

Test Report # 317294 B

Equipment Under Test: CTR BT 01

Test Date(s): 8/28/17 – 10/4/17

Prepared for: Raffel Systems
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Report Issued by: Shane Dock, EMC Engineer

Signature:



Date: 4/16/2018

Report Reviewed by: Adam Alger, Quality Systems Engineer

Signature: 

Date: 3/13/2018

Report Constructed by: Shane Dock, EMC Engineer

Signature:



Date: 4/16/2018

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Laird Technologies Test Services in Review

The Laird Technologies, Inc. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein, unless otherwise noted.



Federal Communications Commission (FCC) – USA

Accredited recognition of two 3 meter Semi-Anechoic Chambers

Accredited Test Firm Registration Number: 953492



Innovation, Science and Economic Development Canada

ISED Site listing of two 3 meter Semi-Anechoic Chambers based on RSS-GEN – Issue 4

File Number: IC 3088A-2

File Number: IC 3088A-3

Company: Raffel Systems	Page 3 of 12	Name: CTR BT 01
Report: 317294 B		Model: CTRBT-01
Job: C-2795		Serial: Engineering Sample

1 TEST REPORT SUMMARY

On **2/22/18** the Equipment Under Test (EUT), **CTR BT 01**, as provided by **Raffel Systems** was tested to the following requirements:

Requirement	Description	Specification	Method	Result
FCC Part 1.1307, 2.1091, 2.1093	RF Exposure and equipment authorization requirements	Reported	FCC KDB 447498	Reported
ISED Canada RSS-102	Radiofrequency Radiation Exposure Evaluation: Portable	Reported	RSS-102 Section 2.5.2	Reported

Notice:

The results relate only to the item tested and described in this report. Any modifications made to the equipment under test after the specified test date(s) may invalidate the data herein.

If the resulting measurement margin is seen to be within the uncertainty value, as listed in this report, the possibility exists that this unit may not meet the required limit specification if subsequently tested.

2 CLIENT INFORMATION

Company Name	Raffel Systems
Contact Person	Edward Nowak
Address	N112 W14600 Mequon Rd. Germantown, WI 53022

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	CTR BT 01
Model Number	CTRB-T-01
Serial Number	Engineering Sample
FCC/IC Number	FCC ID: YZHCTRB-T-01 IC ID: 9314A-CTRB-T-01

2.2 Product Description

System is used to communicate with integrated cup holders in furniture with multiple power motion actuators. This module interfaces with a custom App giving the end user capability to control furniture functionality either via the cupholder interface or the App. The App may also provide additional functionality not present on the cup controls (for instance home position, memory functionality, massage, etc).

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Additional Information

EUT emissions peaked out in all orientations. Unit tested with USB port Occupied and with an output power of -12 as the set. Unit programmed via buttons on cupholder. Unit connected to sample motor.

2.6 Channel Plan

EUT emissions tested for Low Mid and High Channel.

Low – 2402 MHz

Mid – 2440 MHz

High – 2480 MHz

3 REFERENCES

Publication	Edition	Date
CFR 47 Part 15	-	2017
ANSI C63.10	-	2013
RSS-247	2	2017
RSS GEN	4	2014
RSS-102	5	2015
CFR 47 Part 1 and 2	-	2017
FCC KDB 447498	6	2015

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k = 2$.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty $\pm$
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

Operator	Shane Dock
Test Date	9/20/17
Location	Conducted RF Measurement Area
Temp. / R.H.	70 degrees Fahrenheit / 53% RH
Requirement	15.247 (b) (3)
Method	FCC KDB 558074 D01 DTS Meas Guidance V04, section 9.1.1

Limits:

Maximum Conducted Output Power (watts)	Maximum Conducted Output Power (dBm)
1	30

Test Parameters

Frequency	2402, 2440, 2480 MHz
RBW	3 MHz

Table

Channel	Low	Mid	High
Pout Conducted (dBm)	-14.403	-14.570	-14.850

6 EXCLUSION CALCULATION

6.1 FCC

Frequency = 2402 MHz

Output Power = -14.403 dBm + 4.0 dB (Tune-up Tolerance) + 1.6 dBi (Antenna Gain) = -8.803 dBm
= 0.13 mW

At 5 mm, the max power including tune-up tolerance = $3.0 * 5 \text{ mm} / (\sqrt{2.402}) = 9.68 \text{ mW}$ for 1-g SAR
= $7.5 * 5 \text{ mm} / \sqrt{2.402} = 24.20 \text{ mW}$ for 10-g SAR.

The unit is excluded from Sar testing, as 0.13 mW is less than these two thresholds at 5 mm.

6.2 Industry Canada

Unit EIRP (dBm) = Output Power (dBm, with tune up tolerance) + Antenna Gain (dBi) = -10.403 dBm + 1.6 dBi = -8.803 dBm = 0.13 mW

Threshold per Table 1 of RSS-102 at 2402 MHz for a separation distance 5 mm or less = 4.3 mW.

The EUT is therefore exempt from routine evaluation at 5 mm or more, as 4.3 mW > 0.13 mW.

7 REVISION HISTORY

Version	Date	Notes	Person
V0	3/13/18	First Draft	Shane Dock
V1	4/5/18	Revisions added	Shane Dock
V2	4/16/18	Final Draft	Shane Dock

END OF REPORT