

# MPE REPORT

## FCC

APPLICANT

**Treadly Inc**

MODEL NAME

**TRB200**

FCC ID

**2AYVR-TRB200**

REPORT NUMBER

**HA210106-ESM-001-R04**

# TEST REPORT

**Date of Issue**  
February 25, 2021

**Test Site**  
Hyundai C-Tech, Inc. dba HCT America, Inc.  
1726 Ringwood Ave, San Jose, CA 95131, USA

<b>Applicant</b>	Treadly Inc
<b>Applicant Address</b>	530 Secaucus Rd, Secaucus, NJ 07094, U.S.A.
<b>FCC ID</b>	2AYVR-TRB200
<b>Model Name</b>	TRB200
<b>EUT Type</b>	Wi-Fi/BLE Module
<b>FCC Rule Part(s)</b>	Part 1 (§1.1310), Part 2 (§2.1091)
<b>Test Procedure</b>	KDB 447498 D01 v06

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was in accordance with the procedures specified in §2.947. The results in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

**Tested By**

Yongsoo Park

Test Engineer

**Reviewed By**

Sunwoo Kim

Technical Manager

## REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA210106-ESM-001-R04	02/17/2021	Initial Issue
HA210106-ESM-001-R04	02/25/2021	Updated calculations.

## TABLE OF CONTENTS

1. EUT DESCRIPTION .....	4
2. INTRODUCTION .....	5
2.1. LIMIT .....	5
2.2. MAXIMUM PERMISSIBLE EXPOSURE PREDICTION .....	5
3. RESULT .....	6
3.1. MPE Calculation .....	6
3.2. SUMMARY OF RESULTS .....	7

## 1. EUT DESCRIPTION

<b>Model</b>	TRB200
<b>EUT Type</b>	Wi-Fi/BLE Module
<b>Power Supply</b>	3.0 – 3.6 VDC
<b>RF Specification</b>	WIFI 2.4 GHz : IEEE 802.11b/g, 802.11n HT20, 802.11n HT40 (SISO) Bluetooth LE (1Mbps) Bluetooth BDR/EDR
<b>Frequency Range</b>	WIFI 2.4 GHz (20 MHz BW) : 2412 MHz – 2462 MHz WIFI 2.4 GHz (40 MHz BW) : 2422 MHz – 2452 MHz Bluetooth LE : 2402 MHz – 2480 MHz Bluetooth BDR / EDR : 2402 MHz – 2480 MHz
<b>Modulation Type</b>	WIFI 2.4 GHz : DSSS/CCK, OFDM Bluetooth LE : GFSK Bluetooth : GFSK, $\pi/4$ -DQPSK, 8DPSK
<b>Antenna Specification <sup>1)</sup></b>	Antenna Type : Chip Antenna Peak Gain : 1.5 dBi
<b>Operating Environment</b>	Indoor and outdoor
<b>Operating Temperature</b>	-40 °C ~ +85 °C

**Note :**

1. Antenna information is based on the document provided.

## 2. INTRODUCTION

### 2.1. LIMIT

The limit for Maximum Permissible Exposure (MPE), specified in FCC Rule Part §1.1310 listed in the table below, shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation specified in §1.1310 (b)

Frequency Range (MHz)	E- Field Strength (V/m)	H- Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (Minutes)
<b>(A) Limits for Occupational / Controlled Exposure</b>				
0.3 – 3.0	614	1.63	*100	6
3.0 – 30	1842 / f	4.89 / f	*900 / f <sup>2</sup>	6
30 – 300	61.4	0.163	1.0	6
300 – 1,500	-	-	f / 300	6
1,500 – 100,000	-	-	5	6
<b>(B) Limits for General Population / Uncontrolled Exposure</b>				
0.3 – 1.34	614	1.63	*100	30
1.34 – 30	824 / f	2.19 / f	*180 / f <sup>2</sup>	30
30 – 300	27.5	0.073	0.2	30
300 – 1,500	-	-	f / 1500	30
1,500 – 100,000	-	-	1.0	30

f = frequency in MHz, \* = Plane-wave equivalent power density

### 2.2. MAXIMUM PERMISSIBLE EXPOSURE PREDICTION

Prediction of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S : Power density (mW/cm<sup>2</sup>)

P : Output power to antenna (mW)

G : Antenna gain in linear scale

R : Distance between the center of radiator and observation point (cm)

### 3. RESULT

#### 3.1. MPE Calculation

Bluetooth				
Frequency (MHz)	2480	MHz		
MPE Limit (mW/cm <sup>2</sup> )	1.0	mW/cm <sup>2</sup>		
Distance (R)	20	Cm		
Output Power (P)	7.00	dBm	5.01	mW
Antenna Gain (G)	1.50	dBi	1.41	-
Power density (S) at distance 20 cm	<b>0.001408</b>	mW/cm <sup>2</sup>	at 20 cm separation distance	

Bluetooth LE				
Frequency (MHz)	2480	MHz		
MPE Limit (mW/cm <sup>2</sup> )	1.0	mW/cm <sup>2</sup>		
Distance (R)	20	Cm		
Output Power (P)	4.00	dBm	2.51	mW
Antenna Gain (G)	1.50	dBi	1.41	-
Power density (S) at distance 20 cm	<b>0.000706</b>	mW/cm <sup>2</sup>	at 20 cm separation distance	

WIFI 2.4 GHz				
Frequency (MHz)	2412	MHz		
MPE Limit (mW/cm <sup>2</sup> )	1.0	mW/cm <sup>2</sup>		
Distance (R)	20	Cm		
Output Power (P)	14.00	dBm	25.12	mW
Antenna Gain (G)	1.50	dBi	1.41	-
Power density (S) at distance 20 cm	<b>0.007059</b>	mW/cm <sup>2</sup>	at 20 cm separation distance	

### 3.2. SUMMARY OF RESULTS

Mode	Frequency Range (MHz)	Ant Gain (dBi)	Power Density (mW/cm <sup>2</sup> )	MPE Ratio (PD/MPE Limit)
Bluetooth (EDR)	2402 – 2480	1.5	0.001408	0.001408
Bluetooth LE	2402 – 2480	1.5	0.000706	0.000706
WIFI 2.4 GHz (802.11b)	2412 – 2462	1.5	0.007059	0.007059

The EUT can only transmit one of WIFI 2.4G, Bluetooth, BLE.  
The worst-case is at WIFI 2.4G (802.11b) mode.

#### Sample Calculation

TOTAL MPE (20cm distance) =  $0.007059/1.0 = 0.007059 < 1.0$