

ChronoTrack Systems

TEST REPORT FOR

ChronoTrack Time Keeping Device, Revolution

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207 & 15.247

Report No.: 91963-8

Date of issue: July 6, 2011



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

ChronoTrack Systems
111 East Diamond Ave.
Evansville, IN 47711

Representative: Daniel Howell
Customer Reference Number: 2011-0196

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 91963

DATE OF EQUIPMENT RECEIPT:
DATE(S) OF TESTING:

June 21, 2011
June 21-22, 2011

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Site Registration & Accreditation Information

Location	CB #	Japan	Canada	FCC
Mariposa A	US0103	R-563, C-578, T-1492 & G-87	3082A-2	90477

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C Section 15.207 & 15.247

Description	Test Procedure/Method	Results
AC Mains Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
Radiated Spurious Emissions	FCC Part 15 Subpart C Section 15.247(d) / ANSI C63.4 (2003)	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

ChronoTrack Time Keeping Device

Manuf: ChronoTrack
Model: Revolution
Serial: 10259

Switching Adapter (power supply)

Manuf: CUI Inc.
Model: DSA-60W-20 1 24060
Serial: None

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Display Tablet

Manuf: Xplore Technologies
Model: iX104
Serial: 914G001068G7350138EM000

AC/DC Adapter

Manuf: Delta Electronics, Inc.
Model: SADP-65KB D
Serial: 92W0009590257

Switching Adapter (power supply)

Manuf: CUI Inc.
Model: DSA-60W-20 1 24060
Serial: None

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.207 AC Mains Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • 209-966-5240

Customer: **ChronoTrack Systems**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **91963** Date: **6/21/2011**
 Test Type: **Conducted Emissions** Time: **2:14:31 PM**
 Equipment: **ChronoTrack Time Keeping Device** Sequence#: **4**
 Manufacturer: ChronoTrack Tested By: **Chuck Kendall**
 Model: Revolution **120V 60Hz**
 S/N: **10259**

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP02221	Attenuator	PE7010-10	6/7/2011	6/7/2013
T2	AN02609	High Pass Filter	HE9615-150K-50-720B	2/11/2010	2/11/2012
	AN02111	Spectrum Analyzer	8593EM	3/7/2011	3/7/2013
T3	ANMMACOND	Cable		5/10/2011	5/10/2013
T4	AN00374	50uH LISN-Black Lead Amplitude (dB)	8028-TS-50-BNC	5/16/2011	5/16/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
ChronoTrack Time Keeping Device*	ChronoTrack	Revolution	10259
Switching Adapter (power supply)	CUI Inc.	DSA-60W-20 1 24060	None

Support Devices:

Function	Manufacturer	Model #	S/N
Display Tablet	Xplore Technologies	iX104	914G001068G7350138EM000
AC/DC Adapter	Delta Electronics, Inc.	SADP-65KB D	92W0009590257

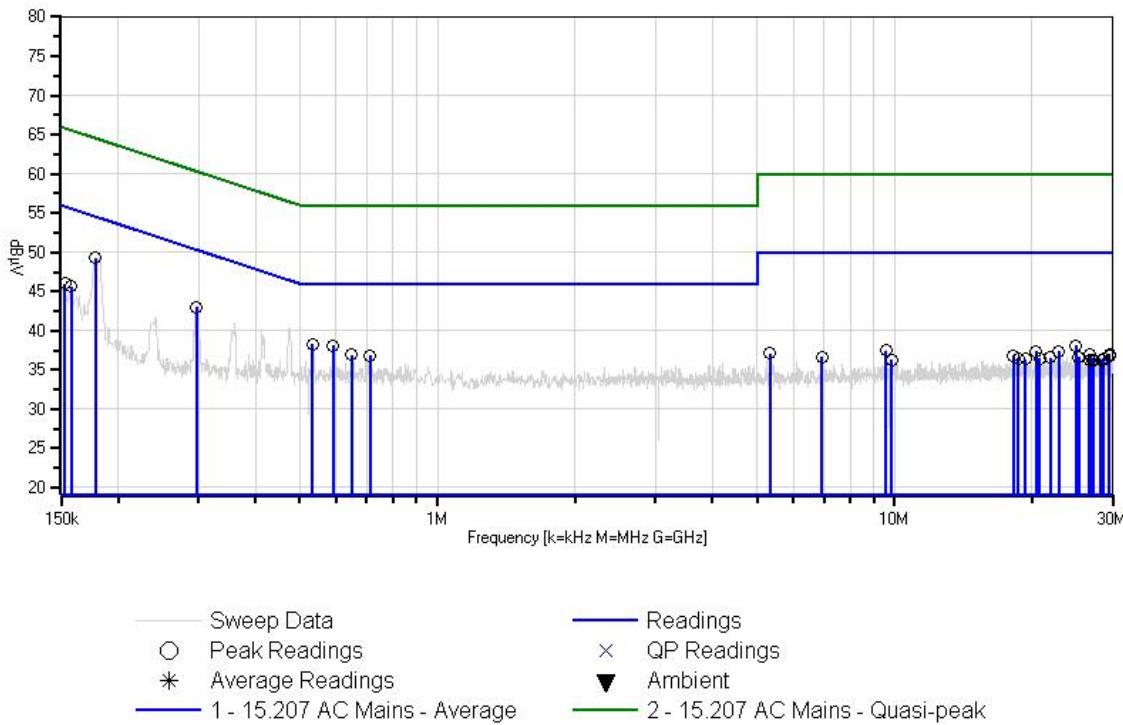
Test Conditions / Notes:

15.207 AC Mains - Average
 EUT is setup as tabletop equipment with the antenna and EUT on the 80cm high wooden table atop the 40" diameter flush mounted turntable. The power adapter is also atop the wooden table.
 Unit is transmitting and receiving via the Impinj transceiver within the EUT.
 RBW = 9 kHz, VBW= 30 kHz
 Frequencies of Interest: 150 kHz to 30 MHz
 Temp = 80°F
 Relative Humidity = 35%
 Press = 988 mbars

Ext Attn: 0 dB

Measurement Data:		Reading listed by margin.						Test Lead: Black			
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	178.361k	37.6	+9.9	+0.3	+0.1	+1.4	+0.0	49.3	54.6	-5.3	Black
2	296.894k	31.7	+9.9	+0.1	+0.2	+1.1	+0.0	43.0	50.3	-7.3	Black
3	532.507k	27.3	+9.9	+0.1	+0.2	+0.8	+0.0	38.3	46.0	-7.7	Black
4	591.410k	27.1	+9.9	+0.2	+0.2	+0.7	+0.0	38.1	46.0	-7.9	Black
5	649.586k	26.0	+9.9	+0.1	+0.2	+0.7	+0.0	36.9	46.0	-9.1	Black
6	712.126k	25.9	+9.9	+0.1	+0.3	+0.6	+0.0	36.8	46.0	-9.2	Black
7	152.909k	32.6	+9.9	+1.9	+0.1	+1.5	+0.0	46.0	55.8	-9.8	Black
8	157.999k	32.6	+9.9	+1.5	+0.1	+1.5	+0.0	45.6	55.6	-10.0	Black
9	24.943M	26.2	+9.9	+0.1	+1.3	+0.6	+0.0	38.1	50.0	-11.9	Black
10	9.571M	26.2	+9.9	+0.1	+0.9	+0.4	+0.0	37.5	50.0	-12.5	Black
11	22.896M	25.4	+9.9	+0.2	+1.3	+0.6	+0.0	37.4	50.0	-12.6	Black
12	20.418M	25.5	+9.9	+0.2	+1.2	+0.6	+0.0	37.4	50.0	-12.6	Black
13	5.337M	26.3	+9.9	+0.0	+0.6	+0.3	+0.0	37.1	50.0	-12.9	Black
14	29.555M	24.9	+9.9	+0.2	+1.4	+0.6	+0.0	37.0	50.0	-13.0	Black
15	26.828M	24.9	+9.9	+0.1	+1.4	+0.6	+0.0	36.9	50.0	-13.1	Black
16	29.507M	24.7	+9.9	+0.2	+1.4	+0.6	+0.0	36.8	50.0	-13.2	Black
17	18.175M	25.0	+9.9	+0.1	+1.2	+0.6	+0.0	36.8	50.0	-13.2	Black
18	6.932M	25.7	+9.9	+0.1	+0.7	+0.3	+0.0	36.7	50.0	-13.3	Black

19	25.306M	24.8	+9.9	+0.1	+1.3	+0.6	+0.0	36.7	50.0	-13.3	Black
20	21.914M	24.6	+9.9	+0.2	+1.3	+0.6	+0.0	36.6	50.0	-13.4	Black
21	18.634M	24.7	+9.9	+0.1	+1.2	+0.6	+0.0	36.5	50.0	-13.5	Black
22	20.752M	24.6	+9.9	+0.2	+1.2	+0.6	+0.0	36.5	50.0	-13.5	Black
23	28.726M	24.4	+9.9	+0.2	+1.4	+0.6	+0.0	36.5	50.0	-13.5	Black
24	19.355M	24.6	+9.9	+0.1	+1.2	+0.6	+0.0	36.4	50.0	-13.6	Black
25	27.088M	24.3	+9.9	+0.1	+1.4	+0.6	+0.0	36.3	50.0	-13.7	Black
26	26.656M	24.4	+9.9	+0.1	+1.3	+0.6	+0.0	36.3	50.0	-13.7	Black
27	9.860M	25.0	+9.9	+0.1	+0.9	+0.4	+0.0	36.3	50.0	-13.7	Black
28	28.561M	24.2	+9.9	+0.2	+1.4	+0.6	+0.0	36.3	50.0	-13.7	Black
29	28.273M	24.2	+9.9	+0.2	+1.4	+0.6	+0.0	36.3	50.0	-13.7	Black
30	27.287M	24.3	+9.9	+0.1	+1.4	+0.6	+0.0	36.3	50.0	-13.7	Black

Date: 6/21/2011 Time: 2:14:31 PM ChronoTrack Systems WO#: 91963
 15.207 AC Mains - Average Test Lead: Black 120V 60Hz Sequence#: 4 Ext ATTN: 0 dB


Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • 209-966-5240

Customer: **ChronoTrack Systems**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **91963** Date: 6/21/2011
 Test Type: **Conducted Emissions** Time: 2:24:06 PM
 Equipment: **ChronoTrack Time Keeping Device** Sequence#: 5
 Manufacturer: ChronoTrack
 Model: Revolution
 S/N: 10259
 Tested By: Chuck Kendall
 120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP02221	Attenuator	PE7010-10	6/7/2011	6/7/2013
T2	AN02609	High Pass Filter	HE9615-150K-50-720B	2/11/2010	2/11/2012
	AN02111	Spectrum Analyzer	8593EM	3/7/2011	3/7/2013
T3	ANMACOND	Cable		5/10/2011	5/10/2013
T4	AN00374	50uH LISN-White Lead Amplitude (dB)	8028-TS-50-BNC	5/16/2011	5/16/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N

ChronoTrack Time Keeping Device*	ChronoTrack	Revolution	10259
Switching Adapter (power supply)	CUI Inc.	DSA-60W-20 1 24060	None

Support Devices:

Function	Manufacturer	Model #	S/N
Display Tablet	Xplore Technologies	iX104	914G001068G7350138EM000
AC/DC Adapter	Delta Electronics, Inc.	SADP-65KB D	92W0009590257

Test Conditions / Notes:

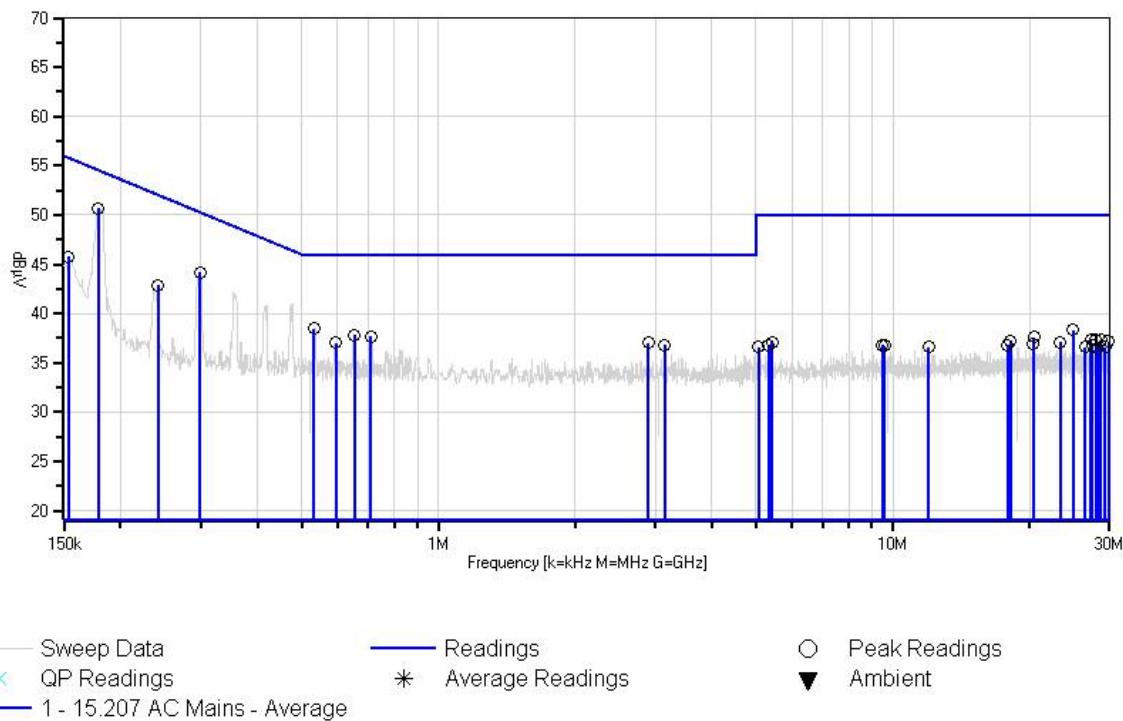
15.207 AC Mains - Average
EUT is setup as tabletop equipment with the antenna and EUT on the 80cm high wooden table atop the 40" diameter flush mounted turntable. The power adapter is also atop the wooden table.
Unit is transmitting and receiving via the Impinj transceiver within the EUT.
RBW = 9 kHz, VBW= 30 kHz
Frequencies of Interest: 150 kHz to 30 MHz
Temp = 80°F
Relative Humidity = 35%
Press = 988 mbars

Ext Attn: 0 dB

#	Freq MHz	Reading listed by margin.						Test Lead: White			
		Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	178.361k	38.9	+9.9	+0.3	+0.1	+1.5	+0.0	50.7	54.6	-3.9	White
2	299.076k	32.8	+9.9	+0.1	+0.2	+1.2	+0.0	44.2	50.3	-6.1	White
3	532.507k	27.5	+9.9	+0.1	+0.2	+0.8	+0.0	38.5	46.0	-7.5	White
4	654.677k	26.9	+9.9	+0.1	+0.2	+0.7	+0.0	37.8	46.0	-8.2	White
5	710.671k	26.7	+9.9	+0.1	+0.3	+0.7	+0.0	37.7	46.0	-8.3	White
6	2.897M	26.1	+9.9	+0.1	+0.5	+0.4	+0.0	37.0	46.0	-9.0	White
7	595.774k	25.9	+9.9	+0.2	+0.2	+0.8	+0.0	37.0	46.0	-9.0	White
8	241.627k	31.3	+9.9	+0.2	+0.2	+1.3	+0.0	42.9	52.0	-9.1	White
9	3.144M	25.9	+9.9	+0.1	+0.5	+0.4	+0.0	36.8	46.0	-9.2	White
10	153.636k	32.4	+9.9	+1.8	+0.1	+1.6	+0.0	45.8	55.8	-10.0	White
11	24.943M	26.5	+9.9	+0.1	+1.3	+0.5	+0.0	38.3	50.0	-11.7	White
12	20.418M	25.7	+9.9	+0.2	+1.2	+0.6	+0.0	37.6	50.0	-12.4	White
13	27.951M	25.4	+9.9	+0.2	+1.4	+0.5	+0.0	37.4	50.0	-12.6	White
14	28.719M	25.3	+9.9	+0.2	+1.4	+0.5	+0.0	37.3	50.0	-12.7	White
15	27.225M	25.4	+9.9	+0.1	+1.4	+0.5	+0.0	37.3	50.0	-12.7	White

16	18.166M	25.4	+9.9	+0.1	+1.2	+0.6	+0.0	37.2	50.0	-12.8	White
17	29.890M	25.2	+9.9	+0.2	+1.4	+0.5	+0.0	37.2	50.0	-12.8	White
18	5.418M	26.2	+9.9	+0.0	+0.6	+0.4	+0.0	37.1	50.0	-12.9	White
19	23.388M	25.2	+9.9	+0.2	+1.3	+0.5	+0.0	37.1	50.0	-12.9	White
20	20.328M	25.0	+9.9	+0.2	+1.2	+0.6	+0.0	36.9	50.0	-13.1	White
21	9.499M	25.5	+9.9	+0.1	+0.9	+0.4	+0.0	36.8	50.0	-13.2	White
22	5.337M	25.9	+9.9	+0.0	+0.6	+0.4	+0.0	36.8	50.0	-13.2	White
23	27.451M	24.9	+9.9	+0.1	+1.4	+0.5	+0.0	36.8	50.0	-13.2	White
24	17.896M	25.0	+9.9	+0.1	+1.2	+0.6	+0.0	36.8	50.0	-13.2	White
25	9.571M	25.4	+9.9	+0.1	+0.9	+0.4	+0.0	36.7	50.0	-13.3	White
26	11.986M	25.1	+9.9	+0.1	+1.0	+0.5	+0.0	36.6	50.0	-13.4	White
27	5.062M	25.7	+9.9	+0.0	+0.6	+0.4	+0.0	36.6	50.0	-13.4	White
28	29.342M	24.6	+9.9	+0.2	+1.4	+0.5	+0.0	36.6	50.0	-13.4	White
29	26.492M	24.8	+9.9	+0.1	+1.3	+0.5	+0.0	36.6	50.0	-13.4	White
30	28.171M	24.5	+9.9	+0.2	+1.4	+0.5	+0.0	36.5	50.0	-13.5	White

Date: 6/21/2011 Time: 2:24:06 PM ChronoTrack Systems WO#: 91963
 15.207 AC Mains - Average Test Lead: White 120V 60Hz Sequence#: 5 Ext ATTN: 0 dB



Test Setup Photos



15.247(d) Radiated Spurious Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Drive • 209-966-5240

Customer: **ChronoTrack Systems**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **91963** Date: **6/21/2011**
 Test Type: **Maximized Emissions** Time: **11:37:35**
 Equipment: **ChronoTrack Time Keeping Device** Sequence#: **1**
 Manufacturer: **ChronoTrack** Tested By: **Chuck Kendall**
 Model: **Revolution**
 S/N: **10259**

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
T1	ANMA10M	Cable		5/10/2011	5/10/2013
T2	AN00062	Preamp	8447D	6/23/2010	6/23/2012
T3	AN01991	Biconilog Antenna	CBL6111C	11/16/2010	11/16/2012

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
ChronoTrack Time Keeping Device*	ChronoTrack	Revolution	10259
Switching Adapter (power supply)	CUI Inc.	DSA-60W-20 1 24060	None

Support Devices:

Function	Manufacturer	Model #	S/N
Display Tablet	Xplore Technologies	iX104	914G001068G7350138EM000
AC/DC Adapter	Delta Electronics, Inc.	SADP-65KB D	92W0009590257

Test Conditions / Notes:

15.247(d) / 15.209 Radiated Spurious Emissions

EUT is setup as tabletop equipment with the antenna and EUT on the 80cm high wooden table atop the 40' diameter flush mounted turntable. The power adapter is also atop the wooden table.

Unit is transmitting and receiving via long rectangular antenna. EUT is communicating with the Xplore tablet computer in the test control building via an Ethernet line.

RBW = 120 kHz; VBW = 300 kHz

Frequencies of interest: 30 MHz to 1000 MHz

Temp 85°F

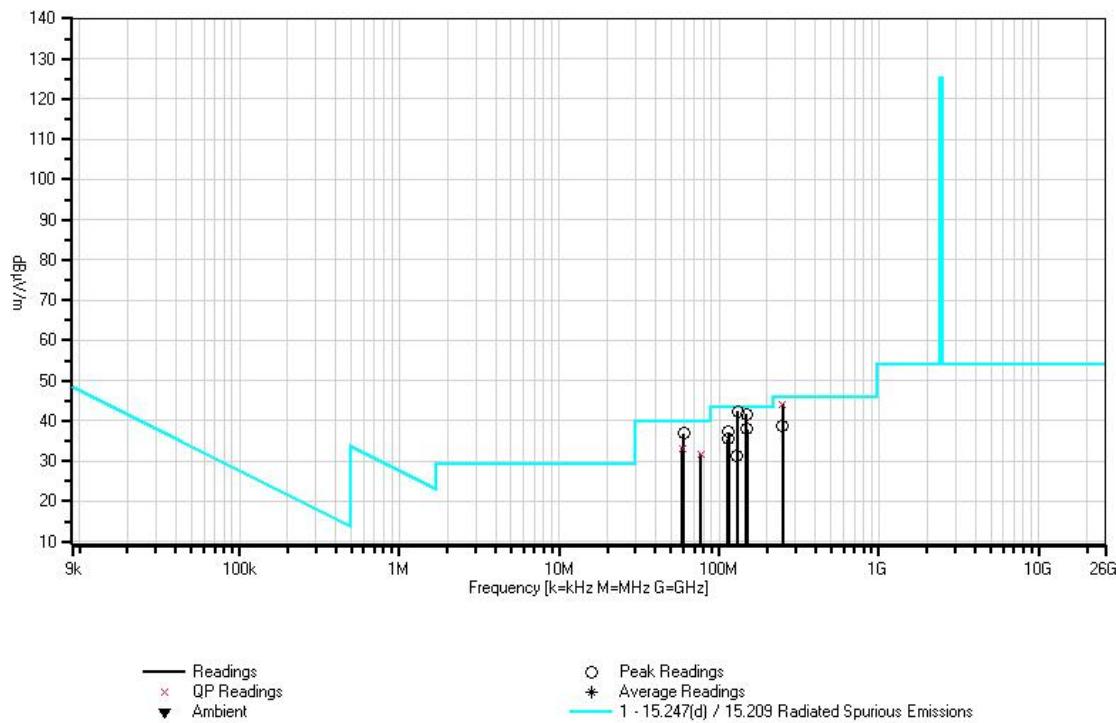
Relative Humidity = 35%

Press = 977 mBars

Ext Attn: 0 dB

Measurement Data: Reading listed by margin.				Test Distance: 10 Meters						
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	131.112M	48.4	+2.5	-30.6	+11.6	+10.5	42.4	43.5	-1.1	Horiz
2	147.531M	48.0	+2.7	-30.6	+11.1	+10.5	41.7	43.5	-1.8	Horiz
3	250.004M QP	47.5	+3.6	-30.0	+12.5	+10.5	44.1	46.0	-1.9	Horiz
^	250.007M	49.3	+3.6	-30.0	+12.5	+10.5	45.9	46.0	-0.1	Horiz
5	60.139M	48.8	+1.7	-30.9	+6.7	+10.5	36.8	40.0	-3.2	Vert
6	149.987M	44.3	+2.7	-30.6	+11.0	+10.5	37.9	43.5	-5.6	Vert
7	114.355M	43.9	+2.4	-30.6	+11.0	+10.5	37.2	43.5	-6.3	Horiz
8	58.708M QP	44.9	+1.7	-30.9	+7.0	+10.5	33.2	40.0	-6.8	Vert
9	250.030M	42.0	+3.6	-30.0	+12.5	+10.5	38.6	46.0	-7.4	Vert
10	113.120M	42.3	+2.4	-30.6	+10.9	+10.5	35.5	43.5	-8.0	Vert
11	76.573M QP	42.3	+2.0	-30.8	+7.7	+10.5	31.7	40.0	-8.3	Vert
^	76.583M	44.7	+2.0	-30.8	+7.7	+10.5	34.1	40.0	-5.9	Vert
13	128.950M	37.4	+2.5	-30.6	+11.6	+10.5	31.4	43.5	-12.1	Vert

CKC Laboratories, Inc. Date: 6/21/2011 Time: 11:37:35 ChronoTrack Systems WO#: 91963
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 10 Meters Sequence#: 1 Ext ATTN: 0 dB



Test Location: CKC Laboratories • 5046 Sierra Pines Dr • Mariposa, CA 95338 • (209) 966-5240

Customer: **ChronoTrack Systems**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **91963** Date: **6/22/2011**
 Test Type: **Maximized Emissions** Time: **13:03:34**
 Equipment: **ChronoTrack Time Keeping Device** Sequence#: **1**
 Manufacturer: ChronoTrack Tested By: Chuck Kendall
 Model: Revolution
 S/N: 10259

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02660	Spectrum Analyzer	E4446A	6/30/2010	6/30/2012
T1	AN03155	Preamp	83017A	7/17/2009	7/17/2011
T2	AN00327	Horn Antenna	3115	4/23/2010	4/23/2012
T3	ANP01403	Cable	58758-23	6/22/2011	6/22/2013
T4	ANP05904	Cable	32022-2-29094K-144TC	6/22/2011	6/22/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
ChronoTrack Time Keeping Device*	ChronoTrack	Revolution	10259
Switching Adapter (power supply)	CUI Inc.	DSA-60W-20 1 24060	None

Support Devices:

Function	Manufacturer	Model #	S/N
Display Tablet	Xplore Technologies	iX104	914G001068G7350138EM000
Switching Adapter (power supply)	CUI Inc.	DSA-60W-20 1 24060	None

Test Conditions / Notes:

15.247(d) / 15.209 Radiated Spurious Emissions

EUT is setup as tabletop equipment with the antenna and EUT on the 80cm high wooden table atop the 40" diameter flush mounted turntable. The power adapter is also atop the wooden table.

Unit is transmitting and receiving via long rectangular antenna. EUT is communicating with the Xplore tablet computer in the test control building via an Ethernet line.

RBW = 1MHz; VBW = 3 MHz

Frequencies of interest: 1GHz to 10 GHz

Temp 85°F

Relative Humidity = 35%

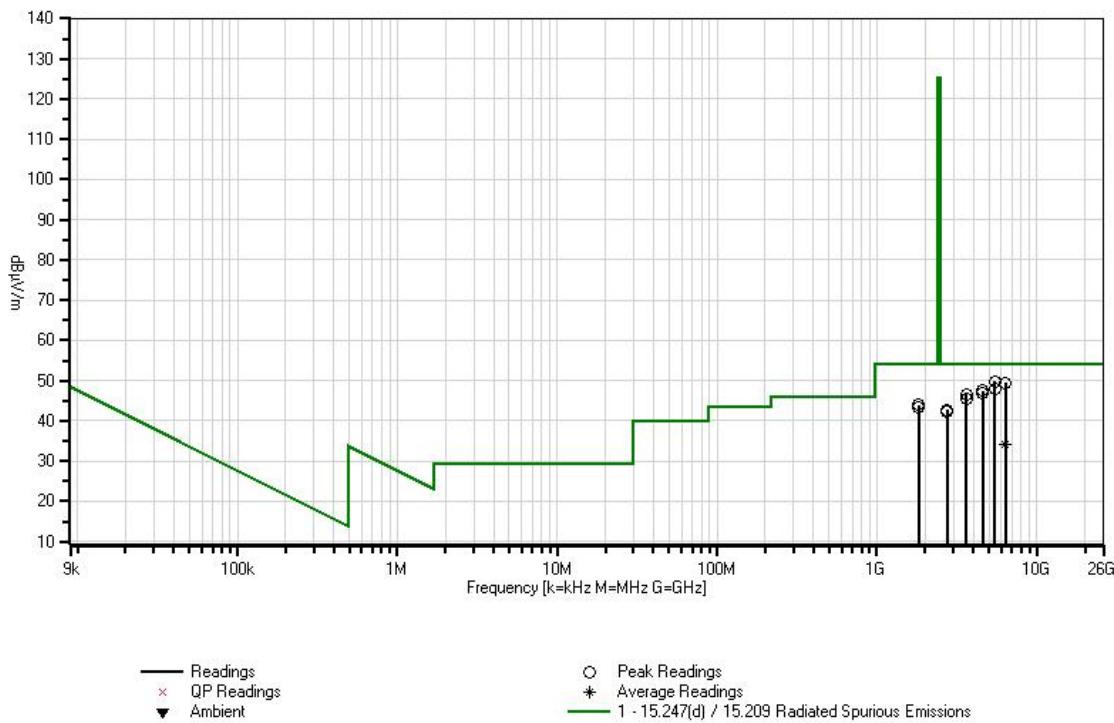
Press = 977 mBars

Ext Attn: 0 dB

#	Freq MHz	Reading listed by margin.				Test Distance: 3 Meters					
		Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	5476.247M	41.3	-33.3	+34.0	+4.4	+3.4	+0.0	49.8	54.0	-4.2	Horiz
2	6378.195M	40.7	-33.2	+34.7	+4.1	+3.2	+0.0	49.5	54.0	-4.5	Horiz
3	5476.040M	39.5	-33.3	+34.0	+4.4	+3.4	+0.0	48.0	54.0	-6.0	Vert

4	4559.460M	40.7	-33.1	+32.7	+3.9	+3.2	+0.0	47.4	54.0	-6.6	Vert
5	4559.760M	40.1	-33.1	+32.7	+3.9	+3.2	+0.0	46.8	54.0	-7.2	Horiz
6	3633.207M	42.3	-33.4	+31.9	+3.4	+2.4	+0.0	46.6	54.0	-7.4	Horiz
7	3632.990M	41.2	-33.4	+31.9	+3.4	+2.4	+0.0	45.5	54.0	-8.5	Vert
8	1823.830M	44.9	-34.3	+28.4	+2.3	+2.6	+0.0	43.9	54.0	-10.1	Vert
9	1823.432M	44.3	-34.3	+28.4	+2.3	+2.6	+0.0	43.3	54.0	-10.7	Horiz
10	2742.740M	41.1	-33.7	+30.4	+2.8	+2.2	+0.0	42.8	54.0	-11.2	Vert
11	2744.346M	40.6	-33.7	+30.4	+2.8	+2.2	+0.0	42.3	54.0	-11.7	Horiz
12	6378.664M Ave	25.3	-33.2	+34.7	+4.1	+3.2	+0.0	34.1	54.0	-19.9	Horiz
13	6378.394M Ave	25.3	-33.2	+34.7	+4.1	+3.2	+0.0	34.1	54.0	-19.9	Horiz
14	6378.649M Ave	25.2	-33.2	+34.7	+4.1	+3.2	+0.0	34.0	54.0	-20.0	Vert
^	6378.560M	39.6	-33.2	+34.7	+4.1	+3.2	+0.0	48.4	54.0	-5.6	Vert

CKC Laboratories Date: 6/22/2011 Time: 13:03:34 ChronoTrack Systems WO#: 91963
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



Test Setup Photos



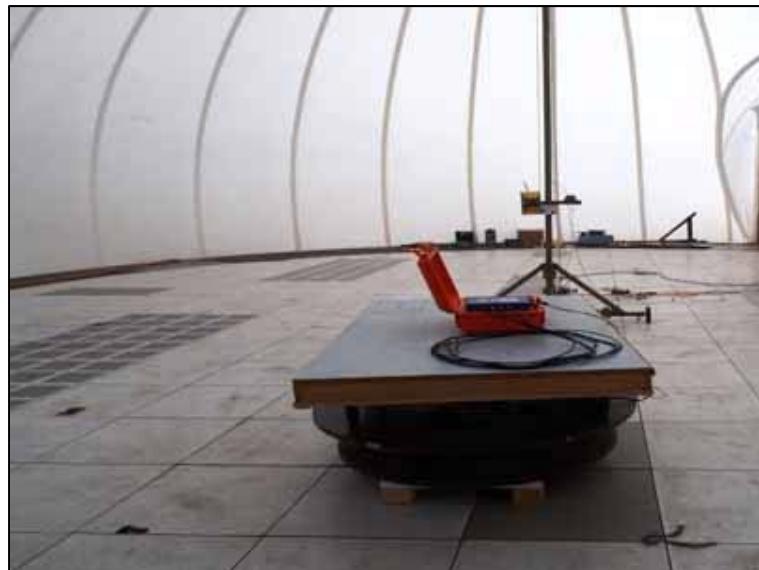
LOW FREQUENCY



LOW FREQUENCY



HIGH FREQUENCY



HIGH FREQUENCY

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS	
Meter reading	(dB μ V)
+ Antenna Factor	(dB)
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.