

BCycle, LLC BBT v2 26095 rev1.1 11411

### **Code of Federal Regulations Title 47 Part 15 – Radio Frequency Devices**

Subpart C – Intentional Radiators – Section 15.247 Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

### THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

for

LIMITED SINGLE MODULAR APPROVAL

(No RF Shield. Three input power configurations)

### FCC ID: 2AHXD-5267706

Formal Name:	BBT
Kind of Equipment:	Bluetooth Low Energy (BLE) Transceiver
Frequency Range(s):	2402 – 2480 MHz
Test Configuration:	Table top, Stand-alone With 3 different input power configurations
Model Number(s):	BBT v2
Model(s) Tested:	BBT v2
Serial Number(s):	N/A
Date of Tests:	March 16 <sup>th</sup> through April 15 <sup>th</sup> , and September 27 - 2 <u>8</u> , 2021
Test Conducted For:	BCycle, LLC 801 W. Madison Street Waterloo, WI 53594, USA

**NOTICE**: The test report contains test data, equipment lists, photographs and/or other information regarding only the sample provided by the client for testing. This test report shall not be used to claim product approval or endorsement by any governmental, regulatory, or accrediting agency. Please see the "Description of Test Sample" page listed inside of this report.

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# **CERTIFICATE OF ACCREDITATION**

#### The ANSI National Accreditation Board

Hereby attests that

#### DLS Electronic Systems, Inc. 1250 Peterson Drive

Wheeling, IL 60090 (and satellite locations as shown on the scope)

Fulfills the requirements of

# ISO/IEC 17025:2017

U.S. Federal Communication Commission (FCC) EMC and Telecommunications (EC&T) Testing Designation Program

and Recognition of Telecommunications Testing - Innovation, Science, and Economic Development (ISED) Canada

and

FDA Accreditation Scheme for Conformity Assessment (ASCA) Pilot Program -Basic Safety and Essential Performance of Medical Electrical Equipment, Medical Electrical Systems, and Laboratory Medical Equipment

In the field of

#### TESTING

This certificate is valid only when accompanied by a current scope of accreditation document. The current scope of accreditation can be verified at <u>www.anab.org</u>.



R. Douglas Leonard Jr., VP, PILR SBU Expiry Date: 23 April 2024 Certificate Number: AT-1859



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025/2017. 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 April 2017).

### SATELLITE SITE

DLS Electronic Systems, Inc. (Oats site) 166 South Carter Genoa City, Wisconsin 53128

www.dlsemc.com



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# **1.0 Summary of Test Report**

It was determined that the BBT, model BBT v2, with three different input power configurations, complies with the requirements of Title 47 CFR Part 15, Subpart C, Section 15.247.

### Subpart C Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	<b>Compliant?</b>
15.31(e)	Supply Voltage Statement	N/A		Yes
15.203	Antenna Requirement Statement	N/A		Yes
Informative	Duty Cycle of Test Unit	ANSI C63.10-2013 Section 11.6(b)	1	Yes
15.247(a)(2)	DTS Bandwidth (6 dB Bandwidth)	ANSI C63.10-2013 Sections 6.9.2 & 11.8.2	1	Yes
15.247(b)(3)	Peak Output Power	ANSI C63.10-2013 Section 11.9.1.1	1	Yes
15.247(e)	Peak Power Spectral Density	ANSI C63.10-2013 Section 11.10.2	1	Yes
15.247(d)	Emissions in Non-Restricted Frequency Bands	ANSI C63.10-2013 Sections 11.11.1(a), 11.11.2, & 11.11.3	1	Yes
15.247(d) 15.205(b) 15.209(a)	Emissions in Restricted Frequency Bands	ANSI C63.10-2013 Section 11.12.1	2	Yes
15.247(d)	Authorized Band Edge	ANSI C63.10-2013 Sections 6.10.4 & 11.11.1(a)	1	Yes
15.247(d) 15.205(b) 15.209(a)	Restricted Band Edge	ANSI C63.10-2013 Section 6.10.5.2	2	Yes
15.207	AC Line Conducted Emissions	ANSI C63.10-2013 Section 6.2	3	Yes

Note 1: RF Conducted measurement.

- Note 2: Radiated Emission measurement; tested in 3 orthogonal axes.
- Note 3: AC Line Conducted measurement.



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## 2.0 Introduction

During March 16<sup>th</sup> through April 15<sup>th</sup>, and September 27 - 28, 2021 the BBT, model BBT v2, with three different input power configurations, as provided by BCycle, LLC was tested to the requirements of Title 47 CFR Part 15, Subpart C, Section 15.247. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S. Electronic Systems, Inc.

### 3.0 Test Facilities

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

### Wisconsin Test Facility:

D.L.S. Electronic Systems, Inc. 166 S. Carter Street Genoa City, Wisconsin 53128 Wheeling Test Facility: D.L.S. Electronic Systems, Inc. 1250 Peterson Drive Wheeling, IL 60090

FCC Registration #90531

# 4.0 Description of Test Sample

**Description:** 

This module is part of a "kiosk" assembly located outdoors. The BLE module is connected to a PC through a USB cable. The PC is located inside the metal kiosk box, with the module mounted to the outside in a weathertight enclosure. The module scans for BLE devices with a particular service ID, connects to them and downloads a small amount of data, disconnects and then sends the data to the PC when requested. It is continuously scanning for BLE devices with which to connect.

### **Type of Equipment / Frequency Range:**

DTS – BLE module / 2402 – 2480 MHz

#### **Physical Dimensions of Equipment Under Test:**

Length: 3 in x Width: 1 in x Height: 0.25 in



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#### 4.0 Description of Test Sample – continued

#### **Power Source:**

Three different configurations:

<u>5273581 Bike Side Module</u>: **12 Volts DC** (from a cable harness on an eBike; through a short 4 inch cable soldered to the circuit board)

<u>5273582 3.0 Dock Module</u>: **3.8 Volts DC** (from a BCycle motherboard; through feather interface pins)

5273583 Kiosk Module: 5 Volts DC (from a PC running a BCycle application; through a 1-meter USB cable soldered to the circuit board)

#### **Internal Frequencies:**

Switching power supply, clock, timing signal, & microprocessor operating frequencies:

32 MHz, 32.768 kHz

#### **Transmit Frequencies Used For Test Purpose:**

2402 MHz, 2440 MHz, 2480 MHz

#### Type of Modulation(s) / Antenna Type:

GFSK, data rate 1 Mbps, BLE V5.0 /

L-shape PCB trace antenna, (3.64 dBd Peak Gain)



Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

# 5.0 Test Equipment

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

### **D.L.S.** Wisconsin – RF Conducted – Site G1 – Test Equipment:

Description	Manufacturer	Model	Serial	<b>Frequency Range</b>	Cal	Cal Due
		Number	Number		Dates	Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz-40 GHz	1-29-21	1-29-22
Cable	Micro-Coax	UFC142A	CBL-101	30 MHz – 40 GHz	5-12-20	5-12-21
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A

### D.L.S. Wisconsin – Radiated Emissions 30-1000 MHz – Site G1 – Test Equipment: (Pre-scan search: <u>No Radiated Emissions detected from 30 to 1000 MHz</u>)

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz-40 GHz	1-29-21	1-29-22
Antenna	EMCO	3104C	9701-4785	20 MHz-200 MHz	4-15-20	4-15-22
Antenna	Electro-Metrics	LPA-25	1205	200 MHz-1 GHz	4-15-20	4-15-22
Cable	Micro-Coax	UFB311A	CBL-100	30 MHz-18 GHz	5-5-20	5-5-21
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A

### D.L.S. Wisconsin – Radiated Emissions 1-4.2 GHz – Site G1 – Test Equipment:

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz-40 GHz	1-29-21	1-29-22
Horn Antenna	EMCO	3115	9903-5731	1 GHz-18 GHz	1-16-20	1-16-22
Cable	Micro-Coax	UFB311A	CBL-100	30 MHz-18 GHz	5-5-20	5-5-21
Cable	Micro-Coax	UFB311A	CBL-100	30 MHz-18 GHz	4-7-21	4-7-22
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A



Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

### **5.0** Test Equipment – continued

	D.L.S.	Wisconsin -	- Radiated	Emissions	4.2-18	GHz –	Site G1	– Test	<b>Equipment:</b>
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Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz-40 GHz	1-29-21	1-29-22
Horn Antenna	EMCO	3115	9903-5731	1 GHz-18 GHz	1-16-20	1-16-22
Cable	Micro-Coax	UFB311A	CBL-100	30 MHz-18 GHz	5-5-20	5-5-21
Cable	Micro-Coax	UFB311A	CBL-100	30 MHz-18 GHz	4-7-21	4-7-22
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A
High Pass Filter	Q Microwave	100462	1	4.2 GHz - 18 GHz	11-6-20	11-6-21
Preamplifier	Miteq	AMF-7D- 01001800- 22-10P	1777990	1 GHz-18 GHz	1-5-21	1-5-22

D.L.S. Wisconsin - Kaulattu Elinssions 10-23 OLL - Sitt OL - List Equipment	D.L.S	S. Wisc	onsin –	- Radiated	<b>Emissions</b>	18-25 (	GHz – Site	- G1 -	<b>Test Eq</b>	uipment
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Description	Manufacturer	ModelSerialFrequencyNumberNumberRange		Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz-40 GHz	1-29-21	1-29-22
Horn Antenna	EMCO	3116	2549	18 GHz-40 GHz	1-28-21	1-28-23
Cable	Teledyne	096-0004- 036	CBL-091	30 MHz-40 GHz	5-12-20	5-12-21
Cable	Micro-Coax	UFC142A	CBL-102	30 MHz-40 GHz	5-12-20	5-12-21
High Pass Filter	K & L	50140 11SH10- 18000/T40 000-K-K	8	18 GHz-40 GHz	5-5-20	5-5-21
Preamplifier	Miteq	AMF-8B- 180265-40- 10P-H/S	438727	18 GHz-26 GHz	5-5-20	5-5-21
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A



Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

### 5.0 Test Equipment – continued

### **D.L.S. Wisconsin – AC Line Conducted (Screen Room)**

Description	Manufacturer	Model	Serial	Frequency	Cal	Cal Due
		Number	Number	Range	Dates	Dates
Receiver	Narda PMM	9010F	020WW40	10 Hz – 50 MHz	4-29-20	4-29-21
			102			
Cable	Beldin	9914	CBL-043	9 kHz – 30 MHz	3-30-21	3-30-22
Cable	Manhattan/CDT	RG-223/U	CBL-045	9 kHz – 30 MHz	3-30-21	3-30-22
LISN	ComPower	LI-220A	192036	9 kHz – 30 MHz	8-25-20	8-25-21
Filter- High-	Solar Electronics	7930-120	090702	120 kHz – 30	10-13-20	10-13-21
Pass				MHz		
Limiter	Electro-Metrics	EM-7600	705	9 kHz – 30 MHz	10-13-20	10-13-21
Test Software	Narda PMM	Emission	V2.22	N/A	N/A	N/A
		Suite				

# 6.0 Test Arrangements

#### Measurement Arrangement:

All measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to ANSI C63.10-2013, unless otherwise noted. Description of procedures and measurements can be found in Section A – Measurement Data. See separate exhibit for photos of the test set up. See Section B for measurement uncertainty.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

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



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### 7.0 Test Conditions

### **Temperature and Humidity:**

70 °F at 27% RH

#### **Supply Voltage:**

Radiated Emission measurements:

5273581 Bike Side Module: **12 Volts DC** (from a linear DC bench supply; through a short 4 inch cable soldered to the circuit board)

5273582 3.0 Dock Module: **3.8 Volts DC** (from a linear DC bench supply; through feather interface pins)

5273583 Kiosk Module: **5 Volts DC** (from an off-the-shelf 120V, 60Hz to 5 VDC USB power adapter; through a 1-meter USB cable soldered to the circuit board)

Power adapter used: Intertek NeverBlock Wall Charger, Model 1310806TG, SN: 2634103975

RF Conducted measurements:

<u>RF conducted radio test unit</u>: **5 Volts DC** (from an off-the-shelf 120V, 60Hz to 5 VDC USB power adapter; through a micro USB connector soldered on the circuit board at the location where a USB cable is normally soldered to the circuit board in the Kiosk Module configuration)

Power adapter used: Tech & Go! NeverBlock Wall Charger, Model 1310806TG, SN: 2634103975

# 8.0 Modifications Made to EUT For Compliance

None noted at time of test.



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### 9.0 Additional Descriptions

In following FCC Part 15 and ANSI C63.10 requirements, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle.

For RF Conducted measurements, a temporary SMA connector was soldered in place of the antenna. An RF cable was connected to the SMA connector and directly to the input of the spectrum analyzer. The output power of the EUT is low enough that no external attenuators were needed. Correction factors for the loss of the RF cable were downloaded into the spectrum analyzer so that the values displayed on the spectrum analyzer are already corrected for cable loss, and no further corrections are needed.

For Radiated Emission measurements, the EUT was tested while transmitting from the on-board trace antenna. The device was set up on a non-conductive table for testing purposes. All three module configurations (see section 4.0 Description of Test Sample) were tested for all radiated measurements. The data contained in this report represents the worst-case configuration for each test. For radiated emission testing purposes, each configuration was tested as stand-alone (outside the various enclosures) and powered as stated in section 7.0 (Test Conditions, Supply Voltage).

The EUT was programmed for continuous transmission (100% duty cycle) on the lowest, middle, and highest channels of operation in the 2.4 GHz BLE frequency band. The EUT's were rotated through three orthogonal axes to find worst-case emission levels. These worst-case levels and input power configurations are recorded in this test report.

See Section A for operation and setup specific to the FCC Rule part and ANSI C63.10 guidance reference for each test performed. See the separate Setup Photos exhibit for test setup photos of the RF Conducted measurements and each of the three configurations tested for Radiated Emission measurements.



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# 10.0 FCC 15.31(e) Supply Voltage Requirement statement

FCC 15.31(e) - For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Compliance Statement: This device complies with the requirements of Part 15.31(e):

This device is battery operated. All tests were performed using a new (or fully charged) battery.

This device provides a constant regulated voltage to the RF circuitry regardless of supply voltage (see schematic diagrams).

This device does not provide a constant regulated voltage to the RF circuitry regardless of supply voltage. Data has been supplied in this test report that supports compliance. Details:

### 11.0 FCC 15.203 Antenna Requirement statement

#### SECTION 15.203 ANTENNA REQUIREMENT

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.... This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221.

Statement: This wireless device (Intentional Radiator) meets the requirements of FCC Part 15.203:

 $\square$  The antenna is permanently attached

The antenna has a unique coupling to the intentional radiator. Description of coupling:

This intentional radiator is professionally installed

This intentional radiator, in accordance with Section 15.31(d), must be measured at the installation site.



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## 12.0 Results

Measurements were performed in accordance with ANSI C63.10-2013. Graphical and tabular data can be found in Section A at the end of this report.

### **13.0** Conclusion

The BBT, model BBT v2, with three different input power configurations, as provided by BCycle, LLC, tested during March 16<sup>th</sup> through April 15<sup>th</sup>, and September 27 - 28, 2021 **meets** the requirements of Title 47 CFR Part 15, Subpart C, Section 15.247, for a Limited Single Modular Approval.



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# Section A – Measurement Data

# A1.0 Duty Cycle of Test Unit

**Rule Part:** 

Informative

#### **Test Procedure:**

ANSI C63.10-2013, Section 11.6(b) Zero-span mode on a spectrum analyzer

#### Limit:

Informative

#### **Results:**

Duty Cycle Correction Factor:

**None**. EUT in test mode is transmitting continuously with a duty cycle of 100%.

#### Notes:

This test was performed using the RF Conducted test configuration. The test software was set to transmit a modulated signal at 100% duty cycle with an output power setting of 0. These same software settings were used for all RF Conducted and Radiated Emission testing.



#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	02-16-2021
Company:	BCycle
EUT:	BBT
Test:	Duty Cycle of Test Unit – RF Conducted
Operator:	cbrandt

#### Comment: Mid Channel: 2440 MHz Duty Cycle = 100%

100 ms sweep:







#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	02-16-2021
Company:	BCycle
EUT:	BBT
Test:	Duty Cycle of Test Unit – RF Conducted
Operator:	cbrandt

### Comment: Mid Channel: 2440 MHz Duty Cycle = 100%

1 ms sweep:



Date: 16.MAR.2021 12:42:25



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Section A

# A2.0 DTS Bandwidth (6 dB bandwidth)

**Rule Part:** 

Section 15.247(a)(2)

### **Test Procedure:**

ANSI C63.10-2013, Sections 6.9.2 and 11.8.2 Occupied bandwidth – relative measurement procedure Automatic bandwidth measurement function of spectrum analyzer

#### Limit:

Minimum 6 dB bandwidth must be at least 500 kHz.

#### **Results:**

Compliant. Minimum 6 dB bandwidth = **754 kHz**.

#### Notes:

Per ANSI C63.10 Section 5.11, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. This test was performed using the RF Conducted test configuration. The EUT was tested at the low, middle, and high channels of operation in accordance with FCC 15.31(m).



#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	DTS (6 dB) Bandwidth – RF Conducted
Operator:	cbrandt

### Comment: Power setting 0 Low Channel: 2402 MHz



#### 6 dB Bandwidth = **754 kHz**



#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	DTS (6 dB) Bandwidth – RF Conducted
Operator:	cbrandt

#### Comment: Power setting 0 Mid Channel: 2440 MHz



#### 6 dB Bandwidth = 762 kHz



#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	DTS (6 dB) Bandwidth – RF Conducted
Operator:	cbrandt

### Comment: Power setting 0 High Channel: 2480 MHz

#### Marker 1 [T3 ndB] RBW 100 kHz RF Att 20 dB Ref Lvl ndB 6.00 dB VBW 300 kHz 5 dBm BW 753.50701403 kHz SWT 5 ms dBm Unit А -10 -20 IN1 -30 ЗМА **SVIEW** -40 РÛ my An were -50 mmen TDF -60 -70 -80 -90 -95 Center 2.48 GHz 400 kHz/ Span 4 MHz

### 6 dB Bandwidth = **754 kHz**



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# A3.0 Peak Output Power

### **Rule Part:**

Section 15.247(b)(3)

#### **Test Procedure:**

ANSI C63.10-2013, Section 11.9.1.1 Maximum peak conducted output power RBW  $\geq$  DTS bandwidth method

#### Limit:

1 Watt (30 dBm) RF Conducted

#### **Results:**

Compliant Maximum Peak Output Power measured -2.10 dBm = 0.62 mW.

#### Notes:

Per ANSI C63.10 Section 5.11, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. This test was performed using the RF Conducted test configuration. The EUT was tested at the low, middle, and high channels of operation in accordance with FCC 15.31(m).



#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

03-16-2021
BCycle
BBT
Output power – RF Conducted
cbrandt

### Comment: Power setting 0 Low Channel: 2402 MHz

### Peak Output Power = -2.10 dBm = 0.62 mW





#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	Output power – RF Conducted
Operator:	cbrandt

### Comment: Power setting 0 Mid Channel: 2440 MHz

### Peak Output Power = -2.35 dBm = 0.58 mW







#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	Output power – RF Conducted
Operator:	cbrandt

#### Comment: Power setting 0 High Channel: 2480 MHz

### Peak Output Power = -3.13 dBm = 0.49 mW







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# A4.0 Peak Power Spectral Density

### **Rule Part:**

Section 15.247(e)

#### **Test Procedure:**

ANSI C63.10-2013, Section 11.10.2 Maximum Peak Power Spectral Density Method PKPSD (peak PSD)

#### Limit:

+8 dBm in any 3 kHz band during continuous transmission

#### **Results:**

Compliant Peak Power Spectral Density measured -5.71 dBm/3kHz.

#### Notes:

Per ANSI C63.10 Section 5.11, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. This test was performed using the RF Conducted test configuration. The EUT was tested at the low, middle, and high channels of operation in accordance with FCC 15.31(m).



#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	Power Spectral Density – RF Conducted
Operator:	cbrandt
Detector:	Peak; max-hold

#### Power setting: 0 Comment: Low Channel: 2402 MHz +8 dBm/3kHz Limit:

### Power Spectral Density (peak PSD) = -5.71 dBm/30kHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	Power Spectral Density – RF Conducted
Operator:	cbrandt
Detector:	Peak; max-hold

#### Power setting: 0 Comment: Mid Channel: 2440 MHz Limit: +8 dBm/3kHz

### Power Spectral Density (peak PSD) = -5.72 dBm/30kHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	Power Spectral Density – RF Conducted
Operator:	cbrandt
Detector:	Peak; max-hold

#### Comment: Power setting: 0 High Channel: 2480 MHz Limit: +8 dBm/3kHz

### Power Spectral Density (peak PSD) = -6.48 dBm/30kHz





BCycle, LLC BBT v2 26095 rev1.1 11411

# A5.0 Emissions in Non-Restricted Frequency Bands – RF Conducted

#### **Rule Part:**

Section 15.247(d)

#### **Test Procedure:**

ANSI C63.10-2013, Sections 11.11.1(a), 11.11.2, and 11.11.3 Maximum PEAK conducted power procedure Reference level measurement Emission level measurement

#### Limit:

20 dB down from the highest emission level within the authorized band as measured with a 100 kHz resolution bandwidth (RBW)

#### **Results:**

Compliant

#### Notes:

Per ANSI C63.10 Section 5.11, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. This test was performed using the RF Conducted test configuration. The EUT was tested at the low, middle, and high channels of operation in accordance with FCC 15.31(m).



BCycle, LLC BBT v2 26095 rev1.1 11411

Section A

# A5.1 Emissions in Non-Restricted Frequency Bands – Low Channel

Test Date: Company: EUT: Test: Operator:	03-16-2021 BCycle BBT Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted cbrandt										
Comment:	RBW = 100  kHz Span $\ge 1.5 \text{ x DTS}$ bandwidth Sweep = auto couple Detector = Peak			$VBW \ge 300 \text{ kHz}$ Trace = max hold							
	Low Ch Power se Referen	Low Channel: 2402 MHz Power setting 0 Reference Level measurement									
	Limit =	-2.54 d	lBm – 2	20  dB =	-22.54	dBm					
(A)	Ref Lvl 5 dBm		Marker	1 [T3] -2 2.40176	.54 dBm 152 GHz	RBW VBW SWT	100 ki 300 ki 5 m.	Iz F Iz 5 U	RF Att Jnit	20 dB dBm	
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-10							$\frown$	<u> </u>			
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- 3 0	3VIEW	Agrander								-	3113
- 4 0											
- 50											PO TDF
- 60											
-70											
- 8 0											
- 9 0											
-95	Center 2	.402 G	Ez		200	kHz/			Sp	an 2 MHz	



#### Section A

BCycle, LLC
BBT v2
26095 rev1.1
11411

Test Date:03-16-2021Company:BCycleEUT:BBTTest:Spurious Emissions in Non-Restricted Frequency Bands – RF ConductedOperator:cbrandtComment:RBW = 100 kHzVBW  $\geq$  300 kHz

Comment:RBW = 100 kHz<br/> $Span \ge 1.5 \text{ x DTS bandwidth}$ <br/>Sweep = auto couple<br/>Detector = Peak $VBW \ge 300 \text{ kHz}$ <br/>Trace = max hold

Low Channel: 2402 MHz Power setting 0 Emission Level measurement

Limit = -2.54 dBm - 20 dB = -22.54 dBm

#### Frequency Range: 30 – 1000 MHz





#### Section A

BCycle, LLC
BBT v2
26095 rev1.1
11411

Test Date:	03-16-2021	
Company:	BCycle	
EUT:	BBT	
Test:	Spurious Emissions ir	Non-Restricted Frequency Bands – RF Conducted
Operator:	cbrandt	
Comment:	RBW = 100 kHz	$VBW \ge 300 \text{ kHz}$
	$\nabla n n n > 1.5 \times 10^{10} \text{ hor}$	duradth

RBW = 100 kHzVBW  $\geq$  300 kHzSpan  $\geq$  1.5 x DTS bandwidthSweep = auto coupleDetector = Peak

Low Channel: 2402 MHz Power setting 0 Emission Level measurement

Limit = -2.54 dBm - 20 dB = -22.54 dBm

### Frequency Range: 1 – 7 GHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date: 03-16-2021 BCycle Company: BBT EUT: Test: Spurious Emissions in Non-Restricted Frequency Bands - RF Conducted cbrandt Operator: RBW = 100 kHzComment:  $VBW \ge 300 \text{ kHz}$ 

Span  $\ge$  1.5 x DTS bandwidth Sweep = auto couple Trace = max holdDetector = Peak

> Low Channel: 2402 MHz Power setting 0 **Emission Level** measurement

Limit = -2.54 dBm - 20 dB = -22.54 dBm

#### Frequency Range: 7 – 18 GHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date: Company:	03-16-2021 BCvcle	
EUT: Test: Operator:	BBT Spurious Emissions in cbrandt	Non-Restricted Frequency Bands – RF Conducted
Comment:	RBW = 100  kHz	$VBW \ge 300 \text{ kHz}$

Domment:RBW = 100 kHz $VBW \ge 300 \text{ kHz}$  $Span \ge 1.5 \text{ x DTS bandwidth}$ Sweep = auto coupleTrace = max holdDetector = PeakTrace = max hold

Low Channel: 2402 MHz Power setting 0 Emission Level measurement

Limit = -2.54 dBm - 20 dB = -22.54 dBm

### Frequency Range: 18 – 25 GHz





BCycle, LLC BBT v2 26095 rev1.1 11411

Section A

# A5.2 Emissions in Non-Restricted Frequency Bands – Middle Channel

Test Date: Company: EUT: Test: Operator:	03-17-2021 BCycle BBT Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted cbrandt										
Comment:	RBW = 100  kHz Span $\ge 1.5 \text{ x DTS}$ bandwidth Sweep = auto couple			$VBW \ge 300 \text{ kHz}$ Trace = max hold							
	Mid C Power Refere Limit =	Detector = Peak Mid Channel: 2440 MHz Power setting 0 Reference Level measurement Limit = $-2.73 \text{ dBm} - 20 \text{ dB} = -22.73 \text{ dBm}$									
×	Ref Lvl 5 dBm		Marker :	1 [T3] -2 2.43976	.73 dBm 954 GHz	RBW VBW SWT	100 k 300 k 5 m	Hz R Hz s U	F Att nit	20 dB dBm	ı
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-10								$\overline{}$			
-20		/									
-30											IN1
	SVIEW									num -	ЗМА
- 4 0	)										PO
-50											TDF
6											
- 61											
- 70											
- 80											
-9( _9)	5										
	Center	2.44 GH	z		200	kHz/			Sp.	an 2 MHz	


#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:03-17-2021Company:BCycleEUT:BBTTest:Spurious Emissions in Non-Restricted Frequency Bands – RF ConductedOperator:cbrandtComment:RBW = 100 kHzVBW  $\geq$  300 kHz

omment:RBW = 100 kHz $VBW \ge 300 \text{ kHz}$  $Span \ge 1.5 \text{ x DTS bandwidth}$ Sweep = auto coupleTrace = max holdDetector = PeakTrace = max hold

Mid Channel: 2440 MHz Power setting 0 Emission Level measurement

Limit = -2.73 dBm - 20 dB = -22.73 dBm

#### Frequency Range: 30 – 1000 MHz





#### Section A

BCycle, LLC
BBT v2
26095 rev1.1
1411

Test Date:03-17-2021Company:BCycleEUT:BBTTest:Spurious Emissions in Non-Restricted Frequency Bands – RF ConductedOperator:cbrandtComment:RBW = 100 kHzVBW  $\geq$  300 kHz

Tomment:RBW = 100 kHz $VBW \ge 300 \text{ kHz}$  $Span \ge 1.5 \text{ x DTS bandwidth}$ Sweep = auto coupleTrace = max holdDetector = PeakTrace = max hold

Mid Channel: 2440 MHz Power setting 0 Emission Level measurement

Limit = -2.73 dBm - 20 dB = -22.73 dBm

#### Frequency Range: 1 – 7 GHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date: 03-17-2021 BCycle Company: BBT EUT: Test: Spurious Emissions in Non-Restricted Frequency Bands - RF Conducted cbrandt Operator: RBW = 100 kHzComment:  $VBW \ge 300 \text{ kHz}$ 

Span  $\geq$  1.5 x DTS bandwidth Sweep = auto couple Trace = max holdDetector = Peak

> Mid Channel: 2440 MHz Power setting 0 **Emission Level** measurement

Limit = -2.73 dBm - 20 dB = -22.73 dBm

#### Frequency Range: 7 – 18 GHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:	03-17-2021	
Company:	BCycle	
EUT:	BBT	
Test:	Spurious Emissions in Non	-Restricted Frequency Bands – RF Conducted
Operator:	cbrandt	
Comment:	RBW = 100 kHz	$VBW \ge 300 \text{ kHz}$
	Span $\geq$ 1.5 x DTS bandwid	th
	Sweep = auto couple	Trace = max hold
	Detector = Peak	

Mid Channel: 2440 MHz Power setting 0 Emission Level measurement

Limit = -2.73 dBm - 20 dB = -22.73 dBm

#### Frequency Range: 18 – 25 GHz





Company:B0Model Tested:B1Report Number:26Project Number:11

BCycle, LLC BBT v2 26095 rev1.1 11411

Section A

### A5.3 Emissions in Non-Restricted Frequency Bands – High Channel

Test Date: Company: EUT: Test: Operator:	03-17-2021 BCycle BBT Spurious Emissions in Non-Restricted Frequency Bands – RF Conducted cbrandt										
Comment:	RBW = Span ≥ Sweep Detecte	$RBW = 100 \text{ kHz}$ $VBW \ge 300 \text{ kHz}$ $Span \ge 1.5 \text{ x DTS bandwidth}$ Trace = max holdSweep = auto coupleTrace = max holdDetector = PeakTrace = max hold									
	High C Power Refere	Channel: setting ( ence Lev	2480 1 0 v <b>el</b> mea	MHz suremer	nt	ID					
	Limit =	= -3.33 (	1Bm – 2	20  dB =	-23.33 (	IBM					
	Ref Lvl		Marker	1 [T3] -3.	.33 dBm	rbw Vbw	100 k 300 k	Hz : Hz	RF Att	20 dB	
~	5 dBm		:	2.479769	954 GHz	SWT	5 m	5	Unit	dBr	l
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#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:03-17-2021Company:BCycleEUT:BBTTest:Spurious Emissions in Non-Restricted Frequency Bands – RF ConductedOperator:cbrandtComment:RBW = 100 kHzVBW  $\geq$  300 kHz

Comment:RBW = 100 kHz $VBW \ge 300 \text{ kHz}$  $Span \ge 1.5 \text{ x DTS bandwidth}$ Sweep = auto coupleTrace = max holdDetector = PeakTrace = max hold

High Channel: 2480 MHz Power setting 0 Emission Level measurement

Limit = -3.33 dBm - 20 dB = -23.33 dBm

#### Frequency Range: 30 – 1000 MHz



Date: 17.MAR.2021 09:14:34



#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date:03-17-2021Company:BCycleEUT:BBTTest:Spurious Emissions in Non-Restricted Frequency Bands – RF ConductedOperator:cbrandtComment:RBW = 100 kHzVBW  $\geq$  300 kHz

omment:RBW = 100 kHz $VBW \ge 300 \text{ kHz}$  $Span \ge 1.5 \text{ x DTS bandwidth}$ Sweep = auto coupleDetector = Peak

High Channel: 2480 MHz Power setting 0 Emission Level measurement

Limit = -3.33 dBm - 20 dB = -23.33 dBm

#### Frequency Range: 1 – 7 GHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date: 03-17-2021 BCycle Company: BBT EUT: Test: Spurious Emissions in Non-Restricted Frequency Bands - RF Conducted cbrandt Operator: RBW = 100 kHzComment:  $VBW \ge 300 \text{ kHz}$ 

Span  $\ge$  1.5 x DTS bandwidth Sweep = auto couple Trace = max holdDetector = Peak

> High Channel: 2480 MHz Power setting 0 **Emission Level** measurement

Limit = -3.33 dBm - 20 dB = -23.33 dBm

#### Frequency Range: 7 – 18 GHz





#### Section A

Company:	BCycle, LLC
Model Tested:	BBT v2
Report Number:	26095 rev1.1
Project Number:	11411

Test Date: Company: EUT: Test: Operator:	03-17-2021 BCycle BBT Spurious Emissions in Nor cbrandt	n-Restricted Frequency Bands – RF Conducted
Comment:	RBW = 100  kHz Span > 1.5 x DTS bandwid	$VBW \ge 300 \text{ kHz}$
	Sweep = auto couple	Trace = max hold

Detector = Peak High Channel: 2480 MHz

Power setting 0 Emission Level measurement

Limit = -3.33 dBm - 20 dB = -23.33 dBm

#### Frequency Range: 18 – 25 GHz





Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

### A6.0 Emissions in Restricted Frequency Bands

#### **Rule Part:**

Sections 15.247(d), 15.205(b), and 15.209(a)

#### **Test Procedure:**

ANSI C63.10-2013, Section 11.12.1 Radiated emission measurements

#### Limit:

Table in FCC 15.209

#### **Results:**

Compliant

#### Notes:

This was a Radiated Emission test. The EUT was tested while transmitting from the on-board trace antenna. The device was set up on a non-conductive table for testing purposes. All three module configurations (see section 4.0 Description of Test Sample) were tested. Each configuration was tested as stand-alone (outside the various enclosures) and powered as stated in section 7.0 (Test Conditions, Supply Voltage). The worst-case configuration and data are recorded.

Per ANSI C63.10 Section 5.11, the EUT's were programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. The EUT's were programmed for continuous transmission (100% duty cycle) on the lowest, middle, and highest channels of operation in accordance with FCC 15.31(m) and were rotated through three orthogonal axes to find worst-case emission levels.



Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

### Radiated Emissions in Restricted Frequency Bands

# BCycle Project: BBT, model BBT v2

# No Radiated Emissions were found from the BBT, model BBT v2

## from <u>30 to 1000 MHz</u>

# with the device in modulated continuous transmit mode, (100% duty cycle). Power setting 0.

(pre-scan search for emissions in 3-meter chamber, Site G1)

## 04-15-2021

#### FCC Part 15.247 / 15.205 / 15.209

#### Electric Field Strength

EUT:	BBT Module, Model:	5267706	(3.0 Dock	Module (	config)
Manufacturer:	Trek Bicycle				
Operating Condition:	73 deg F; 47% R.H.				
Test Site:	DLS O.F. Gl				
Operator:	cbrandt				
Test Specification:	Radiated Emissions	in Restricted	Bands		
Comment:	Continuous Transmit	; 2402, 2440,	and 2480	MHz	
	Date: 09-28-21				

#### TEXT: "Vert 3 meters"

Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with VERTICAL Antenna Polarization

Sample Equations: Total Level( $dB\mu V/m$ ) = Level( $dB\mu V$ ) + System Loss(dB) + Antenna Factor( $dB\mu V/m$ ) 24.6 = 35.51 + (-22.1) + 11.20 Margin(dB) = Limit( $dB\mu V/m$ ) - Total Level( $dB\mu V/m$ ) 15.4 = 40 - 24.6

Graph Markers: + Frequency marker (Level of marker not related to final level)

Final maximized level using Quasi-Peak detector

X Final maximized level using Average dector

# Final maximized level using Peak detector

- Background Scan Peak Detector (Optional)

- Background Scan Average Detector (Optional)



#### MEASUREMENT RESULT: "A4110\_sv\_Final"

9/28/2021 9:27AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
		Factor	Loss	Level			Ant.	Angle	Detector	
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
7332.670000	67.64	36.41	-52.2	51.8	54.0	2.2	1.51	179	AVERAGE	Mid ch
7440.640000	66.51	36.48	-52.3	50.7	54.0	3.3	1.25	177	AVERAGE	High ch
7332.670000	74.81	36.41	-52.2	59.0	74.0	15.0	1.51	179	MAX PEAK	Mid ch
7440.640000	73.66	36.48	-52.3	57.9	74.0	16.1	1.25	177	MAX PEAK	High ch
4888.230000	56.44	33.19	-53.6	36.1	54.0	17.9	1.55	235	AVERAGE	Mid ch
4804.340000	56.83	32.98	-53.8	36.0	54.0	18.0	1.40	135	AVERAGE	Low ch
4960.420000	55.66	33.22	-53.4	35.5	54.0	18.5	1.19	225	AVERAGE	High ch
4960.420000	67.08	33.22	-53.4	46.9	74.0	27.1	1.19	225	MAX PEAK	High ch
4804.340000	67.56	32.98	-53.8	46.8	74.0	27.2	1.40	135	MAX PEAK	Low ch
4888.230000	66.95	33.19	-53.6	46.6	74.0	27.4	1.55	235	MAX PEAK	Mid ch

#### FCC Part 15.247 / 15.205 / 15.209

#### Electric Field Strength

EUT:	BBT Module, Model:	5267706	(3.0 Dock	Module (	config)
Manufacturer:	Trek Bicycle				
Operating Condition:	73 deg F; 47% R.H.				
Test Site:	DLS O.F. Gl				
Operator:	cbrandt				
Test Specification:	Radiated Emissions	in Restricted	Bands		
Comment:	Continuous Transmit	; 2402, 2440,	and 2480	MHz	
	Date: 09-28-21				

#### TEXT: "Horz 3 meters"

Short Description: Test Set-up

Test Set-up: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization

Sample Equations: Total Level( $dB\mu V/m$ ) = Level( $dB\mu V$ ) + System Loss(dB) + Antenna Factor( $dB\mu V/m$ ) 24.6 = 35.51 + (-22.1) + 11.20 Margin(dB) = Limit( $dB\mu V/m$ ) - Total Level( $dB\mu V/m$ ) 15.4 = 40 - 24.6

Graph Markers: + Frequency marker (Level of marker not related to final level)

Final maximized level using Quasi-Peak detector

X Final maximized level using Average dector

# Final maximized level using Peak detector

- Background Scan Peak Detector (Optional)

- Background Scan Average Detector (Optional)



#### MEASUREMENT RESULT: "A4110\_sh\_Final"

9/28/2021 9:42AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
		Factor	Loss	Level			Ant.	Angle	Detector	
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB	m	deg		
7440.700000	65.73	36.48	-52.3	49.9	54.0	4.1	1.73	180	AVERAGE	High ch
7332.680000	65.62	36.41	-52.2	49.8	54.0	4.2	1.68	182	AVERAGE	Mid ch
7440.700000	73.30	36.48	-52.3	57.5	74.0	16.5	1.73	180	MAX PEAK	High ch
7332.680000	73.18	36.41	-52.2	57.4	74.0	16.6	1.68	182	MAX PEAK	Mid ch
4960.350000	55.43	33.22	-53.4	35.2	54.0	18.8	1.72	180	AVERAGE	High ch
4804.290000	55.71	32.98	-53.8	34.9	54.0	19.1	1.33	40	AVERAGE	Low ch
4888.310000	54.86	33.19	-53.6	34.5	54.0	19.5	1.68	140	AVERAGE	Mid ch
4960.350000	66.83	33.22	-53.4	46.6	74.0	27.4	1.72	180	MAX PEAK	High ch
4804.290000	67.08	32.98	-53.8	46.3	74.0	27.7	1.33	40	MAX PEAK	Low ch
4888.310000	66.20	33.19	-53.6	45.8	74.0	28.2	1.68	140	MAX PEAK	Mid ch



Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

### Radiated Emissions in Restricted Frequency Bands

# BCycle Project: BBT, model BBT v2

No Radiated Emissions were found from the BBT, model BBT v2

## from <u>18 to 25 GHz</u>

## with the device in modulated continuous transmit mode, (100% duty cycle). Power setting 0.

### (at a 1-meter test distance)

## 04-15-2021



Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

Section A

### A7.0 Authorized Band Edge – RF Conducted

### **Rule Part:**

Section 15.247(d)

#### **Test Procedure:**

ANSI C63.10-2013, Sections 6.10.4 and 11.11.1(a) Authorized-band band-edge measurements (relative method). Maximum PEAK conducted power procedure.

#### Limit:

20 dB down from the highest emission level within the authorized band as measured with a 100 kHz resolution bandwidth (RBW).

#### **Results:**

Compliant

#### **Sample Equation(s):**

None

#### Notes:

Per ANSI C63.10 Section 5.11, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. This test was performed using the RF Conducted test configuration. The EUT was tested at the low and high channels of operation. The maximum level of the fundamental emission was measured with a span wide enough to capture the peak level of the emission as well as any modulation products that fell outside of the operating band. The marker-delta function of the spectrum analyzer was used to show that the level at the band-edge (including all modulation product outside of the authorized band) are greater than 20 dB below the peak level of the fundamental emission.



#### Section A

BCycle, LLC BBT v2 26095 rev1.1 11411

03-16-2021
BCycle
BBT
Lower Band Edge Compliance – RF Conducted
cbrandt
Peak; max-hold
Power setting: 0
Low Channel: 2402 MHz

#### Band-Edge Frequency = 2.4 GHz Limit at Band-Edge > 20 dB Below Peak In-Band Emission Emission at Band-Edge is **48.16** dB below the Peak in-band emission





#### Section A

BCycle, LLC BBT v2 26095 rev1.1 11411

Test Date:	03-16-2021
Company:	BCycle
EUT:	BBT
Test:	Upper Band Edge Compliance – RF Conducted
Operator:	cbrandt
Detector:	Peak; max-hold
Comment:	Power setting: 0
	High Channel: 2480 MHz

#### Band-Edge Frequency = 2.4835 GHz Limit at Band-Edge > 20 dB Below Peak In-Band Emission Emission at Band-Edge is **56.59** dB below the Peak in-band emission





Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

Section A

### A8.0 Restricted Band Edge – Radiated

### **Rule Part:**

Sections 15.247(d), 15.205(b), and 15.209(a)

### **Test Procedure:**

ANSI C63.10-2013, Section 6.10.5.2 Restricted-band band-edge measurements.

### Limit:

Table in FCC 15.209

#### **Results:**

Compliant

#### **Sample Equation(s):**

None

#### Notes:

This was a Radiated Emission test. The EUT was tested while transmitting from the on-board trace antenna. The device was set up on a non-conductive table for testing purposes. All three module configurations (see section 4.0 Description of Test Sample) were tested. Each configuration was tested as stand-alone (outside the various enclosures) and powered as stated in section 7.0 (Test Conditions, Supply Voltage). The worst-case configuration and data are recorded.

Per ANSI C63.10 Section 5.11, the EUT's were programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction. The EUT's were programmed to the lowest and highest channels of operation and were rotated through three orthogonal axes to find worst-case emission levels. The maximum field strength level at the band-edge (including all modulation product outside of the authorized band) was measured and recorded.



#### Section A

BCycle, LLC BBT v2 26095 rev1.1 11411

Test Date:	09-27-2021
Company:	BCycle
EUT:	BBT ( <u>Kiosk</u> Module configuration – found to be worst-case)
Test:	Lower Restricted Band-Edge - Radiated
Operator:	cbrandt
Comment:	Low Channel: 2402 MHz
	Lower Restricted Band-Edge frequency: 2.390 GHz
	Transmit at 100% duty cycle, modulated
Test Distance:	3 meters
Detector:	Linear Average with max-hold

# VERTICAL:Average level at restricted band edge = $38.55 \text{ dB}\mu\text{V/m}$ AVERAGE:Limit: $54 \text{ dB}\mu\text{V/m}$ at 3 meters





#### Section A

09-27-2021 Test Date: BCycle Company: EUT: BBT (Kiosk Module configuration – found to be worst-case) Test: Lower Restricted Band-Edge - Radiated Operator: cbrandt Comment: Low Channel: 2402 MHz Lower Restricted Band-Edge frequency: 2.390 GHz Transmit at 100% duty cycle, modulated Test Distance: 3 meters Peak with max-hold Detector:

# VERTICAL:Peak level at restricted band edge = $57.63 \text{ dB}\mu\text{V/m}$ PEAK:Limit: 74 dB $\mu$ V/m at 3 meters





#### Section A

Company:BCModel Tested:BEReport Number:260Project Number:114

BCycle, LLC BBT v2 26095 rev1.1 11411

Test Date:	04-15-2021
Company:	BCycle
EUT:	BBT ( <u>Kiosk</u> Module configuration – found to be worst-case)
Test:	Lower Restricted Band-Edge - Radiated
Operator:	cbrandt
Comment:	Low Channel: 2402 MHz
	Lower Restricted Band-Edge frequency: 2.390 GHz
	Transmit at 100% duty cycle, modulated
Test Distance:	3 meters
Detector:	Linear Average with max-hold

# HORIZONTAL:Average level at restricted band edge = $38.96 \text{ dB}\mu\text{V/m}$ AVERAGE:Limit: $54 \text{ dB}\mu\text{V/m}$ at 3 meters





#### Section A

Test Date: 09-27-2021 BCycle Company: EUT: BBT (Kiosk Module configuration – found to be worst-case) Test: Lower Restricted Band-Edge - Radiated Operator: cbrandt Comment: Low Channel: 2402 MHz Lower Restricted Band-Edge frequency: 2.390 GHz Transmit at 100% duty cycle, modulated Test Distance: 3 meters Detector: Peak with max-hold

# HORIZONTAL:Peak level at restricted band edge = $57.09 \text{ dB}\mu \text{V/m}$ PEAK:Limit: 74 dB $\mu$ V/m at 3 meters





#### Section A

09-27-2021 Test Date: BCycle Company: EUT: BBT (Kiosk Module configuration – found to be worst-case) Test: Upper Restricted Band-Edge - Radiated Operator: cbrandt Comment: High Channel: 2480 MHz Upper Restricted Band-Edge frequency: 2.4835 GHz Transmit at 100% duty cycle, modulated Test Distance: 3 meters Linear Average with max-hold Detector:

## VERTICAL:Average level at restricted band edge = $51.16 \text{ dB}\mu\text{V/m}$ AVERAGE:Limit: $54 \text{ dB}\mu\text{V/m}$ at 3 meters





#### Section A

Test Date:	09-27-2021
Company:	BCycle
EUT:	BBT ( <u>Kiosk</u> Module configuration – found to be worst-case)
Test:	Upper Restricted Band-Edge - Radiated
Operator:	cbrandt
Comment:	High Channel: 2480 MHz
	Upper Restricted Band-Edge frequency: 2.4835 GHz
	Transmit at 100% duty cycle, modulated
Test Distance:	3 meters
Detector:	Peak with max-hold

# VERTICAL:Peak level at restricted band edge = $60.02 \text{ dB}\mu\text{V/m}$ PEAK:Limit: 74 dB $\mu$ V/m at 3 meters





#### Section A

Company:BCyModel Tested:BB7Report Number:2609Project Number:114

BCycle, LLC BBT v2 26095 rev1.1 11411

Test Date:	09-27-2021
Company:	BCycle
EUT:	BBT ( <u>Kiosk</u> Module configuration – found to be worst-case)
Test:	Upper Restricted Band-Edge - Radiated
Operator:	cbrandt
Comment:	High Channel: 2480 MHz
	Upper Restricted Band-Edge frequency: 2.4835 GHz
	Transmit at 100% duty cycle, modulated
Test Distance:	3 meters
Detector:	Linear Average with max-hold

# HORIZONTAL:Average level at restricted band edge = $51.41 \text{ dB}\mu\text{V/m}$ AVERAGE:Limit: $54 \text{ dB}\mu\text{V/m}$ at 3 meters





#### Section A

Company:BCycle, LLCModel Tested:BBT v2Report Number:26095 rev1.1Project Number:11411

Test Date:	09-27-2021
Company:	BCycle
EUT:	BBT ( <u>Kiosk</u> Module configuration – found to be worst-case)
Test:	Upper Restricted Band-Edge - Radiated
Operator:	cbrandt
Comment:	High Channel: 2480 MHz
	Upper Restricted Band-Edge frequency: 2.4835 GHz
	Transmit at 100% duty cycle, modulated
Test Distance:	3 meters
Detector:	Peak with max-hold

# HORIZONTAL:Peak level at restricted band edge = $60.61 \text{ dB}\mu\text{V/m}$ PEAK:Limit: 74 dB $\mu$ V/m at 3 meters





Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

Section A

### A9.0 AC Line Conducted Emissions

### **Rule Part:**

Sections 15.207

### **Test Procedure:**

ANSI C63.10-2013, Section 6.2 Standard test method for ac powerline conducted emissions from unlicensed wireless devices.

### Limit:

Table in FCC 15.207

#### **Results:**

Compliant

### Sample Equation(s):

None

#### Notes:

Per ANSI C63.10 Section 5.11, the EUT was programmed for continuous transmit, modulated, with a 100% duty cycle. Power setting 0 was used per manufacturer's instruction.

This was an AC Conducted emissions measurement performed on the Kiosk Module configuration. The EUT was powered with 5.0 Volts DC from an Intertek NeverBlock USB power adapter (Model 1310806TG, SN: 2634103975) (Not provided with DUT). The power adapter was connected to a Line Impedance Stabilization Network using a 1-meter non-shielded power cord.

### PMM NARDA REPORT: #11411 Trek BBT Module 5267706 120v L1\_000



Standard	:	FCC Part 15.207
Test Type	:	Voltage Mains Test
Test Site	:	Screen Room
Temperature	:	70 °F
Humidity	:	32 %
Test Specs	:	Line 1; Quasi-Peak Detector vs AVERAGE Limit
Operator	:	cbrandt
DLS Project #	:	11411
Result	:	Pass

: 020WW40102

: 04/14/2021

#### EUT

S/N

Last Calibration

Manufacturer	: Trek Bicycle
Model	: 5267706
Product	: BBT Module, Kiosk configuration
Notes	: 120 V 60 Hz; USB powered from off-the-shelf power adapter
Comments	: Continuous Transmit; High Channel
	: Tested with Intertek, NeverBlock Wall Charger, model 1310806TG, SN: 2634103975
Testing Company	: DLS Electronic Systems, Inc.
Tel./Fax	: 262-279-0210
Web site	: http://www.dlsemc.com
Receiver Details	
Model	: PMM 9010F
Brand	: Narda

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.







#### #11411 Trek BBT Module 5267706 120v L1\_000

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	PQ	1500 ms	9 kHz	10	OFF	ON		

Ancillary = General	-Factors:	Peak ——
Nr. of Worst = Infinite (3)	LICKLDI CHCCE	OPeak
11. Star of star - mining (S)		di can
Limits:	LIM #507 w CBE-035	
FCC 15_207 AV	HPF #592	
	Cables 43 & 45	



#11411 Trek BBT Module 5267706 120v L1\_000 15/04/2021 16:51:41
Rel. SW 2.22 (August 2015)
Rel. FW 1.93 01/10/19

Margin: 100 dB

	Frequency	QPeak	Limit	Delta	Factor	Factor	Factor	Factor
			FCC 15_20		LISN DLS#	LIM #507	HPF #592	Cables 43
	[MHz]	[dBµV]	[dBµV]	[dB]	[dB]	[dB]	[dB]	[dB]
1	0.15	28.89	56.00	-27.11	0.10	9.68	2.16	0.03
2	0.156135	28.83	55.67	-26.84	0.09	9.68	2.07	0.04
3	0.634665	25.02	46.00	-20.98	0.03	9.75	0.67	0.11
4	0.736915	33.98	46.00	-12.02	0.03	9.76	0.61	0.13
5	5.53244	24.17	50.00	-25.83	0.04	9.81	0.15	0.46
6	17.63884	29.02	50.00	-20.98	0.00	9.89	0.24	0.76

### PMM NARDA REPORT: #11411 Trek BBT Module 5267706 120v L2\_001



Standard		FCC Part 15.207
Test Type	:	Voltage Mains Test
Test Site	:	Screen Room
Temperature	:	70 °F
Humidity	:	32 %
Test Specs	:	Line 2; Quasi-Peak Detector vs AVERAGE Limit
Operator	:	cbrandt
DLS Project #	:	11411
Result	:	Pass

#### EUT

Manufacturer	: Trek Bicycle
Model	: 5267706
Product	: BBT Module, Kiosk configuration
Notes	: 120 V 60 Hz; USB powered from off-the-shelf power adapter
Comments	: Continuous Transmit; High Channel
	: Tested with Intertek, NeverBlock Wall Charger, model 1310806TG, SN: 2634103975
Testing Company	: DLS Electronic Systems, Inc.
Tel./Fax	: 262-279-0210
Web site	: http://www.dlsemc.com
Receiver Details	
Model	: PMM 9010F
Brand	: Narda

 S/N
 : 020WW40102

 Last Calibration
 : 04/14/2021

NOTE: The column in the table that is labeled "delta" shows the margin in dB with respect to the limit. A negative number indicates the level of the emission is under the limit by the given value, while a positive number indicates the emission level is above the limit by the given value.







#### #11411 Trek BBT Module 5267706 120v L2\_001

	Start [MHz]	Stop [MHz]	Step	Detector	Hold Time	RBW	Min Att	Pre Amp	Pre Sel	Prompt start	Ancillary
1	0.15	30	AUTO (2.045 kHz)	PQ	1500 ms	9 kHz	10	OFF	ON		

Ancillary = General	-Factors:	Peak ——
Nr. of Worst = Infinite (2)	LISN DLS#665	QPeak ——
-L imits:	LIM #507 w CBL-035	
ECC 15 207 AV	HPF #592	
	Cables 43 & 45	


#11411 Trek BBT Module 5267706 120v L2\_001 15/04/2021 17:00:22
Rel. SW 2.22 (August 2015)
Rel. FW 1.93 01/10/19

Margin: 100 dB

	Frequency	QPeak	Limit	Delta	Factor	Factor	Factor	Factor
			FCC 15_20.	•	LISN DLS#	LIM #507 .	. HPF #592	Cables 43
	[MHz]	[dBµV]	[dBµV]	[dB]	[dB]	[dB]	[dB]	[dB]
1	0.15	28.64	56.00	-27.36	0.10	9.68	2.16	0.03
2	0.164315	29.45	55.24	-25.79	0.08	9.67	1.95	0.06
3	0.544685	21.65	46.00	-24.35	0.03	9.76	0.84	0.10
4	0.687835	26.02	46.00	-19.98	0.03	9.76	0.64	0.12
5	0.741005	34.13	46.00	-11.87	0.03	9.76	0.61	0.14
6	4.98438	23.34	46.00	-22.66	0.04	9.79	0.14	0.41
7	5.49563	26.36	50.00	-23.64	0.04	9.81	0.15	0.45
8	17.546815	26.31	50.00	-23.69	0.00	9.89	0.24	0.76
9	25.898595	26.96	50.00	-23.04	-0.03	9.87	0.31	0.88



Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

## **Section B – Measurement Uncertainty**

Compliance with the limits in this standard are based on the results of the compliance measurement. Our calculated measurement uncertainty including the measurement instrumentation, associated connections between the various instruments in the measurement chain, and other contributions, are provided in this section of the test report.

Parameter	Expanded Uncertainty (K=2)		
Occupied Channel Bandwidth	+/- 1.14%		
RF Output Power, Conducted	+/- 0.89 dB		
Unwanted Emissions, Conducted	+/- 2.62 dB		
All Emissions, Radiated	+/- 4.95 dB		
DC and Low Frequency Voltages	+/- 2.42%		
Time	+/- 0.01%		
Duty Cycle	+/- 0.05%		

Radiated & RF Conducted Emission 30 MHz to 25 GHz Uncertainty

AC Line Conducted Emissions 150 kHz to 30 MHz Uncertainty

	AC Line Conducted	Uncertainty ( + / - dB )
Contribution	Drobability Distribution	
Contribution	Probability Distribution	
		150 kHz - 30 MHz
Combined Standar	b	
Uncertainty	Normal	1.05
Expanded		
Uncertainty	Normal (k=2)	2.10



Company: Model Tested: Report Number: Project Number: BCycle, LLC BBT v2 26095 rev1.1 11411

## **END OF REPORT**

<b>Revision</b> #	Date	Comments	By
1.0	10-20-2021	Initial Release	CB
1.1	08-30-2022	Reported antenna gain change due to new gain measurement	CB