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FCC PART 15.231(e) TEST REPORT

LOW POWER UNLICENSED TRANSMITTER

Applicant	PRO TECH MONITORING, INC
Address	2549 SUCCESS DRIVE ODESSA FL 33556 USA
FCC ID	NC3BTR3000
Product Description	MONITORING BRACELET
Test Results	☒ Pass ☐ Fail

ACCREDITED
Certificate # 0955-01

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:

☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

ACCREDITED

Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

TIMCO ENGINEERING INC.

Authorized Signatory Name:

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

REPORT SUMMARY

Disclaimer	The test results only relate to the item tested.
Applicable Rule(s)	FCC Pt 15.231, Pt 15.209, Pt 15.207, ANSI C63.4: 2003

TEST ENVIRONMENT

Test Facility	The test sites are located at 849 NW State Road 45 Newberry, FL 32669 USA.
Test Condition:	Temperature: 26ºC Relative humidity: 50%

TEST SETUP

Test Exercise (e.g software description, test signal, etc.):	The DUT was placed in continuous transmit mode of operation.
Deviation from the standard(s)	No deviation from the standard(s)
Modification to the DUT:	No modification was made to the DUT.
Supporting Peripheral Equipment	Not applicable. The device is a stand-alone remote control radio.

DUT SPECIFICATION

Applicant	PRO TECH MONITORING, INC		
Description	MONITORING BRACELET		
FCC ID	NC3BTR3000		
Frequency Range	418-419 MHz		
DUT Power Source	☐ 110–120Vac/50– 60Hz		
	☐ DC Power		
	☒ Battery Operated Exclusively		
Test Item	☐ Prototype	☒ Pre-Production	☐ Production
Type of Equipment	☐ Fixed	☐ Mobile	☒ Portable

TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/15/03	4/15/05
Blue Tower RF Preselector	HP	85685A	2620A00294		out for Cal
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/15/03	4/15/05
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/03
LISN	Electro-Metrics	EM-7820	2682	CAL 3/12/03	3/12/05
Log-Periodic Antenna	Eaton	96005	1243	CAL 5/8/03	5/8/05

TEST PROCEDURES

Power line conducted Emissions: The test procedure used was ANSI C63.4-2003.

Spurious Emissions: The test procedure used was ANSI C63.4-2003 using a spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was always greater than the RBW.

Occupied Bandwidth: A small sample of the transmitter output was fed into the spectrum analyzer and a was generated. The vertical scale is set to 10 dB per division.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB/m. The gain of the preselector was accounted for in the spectrum analyzer reading.

Example:

Freq MHz	Meter Reading dBuV	ACF dB/m	Cable Loss dB	Field Strength dBuV/m @ 3 m
33	20	+10.36	+1.2	= 31.56

ANSI C63.4-2003 Measurement: The DUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The DUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes when necessary and the highest readings were converted to average readings based on the duty cycle.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

RADIATION INTERFERENCE

Rules Part No.: 15.231(e)

Requirements:

Fundamental Frequency (MHz)	Field Strength of Fundamental (µV/m)	Field Strength of Harmonics and Spurious Emissions (µV/m @ 3m)
40.66 to 40.70	1000	100
70 to 130	500	50
130 to 174	500-1500	50-150
174 to 260	1500	150
260 to 470	1500-5000	150-500
470 and above	5000	500

Linear interpolation shall be employed.

No fundamental frequency is allowed in the restricted bands.

Spurious emissions in the restricted bands must be less than 54 dBµV/m or to the limits of 15.209.

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:
1) for the band 130-174 MHz, uV/m at 3 meters = 22.727(F)-2455
2) for the band 260-470 MHz, uV/m at 3 meters = 16.667(F)-2833.33.

Sample calculation of limit @ 315 MHz:

16.667 (315)-2833.3333 = 2417 uV/m
20log(2417) = 67.6 dBuV/m limit @ 315 MHz

Sample calculation of limit @ 433.92 MHz:

16.667 (433.9)-2833.3333 = 4398 uV/m
20log(4398) = 72.8 dBuV/m limit @ 433.9 MHz

FOR THIS DUT:
The limit for average field strength in dBuV/m for the fundamental frequency is 72.33 dBµV/m.

The limit for average field strength in dBuV/m for the harmonics and other spurious frequencies is 52.33 dBµV/m unless it is in a restricted band.

Test Data:

Emission Frequency MHz	*	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m	Margin dB
418.00		48.8Pk	H	1.22	16.64	66.66	5.67
418.00		54.5Pk	V	1.22	16.28	72.00	0.33
835.90		4.6Pk	V	1.97	21.98	28.55	23.78

** -Denotes restricted bands

Note: Emissions that are 20 dB below the limit are not required to be reported.

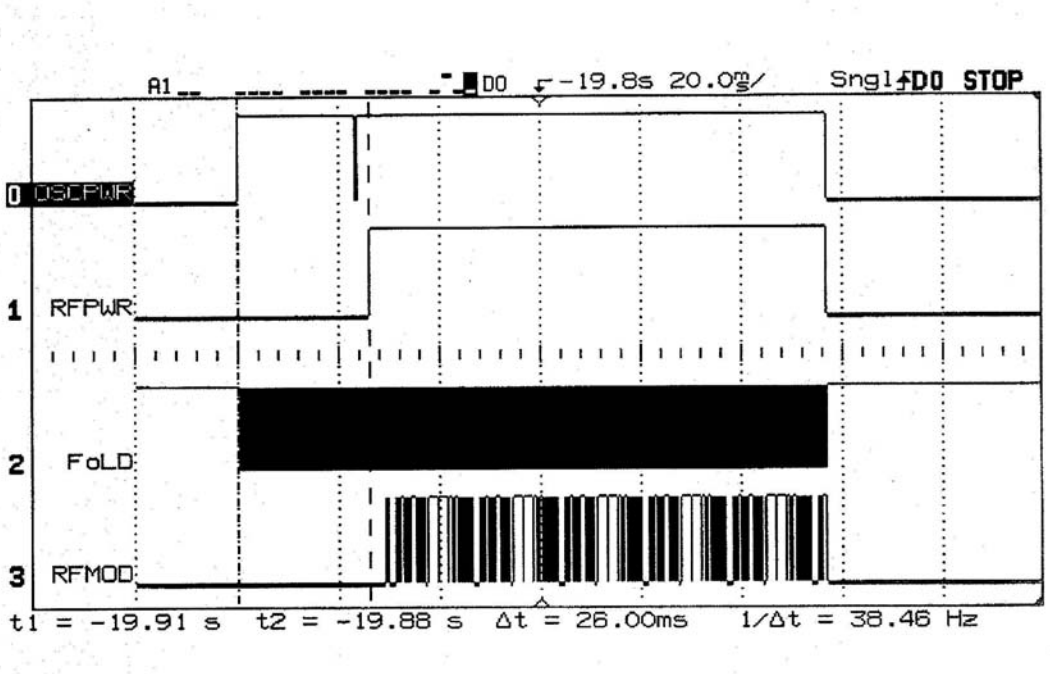
CALCULATION OF DUTY CYCLE

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero (0) frequency span. A plot is then made of the pulse train with a sweep time of 100 milliseconds. This sweep determines the duration of the pulse train. This sweep allows the determination of the number of and type of pulses, i.e. long & short. Plots are then made showing the duration of each type of pulse and its duration. From the 100-millisecond plot, the number of a given type of pulse is then multiplied by the duration of that type pulse. This allows the calculation of the amount of time the DUT is on within 100 ms.

From the plot the transmit time in 100ms can be seen. The RFPWR time is the tranmit time which is 95 ms.

This gives a duty cycle correction factor near 0 dB.

See the following plots.



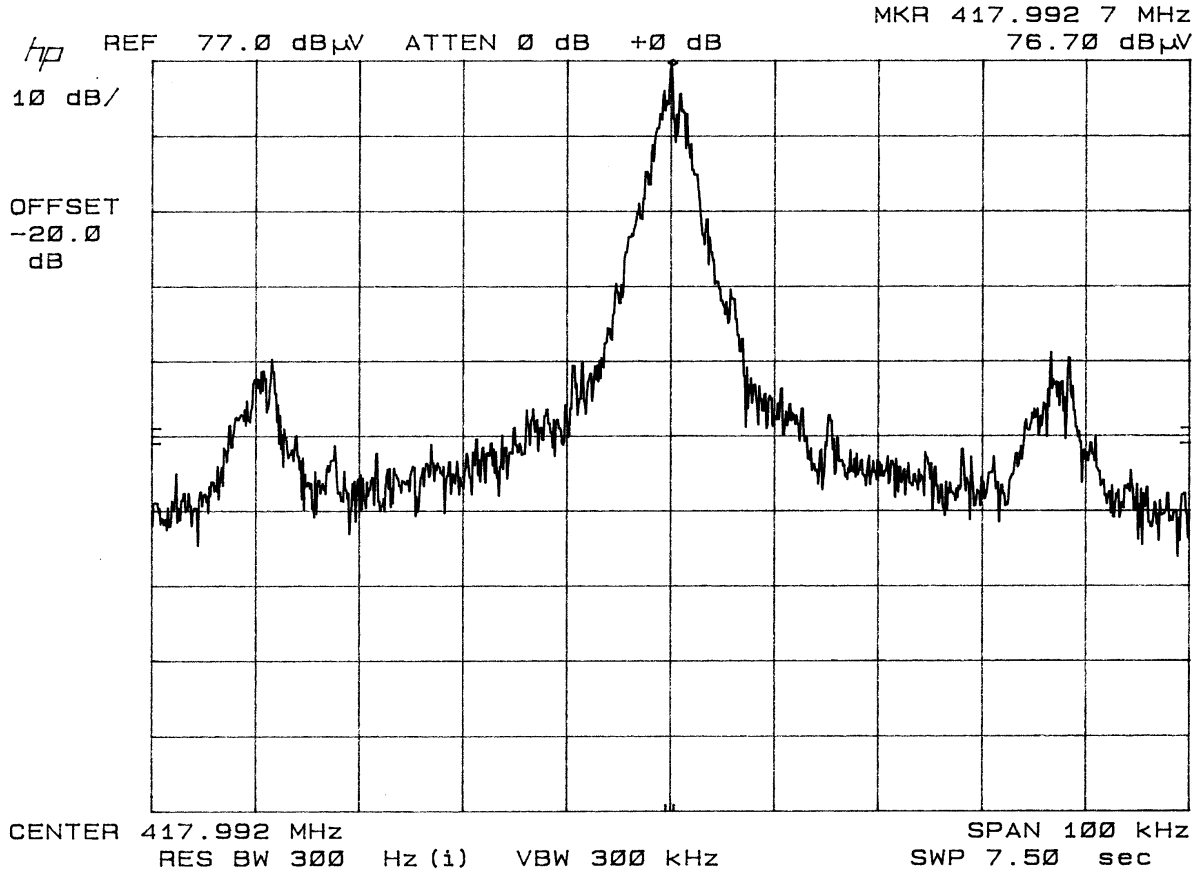
The duration of the trasmission is less than one second and the silent time is greater than 10 seconds.

OCCUPIED BANDWIDTH

Rules Part No.: 15.231(C)

Requirements: The bandwidth of the emission shall be no wider than .25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Data: Please refer to the following plot.



POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Pt 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Data: Not applicable because the DUT is battery operated exclusively.