

RF Exposure Evaluation Report

Maximum Permissible (MPE) Evaluation

Equipment	BLE Pressure Transducer
Brand Name	TRANSDUCERS
Model Number	TDWLBLC
FCC ID	2ACGE-TDWLBLC
IC #	12056A-TDWLBLC
FCC Standard	CFR 47 Part 15 Subpart C §15.247
IC Standard	RSS247 Issue 1
Applicant	Transducers Direct PO Box 162, 264 Center Street Miamiville, Ohio, 45147 USA

The product sample was received on 9-12-2017, and testing was completed on 9-22-2017. We, EMCE Engineering, would like to declare that the tested sample has been evaluated in accordance with 47 CFR Part 2.1091, and the result of the testing is that the device complies with the applicable limits.

Test Report shall not be reproduced except in full, without prior written approval of EMCE Engineering.

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Revision History

Report #	Version	Description	Issued Date
4378-M	-	Original	05/31/2018

General Description

1.0 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range	Operating Frequency	Modulation Type
Bluetooth LE	2400-2483.5	2402-2480	GFSK

2.0 Testing Location

EMCE Engineering	1726 Ringwood Ave. San Jose, CA 95131 USA
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3.1 Maximum Permissible Exposure Limits

A. FCC Limits for Occupational / Controlled Exposure

Frequency Range	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (s) mW/cm ²	Averaging Time E ² , H ² or S minutes
0.3-3.0	614	1.63	100*	6
3.0-30	1842/f	4.89/f	900/f*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

B. FCC Limits for General Population / Uncontrolled Exposure

Frequency Range	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (s) mW/cm ²	Averaging Time E ² , H ² or S minutes
0.3-3.0	614	1.63	100*	6
3.0-30	1842/f	4.89/f	900/f*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

Note: F = frequency in MHz; plane wave equivalent power density

C. ISED Limits (per IC RSS102)

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ^{±1}	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}

Note: f is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

3.2 MPE Calculation Method

The MPE was calculated at 31 cm to show compliance with the power density limit. The following formula was used to calculate the power density.

(According to the FCC OET Bulletin 65 (Edition 97-01))

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

Where:

S=Power density (in appropriate units, e.g. mW/cm²)

P=Power input to antenna (in appropriate units, e.g., mW)

G=Power gain of the antenna in the direction of interest relative to an isotropic radiator

R=Distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Tx Frequency= 2402 to 2480 [MHz]

4.0 Results

Maximum Peak Power (mW)	2.91 (dBm) 1.95 mW
Antenna Gain	1.0 (dBi)
P	1.95 (mW)
G	1.25 (numeric)
R	20(cm)

(per EMCE Engineering Test Report 4331-1)

Calculated Power density: 0.000489 (mW/cm²)