

TEST REPORT

Report Number: 3085182-37-1-2

Project Number: 3085182

February 13, 2006

**Testing performed on the
Model Number: OPID 433MHZ**

to

FCC Part 15.231

For Guidance Monitoring, Ltd.

Test Performed by:

Intertek ETL Semko
1950 Evergreen Blvd, Suite 100
Duluth, GA 30096

Test Authorized by:

Guidance Monitoring, Ltd.
4 Dominus Way
Meridian Business Park
Leicester, LE19 1RP
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Date: February 13, 2006

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1 Summary of Tests

MODEL: OPID 433MHZ

FCC ID: OY3PID23

TEST	FCC REFERENCE	RESULTS
Radiated Emission	15.231(b)	Complies
Out of Band Radiated Emission	15.231(b)	Complies
AC Conducted Emission	15.207	Not Required
20 dB Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	Not Required
Reduced Field Strengths	15.231(e)	Complies
Antenna Requirement	15.203	Complies

2 General Description

2.1 Product Description

The test results in this report pertain only to the item(s) tested.

The following description of the OPID 433MHZ was supplied by Guidance Monitoring, Ltd.:

The OPID 433MHZ is an ankle-worn offender tag that transmits back to a monitoring center.

Overview of the EUT

Applicant	Guidance Monitoring, Ltd. 4 Dominus Way Meridian Business Park Leicester, LE19 1RP, England
Trade Name & Model No.	Offender Electronic Monitoring System, OPID 433MHZ
FCC Identifier	OY3PID23
Use of product	Monitoring device
Transmitter activation	[] Manual and automatically deactivate within 5 seconds of being released [x] Periodic transmissions
Frequency Range (MHz)	433.92
Antenna Requirement	The EUT uses a permanently connected antenna.
Manufacturer name & address	Guidance Monitoring, Ltd. 4 Dominus Way Meridian Business Park Leicester, LE19 1RP, England
EUT type	Production
EUT received date:	12/2/2005
Operating condition:	Good

2.2 Related Submittal(s) Grants

This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

2.3 Test Methodology

Radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Duluth 10-meter chamber site is located at 1950 Evergreen Blvd., Suite 100, Duluth, Georgia. The test site is a 10-meter semi-anechoic chamber. The site meets the characteristics of CISPR 16-1: 1993 and ANSI C63.4: 1992. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

The A2LA accreditation code for this site is 121624 under certificate number 1455.01.

The Industry Canada file number for this site is IC 2077.

3 System Test Configuration

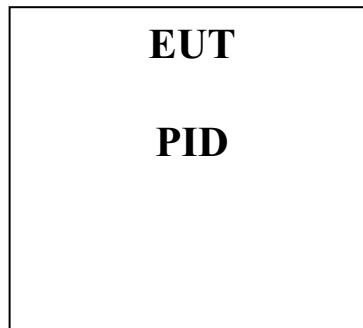
3.1 Support Equipment

No support equipment was needed for this evaluation.

3.2 Cabling

No cables were needed for this evaluation.

3.3 Block Diagram of Test Setup



3.4 Justification

For emissions testing, the test procedures described in American National Standards Institute C63.4-1992 were employed. The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it).

The EUT was configured to transmit full power.

3.5 Software Exercise Program

No special software was required. For emissions testing, a sample was provided that would transmit continuously.

3.6 Mode of Operation During Test

The EUT was set to transmit continuously during testing.

3.7 Modifications Required for Compliance

No modifications were installed by Intertek during compliance testing in order to bring the product into compliance.

3.8 Additions, deviations and exclusions from standards

No additions, deviations or exclusions from the standard were made.

4 Measurement Results

4.1 Radiated Emission FCC Rule 15.231(b)

4.1.1 Procedure

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. The signal is maximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 4000 MHz.

Analyzer resolution is:

100 kHz or greater for frequencies 1000 MHz and below,
1 MHz for frequencies above 1000 MHz.

The Peak value of the Field Strength was measured. The Average value was obtained from the Peak by subtracting the Duty Cycle Correction Factor.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

4.1.2 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follows:

$$FS = RA + AF + CF - AG - DC$$

Where FS = Field Strength in dB (μ V/m)

RA = Receiver Amplitude (including preamplifier) in dB (μ V)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB(1/m)

AG = Amplifier Gain in dB

DC = Duty Cycle (Average Factor)

4.1.3 Test Result

The following data list the significant emission frequencies, the limit and the margin of compliance. The EUT was scanned from 30 MHz to 5 GHz. There were no other radiated emissions within 20 dB of the limit.

Table 4-1: Radiated Emissions – Fundamental & Spurious Emissions

Limits: FCC Part 15.231(e)

Frequency Range (MHz): 30-1000

Test Distance (m): 3

Input power: battery

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J	
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Duty Cycle Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	
V	433.888	86.8	17.1	3.9	27.9	7.7	72.3	72.8	-0.5	X
H	433.888	85.7	16.9	3.9	27.9	7.7	71.0	72.8	-1.8	X
V	433.888	84.2	17.1	3.9	27.9	7.7	69.7	72.8	-3.1	Y
H	433.888	84.7	16.9	3.9	27.9	7.7	70.0	72.8	-2.8	Y
V	433.888	83.7	17.1	3.9	27.9	7.7	69.2	72.8	-3.6	Z
H	433.888	85.0	16.9	3.9	27.9	7.7	70.3	72.8	-2.5	Z
V	867.925	57.1	20.6	5.9	27.7	7.7	48.2	52.8	-4.6	
H	867.925	58.6	21.4	5.9	27.7	7.7	50.5	52.8	-2.3	
V	1301.875	40.3	23.4	6.7	27.3	7.7	35.4	54.0	-18.6	
H	1301.875	34.9	24.5	6.7	27.3	7.7	31.1	54.0	-22.9	
Calculations		G=C+D+E-F-G		J=H-I						

4.2 AC Line Conducted Emission FCC Rule 15.207

4.2.1 Measurement Procedure

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to 12 mm of insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4: 1992

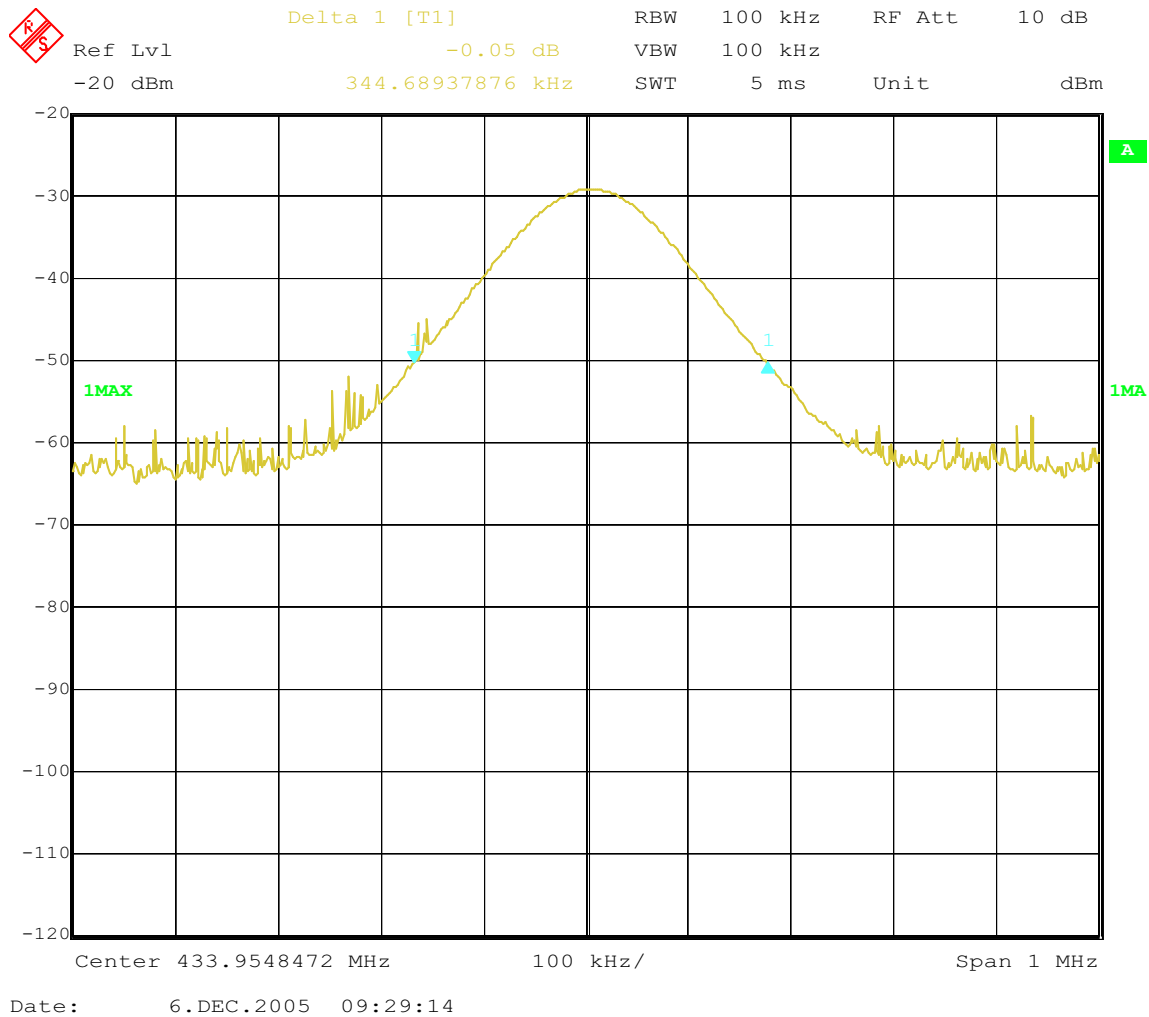
4.2.2 Test Result

This test was not required as the EUT is battery powered and does not connect to the ac mains.

4.3 Occupied Bandwidth Plot FCC Rule 15.231(c)

The following plots show the occupied bandwidth the transmitter. The widest occupied bandwidth at 20 dBc is 344kHz, which is 0.08% of the fundamental frequency.

Figure 4-1: Bandwidth plot



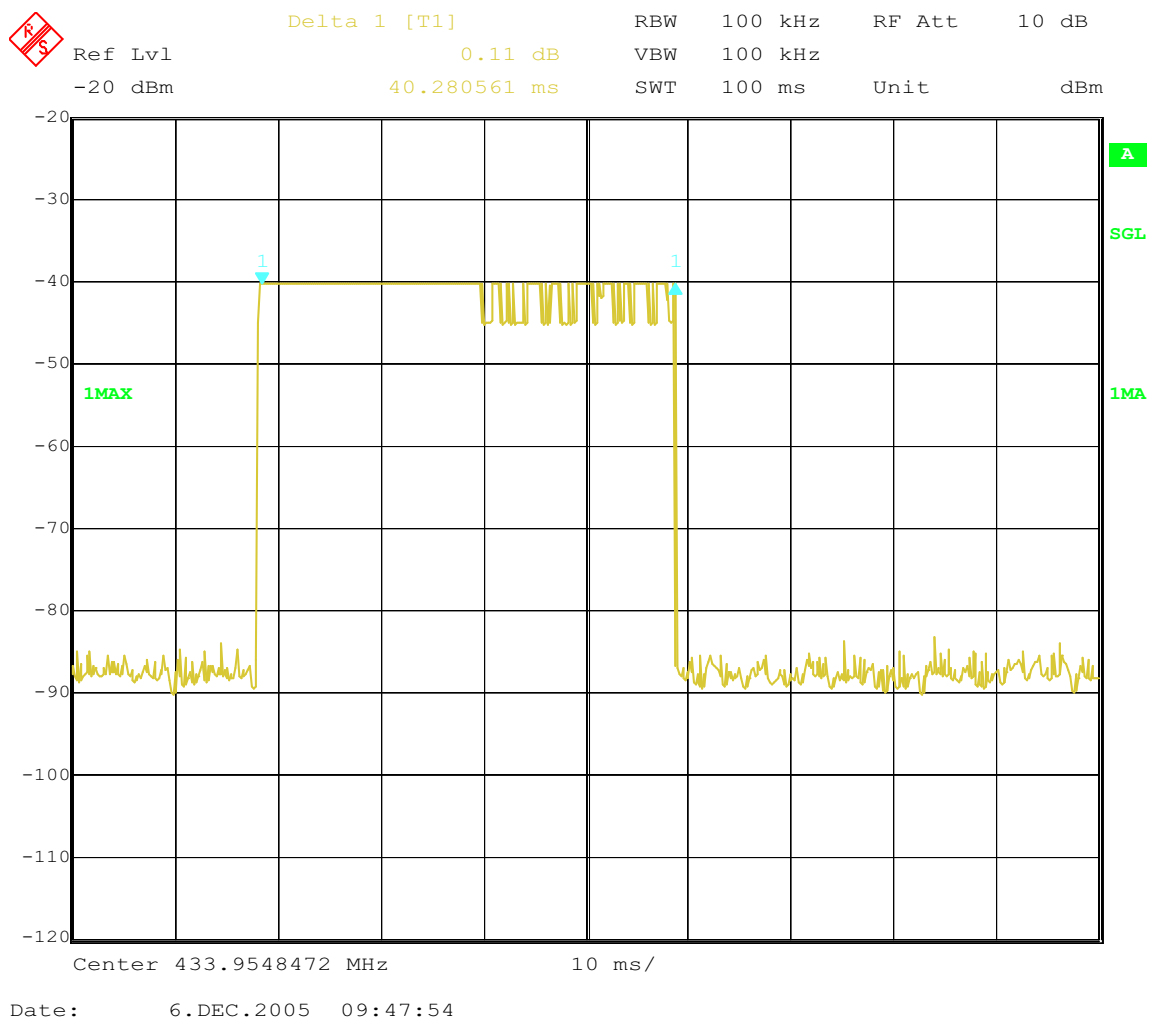
4.4 Transmitter Duty Cycle Calculation and Measurements

The following plot shows the Duty Cycle (DC) of the transmission signal. The Duty Cycle Correction Factor is 7.7 dB.

Duty Cycle is defined as the maximum ON time in a 100 millisecond period divided by 100.

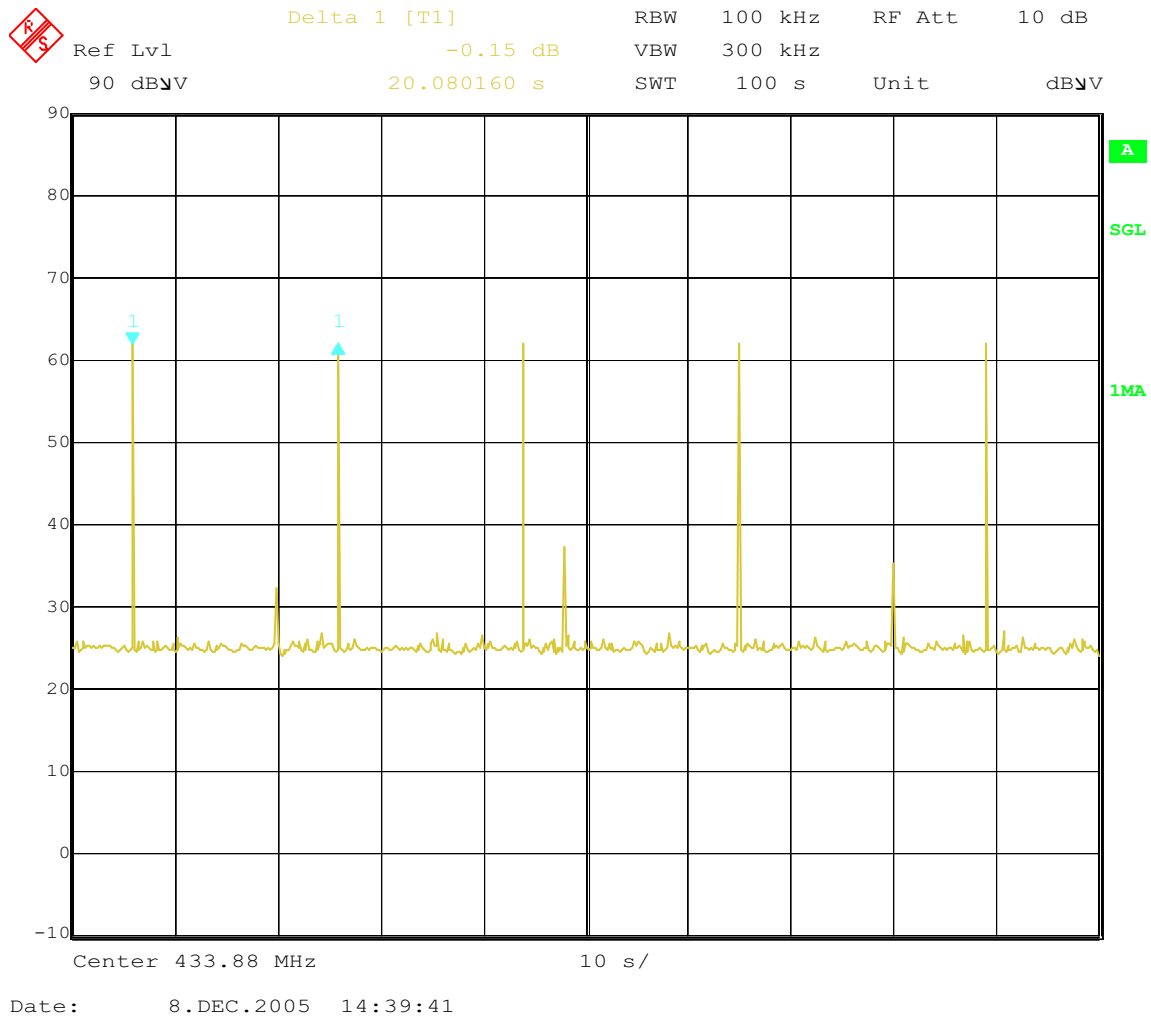
$$\text{Duty Cycle Correction Factor, dB} = 20 * \log(\text{DC})$$

Figure 4-2: Output – 100 milliseconds



4.5 Reduced Field Strengths
FCC Rule 15.231(e)

Figure 4-3: Output – 100 Seconds



Antenna Requirement

X	The transmitter uses a permanently connected antenna.
	The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but does NOT use a standard antenna jack or electrical connector.
	The EUT requires professional installation.

Please refer to the attached documentation for details.

5 List of test equipment

Equipment	Manufacturer	Model Number	Serial Number	Cal. Interval	Cal. Due
EMI Receiver	Hewlett-Packard	8546A	3650A00362	1 yr	01/05/2006
RF Filter Section	Hewlett-Packard	85460A	3704A00331	1 yr	01/05/2006
Spectrum Analyzer	Rohode & Schwarz	FSEK 30	100353	1 yr	08/30/2006
Amplifier	Hewlett-Packard	HP8449B	3008A00989	1 yr	04/22/2006
Antenna	Schnaffner-Chase	CBL6112B	2622	1 yr	08/23/2006
Horn Antenna	EMCO	3115	9208-3919	1 yr	03/11/2006
Cable	N/A	CableMP3	N/A	1 yr	05/11/2006
Cable	N/A	CableE01	N/A	1 yr	05/11/2006
Cable	N/A	CableE11	#211266	1 yr	05/12/2006
Cable	N/A	Cable E20	N/A	1 yr	05/12/2006
Cable	N/A	CableE202	N/A	1 yr	05/13/2006

6 Document History

Report Number	Writer Initials	Date	Change
3085182-37-1-0	TJI	December 15, 2005	Original document
3085182-37-1-1	TJI	February 8, 2006	Updated FCC ID: from OY3PID23 to OY3OPID433
3085182-37-1-2	TJI	February 13, 2006	Correction to table 4-1, duty cycle factor added to second and third harmonic. The test data in table 4-1 was taken on 10/25/2005