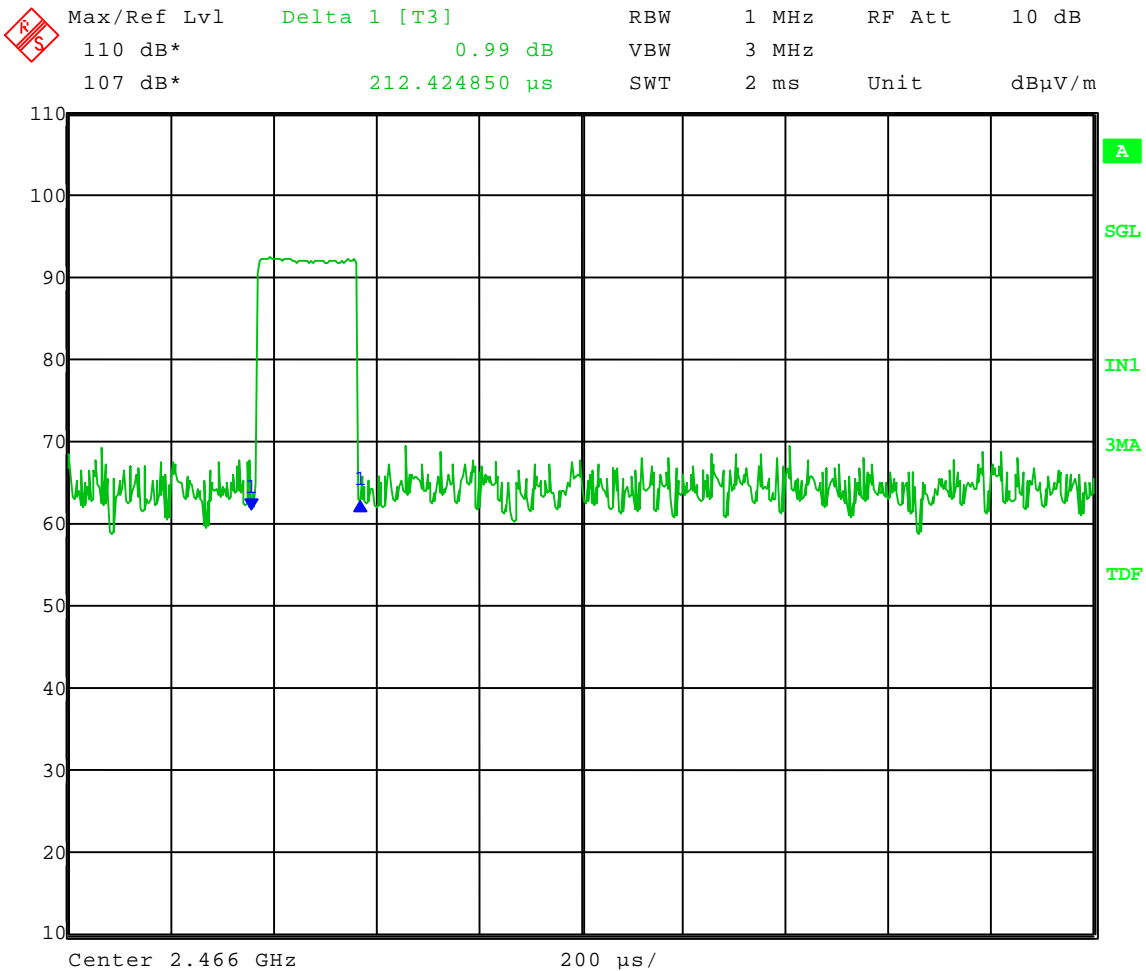
Company: Saris Cycling Group Inc.
Model Tested: J2CPUFT3
Report Number: 15663

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 9-10-2009
Company: Saris Cycling Group
EUT: Joule 2.0
Test: Duty Cycle (FCC Part 15.249)
Operator: Adam A

Comment: Duty Cycle Correction: $20\log(.2124/100) = -53.5$
Duty Cycle Correction factor: 53.5 dB
Maximum Duty Cycle Correction: **20 dB**

Duration of one pulse:



Date: 10.SEP.2009 14:02:36