Sentinel Offender Services

ADDENDUM TO TEST REPORT 95337-14

Electronic Personnel Monitoring Unit
Model: Unitrak

Tested To The Following Standards:

FCC Part 15 Subpart C Section(s)
15.207 & 15.231

Report No.: 95337-14A

Date of issue: March 17, 2014

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

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.

Testing the Future
CKC LABORATORIES, INC.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Sentinel Offender Services
220 Technology Drive, Suite 200
Irvine, CA 92618

Representative: Trevor Coolidge
Customer Reference Number: 38492

REPORT PREPARED BY:

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

Project Number: 95337

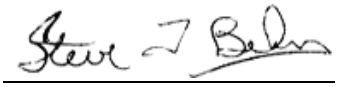
DATE OF EQUIPMENT RECEIPT: February 3, 2014
DATE(S) OF TESTING: February 3 - 4, 2014
March 14-18, 2014

Revision History

Original: Testing of the Electronic Personnel Monitoring Unit, Unitrak to FCC Part 15 C Section 15.207 & 15.231.
Addendum A: To add conducted emissions and additional fundamental field strength test data with the EUT connected to an AC/DC adaptor.

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.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D	US0060	SL2-IN-E-1146R	3082D-2	100638	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Test Procedure/Method	Description	Results
15.207	Conducted Emissions	Pass
15.31(e)	Voltage Variation	Pass
15.231(a)	Types of Momentary Signals	Pass
15.231(b) / KDB 558074 DO1 DTS Measurement Guidance V03	Field Strength of Fundamental and Spurious Emissions	Pass
15.231(c) / KDB 558074 DO1 DTS Measurement Guidance V03	-20dB Occupied Bandwidth	Pass
15.231(d)	Frequency Stability	NA
15.231(e)	Reduced Field Strengths	NA

NA = Not Applicable

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

Electronic Personnel Monitoring Unit
Manuf: Sentinel Offender Services
Model: Unitrak
Serial: 302F

PERIPHERAL DEVICES

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

External Battery Pack
Manuf: Anker
Model: 10000mAh
Serial: 05DMP2

Universal AC/DC Adaptor
Manuf: Rhino
Model: PSNC-75M
Serial: 12-B013481

External Battery Pack
Manuf: Anker
Model: 10000mAh
Serial: 05DMP2

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 Conducted Emissions

Test Data

Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.207 AC Mains - Average**
Work Order #: **95337** Date: 3/14/2014
Test Type: **Conducted Emissions** Time: 10:25:27 AM
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 3
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak 120V 60Hz
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T2	ANP01910	Cable	RG-142	1/8/2014	1/8/2016
T3	AN00969A	50uH LISN-Line 1 (L1) (dB)	3816/2NM	3/12/2013	3/12/2015
	AN00969A	50uH LISN-Line 2 (L2) (dB)	3816/2NM	3/12/2013	3/12/2015
T4	AN02343	High Pass Filter	HE9615-150K-50-720B	1/10/2013	1/10/2015
	AN02467	Spectrum Analyzer	E7405A	4/17/2013	4/17/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
Universal AC/DC Adaptor	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The EUT is placed on the wooden table. The EUT is set to always be in transmitting mode. External controller is connected to the EUT to vary power if needed.
The EUT connected to AC/DC adapter via USB cable.

Fundamental operating frequency: 433.9MHz

Frequency Range: 150kHz-30MHz
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;

Temp: 20°C, 47% Relative Humidity, 100.1kpa
Site D

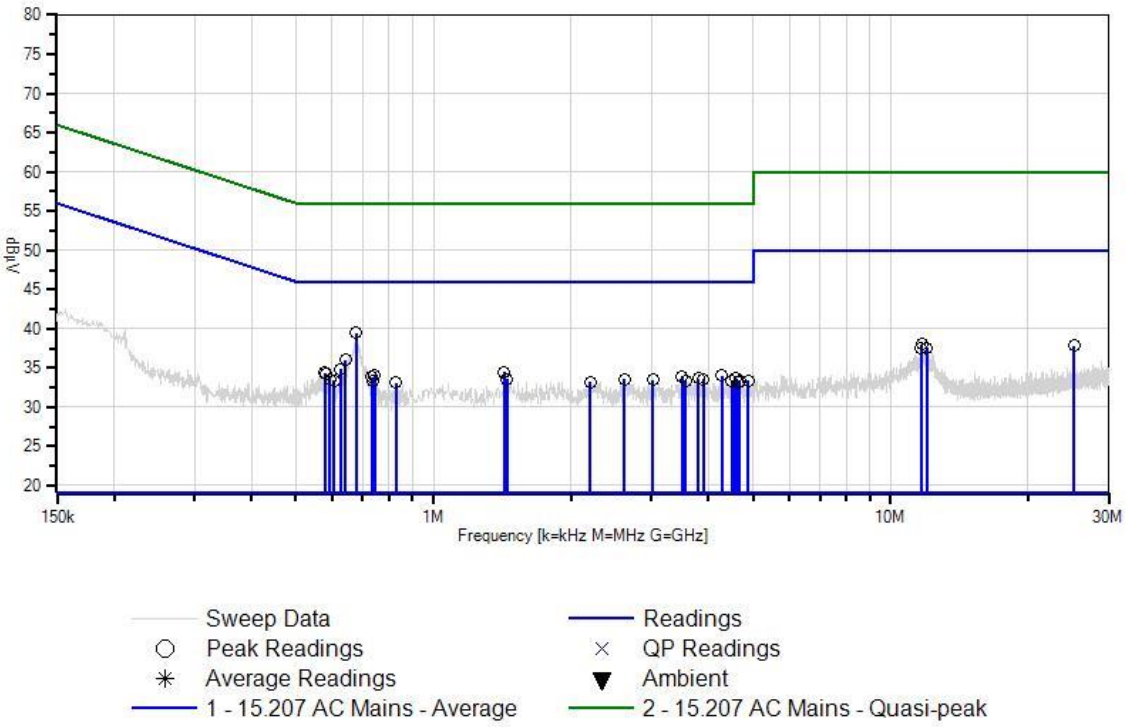
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: L1(L)

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	677.952k	33.5	+5.7	+0.0	+0.1	+0.2	+0.0	39.5	46.0	-6.5	L1(L)
2	642.318k	30.0	+5.7	+0.0	+0.1	+0.2	+0.0	36.0	46.0	-10.0	L1(L)
3	624.866k	28.8	+5.7	+0.0	+0.1	+0.2	+0.0	34.8	46.0	-11.2	L1(L)
4	1.426M	28.5	+5.7	+0.0	+0.1	+0.2	+0.0	34.5	46.0	-11.5	L1(L)
5	579.052k	28.4	+5.7	+0.0	+0.1	+0.2	+0.0	34.4	46.0	-11.6	L1(L)
6	580.506k	28.2	+5.7	+0.0	+0.1	+0.2	+0.0	34.2	46.0	-11.8	L1(L)
7	743.400k	28.2	+5.7	+0.0	+0.1	+0.1	+0.0	34.1	46.0	-11.9	L1(L)
8	4.275M	27.9	+5.7	+0.2	+0.1	+0.1	+0.0	34.0	46.0	-12.0	L1(L)
9	11.716M	31.3	+5.8	+0.2	+0.5	+0.2	+0.0	38.0	50.0	-12.0	L1(L)
10	3.501M	27.8	+5.7	+0.2	+0.1	+0.1	+0.0	33.9	46.0	-12.1	L1(L)
11	733.219k	27.9	+5.7	+0.0	+0.1	+0.1	+0.0	33.8	46.0	-12.2	L1(L)
12	25.176M	29.8	+5.8	+0.4	+1.5	+0.3	+0.0	37.8	50.0	-12.2	L1(L)
13	3.799M	27.6	+5.7	+0.2	+0.1	+0.1	+0.0	33.7	46.0	-12.3	L1(L)
14	4.581M	27.6	+5.7	+0.2	+0.1	+0.1	+0.0	33.7	46.0	-12.3	L1(L)
15	12.004M	30.9	+5.8	+0.2	+0.5	+0.2	+0.0	37.6	50.0	-12.4	L1(L)
16	1.447M	27.6	+5.7	+0.0	+0.1	+0.2	+0.0	33.6	46.0	-12.4	L1(L)
17	592.141k	27.6	+5.7	+0.0	+0.1	+0.2	+0.0	33.6	46.0	-12.4	L1(L)

18	3.892M	27.5	+5.7	+0.2	+0.1	+0.1	+0.0	33.6	46.0	-12.4	L1(L)
19	2.612M	27.5	+5.7	+0.1	+0.1	+0.2	+0.0	33.6	46.0	-12.4	L1(L)
20	3.025M	27.4	+5.7	+0.1	+0.1	+0.2	+0.0	33.5	46.0	-12.5	L1(L)
21	11.679M	30.8	+5.8	+0.2	+0.5	+0.2	+0.0	37.5	50.0	-12.5	L1(L)
22	739.037k	27.5	+5.7	+0.0	+0.1	+0.1	+0.0	33.4	46.0	-12.6	L1(L)
23	605.231k	27.4	+5.7	+0.0	+0.1	+0.2	+0.0	33.4	46.0	-12.6	L1(L)
24	3.556M	27.3	+5.7	+0.2	+0.1	+0.1	+0.0	33.4	46.0	-12.6	L1(L)
25	4.875M	27.3	+5.7	+0.2	+0.1	+0.1	+0.0	33.4	46.0	-12.6	L1(L)
26	4.679M	27.3	+5.7	+0.2	+0.1	+0.1	+0.0	33.4	46.0	-12.6	L1(L)
27	4.492M	27.2	+5.7	+0.2	+0.1	+0.1	+0.0	33.3	46.0	-12.7	L1(L)
28	2.204M	27.1	+5.7	+0.1	+0.1	+0.2	+0.0	33.2	46.0	-12.8	L1(L)
29	829.210k	27.2	+5.7	+0.0	+0.1	+0.1	+0.0	33.1	46.0	-12.9	L1(L)
30	4.645M	27.0	+5.7	+0.2	+0.1	+0.1	+0.0	33.1	46.0	-12.9	L1(L)

Date: 3/14/2014 Time: 10:25:27 AM Sentinel Offender Services WO#: 95337
15.207 AC Mains - Average Test Lead: L1(L) 120V 60Hz Sequence#: 3 Ext ATTN: 0 dB



Test Location: CKC Laboratories • 110 Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.207 AC Mains - Average**
Work Order #: **95337** Date: 3/14/2014
Test Type: **Conducted Emissions** Time: 10:28:54 AM
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 4
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak 120V 60Hz
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T2	ANP01910	Cable	RG-142	1/8/2014	1/8/2016
	AN00969A	50uH LISN-Line 1 (L1) (dB)	3816/2NM	3/12/2013	3/12/2015
T3	AN00969A	50uH LISN-Line 2 (L2) (dB)	3816/2NM	3/12/2013	3/12/2015
T4	AN02343	High Pass Filter	HE9615-150K-50-720B	1/10/2013	1/10/2015
	AN02467	Spectrum Analyzer	E7405A	4/17/2013	4/17/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
Universal AC/DC Adaptor	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The EUT is placed on the wooden table. EUT is set to always be in transmitting mode. External controller is connected to the EUT to vary power if needed.
The EUT connected to AC/DC adapter via USB cable.

Fundamental operating frequency: 433.9MHz

Frequency Range: 150kHz-30MHz
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz

Temp: 20°C, 47% Relative Humidity, 100.1kpa

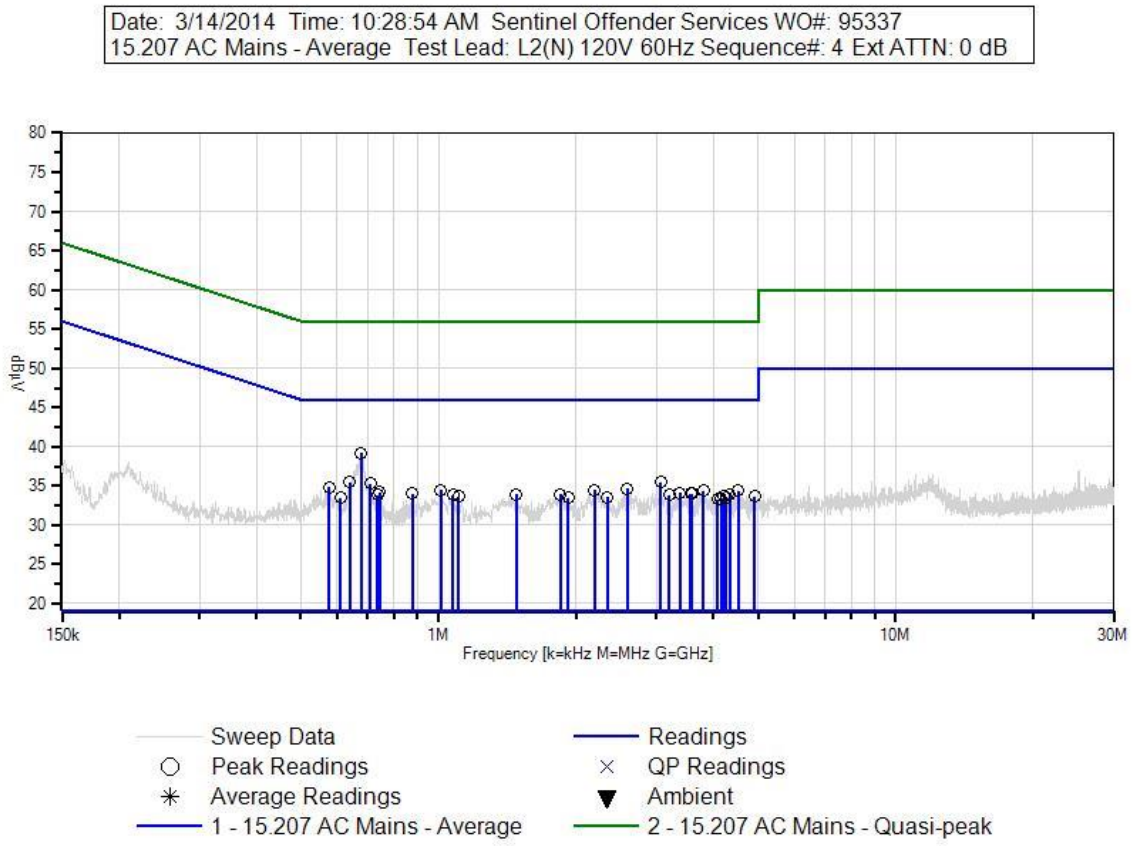
Site D

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: L2(N)

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	677.224k	33.3	+5.7	+0.0	+0.0	+0.2	+0.0	39.2	46.0	-6.8	L2(N)
2	640.137k	29.6	+5.7	+0.0	+0.0	+0.2	+0.0	35.5	46.0	-10.5	L2(N)
3	3.063M	29.4	+5.7	+0.1	+0.1	+0.2	+0.0	35.5	46.0	-10.5	L2(N)
4	709.221k	29.5	+5.7	+0.0	+0.0	+0.1	+0.0	35.3	46.0	-10.7	L2(N)
5	576.143k	28.9	+5.7	+0.0	+0.0	+0.2	+0.0	34.8	46.0	-11.2	L2(N)
6	2.591M	28.6	+5.7	+0.1	+0.1	+0.2	+0.0	34.7	46.0	-11.3	L2(N)
7	1.013M	28.6	+5.7	+0.0	+0.1	+0.1	+0.0	34.5	46.0	-11.5	L2(N)
8	2.191M	28.4	+5.7	+0.1	+0.1	+0.2	+0.0	34.5	46.0	-11.5	L2(N)
9	3.799M	28.3	+5.7	+0.2	+0.1	+0.1	+0.0	34.4	46.0	-11.6	L2(N)
10	4.522M	28.3	+5.7	+0.2	+0.1	+0.1	+0.0	34.4	46.0	-11.6	L2(N)
11	743.400k	28.4	+5.7	+0.0	+0.0	+0.1	+0.0	34.2	46.0	-11.8	L2(N)
12	3.378M	28.0	+5.7	+0.2	+0.1	+0.1	+0.0	34.1	46.0	-11.9	L2(N)
13	877.205k	28.2	+5.7	+0.0	+0.0	+0.1	+0.0	34.0	46.0	-12.0	L2(N)
14	3.556M	27.9	+5.7	+0.2	+0.1	+0.1	+0.0	34.0	46.0	-12.0	L2(N)
15	3.582M	27.9	+5.7	+0.2	+0.1	+0.1	+0.0	34.0	46.0	-12.0	L2(N)
16	1.481M	27.9	+5.7	+0.0	+0.1	+0.2	+0.0	33.9	46.0	-12.1	L2(N)
17	1.851M	27.8	+5.7	+0.1	+0.1	+0.2	+0.0	33.9	46.0	-12.1	L2(N)
18	1.077M	27.9	+5.7	+0.0	+0.1	+0.1	+0.0	33.8	46.0	-12.2	L2(N)
19	735.401k	28.0	+5.7	+0.0	+0.0	+0.1	+0.0	33.8	46.0	-12.2	L2(N)
20	4.330M	27.7	+5.7	+0.2	+0.1	+0.1	+0.0	33.8	46.0	-12.2	L2(N)
21	3.203M	27.8	+5.7	+0.1	+0.1	+0.1	+0.0	33.8	46.0	-12.2	L2(N)
22	1.107M	27.8	+5.7	+0.0	+0.1	+0.1	+0.0	33.7	46.0	-12.3	L2(N)
23	4.220M	27.6	+5.7	+0.2	+0.1	+0.1	+0.0	33.7	46.0	-12.3	L2(N)
24	4.917M	27.6	+5.7	+0.2	+0.1	+0.1	+0.0	33.7	46.0	-12.3	L2(N)

25	2.340M	27.5	+5.7	+0.1	+0.1	+0.2	+0.0	33.6	46.0	-12.4	L2(N)
26	4.262M	27.5	+5.7	+0.2	+0.1	+0.1	+0.0	33.6	46.0	-12.4	L2(N)
27	611.049k	27.6	+5.7	+0.0	+0.0	+0.2	+0.0	33.5	46.0	-12.5	L2(N)
28	1.923M	27.4	+5.7	+0.1	+0.1	+0.2	+0.0	33.5	46.0	-12.5	L2(N)
29	4.152M	27.3	+5.7	+0.2	+0.1	+0.1	+0.0	33.4	46.0	-12.6	L2(N)
30	4.075M	27.2	+5.7	+0.2	+0.1	+0.1	+0.0	33.3	46.0	-12.7	L2(N)



Test Setup Photo(s)

Front View

Back View

15.31(e) Voltage Variations

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.31e**
Work Order #: **95337** Date: 3/18/2014
Test Type: **Maximized Emissions** Time: 14:29:10
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 1
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/12/2014	3/12/2016
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T5	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T6	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply, Dual-tracking	Topward	6306D	988614

Test Conditions / Notes:

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. The EUT is set to always transmitting mode. External controller is connected to EUT to vary power if needed.
EUT is connected to DC power supply via USB port.
Nominal voltage of supply voltage is 5VDC.

Fundamental operating frequency: 433.9MHz
RBW=VBW=120kHz
Temp: 23°C, 32% Relative Humidity, 100.1kpa

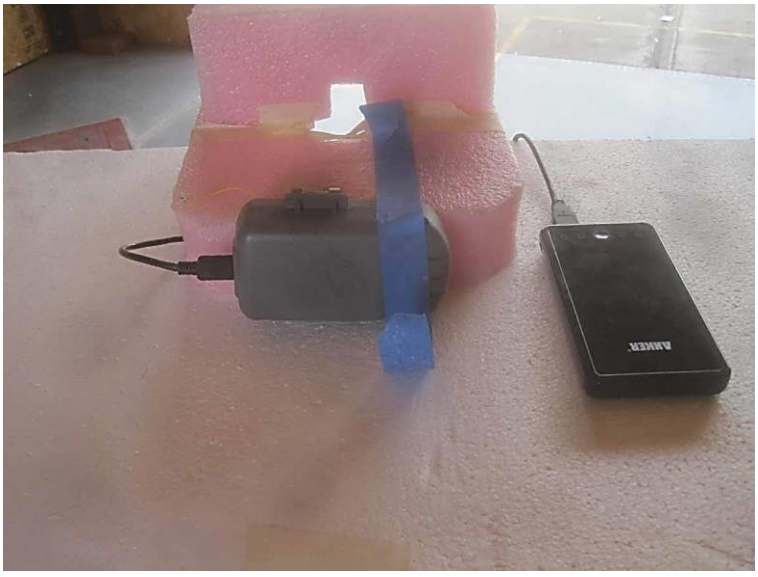
Site D

Emission is investigated with EUT rotating in three axes.

15.31(e) compliance: the supply voltage was varied between 85%(4.25VDC) and 115%(5.75VDC) of the nominal rated supply voltage, no change in the fundamental signal level was observed.

Test Setup Photo(s)

X - Axis



Y - Axis

Z - Axis

Back View

15.231(a) Types of Momentary Signals

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.231(a) Types of Momentary Signals**
Work Order #: **95337** Date: 2/3/2014
Test Type: **Maximized Emissions** Time: 14:29:31
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 1
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T5	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T6	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
External Battery Pack	Anker	10000mAh	05DMP2

Test Conditions / Notes:

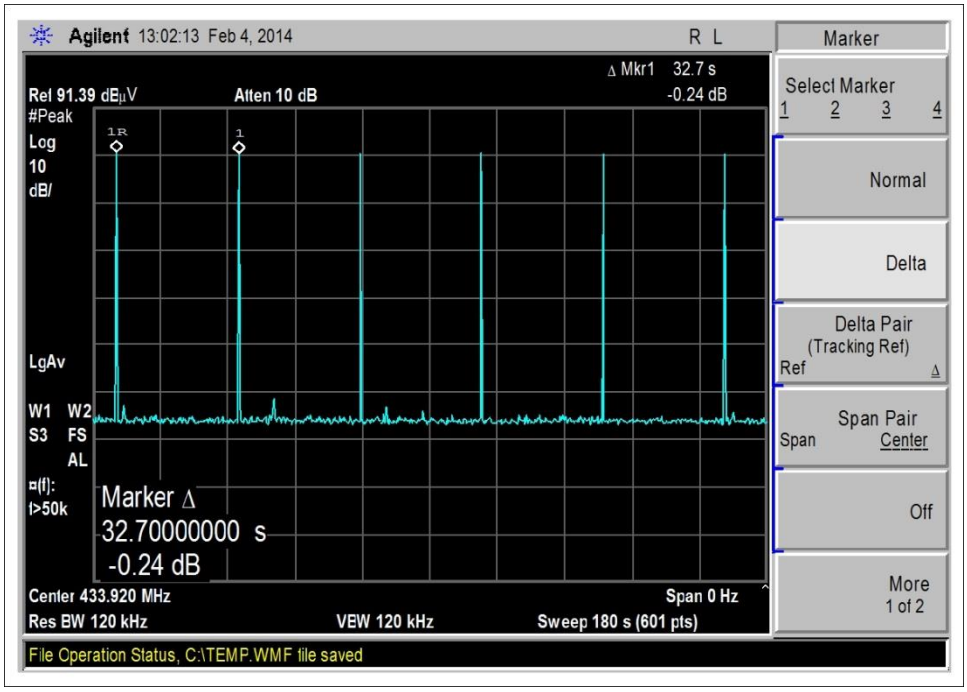
The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is set to always transmitting mode. External controller is connected to EUT to vary power if needed.
EUT connected to external battery pack via USB port.

Fundamental operating frequency: 433.9MHz
RBW=VBW=120kHz
Temp: 18°C, 47% Relative Humidity, 100.1kpa

Site D

Emission is investigated with EUT rotating in three axes.

Test Data


Agilent 13:02:13 Feb 4, 2014
R L
Marker
Δ Mkr1 32.7 s
-0.24 dB
Ref 91.39 dBµV
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 W2
S3 FS
AL
¤(f):
f>50k
Marker Δ
32.70000000 s
-0.24 dB
Center 433.920 MHz
Span 0 Hz
Res BW 120 kHz
VEW 120 kHz
Sweep 180 s (601 pts)
File Operation Status, C:\TEMP.WMF file saved
Select Marker
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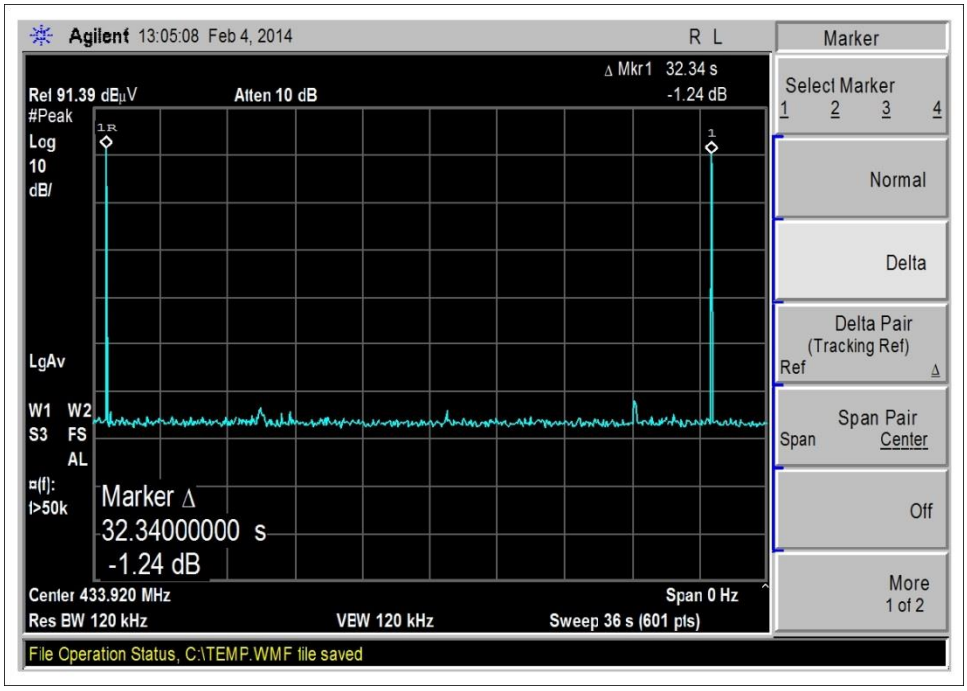
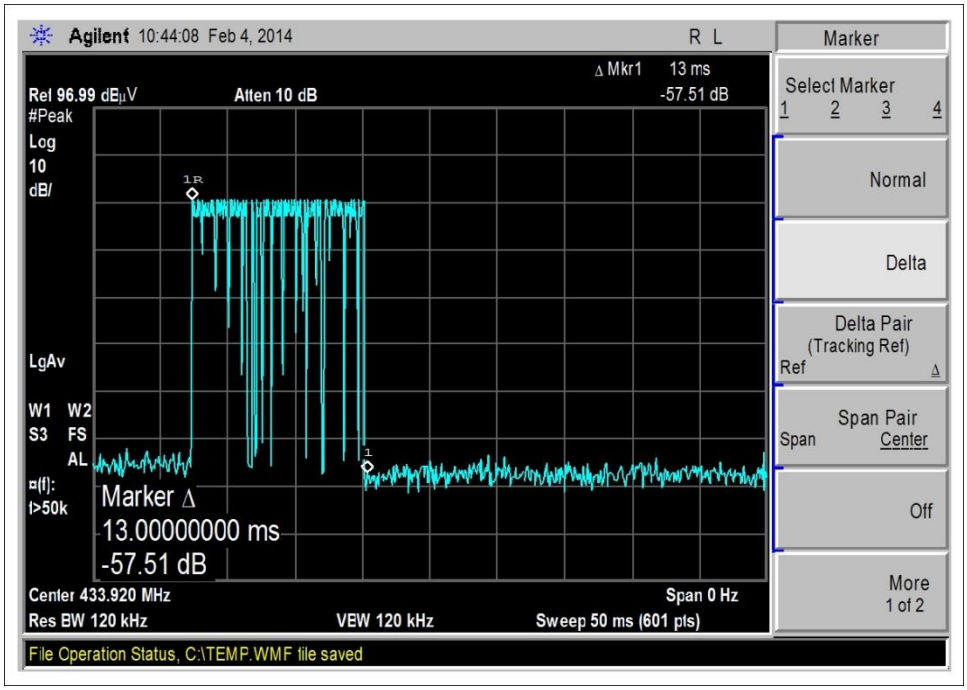
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2


Agilent 13:05:08 Feb 4, 2014
R L
Marker
Δ Mkr1 32.34 s
-1.24 dB
Ref 91.39 dBµV
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 W2
S3 FS
AL
¤(f):
f>50k
Marker Δ
32.34000000 s
-1.24 dB
Center 433.920 MHz
Span 0 Hz
Res BW 120 kHz
VEW 120 kHz
Sweep 36 s (601 pts)
File Operation Status, C:\TEMP.WMF file saved
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2

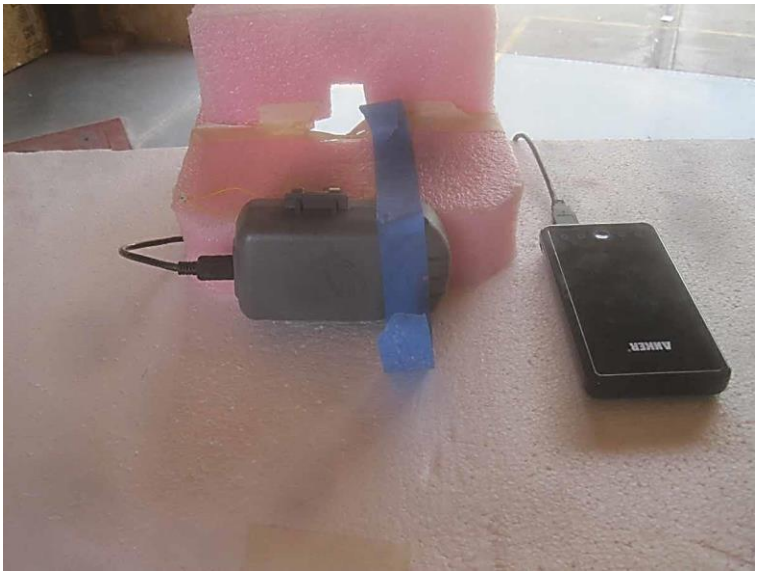


15.231(a)(3): Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

Measured on time is 13ms after every 32.34s
In one hour or 3600s, there is 3600/32.34=111 polling times or 111*0.013s=1.443s on time.
Total transmission time of the EUT does not exceed two seconds per hour.

Test Setup Photo(s)

X - Axis



Y - Axis

Z - Axis

Back View

15.231(b) Field Strength of Fundamental and Spurious Emission

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.231(b) Fundamental Field Strength**
Work Order #: **95337** Date: 2/3/2014
Test Type: **Maximized Emissions** Time: 14:29:31
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 1
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T5	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T6	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014
	AN01234	Duty Cycle Correction Factor		2/3/2014	2/3/2016

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
External Battery Pack	Anker	10000mAh	05DMP2

Test Conditions / Notes:

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is set to always transmitting mode. External controller is connected to EUT to vary power if needed.
EUT connected to external battery pack via USB port.

Fundamental operating frequency: 433.9MHz
RBW=VBW=120kHz
Temp: 18°C, 47% Relative Humidity, 100.1kpa

Site D

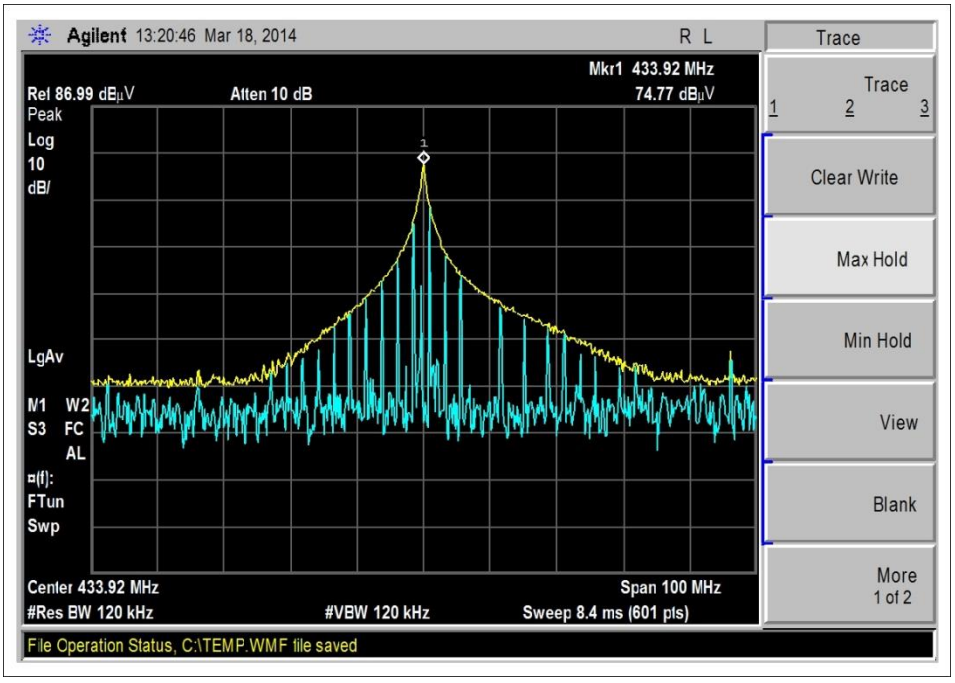
Emission is investigated with EUT rotating in three axes.
Duty cycle correction factor = 20log(dwell time/100 ms)= 20log(13/100)=-17.72db

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	433.917M	74.6	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	67.5	80.5 Z axis	-13.0	Horiz
2	433.917M	71.3	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	64.2	80.5 Y axis	-16.3	Horiz
3	433.917M	70.1	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	63.0	80.5 X axis	-17.5	Horiz
4	433.917M	69.6	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	62.5	80.5 X axis	-18.0	Vert
5	433.917M	63.4	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	56.3	80.5 Z axis	-24.2	Vert
6	433.917M	63.2	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	56.1	80.5 Y axis	-24.4	Vert

Test Data



Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.231(b) Spurious Field Strength (433.92 MHz Transmitter)**
Work Order #: **95337** Date: 2/4/2014
Test Type: **Maximized Emissions** Time: 09:58:24
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 2
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
T1	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T4	AN01234	Duty Cycle Correction Factor		2/3/2014	2/3/2016
T5	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T6	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T7	AN00787	Preamp	83017A	5/31/2013	5/31/2015
T8	AN01646	Horn Antenna	3115	4/13/2012	4/13/2014
T9	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015
T10	AN03169	High Pass Filter	HM1155-11SS	7/30/2013	7/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
External Battery Pack	Anker	10000mAh	05DMP2

Test Conditions / Notes:

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. The EUT is set to always be in transmitting mode. External controller is connected to EUT to vary power if needed.
EUT connected to external battery pack via USB port.

Fundamental operating frequency: 433.9MHz
Frequency Range: 9KHz-4.7GHz
9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;
30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,
1000 MHz-47000 MHz; RBW=1 MHz, VBW=1 MHz.
Temp: 18°C, 47% Relative Humidity, 100.1kpa
Site D

Emission is investigated with EUT rotating in three axes.
Duty cycle correction factor = 20log(dwell time/100 ms)= 20log(13/100)=-17.72db

Ext Attn: 0 dB

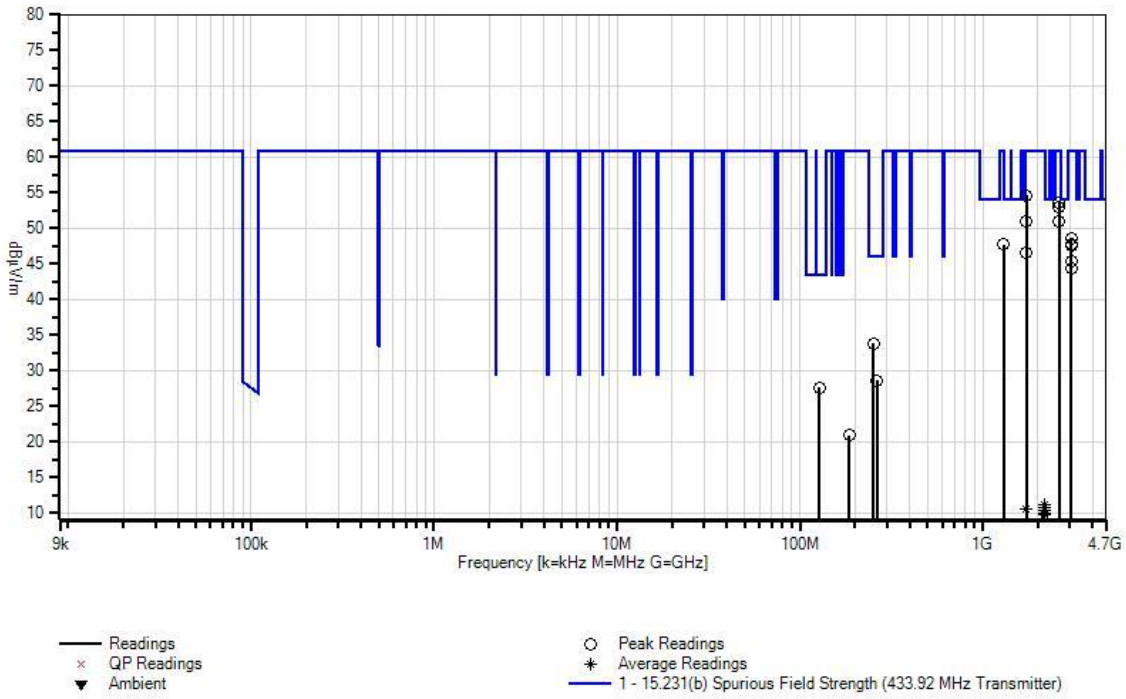
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	1735.480M	58.7	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	+0.0 +27.0	+0.0	54.7	60.8 Y axis	-6.1	Vert
2	1301.610M	55.7	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	+0.0 +24.5	+0.0	47.7	54.0 Y axis	-6.3	Horiz
3	2603.270M	56.2	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.1	+0.0	53.6	60.8 Y axis	-7.2	Vert
4	2603.270M	55.7	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.1	+0.0	53.1	60.8 X axis	-7.7	Vert
5	1735.530M	55.1	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	+0.0 +27.0	+0.0	51.1	60.8 X axis	-9.7	Vert
6	2603.170M	53.5	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.1	+0.0	50.9	60.8 Z axis	-9.9	Vert
7	252.580M	44.6	-26.5 +1.0 +0.0	+12.6 +1.8 +0.0	+0.3 +0.0	+0.0 +0.0	+0.0	33.8	46.0	-12.2	Vert
8	3037.490M	48.0	+0.0 +3.7 +0.8	+0.0 +6.2 +0.2	+0.0 -39.7	+0.0 +29.4	+0.0	48.6	60.8 Z axis	-12.2	Horiz
9	3037.240M	47.1	+0.0 +3.7 +0.8	+0.0 +6.2 +0.2	+0.0 -39.7	+0.0 +29.4	+0.0	47.7	60.8 X axis	-13.1	Vert
10	3037.340M	47.1	+0.0 +3.7 +0.8	+0.0 +6.2 +0.2	+0.0 -39.7	+0.0 +29.4	+0.0	47.7	60.8 Z axis	-13.1	Vert
11	3037.290M	47.0	+0.0 +3.7 +0.8	+0.0 +6.2 +0.2	+0.0 -39.7	+0.0 +29.4	+0.0	47.6	60.8 X axis	-13.2	Horiz
12	1735.583M	50.5	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	+0.0 +27.0	+0.0	46.5	60.8 Z axis	-14.3	Vert
13	3037.240M	44.8	+0.0 +3.7 +0.8	+0.0 +6.2 +0.2	+0.0 -39.7	+0.0 +29.4	+0.0	45.4	60.8 Y axis	-15.4	Vert
14	127.650M	40.6	-26.8 +0.7 +0.0	+11.6 +1.3 +0.0	+0.2 +0.0	+0.0 +0.0	+0.0	27.6	43.5	-15.9	Vert
15	3037.190M	43.8	+0.0 +3.7 +0.8	+0.0 +6.2 +0.2	+0.0 -39.7	+0.0 +29.4	+0.0	44.4	60.8 Y axis	-16.4	Horiz

16	264.400M	39.1	-26.4 +1.0 +0.0	+12.8 +1.9 +0.0	+0.3 +0.0	+0.0 +0.0	+0.0	28.7	46.0	-17.3	Horiz
17	185.450M	36.0	-26.7 +0.8 +0.0	+9.0 +1.6 +0.0	+0.2 +0.0	+0.0 +0.0	+0.0	20.9	60.8	-39.9	Horiz
18	1301.410M Ave	32.5	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	-17.7 +24.5	+0.0	6.8	54.0 X axis	-47.2	Horiz
19	1301.460M Ave	32.5	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	-17.7 +24.5	+0.0	6.8	54.0 Y axis	-47.2	Vert
^	1301.460M	57.7	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	+0.0 +24.5	+0.0	49.7	54.0 Y axis	-4.3	Vert
21	1301.613M Ave	32.5	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	-17.7 +24.5	+0.0	6.8	54.0 Z axis	-47.2	Vert
^	1301.560M	55.8	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	+0.0 +24.5	+0.0	47.8	54.0 X axis	-6.2	Vert
^	1301.613M	55.5	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	+0.0 +24.5	+0.0	47.5	54.0 Z axis	-6.5	Vert
24	1301.410M Ave	32.2	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	-17.7 +24.5	+0.0	6.5	54.0 Z axis	-47.5	Horiz
^	1301.410M	58.9	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	+0.0 +24.5	+0.0	50.9	54.0 X axis	-3.1	Horiz
^	1301.410M	55.9	+0.0 +2.4 +0.6	+0.0 +4.4 +0.6	+0.0 -40.5	+0.0 +24.5	+0.0	47.9	54.0 Z axis	-6.1	Horiz
27	2169.203M Ave	31.1	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.5	+0.0	11.2	60.8 Z axis	-49.6	Vert
28	2169.150M Ave	30.8	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.5	+0.0	10.9	60.8 Y axis	-49.9	Horiz
29	1735.480M Ave	32.3	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	-17.7 +27.0	+0.0	10.6	60.8 Z axis	-50.2	Horiz
^	1735.480M	57.6	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	+0.0 +27.0	+0.0	53.6	60.8 Z axis	-7.2	Horiz
^	1735.430M	55.0	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	+0.0 +27.0	+0.0	51.0	60.8 X axis	-9.8	Horiz
^	1735.480M	54.4	+0.0 +2.7 +0.6	+0.0 +5.2 +0.3	+0.0 -39.8	+0.0 +27.0	+0.0	50.4	60.8 Y axis	-10.4	Horiz

33	2168.950M Ave	30.2	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.5	+0.0	10.3	60.8 Z axis	-50.5	Horiz
^	2168.950M	66.7	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.5	+0.0	64.5	60.8 Z axis	+3.7	Horiz
35	2169.150M Ave	29.9	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.5	+0.0	10.0	60.8 Y axis	-50.8	Vert
36	2169.150M Ave	29.7	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.5	+0.0	9.8	60.8 X axis	-51.0	Vert
^	2169.203M	66.3	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.5	+0.0	64.1	60.8 Z axis	+3.3	Vert
^	2169.150M	61.1	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.5	+0.0	58.9	60.8 Y axis	-1.9	Vert
^	2169.150M	60.8	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.5	+0.0	58.6	60.8 X axis	-2.2	Vert
40	2169.150M Ave	29.6	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.5	+0.0	9.7	60.8 X axis	-51.1	Horiz
^	2169.150M	67.2	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.5	+0.0	65.0	60.8 Y axis	+4.2	Horiz
^	2169.150M	60.9	+0.0 +3.3 +0.8	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.5	+0.0	58.7	60.8 X axis	-2.1	Horiz
43	2603.320M Ave	28.6	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.1	+0.0	8.3	60.8 X axis	-52.5	Horiz
^	2603.320M	58.3	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.1	+0.0	55.7	60.8 X axis	-5.1	Horiz
45	2603.220M Ave	28.6	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.1	+0.0	8.3	60.8 Y axis	-52.5	Horiz
46	2603.220M Ave	27.8	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	-17.7 +27.1	+0.0	7.5	60.8 Z axis	-53.3	Horiz
^	2603.220M	60.9	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.1	+0.0	58.3	60.8 Y axis	-2.5	Horiz
^	2603.220M	58.3	+0.0 +3.4 +0.7	+0.0 +5.7 +0.2	+0.0 -39.7	+0.0 +27.1	+0.0	55.7	60.8 Z axis	-5.1	Horiz

Date: 2/4/2014 Time: 09:58:24 Sentinel Offender Services WO#: 95337
15.231(b) Spurious Field Strength (433.92 MHz Transmitter) Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.231(b) Fundamental Field Strength**
Work Order #: **95337** Date: 3/14/2014
Test Type: **Maximized Emissions** Time: 10:40:02
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 1
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T5	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T6	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014
	AN01234	Duty Cycle Correction Factor		2/3/2014	2/3/2016

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
External Battery Pack	Anker	10000mAh	05DMP2

Test Conditions / Notes:

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. The EUT is set to always be in transmitting mode. External controller is connected to the EUT to vary power if needed.
The EUT connected to AC/DC adaptor via USB port.

Fundamental operating frequency: 433.9MHz
RBW=VBW=120kHz
Temp: 18°C, 47% Relative Humidity, 100.1kpa

Site D
Emission is investigated with EUT rotating in three axes.

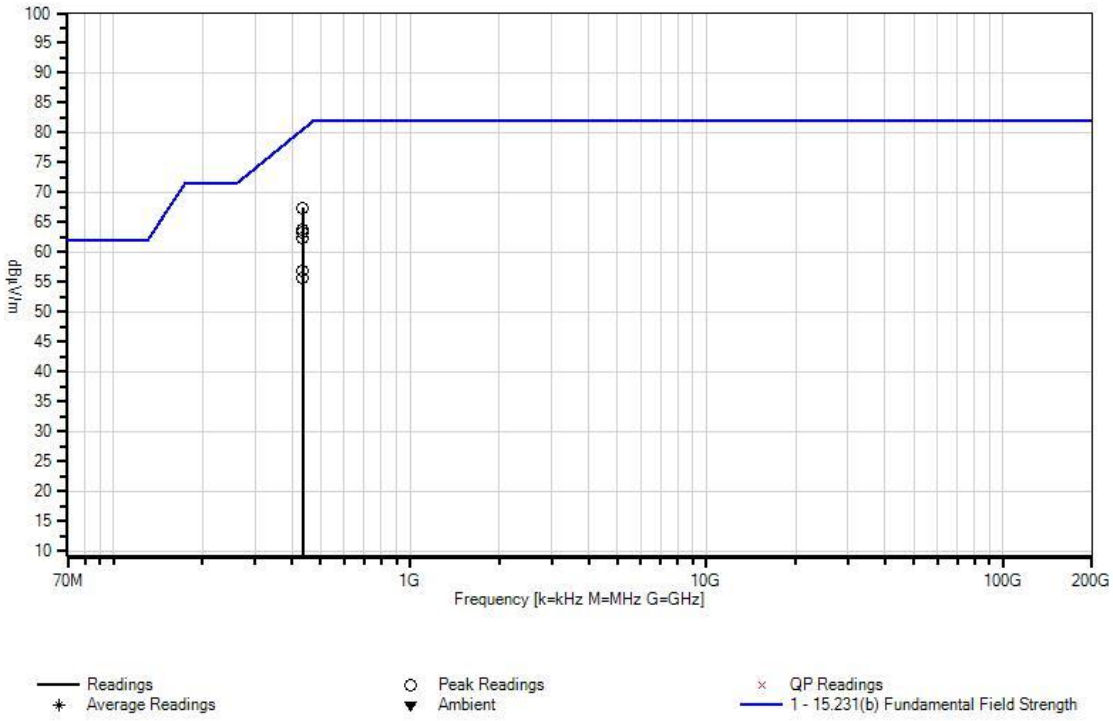
Duty cycle correction factor = 20log(dwell time/100 ms)= 20log(13/100)=-17.72db

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	433.917M	74.5	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	67.4	80.5 Z axis	-13.1	Horiz
2	433.917M	71.0	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	63.9	80.5 Y axis	-16.6	Horiz
3	433.917M	70.4	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	63.3	80.5 X axis	-17.2	Horiz
4	433.917M	69.4	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	62.3	80.5 X axis	-18.2	Vert
5	433.917M	63.9	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	56.8	80.5 Z axis	-23.7	Vert
6	433.917M	62.9	-27.5 +0.0	+16.3 +1.3	+2.4	+0.4	+0.0	55.8	80.5 Y axis	-24.7	Vert

CKC Laboratories, Inc. Date: 3/14/2014 Time: 10:40:02 Sentinel Offender Services WO#: 95337
15.231(b) Fundamental Field Strength Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.231(b) Spurious Field Strength (433.92 MHz Transmitter)**
Work Order #: **95337** Date: 3/14/2014
Test Type: **Maximized Emissions** Time: 10:46:25
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 3
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014
	AN00010	Preamp	8447D	3/29/2012	3/29/2014
	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
	AN01234	Duty Cycle Correction Factor		2/3/2014	2/3/2016
T1	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014
T2	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	AN00787	Preamp	83017A	5/31/2013	5/31/2015
T5	AN01646	Horn Antenna	3115	4/13/2012	4/13/2014
T6	AN02945	Cable	32022-2-2909K-36TC	10/30/2013	10/30/2015
T7	AN03169	High Pass Filter	HM1155-11SS	7/30/2013	7/30/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
Universal AC/DC Adaptor	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. The EUT is set to always be in transmitting mode. External controller is connected to EUT to vary power if needed.
The EUT connected to AC/DC adaptor via USB port.

Fundamental operating frequency: 433.9MHz

Frequency Range: 9KHz-4.7GHz
9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;
150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;
30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,
1000 MHz-47000 MHz; RBW=1 MHz, VBW=1 MHz.

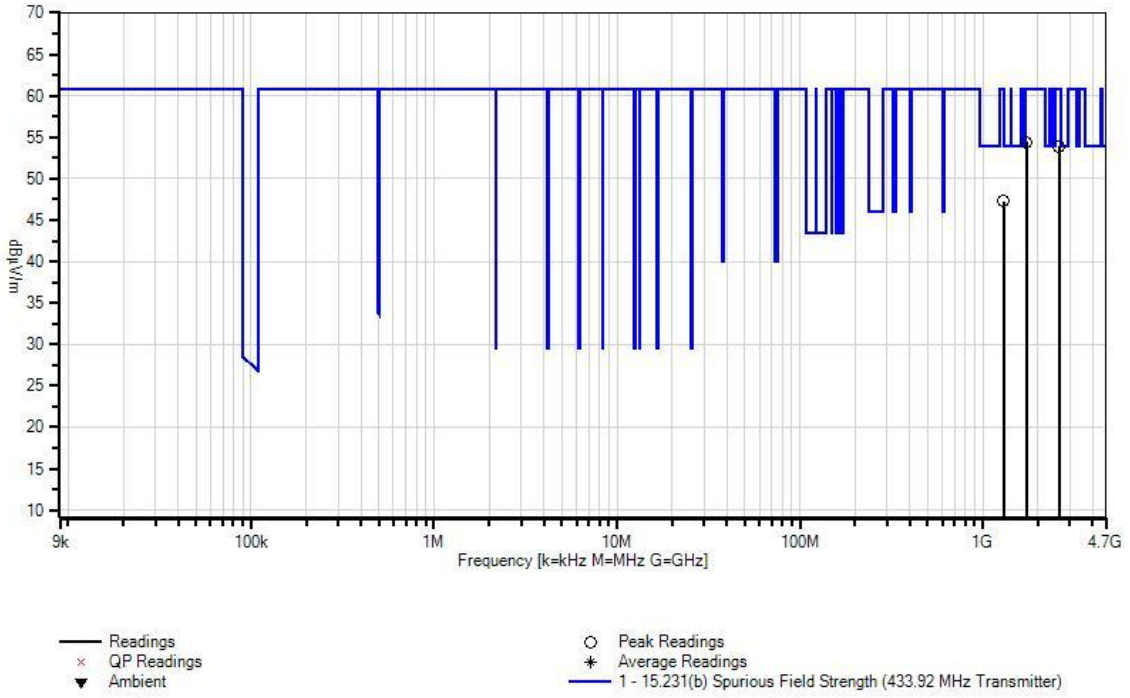
Temp: 18°C, 47% Relative Humidity, 100.1kpa
Site D
Worst case emission is investigated.
Duty cycle correction factor = 20log(dwell time/100 ms)= 20log(13/100)=-17.72db

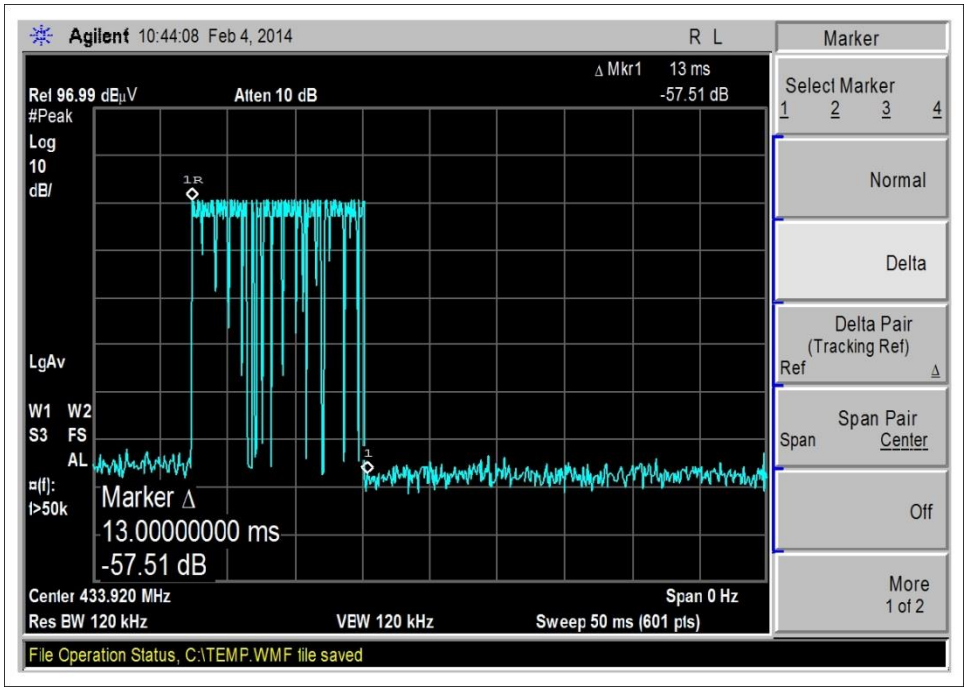
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	1735.480M	58.4	+2.7 +27.0	+0.0 +0.6	+5.2 +0.3	-39.8	+0.0	54.4	60.8 Y axis	-6.4	Vert
2	1301.610M	55.3	+2.4 +24.5	+0.0 +0.6	+4.4 +0.6	-40.5	+0.0	47.3	54.0 Y axis	-6.7	Horiz
3	2603.270M	56.5	+3.4 +27.1	+0.0 +0.7	+5.7 +0.2	-39.7	+0.0	53.9	60.8 Y axis	-6.9	Vert

Date: 3/14/2014 Time: 10:46:25 Sentinel Offender Services WO#: 95337
15.231(b) Spurious Field Strength (433.92 MHz Transmitter) Test Distance: 3 Meters Sequence#: 3 Ext ATTN: 0 dB

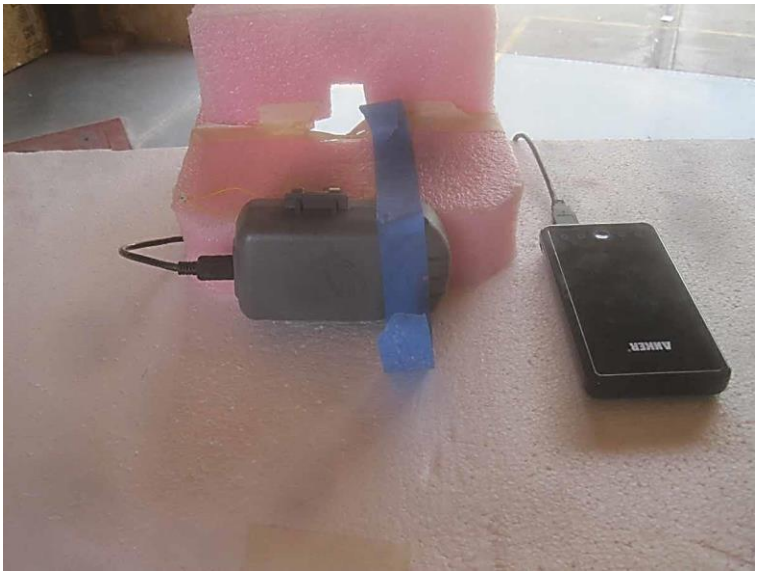



Agilent 10:44:08 Feb 4, 2014
R L
Marker
Δ Mkr1 13 ms
-57.51 dB
Ref 96.99 dBµV
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 W2
S3 FS
AL
¤(f):
f>50k
Marker Δ
13.00000000 ms
-57.51 dB
Center 433.920 MHz
Res BW 120 kHz
VBW 120 kHz
Span 0 Hz
Sweep 50 ms (601 pts)
File Operation Status, C:\TEMP.WMF file saved
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2

Duty Cycle

Test Setup Photo(s)

X - Axis



Y - Axis

Z - Axis

Back View

X – Axis, AC/DC Adaptor

Y – Axis, AC/DC Adaptor

Z – Axis, AC/DC Adaptor

15.231(c) -20dB Occupied Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112

Customer: **Sentinel Offender Services**
Specification: **15.231(c) -20db Occupied Bandwidth**
Work Order #: **95337** Date: 2/3/2014
Test Type: **Maximized Emissions** Time: 14:29:31
Equipment: **Electronic Personnel Monitoring Unit** Sequence#: 1
Manufacturer: Sentinel Offender Services Tested By: Don Nguyen
Model: Unitrak
S/N: 302F

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T2	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
T4	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
T5	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T6	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Electronic Personnel Monitoring Unit*	Sentinel Offender Services	Unitrak	302F

Support Devices:

Function	Manufacturer	Model #	S/N
External Battery Pack	Anker	10000mAh	05DMP2

Test Conditions / Notes:

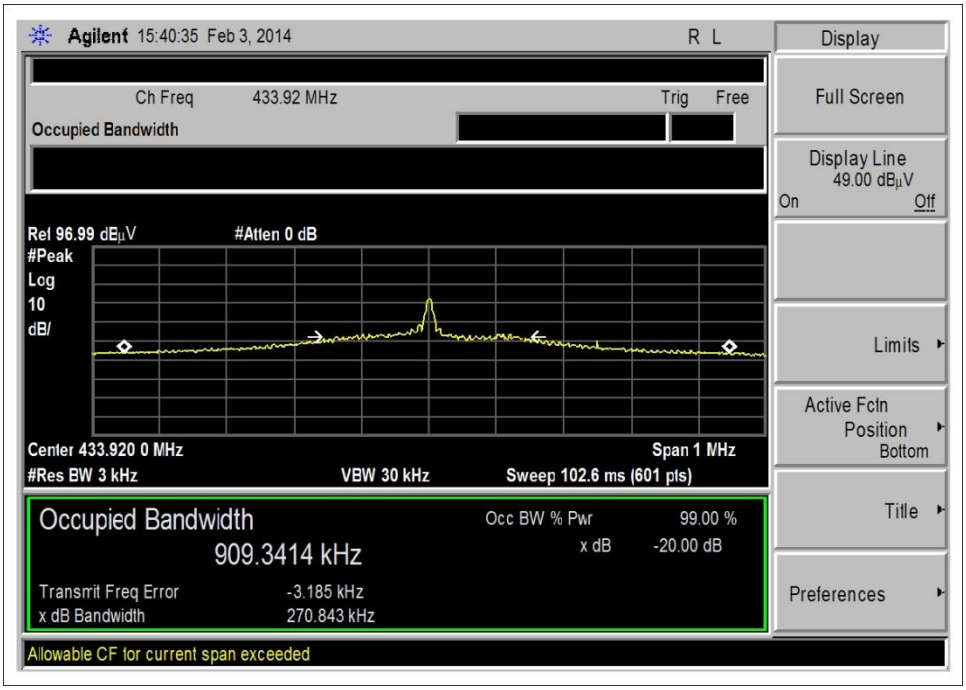
The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is set to always transmitting mode. External controller is connected to EUT to vary power if needed.
EUT connected to external battery pack via USB port.

Fundamental operating frequency: 433.9MHz
RBW=VBW=120kHz
Temp: 18°C, 47% Relative Humidity, 100.1kpa

Site D

Emission is investigated with EUT rotating in three axes.

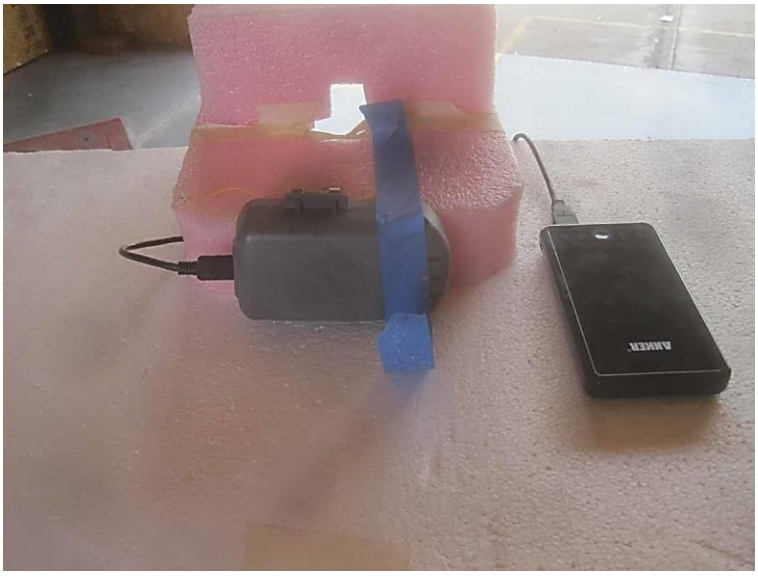
Test Data



Occupied Bandwidth is less than limit of 0.25% of center frequency
=0.25%*433.92MHz=1.0848MHz

Test Setup Photo(s)

X - Axis



Y - Axis

Axis - Z

Back View

15.231(d) Frequency Stability

Test Engineer:	Don Nguyen	**Test Procedure:**	15.231(d)
Test Level:	NA		
Declarations: Operating frequency of the EUT is 433.92MHz which is outside of band 40.66-40.70 MHz. Tested with full charged battery.			

15.231(e) Reduced Field Strengths

Test Engineer:	Don Nguyen	**Test Procedure:**	15.231(e)
Test Level:	NA		
Declarations: The EUT has polling or supervision transmission. Total of duration of transmissions does not exceed more than two seconds per hour of each transmitter.			

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

Unless otherwise indicated, the following configuration parameters are used for equipment setup: 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 dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/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. Unless otherwise specified, 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.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED 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 "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. 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 or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent 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

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. 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.