



849 NW State Road 45
Newberry, FL 32669 USA
Ph.: 888.472.2424 or
352.472.5500
Fax: 352.472.2030
Email: info@timcoengr.com
Website: www.timcoengr.com

FCC PART 15.247

2.4 GHz DTS

TEST REPORT

Applicant	INSTINCT PERFORMANCE LLC
Address	14301 CALIBER DR., SUITE 100
	OKLAHOMA CITY 73134 USA
FCC ID	2ANPQ-REV
Model Number	001 & 002
Product Description	SPORT TRAINING EYEWARE
Date Sample Received	10/18/2017
Final Test Date	10/19/2017
Tested By	Tim Royer
Approved By	Sid Sanders

Report Number	Version Number	Description	Issue Date
1827UT17TestReport	Rev1	Initial Issue	10/19/2017

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**

TABLE OF CONTENTS

GENERAL REMARKS	3
GENERAL INFORMATION	4
EUT Specification	4
Test Supporting Equipment	4
RESULTS SUMMARY	5
RADIATED SPURIOUS EMISSIONS	6
Test Data: Field Strength table.....	8
Test Data: Field Strength table.....	9
Test Data: Field Strength table.....	10
EMC EQUIPMENT LIST	11
STATE OF THE MEASUREMENT UC – TEI TAB LIC DEVICES UC 170428.....	12

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 and was selected by the customer.
- ☐ 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.

I attest that the necessary measurements were made at:

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



Tested by:

Name and Title: Tim Royer, Project Manager/Testing Engineer

Sr. EMC Engineer
EMC-003838-NE



Date: 10/19/2017

Reviewed and approved by:

Name and Title: Sid Sanders Engineer



Date: 10/23/2017

Applicant: INSTINCT PERFORMANCE LLC
FCC ID: 2ANPQ-REV
Report: 1827UT17TestReport_Rev1

[Table of Contents](#)

GENERAL INFORMATION

EUT Specification

Regulatory Standards	FCC Title 47 CFR Part 15.247		
FCC ID	2ANPQ-REV		
Model	001 & 002		
EUT Description	SPORT TRAINING EYEWARE		
Operating Frequency	TX: 2402 – 2483.5MHz		
EUT Power Source	☐ 110–120Vac/50– 60Hz		
	☐ DC Power		
	☒ Battery Operated Exclusively		
Test Item	☐ Prototype	☒ Pre-Production	☐ Production
Type of Equipment	☐ Fixed	☐ Mobile	☒ Portable
Antenna Connector	N/A		
Antenna	Integral		
Test Facility	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.		
Test Conditions	Temperature: 24-26°C Relative humidity: 50-65%		
Measurement Standard	ANSI C63.10-2013 (Measurement Procedures) ANSI C63.4-2009 (Radiated Site Validation)		
Test Exercise	The EUT was tested in a continuous transmission mode		

Test Supporting Equipment

Device	Manufacturer	Model	S/N	Supplied By	Used For
N/A					

RESULTS SUMMARY

FCC Rule Part No.	Requirement	Test Item	Result
15.247(d)	Unwanted Emissions	Radiated Spurious	Pass

Notes:

RADIATED SPURIOUS EMISSIONS

Rules Part No.: FCC part 15.247 (d) & 15.209

Requirements: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below

In addition, Emissions found in restricted bands the levels must comply with the general limits found in FCC part 15.209

Frequency	Limits
FCC Part 15.209, IC RSS-GEN 8.9	
9 to 490 kHz	2400/F (kHz) $\mu\text{V/m}$ @ 300 meters
490 to 1705 kHz	24000/F (kHz) $\mu\text{V/m}$ @ 30 meters
1705 kHz to 30 MHz	29.54 dB $\mu\text{V/m}$ @ 30 meters
30 – 88	40.0 dB $\mu\text{V/m}$ @ 3 meters
88 – 216	43.5 dB $\mu\text{V/m}$ @ 3 meters
216 – 960	46.0 dB $\mu\text{V/m}$ @ 3 meters
Above 960	54.0 dB $\mu\text{V/m}$ @ 3 meters

Test Method: ANSI C63.4 § Annex D Validation of radiated emissions standard test sites
 ANSI C63.10 § 6.3 Common requirements radiated emissions
 ANSI C63.10 § 6.6 Emissions above 1 GHz

Field Strength Calculation:

The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μV) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

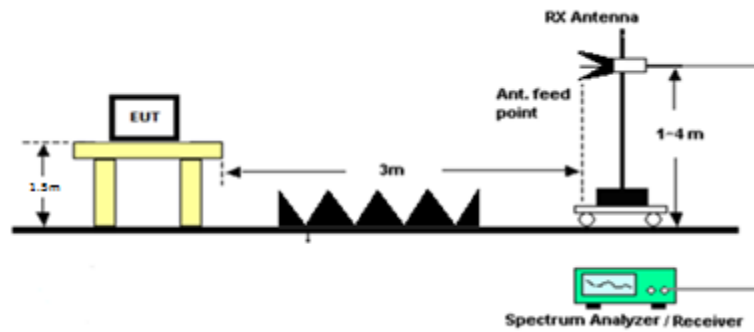
Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dB μV	+ 10.36 dB	+ 0.5 = 30.86 dB $\mu\text{V/m}$ @ 3m

RADIATED SPURIOUS EMISSIONS

Setup:

Emissions above 1 GHz



RADIATED SPURIOUS EMISSIONS

Notes: The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

Only the worst case data rate and Output Power which produced emissions within 20dB of the limit are reported.

The spectrum was measured from 6GHz to 25 GHz

Test Data: Field Strength table

Tuned Freq MHz	Detector	Emission Frequency MHz	Meter Reading dBu V	Antenna Polarity	Field Strength dBu V/M	Limit dBuV/m	Margin dB
2402.00	Peak	7206.00	15.88	V	61.68	74.00	12.32
2402.00	Average	7206.00	6.51	V	52.31	54.00	1.69
2402.00	Peak	7206.00	12.12	H	57.92	74.00	16.08
2402.00	Average	7206.00	5.79	H	51.59	54.00	2.41
2402.00	Peak	9608.00	-2.61	H	45.96	74.00	28.04
2402.00	Peak	9608.00	-2.83	H	45.74	74.00	28.26
2402.00	Average	12010.00	-4.49	H	47.75	54.00	6.25
2402.00	Peak	12010.00	-13.84	H	38.40	74.00	35.60
2402.00	Peak	12010.00	-13.94	V	38.30	74.00	35.70
2402.00	Average	12010.00	-4.69	V	47.55	54.00	6.45
2402.00	Peak	14412.00	-5.34	V	48.68	74.00	25.32
2402.00	Peak	14412.00	-6.73	H	47.29	74.00	26.71
2402.00	Peak	16814.00	-7.01	H	50.08	74.00	23.92
2402.00	Peak	16814.00	-6.36	H	50.73	74.00	23.27
2402.00	Peak	19216.00	-8.70	V	52.60	74.00	21.40
2402.00	Average	21618.00	-9.50	V	52.86	54.00	1.14
2402.00	Average	21618.00	-9.20	H	53.16	54.00	0.84
2402.00	Average	24020.00	-10.60	V	53.27	54.00	0.73
2402.00	Average	24020.00	-11.30	H	52.57	54.00	1.43

Results Meet Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Field Strength table

Tuned Freq MHz	Detector	Emission Frequency MHz	Meter Reading dBu V	Antenna Polarity	Field Strength dBu V/M	Limit dBuV/m	Margin dB
2440.00	Peak	4880.00	12.63	H	54.92	74.00	19.08
2440.00	Average	4880.00	6.42	H	48.71	54.00	5.29
2440.00	Average	4880.00	4.03	V	46.32	54.00	7.68
2440.00	Peak	4880.00	5.88	V	48.17	74.00	25.83
2440.00	Peak	7320.00	6.58	V	52.47	74.00	21.53
2440.00	Peak	7320.00	11.11	H	57.00	74.00	17.00
2440.00	Average	7320.00	-3.10	H	42.79	54.00	11.21
2440.00	Peak	9760.00	-2.48	H	46.39	74.00	27.61
2440.00	Peak	9760.00	-0.84	V	48.03	74.00	25.97
2440.00	Peak	12200.00	-5.61	V	46.93	74.00	27.07
2440.00	Peak	12200.00	-4.56	H	47.98	74.00	26.02
2440.00	Average	12200.00	-13.96	H	38.58	54.00	15.42
2440.00	Average	12200.00	-17.65	V	34.89	54.00	19.11
2440.00	Peak	14640.00	-6.96	V	47.37	74.00	26.63
2440.00	Peak	14640.00	-7.26	H	47.07	74.00	26.93
2440.00	Peak	17080.00	-3.74	H	53.27	74.00	20.73
2440.00	Peak	17080.00	-6.50	V	50.51	74.00	23.49
2440.00	Average	24400.00	-11.10	H	52.99	54.00	1.01
2440.00	Average	24400.00	-12.30	H	51.79	54.00	2.21
2440.00	Average	21960.00	-12.10	H	50.48	54.00	3.52
2440.00	Average	21960.00	-11.60	V	50.98	54.00	3.02
2440.00	Average	19520.00	-12.40	V	49.15	54.00	4.85
2440.00	Average	19520.00	-12.50	H	49.05	54.00	4.95

Results Meet Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Field Strength table

Tuned Freq MHz	Detector	Emission Frequency MHz	Meter Reading dBu V	Antenna Polarity	Field Strength dBu V/M	Limit dBuV/m	Margin dB
2480.00	Peak	7440.00	10.43	V	56.42	74.00	17.58
2480.00	Average	7440.00	0.35	V	46.34	54.00	7.66
2480.00	Peak	7440.00	9.94	H	55.93	74.00	18.07
2480.00	Average	7440.00	4.86	H	50.85	54.00	3.15
2480.00	Peak	9920.00	-1.72	H	47.62	74.00	26.38
2480.00	Peak	9920.00	-4.14	V	45.20	74.00	28.80
2480.00	Peak	12400.00	-5.72	V	46.99	74.00	27.01
2480.00	Peak	12400.00	-5.26	H	47.45	74.00	26.55
2480.00	Peak	14880.00	-7.33	H	47.32	74.00	26.68
2480.00	Peak	14880.00	-7.03	V	47.62	74.00	26.38
2480.00	Peak	17360.00	-5.69	V	51.03	74.00	22.97
2480.00	Peak	17360.00	-6.77	H	49.95	74.00	24.05
2402.00	Peak	19216.00	-9.50	H	51.80	74.00	22.20
2480.00	Average	19840.00	-12.30	H	49.20	54.00	4.80
2480.00	Average	19840.00	-11.50	V	50.00	54.00	4.00
2480.00	Average	22320.00	-10.30	V	52.67	54.00	1.33
2480.00	Average	22320.00	-11.60	H	51.37	54.00	2.63
2480.00	Average	24800.00	-11.40	H	52.95	54.00	1.05
2480.00	Average	24800.00	-12.40	H	51.95	54.00	2.05

Results Meet Requirements

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
CHAMBER	Panashield	3M	N/A	04/25/16	12/31/17
Antenna: Double- Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	03/01/17	03/01/19
Software: Field Strength Program	Timco	N/A	Version 4.10.7.0	N/A	N/A
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244- 01; KMKM- 0670-00; KFKF-0198- 01	08/09/16	08/09/18
Band Reject Filter 2.4 GHz	Micro-Tronics	BRM50702-02	-G042	09/27/16	09/27/18
Antenna: Double- Ridged Horn 18-40 GHz	EMCO	3116	9011-2145	11/18/15	11/18/17
Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	01/04/16	01/04/18

*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

STATE OF THE MEASUREMENT UC – TEI TAB LIC DEVICES UC 170428

The data and results referenced in this document are true and accurate. The measurement uncertainty was calculated for all measurements listed in this test report according To CISPR 16–4 or ENTR 100-028 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: “Uncertainty in EMC Measurements” and is documented in the Timco Engineering, Inc. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Timco Engineering, Inc. is reported:

Test Items	Measurement Uncertainty	Notes
RF Frequency Accuracy	± 49.5 Hz	(1)
RF Conducted Power	± 0.93 dB	(1)
Conducted spurious emission of transmitter valid up to 40GHz	± 1.86 dB	
Occupied Bandwidth	± 2.65 %	
Audio Frequency Response	± 1.86 dB	
Modulation limiting	± 1.88 %	
Radiated RF Power	± 1.4 dB	
Maximum frequency deviation: Within 300 Hz and 6kHz of audio freq.	± 1.88 %	
Within 6kHz and 25kHz of audio Freq.	± 2.04 %	
Rad Emissions Sub Meth up to 26.5GHz	± 2.14 dB	
Adjacent channel power	± 1.47 dB	(1)
Transient Frequency Response	± 1.88 %	
Temperature	± 1.0 °C	(1)
Humidity	± 5.0 %	

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

END OF REPORT