



TESTING

CERT #803.01, 803.02, 803.05, 803.06

CHRONOTRACK SYSTEMS TEST REPORT

FOR THE

TIMEKEEPING SYSTEM, CHRONOTRACK MC627

FCC PART 15 SUBPART B SECTIONS 15.107 AND 15.109 CLASS A

TESTING

DATE OF ISSUE: OCTOBER 26, 2009

PREPARED FOR:

ChronoTrack Systems
111 East Diamond Ave.
Evansville, IN 47711

W.O. No.: 89917

PREPARED BY:

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

Date of test: October 12 - 14, 2009

Report No.: FC09-177

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ADMINISTRATIVE INFORMATION

DATE OF TEST:

October 12 - 14, 2009

DATE OF RECEIPT:

October 12, 2009

REPRESENTATIVE:

Daniel Howell

MANUFACTURER:

ChronoTrack Systems
111 East Diamond Ave.
Evansville, IN 47711

TEST LOCATION:


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

TEST METHOD: ANSI C63.4 (2003)

PURPOSE OF TEST: To perform testing of the Timekeeping System, ChronoTrack MC627 with the requirements for FCC Part 15 Subpart B Sections 15.107 and 15.109 Class A devices.

APPROVALS

QUALITY ASSURANCE:



Steve Behm, Director of Engineering Services



Mike Wilkinson, Senior EMC Engineer/Lab Manager

TEST PERSONNEL:



Chuck Kendall, Senior EMC Engineer /
Senior EMC Consultant



Greg Johnson, EMC Engineer

SITE FILE REGISTRATION NUMBERS

Location	Japan	Canada	FCC
Mariposa A	R-563, C-578 & T-1492	3082A-2	90477

SUMMARY OF RESULTS

Test	Specification	Results
Conducted Emissions	FCC Part 15 Subpart B Section 15.107 Class A	Pass
Radiated Emissions	FCC Part 15 Subpart B Section 15.109 Class A	Pass

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested is a ChronoTrack Timekeeping System.

EQUIPMENT UNDER TEST

Timekeeping System

Manuf: ChronoTrack Systems

Model: ChronoTrack MC627

Serial: 2017-115

PERIPHERAL DEVICES

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

Tablet PC

Manuf: XPlor Technologies

Model: iX104

Serial: 914G001018G7350138EM00

AC/DC power supply

Manuf: Delta Electronics, Inc.

Model: SADP-65KB D

Serial: 92W0725009590

Threshold Antenna

Manuf: Impinj

Model: IPJ-A0310-EU1

Serial: 005107

Threshold Antenna

Manuf: Impinj

Model: IPJ-A0310-EU1

Serial: 005109

GPRS Stub Antenna

Manuf: Wilson

Model: Unknown qtr wave antenna

Serial: NA

MEASUREMENT UNCERTAINTIES

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.

REPORT OF EMISSIONS MEASUREMENTS

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 $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ 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. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

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.

CONDUCTED EMISSIONS

Test Setup Photos



Test Data Sheets

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

Customer: **ChronoTrack Systems**
 Specification: **FCC 15.107(b) Class A - AVE**
 Work Order #: **89917**
 Test Type: **Conducted Emissions**
 Equipment: **Timekeeping System**
 Manufacturer: ChronoTrack Systems
 Model: ChronoTrack MC627
 S/N: 2017-115

Date: 10/13/2009
 Time: 3:55:04 PM
 Sequence#: 2
 Tested By: Greg Johnson
 120V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN Model 8028-50- TS-24-BNC	901235 & 903750	04/22/2009	04/22/2011	AN00374
10dB Attenuator	none	05/20/2009	05/20/2011	ANP02229
Site A conducted cable set	na	05/10/2009	05/10/2011	MACOND
HP85650A QPA	2043A00104	03/10/2009	03/10/2011	AN00069
Spectrum Analyzer (RF Section)	2007A01066	03/10/2009	03/10/2011	AN01184
Spectrum Analyzer (Display)	2005A01550	03/10/2009	03/10/2011	AN01183
TTE High Pass Filter	G7753	01/22/2008	01/22/2010	AN02609

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Timekeeping System*	ChronoTrack Systems	ChronoTrack MC627	2017-115

Support Devices:

Function	Manufacturer	Model #	S/N
Tablet PC	XPlor Technologies	iX104	914G001018G7350138EM00
AC/DC power supply	Delta Electronics, Inc.	SADP-65KB D	92W0725009590
Threshold Antenna	Impinj	IPJ-A0310-EU1	005107
Threshold Antenna	Impinj	IPJ-A0310-EU1	005109
GPRS Stub Antenna	Wilson	Unknown qtr wave antenna	None

Test Conditions / Notes:

Standard: FCC Part 15.107(b) Class A Conducted Emissions
 Frequency Range Tested: .15-30MHz

EUT highest clock frequency is 315MHz must be tested to 1890MHz

The EUT has a GPRS antenna and two Threshold Antennas connected. A pair of battery cables is attached to the external 12V battery port. Ethernet port one is connected to an unterminated cable. Ethernet port 2 is connected to an Ethernet cable that goes down under the turn table to a remote location and is communicating with the Tablet PC.

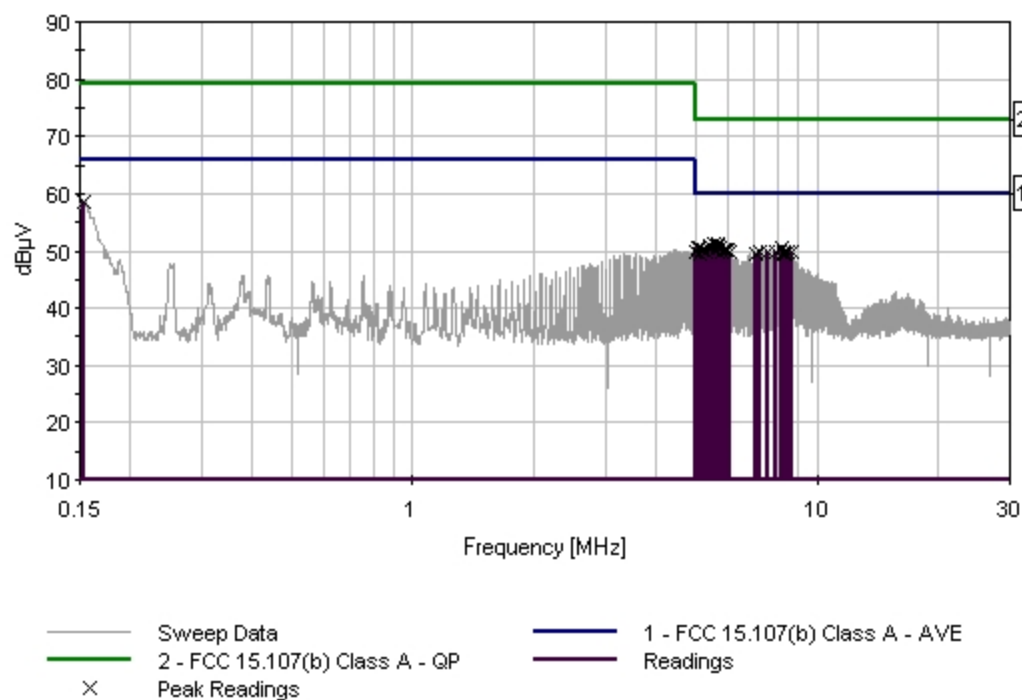
Transducer Legend:

T1=CDN-AN00374-042209-BK	T2=MACOND
T3=Filter 150kHz HP AN02609	T4=ATT-ANP02229-052009-10dB

Measurement Data:		Reading listed by margin.						Test Lead: Black			
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	152.909k	46.9	+0.1	+0.1	+1.8	+9.7	+0.0	58.6	66.0	-7.4	Black
2	5.526M	40.3	+0.1	+0.7	+0.1	+9.9	+0.0	51.1	60.0	-8.9	Black
3	5.716M	40.3	+0.1	+0.7	+0.1	+9.9	+0.0	51.1	60.0	-8.9	Black
4	5.653M	40.2	+0.1	+0.7	+0.1	+9.9	+0.0	51.0	60.0	-9.0	Black
5	5.400M	40.0	+0.1	+0.6	+0.1	+9.9	+0.0	50.7	60.0	-9.3	Black
6	5.770M	39.8	+0.1	+0.7	+0.1	+9.9	+0.0	50.6	60.0	-9.4	Black
7	8.202M	39.6	+0.2	+0.8	+0.1	+9.9	+0.0	50.6	60.0	-9.4	Black
8	5.066M	39.8	+0.1	+0.6	+0.1	+9.9	+0.0	50.5	60.0	-9.5	Black
9	5.463M	39.8	+0.1	+0.6	+0.1	+9.9	+0.0	50.5	60.0	-9.5	Black
10	5.126M	39.7	+0.1	+0.6	+0.1	+9.9	+0.0	50.4	60.0	-9.6	Black
11	5.211M	39.6	+0.1	+0.6	+0.1	+9.9	+0.0	50.3	60.0	-9.7	Black
12	6.022M	39.5	+0.1	+0.7	+0.1	+9.9	+0.0	50.3	60.0	-9.7	Black
13	5.274M	39.5	+0.1	+0.6	+0.1	+9.9	+0.0	50.2	60.0	-9.8	Black
14	5.896M	39.4	+0.1	+0.7	+0.1	+9.9	+0.0	50.2	60.0	-9.8	Black
15	5.589M	39.3	+0.1	+0.7	+0.1	+9.9	+0.0	50.1	60.0	-9.9	Black
16	5.959M	39.3	+0.1	+0.7	+0.1	+9.9	+0.0	50.1	60.0	-9.9	Black
17	5.002M	39.3	+0.1	+0.6	+0.1	+9.9	+0.0	50.0	60.0	-10.0	Black
18	5.328M	39.3	+0.1	+0.6	+0.1	+9.9	+0.0	50.0	60.0	-10.0	Black
19	5.833M	39.2	+0.1	+0.7	+0.1	+9.9	+0.0	50.0	60.0	-10.0	Black
20	6.085M	39.2	+0.1	+0.7	+0.1	+9.9	+0.0	50.0	60.0	-10.0	Black
21	7.517M	38.9	+0.2	+0.8	+0.1	+9.9	+0.0	49.9	60.0	-10.1	Black
22	7.950M	38.9	+0.2	+0.8	+0.1	+9.9	+0.0	49.9	60.0	-10.1	Black

23	8.265M	38.8	+0.2	+0.9	+0.1	+9.9	+0.0	49.9	60.0	-10.1	Black
24	7.202M	38.7	+0.3	+0.8	+0.1	+9.9	+0.0	49.8	60.0	-10.2	Black
25	8.445M	38.7	+0.2	+0.9	+0.1	+9.9	+0.0	49.8	60.0	-10.2	Black
26	8.689M	38.6	+0.3	+0.9	+0.1	+9.9	+0.0	49.8	60.0	-10.2	Black
27	5.148M	38.9	+0.1	+0.6	+0.1	+9.9	+0.0	49.6	60.0	-10.4	Black
28	7.076M	38.5	+0.3	+0.8	+0.1	+9.9	+0.0	49.6	60.0	-10.4	Black
29	8.319M	38.5	+0.2	+0.9	+0.1	+9.9	+0.0	49.6	60.0	-10.4	Black
30	8.382M	38.3	+0.2	+0.9	+0.1	+9.9	+0.0	49.4	60.0	-10.6	Black

CKC Laboratories Date: 10/13/2009 Time: 3:55:04 PM ChronoTrack Systems WO#: 89917
FCC 15.107(b) Class A - AVE Test Lead: Black 120V 60Hz Sequence#: 2 Ext ATTN: 0 dB



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

Customer: **ChronoTrack Systems**
 Specification: **FCC 15.107(b) Class A - AVE**
 Work Order #: **89917**
 Test Type: **Conducted Emissions**
 Equipment: **Timekeeping System**
 Manufacturer: ChronoTrack Systems
 Model: ChronoTrack MC627
 S/N: 2017-115

Date: 10/13/2009
 Time: 16:10:17
 Sequence#: 3
 Tested By: Greg Johnson
 120V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
LISN Model 8028-50- TS-24-BNC	901235 & 903750	04/22/2009	04/22/2011	AN00374
10dB Attenuator	none	05/20/2009	05/20/2011	ANP02229
Site A conducted cable set	na	05/10/2009	05/10/2011	MACOND
HP85650A QPA	2043A00104	03/10/2009	03/10/2011	AN00069
Spectrum Analyzer (RF Section)	2007A01066	03/10/2009	03/10/2011	AN01184
Spectrum Analyzer (Display)	2005A01550	03/10/2009	03/10/2011	AN01183
TTE High Pass Filter	G7753	01/22/2008	01/22/2010	AN02609

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Timekeeping System*	ChronoTrack Systems	ChronoTrack MC627	2017-115

Support Devices:

Function	Manufacturer	Model #	S/N
Tablet PC	XPlor Technologies	iX104	914G001018G7350138EM00
AC/DC power supply	Delta Electronics, Inc.	SADP-65KB D	92W0725009590
Threshold Antenna	Impinj	IPJ-A0310-EU1	005107
Threshold Antenna	Impinj	IPJ-A0310-EU1	005109
GPRS Stub Antenna	Wilson	Unknown qtr wave antenna	None

Test Conditions / Notes:

Standard: FCC Part 15.107(b) Class A Conducted Emissions
 Frequency Range Tested: .15-30MHz

EUT highest clock frequency is 315MHz must be tested to 1890MHz

The EUT has a GPRS antenna and two Threshold Antennas connected. A pair of battery cables is attached to the external 12V battery port. Ethernet port one is connected to an unterminated cable. Ethernet port 2 is connected to an Ethernet cable that goes down under the turn table to a remote location and is communicating with the Tablet PC.

Transducer Legend:

T1=CDN-AN00374-042209-WT	T2=MACOND
T3=Filter 150kHz HP AN02609	T4=ATT-ANP02229-052009-10dB

Measurement Data:

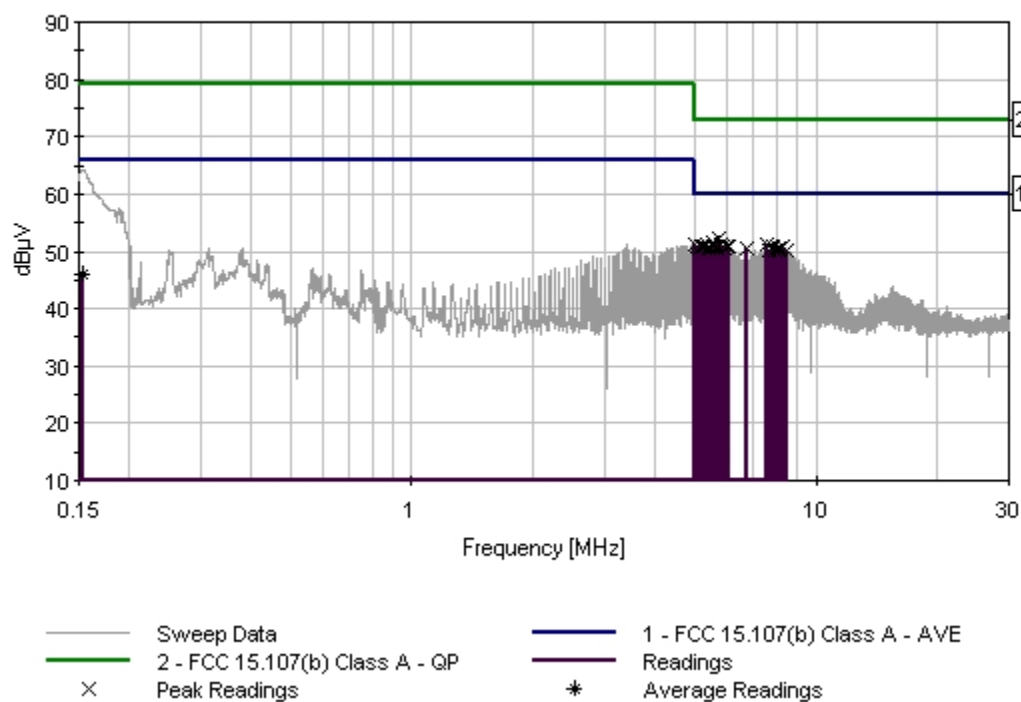
Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	5.770M	40.8	+0.6	+0.7	+0.1	+9.9	+0.0	52.1	60.0	-7.9	White
2	5.526M	40.3	+0.6	+0.7	+0.1	+9.9	+0.0	51.6	60.0	-8.4	White
3	5.833M	39.9	+0.6	+0.7	+0.1	+9.9	+0.0	51.2	60.0	-8.8	White
4	5.002M	39.8	+0.7	+0.6	+0.1	+9.9	+0.0	51.1	60.0	-8.9	White
5	7.580M	39.6	+0.7	+0.8	+0.1	+9.9	+0.0	51.1	60.0	-8.9	White
6	5.454M	39.7	+0.7	+0.6	+0.1	+9.9	+0.0	51.0	60.0	-9.0	White
7	6.022M	39.7	+0.6	+0.7	+0.1	+9.9	+0.0	51.0	60.0	-9.0	White
8	5.580M	39.6	+0.6	+0.7	+0.1	+9.9	+0.0	50.9	60.0	-9.1	White
9	5.896M	39.6	+0.6	+0.7	+0.1	+9.9	+0.0	50.9	60.0	-9.1	White
10	7.824M	39.4	+0.7	+0.8	+0.1	+9.9	+0.0	50.9	60.0	-9.1	White
11	5.211M	39.5	+0.7	+0.6	+0.1	+9.9	+0.0	50.8	60.0	-9.2	White
12	5.337M	39.5	+0.7	+0.6	+0.1	+9.9	+0.0	50.8	60.0	-9.2	White
13	8.319M	39.2	+0.7	+0.9	+0.1	+9.9	+0.0	50.8	60.0	-9.2	White
14	5.062M	39.4	+0.7	+0.6	+0.1	+9.9	+0.0	50.7	60.0	-9.3	White
15	5.274M	39.4	+0.7	+0.6	+0.1	+9.9	+0.0	50.7	60.0	-9.3	White
16	5.707M	39.4	+0.6	+0.7	+0.1	+9.9	+0.0	50.7	60.0	-9.3	White
17	6.085M	39.4	+0.6	+0.7	+0.1	+9.9	+0.0	50.7	60.0	-9.3	White
18	5.400M	39.3	+0.7	+0.6	+0.1	+9.9	+0.0	50.6	60.0	-9.4	White
19	6.716M	39.2	+0.6	+0.7	+0.1	+9.9	+0.0	50.5	60.0	-9.5	White
20	8.130M	39.0	+0.7	+0.8	+0.1	+9.9	+0.0	50.5	60.0	-9.5	White
21	5.148M	39.1	+0.7	+0.6	+0.1	+9.9	+0.0	50.4	60.0	-9.6	White
22	5.653M	39.1	+0.6	+0.7	+0.1	+9.9	+0.0	50.4	60.0	-9.6	White

23	5.959M	39.1	+0.6	+0.7	+0.1	+9.9	+0.0	50.4	60.0	-9.6	White
24	8.202M	38.9	+0.7	+0.8	+0.1	+9.9	+0.0	50.4	60.0	-9.6	White
25	7.635M	38.8	+0.7	+0.8	+0.1	+9.9	+0.0	50.3	60.0	-9.7	White
26	7.950M	38.8	+0.7	+0.8	+0.1	+9.9	+0.0	50.3	60.0	-9.7	White
27	8.067M	38.8	+0.7	+0.8	+0.1	+9.9	+0.0	50.3	60.0	-9.7	White
28	8.445M	38.7	+0.7	+0.9	+0.1	+9.9	+0.0	50.3	60.0	-9.7	White
29	8.508M	38.7	+0.7	+0.9	+0.1	+9.9	+0.0	50.3	60.0	-9.7	White
30	153.630k	33.9	+0.4	+0.1	+1.8	+9.7	+0.0	45.9	66.0	-20.1	White
Ave											
^	153.636k	52.3	+0.4	+0.1	+1.8	+9.7	+0.0	64.3	66.0	-1.7	White

CKC Laboratories Date: 10/13/2009 Time: 16:10:17 ChronoTrack Systems WO#: 89917
FCC 15.107(b) Class A - AVE Test Lead: White 120V 60Hz Sequence#: 3 Ext ATTN: 0 dB



RADIATED EMISSIONS

Test Setup Photos





1.2 GHz



1.2 GHz

Test Data Sheets

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

Customer: **ChronoTrack Systems**
 Specification: **15.109(b) CLASS A**
 Work Order #: **89917**
 Test Type: **Maximized Emissions**
 Equipment: **Timekeeping System**
 Manufacturer: ChronoTrack Systems
 Model: ChronoTrack MC627
 S/N: 2017-115

Date: 10/13/2009
 Time: 14:26:29
 Sequence#: 1
 Tested By: Greg Johnson

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Antenna, Bilog	2455	12/22/2008	12/22/2010	AN01992
Site A 10 meter cable set		05/10/2009	05/10/2011	MA10M
HP85650A QPA	2043A00104	03/10/2009	03/10/2011	AN00069
Spectrum Analyzer (RF Section)	2007A01066	03/10/2009	03/10/2011	AN01184
Spectrum Analyzer (Display)	2005A01550	03/10/2009	03/10/2011	AN01183
HP-8447D Preamp	2727A05444	06/20/2008	06/20/2010	AN00062

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Timekeeping System*	ChronoTrack Systems	ChronoTrack MC627	2017-115

Support Devices:

Function	Manufacturer	Model #	S/N
Tablet PC	XPlor Technologies	iX104	914G001018G7350138EM00
AC/DC power supply	Delta Electronics, Inc.	SADP-65KB D	92W0725009590
Threshold Antenna	Impinj	IPJ-A0310-EU1	005107
Threshold Antenna	Impinj	IPJ-A0310-EU1	005109
GPRS Stub Antenna	Wilson	Unknown qtr wave antenna	None

Test Conditions / Notes:

Standard: FCC Part 15.109(b) Class A Radiated Emissions
 Frequency Range Tested: 30-1000MHz

EUT highest clock frequency is 315MHz must be tested to 1890MHz

The EUT has a GPRS antenna and two Threshold Antennas connected. A pair of battery cables is attached to the external battery port. Ethernet port one is connected to an unterminated cable. Ethernet port 2 is connected to an Ethernet cable that goes down under the turn table to a remote location and is communicating with the Tablet PC.

Transducer Legend:

T1=ANT-AN01992-100909 25-1000MHz	T2=AMP-AN00062-062008
T3=MA10M	

Measurement Data:		Reading listed by margin.				Test Distance: 10 Meters					
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB		Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	65.108M	60.7	+6.8	-30.8	+1.9		+0.0	38.6	39.1	-0.5	Vert
	QP										
^	65.010M	61.4	+6.8	-30.8	+1.9		+0.0	39.3	39.1	+0.2	Vert
3	78.856M	59.1	+7.7	-30.7	+2.1		+0.0	38.2	39.1	-0.9	Vert
	QP										
^	78.890M	62.1	+7.6	-30.7	+2.1		+0.0	41.1	39.1	+2.0	Vert
5	80.344M	58.1	+7.8	-30.7	+2.1		+0.0	37.3	39.1	-1.8	Vert
	QP										
^	80.320M	61.4	+7.8	-30.7	+2.1		+0.0	40.6	39.1	+1.5	Vert
7	55.893M	58.2	+7.9	-30.7	+1.8		+0.0	37.2	39.1	-1.9	Vert
	QP										
^	55.960M	59.1	+7.9	-30.7	+1.8		+0.0	38.1	39.1	-1.0	Vert
9	72.727M	58.7	+6.9	-30.8	+2.0		+0.0	36.8	39.1	-2.3	Vert
	QP										
^	72.760M	59.8	+6.8	-30.8	+2.0		+0.0	37.8	39.1	-1.3	Vert
11	46.460M	51.9	+11.3	-30.7	+1.6		+0.0	34.1	39.1	-5.0	Horiz
12	45.676M	51.1	+11.8	-30.7	+1.6		+0.0	33.8	39.1	-5.3	Vert
	QP										
^	45.680M	52.3	+11.8	-30.7	+1.6		+0.0	35.0	39.1	-4.1	Vert
14	46.844M	49.6	+11.0	-30.7	+1.6		+0.0	31.5	39.1	-7.6	Horiz
	QP										
15	141.350M	50.7	+12.0	-30.4	+2.8		+0.0	35.1	43.5	-8.4	Vert
16	142.850M	50.7	+11.9	-30.4	+2.8		+0.0	35.0	43.5	-8.5	Vert
17	40.678M	44.3	+15.2	-30.8	+1.5		+0.0	30.2	39.1	-8.9	Horiz
18	83.800M	50.3	+8.2	-30.7	+2.1		+0.0	29.9	39.1	-9.2	Horiz
19	145.452M	49.9	+11.9	-30.4	+2.9		+0.0	34.3	43.5	-9.2	Vert
	QP										
^	145.380M	51.4	+11.9	-30.4	+2.9		+0.0	35.8	43.5	-7.7	Vert
21	129.955M	49.8	+11.6	-30.5	+2.7		+0.0	33.5	43.5	-10.0	Vert
	QP										
^	129.925M	52.2	+11.6	-30.5	+2.7		+0.0	36.0	43.5	-7.5	Vert

23	110.825M	49.0	+10.6	-30.6	+2.5	+0.0	31.5	43.5	-12.0	Vert
24	133.965M	47.3	+11.8	-30.5	+2.7	+0.0	31.3	43.5	-12.2	Horiz
25	117.085M	45.2	+11.1	-30.6	+2.5	+0.0	28.2	43.5	-15.3	Horiz
26	143.925M	43.7	+11.9	-30.4	+2.8	+0.0	28.0	43.5	-15.5	Horiz
27	383.955M	37.1	+16.1	-30.1	+4.9	+0.0	28.0	46.4	-18.4	Vert
28	112.420M	40.6	+10.7	-30.6	+2.5	+0.0	23.2	43.5	-20.3	Horiz

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

Customer: **ChronoTrack Systems**
 Specification: **15.109(b) CLASS A**
 Work Order #: **89917**
 Test Type: **Maximized Emissions**
 Equipment: **Timekeeping System**
 Manufacturer: ChronoTrack Systems
 Model: ChronoTrack MC627
 S/N: 2017-115

Date: 10/14/2009
 Time: 14:34:26
 Sequence#: 9
 Tested By: Greg Johnson

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
EMCO 3115 Horn Antenna	9006-3413	06/06/2008	06/06/2010	AN00327
Andrew-25'	N/A	05/19/2009	05/19/2011	AN01012
Preamp HP83017A	00931	07/17/2009	07/17/2011	AN03155
Cable, Andrews Hardline HF-005-20	NA	01/15/2008	01/15/2010	ANP03013
E4446A	US44300407	07/08/2008	07/08/2010	AN02660

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Timekeeping System*	ChronoTrack Systems	ChronoTrack MC627	2017-115

Support Devices:

Function	Manufacturer	Model #	S/N
Tablet PC	XPlor Technologies	iX104	914G001018G7350138EM00
AC/DC power supply	Delta Electronics, Inc.	SADP-65KB D	92W0725009590
Threshold Antenna	Impinj	IPJ-A0310-EU1	005107
Threshold Antenna	Impinj	IPJ-A0310-EU1	005109
GPRS Stub Antenna	Wilson	Unknown qtr wave antenna	None

Test Conditions / Notes:

Standard: FCC Part 15.109(b) Class A Radiated Emissions
 Frequency Range Tested: 1000-1890MHz

EUT highest clock frequency is 315MHz must be tested to 1890MHz

The EUT has a GPRS antenna and two Threshold Antennas connected. A pair of battery cables is attached to the external 12V battery port. Ethernet port one is connected to an unterminated cable. Ethernet port 2 is connected to an Ethernet cable that goes down under the turn table to a remote location and is communicating with the Tablet PC.

Transducer Legend:

T1=ANT AN00327 1GHz-18GHz	T2=CAB-ANP01012-051909
T3=Amp AN03155 to 26.5GHz	T4=CAB-AN03013-40GHZ-3FT

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	1029.548M	63.7	+23.9	+1.6	-36.4	+0.4	-10.0	43.2	49.5	-6.3	Vert
2	1836.881M	56.2	+26.7	+2.0	-34.2	+0.5	-10.0	41.2	49.5	-8.3	Vert
3	1835.797M	52.9	+26.7	+2.0	-34.2	+0.5	-10.0	37.9	49.5	-11.6	Vert
4	1090.299M	57.5	+24.0	+1.6	-36.0	+0.4	-10.0	37.5	49.5	-12.0	Vert
5	1030.494M	56.8	+23.9	+1.6	-36.4	+0.4	-10.0	36.3	49.5	-13.2	Vert
6	1117.247M	55.9	+24.1	+1.6	-35.8	+0.4	-10.0	36.2	49.5	-13.3	Vert
7	1095.500M	55.9	+24.0	+1.6	-35.9	+0.4	-10.0	36.0	49.5	-13.5	Vert
8	1029.075M	56.3	+23.9	+1.6	-36.4	+0.4	-10.0	35.8	49.5	-13.7	Vert
9	1027.657M	53.4	+23.9	+1.6	-36.4	+0.4	-10.0	32.9	49.5	-16.6	Vert
10	1846.638M	47.8	+26.8	+2.0	-34.2	+0.5	-10.0	32.9	49.5	-16.6	Vert
11	1122.448M	51.8	+24.1	+1.6	-35.8	+0.4	-10.0	32.1	49.5	-17.4	Vert
12	1121.029M	51.4	+24.1	+1.6	-35.8	+0.4	-10.0	31.7	49.5	-17.8	Vert
13	1086.281M	51.6	+24.0	+1.6	-36.0	+0.4	-10.0	31.6	49.5	-17.9	Vert
14	1852.420M	46.2	+26.8	+2.0	-34.2	+0.5	-10.0	31.3	49.5	-18.2	Vert
15	1028.603M	50.9	+23.9	+1.6	-36.4	+0.4	-10.0	30.4	49.5	-19.1	Vert
16	1806.167M	45.1	+26.6	+2.0	-34.3	+0.5	-10.0	29.9	49.5	-19.6	Vert
17	1127.412M	48.5	+24.1	+1.6	-35.8	+0.4	-10.0	28.8	49.5	-20.7	Vert
18	1850.251M	43.4	+26.8	+2.0	-34.2	+0.5	-10.0	28.5	49.5	-21.0	Vert
19	1084.862M	48.4	+24.0	+1.6	-36.0	+0.4	-10.0	28.4	49.5	-21.1	Vert
20	1872.294M	43.1	+26.9	+2.0	-34.2	+0.5	-10.0	28.3	49.5	-21.2	Vert
21	1884.580M	42.8	+27.0	+2.0	-34.1	+0.5	-10.0	28.2	49.5	-21.3	Vert
22	1755.578M	43.6	+26.3	+2.0	-34.3	+0.5	-10.0	28.1	49.5	-21.4	Vert

23	1811.948M	43.2	+26.6	+2.0	-34.3	+0.5	-10.0	28.0	49.5	-21.5	Vert
24	1825.318M	43.0	+26.7	+2.0	-34.2	+0.5	-10.0	28.0	49.5	-21.5	Vert
25	1091.481M	47.9	+24.0	+1.6	-36.0	+0.4	-10.0	27.9	49.5	-21.6	Vert
26	1818.814M	43.0	+26.6	+2.0	-34.3	+0.5	-10.0	27.8	49.5	-21.7	Vert
27	1070.443M	47.7	+24.0	+1.6	-36.1	+0.4	-10.0	27.6	49.5	-21.9	Vert
28	1836.381M	40.4	+26.7	+2.0	-34.2	+0.5	-10.0	25.4	49.5	-24.1	Horiz
29	1029.048M	43.4	+23.9	+1.6	-36.4	+0.4	-10.0	22.9	49.5	-26.6	Horiz
30	1089.799M	42.4	+24.0	+1.6	-36.0	+0.4	-10.0	22.4	49.5	-27.1	Horiz
31	1090.981M	42.3	+24.0	+1.6	-36.0	+0.4	-10.0	22.3	49.5	-27.2	Horiz
32	1120.529M	40.6	+24.1	+1.6	-35.8	+0.4	-10.0	20.9	49.5	-28.6	Horiz
33	1120.529M	40.6	+24.1	+1.6	-35.8	+0.4	-10.0	20.9	49.5	-28.6	Horiz