



166 South Carter, Genoa City, WI 53128

Company:

Model Tested:

Certification Exhibit:

Project Number:

Report Number:

Alcotek, Inc.

F-000410-01 Sensing Unit

RF Exposure

11373

26038 rev2.0

RF EXPOSURE STATEMENT OF COMPLIANCE

FCC CFR 47 Part 1.1307(b)

FCC CFR 47 Part 2.1093

SAR Exclusion Thresholds – Portable Device – General Population

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

FCC ID: 2AZIU21-2374

Formal Name: TILT

Kind of Equipment: Portable
Bluetooth Low Energy (BLE V5.0)
Angle Sensor; handheld, attachable, mountable

Frequency Range: 2402 to 2480 MHz

Test Configuration: Tabletop, tested in three orthogonal positions

Model Number(s): F-000410-01 Sensing Unit

Model(s) Tested: F-000410-01 Sensing Unit

Serial Number(s): P0200278

Date of Tests: February 16th, 2021

Test Conducted For: Alcotek, Inc.
150 Hanley Ind. Ct.
St. Louis, MO 63144, 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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SIGNATURE PAGE

Report By:

Craig Brandt
Test Engineer

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager



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CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

DLS Electronic Systems, Inc.
200 E. Marquardt Drive
Wheeling, IL 60090
(and satellite sites as shown on the scope)

Fulfills the requirements of

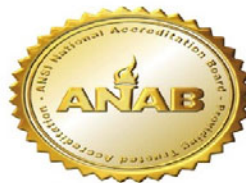
ISO/IEC 17025:2017

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 www.anab.org.

R. Douglas Leonard Jr., VP, PILR SBU
Expiry Date: 23 April 2022
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 Transmitter Information

Maximum Effective Isotropic
Radiated Power (measured): -10.29 dBm

Acceptable tolerances due to component and
production variations and tune up procedures: +/- 0.2 dBm

Frequency Range: 2.402 – 2.480 GHz

Antenna Type: Chip, fixed Johanson 2450AT18D0100E (1.5 dBm Peak Gain)

2.0 Rule Part

CFR 47 Part 1.1307(b)
CFR 47 Part 2.1093

3.0 Test Procedure

FCC 447498 D01 General RF Exposure Guidance v06

- 4.3 General SAR test reduction and exclusion guidance
- 4.3.1 Standalone SAR test exclusion considerations

ANSI C63.10-2013

- 11.9.1.1 Maximum peak conducted output power
RBW $\geq$ DTS bandwidth method

SAR test exclusion based on transmission output power lower than SAR test exclusion levels.

Output power measured using substitution method with calibrated signal generator, and substitution horn antenna.

The EUT was rotated through 3 orthogonal axes to find the highest radiated field strength. The maximum field strength level was measured and, using ANSI C63.10 signal substitution techniques, converted into an Effective Isotropic Radiated Power Level (EIRP). This maximum EIRP level was then compared to the SAR test exclusion level.



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4.0 SAR Test Exclusion Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

$f(\text{GHz})$ is the RF channel transmit frequency in GHz.

Power and distance are rounded to the nearest mW and mm before calculation.

The result is rounded to one decimal place for comparison.

When the minimum *test separation distance* is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

5.0 Output Power

This is a portable device. The maximum peak Effective Isotropic Radiated Power Level (EIRP) measured -10.29 dBm. Adding 0.2 dBm to account for tolerances of the transmitter due to component variations, production variations, and tune up procedures yields -10.09 dBm (0.098 mW).

6.0 Exclusion threshold

Rounding 0.098 mW to the nearest mW = 0 mW
 $[0 \text{ mW} / 5 \text{ mm}] \times [\sqrt{2.480 \text{ GHz}}] = \mathbf{0.0}$

7.0 Results

0.0 is ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR.
SAR measurement is not necessary.



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8.0 Test Equipment

D.L.S. Wisconsin – Radiated Fundamental – Site G1 – Test Equipment: (substitution method)

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
Signal Generator	Rohde & Schwarz	SMR40	100092	1 GHz-40 GHz	4-27-20	4-27-21
Horn Antenna	Com-Power	AH-118	071127	1 GHz-18 GHz	1-29-21	1-29-23
Cable	Mini-Circuits	APC-15FT-NMNM	0805A	30 MHz-18 GHz	6-1-20	6-1-21
Test Software	Rohde & Schwarz	ESK1	V1.7.1	N/A	N/A	N/A

9.0 Conclusion

With a minimum separation distance less than 20 centimeters, this is a *portable* device as defined by FCC KDB 447498 D01 General RF Exposure Guidance v06. The TILT, model F-000410-01 Sensing Unit, as provided by Alcotek, Inc., **meets** the SAR test exclusion based on the worst-case maximum effective isotropic radiated power (EIRP). The peak output power of the transmitter is lower than the SAR test exclusion threshold for portable devices operating in a general population environment.

This device complies with the RF exposure requirements of FCC CFR 47 Part 1.1307(b) and FCC CFR 47 Part 2.1093.



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Section A – Measurement Data

DLS Electronic Systems, Inc.

Company: Alcokec, Inc.
Operator: Craig B
Date of test: 02-16-2021
Temperature: 68 deg. F
Humidity: 26% R.H.
Detector: Max Peak; RBW: 3 MHz; VBW: 10 MHz
Limit: 30 dBm

Power setting 20 (maximum)

EIRP - Substitution Method

Model: Sensing Unit						
Channel: Low - 2402 MHz						
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)
2402 vertical	84.64	-17.90	2.92	9.72	-11.10	30.00
2402 horizontal	84.66	-18.10	2.92	9.72	-11.30	30.00

EIRP = Signal generator output - cable loss + antenna gain



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Section A

DLS Electronic Systems, Inc.

Company: Alcokec, Inc.
Operator: Craig B
Date of test: 02-16-2021
Temperature: 68 deg. F
Humidity: 26% R.H.
Detector: Max Peak; RBW: 3 MHz; VBW: 10 MHz
Limit: 30 dBm

Power setting 20 (maximum)

EIRP - Substitution Method

Model: Sensing Unit						
Channel: Mid - 2440 MHz						
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)
2440 vertical	85.55	-17.05	2.96	9.67	-10.34	30.00
2440 horizontal	85.55	-17.00	2.96	9.67	-10.29	30.00

EIRP = Signal generator output - cable loss + antenna gain



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Section A

DLS Electronic Systems, Inc.

Company: Alcokec, Inc.
Operator: Craig B
Date of test: 02-16-2021
Temperature: 68 deg. F
Humidity: 26% R.H.
Detector: Max Peak; RBW: 3 MHz; VBW: 10 MHz
Limit: 30 dBm

Power setting 20 (maximum)

EIRP - Substitution Method

Model: Sensing Unit						
Channel: High - 2480 MHz						
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)
2480 vertical	84.92	-17.42	2.99	9.58	-10.83	30.00
2480 horizontal	84.92	-17.40	2.99	9.58	-10.81	30.00

EIRP = Signal generator output - cable loss + antenna gain



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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.

Radiated Emission 30 MHz to 18 GHz Uncertainty

		Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)	Uncertainty (+/- dB)
Contribution	Probability Distribution	3M	3M	3M	3M	3M	3M	10M	10M	10M
		30- 100MHz.	100- 700MHz	700- 1000MHz.	1- 4.5Ghz	4.5 - 7Ghz	7 - 18Ghz	30- 100MHz.	100- 700MHz.	700- 1000MHz.
Combined Standard Un certainty	Normal	1.70	1.62	1.66	2.13	2.48	2.85	1.64	1.58	1.66
Expanded Uncertainty	Normal (k=2)	3.40	3.23	3.33	4.26	4.95	5.69	3.29	3.16	3.31



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END OF REPORT

Revision #	Date	Comments	By
1.0	04-12-2021	Initial Release	CB
2.0	05-27-2021	Modified RF assessment calculations to account for production & component tolerances; Removed setup photos (they are in a separate exhibit)	CB