



## MET Laboratories, Inc.

*Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313

33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372

3162 BELICK STREET • SANTA CLARA, CALIFORNIA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372

April 20, 2011

Guardtrax LLC  
11 Commerce Drive  
Cranford, NJ 07016

Dear John Koch,

Enclosed is the EMC Wireless test report for compliance testing of the Guardtrax LLC, Guard Trax 2.0 Model #: GT-900100 as tested to the requirements of the FCC Certification rules under Title 47 of the CFR Part 22 Subpart H and RSS-132, Issue 2, September 2005 for Cellular Devices, Part 24 Subpart E and RSS-133, Issue 5, February 2009 for Broadband PCS Devices.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please contact me.

Sincerely yours,  
MET LABORATORIES, INC.

Jennifer Warnell  
Documentation Department

Reference: (\Guardtrax LLC\EMCS82925-FCC22\_24 Rev. 3)

Certificates and reports shall not be reproduced except in full, without the written permission of MET Laboratories, Inc.



## **MET Laboratories, Inc.**

*Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313

33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372

3162 BELICK STREET • SANTA CLARA, CALIFORNIA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372

### **Electromagnetic Compatibility Criteria Test Report**

for the

**Guardtrax LLC  
Model Guard Trax 2.0 Model #: GT-900100**

**Tested under  
FCC Certification Rules**

**Title 47 of the CFR, Part 22 Subpart H & RSS-132, Issue 2, September 2005**

**for Cellular Devices,**

**Part 24 Subpart E & RSS-133, Issue 5, February 2009  
for Broadband PCS Devices**

**MET Report: EMCS82925-FCC22\_24 Rev. 3**

April 20, 2011

**Prepared For:**

**Guardtrax LLC  
11 Commerce Drive  
Cranford, NJ 07016**

**Prepared By:**

**MET Laboratories, Inc.  
914 W. Patapsco Ave  
Baltimore, MD 21230**



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Cover Page  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## Electromagnetic Compatibility Criteria Test Report

for the

**Guardtrax LLC  
Model Guard Trax 2.0 Model #: GT-900100**

### Tested Under

**FCC Certification Rules  
Title 47 of the CFR, Part 22 Subpart H & RSS-132, Issue 2, September 2005  
for Cellular Devices,  
Part 24 Subpart E & RSS-133, Issue 5, February 2009  
for Broadband PCS Devices**

Lionel Gabrillo, Project Engineer  
Electromagnetic Compatibility Lab

Jennifer Warnell  
Documentation Department

**Engineering Statement:** The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 22 Subpart H, Part 24 Subpart E of the FCC Rules and Industry Canada standards RSS-132, Issue 2, September 2005 and RSS-133, Issue 5, February 2009 under normal use and maintenance.

Shawn McMillen, Wireless Manager  
Electromagnetic Compatibility Lab



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Report Status  
C CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	February 23, 2011	Initial Issue.
1	March 30, 2011	Revised to reflect new company name.
2	April 14, 2011	Revised to reflect engineer corrections.
3	April 20, 2011	Revised to reflect editorial corrections.



## Table of Contents

<b>I.</b>	<b>Executive Summary .....</b>	<b>1</b>
A.	Purpose of Test .....	2
B.	Executive Summary .....	2
<b>II.</b>	<b>Equipment Configuration .....</b>	<b>3</b>
A.	Overview.....	4
B.	References.....	5
C.	Test Site .....	5
D.	Description of Test Sample.....	5
E.	Equipment Configuration.....	7
F.	Support Equipment .....	7
G.	Ports and Cabling Information.....	7
H.	Mode of Operation.....	7
I.	Modifications .....	7
	Modifications to EUT.....	7
	Modifications to Test Standard.....	7
J.	Disposition of EUT .....	7
<b>III.</b>	<b>Electromagnetic Compatibility Criteria for Intentional Radiators – Part 22/24 .....</b>	<b>8</b>
	§ 2.1046 RF Power Output.....	9
	§ 2.1049 Occupied Bandwidth .....	12
	§ 2.1053 Radiated Spurious Emissions .....	13
	§ 2.1051 Spurious Emissions at Antenna Terminals .....	20
<b>IV.</b>	<b>Test Equipment .....</b>	<b>22</b>
<b>V.</b>	<b>Certification &amp; User's Manual Information.....</b>	<b>24</b>
A.	Certification Information .....	25
B.	Label and User's Manual Information .....	29



## List of Tables

Table 1. Executive Summary of EMC Compliance Testing .....	2
Table 2. EUT Summary Table.....	4
Table 3. Standard References .....	5
Table 4. Equipment Configuration.....	7
Table 5. Support Equipment.....	7
Table 6. EIRP, GSM850.....	10
Table 7. EIRP, GSM1900.....	10
Table 8. Test Equipment List .....	23

## List of Figures

Figure 1. Block Diagram of Test Configuration.....	6
Figure 2. RF Power Output Test Setup.....	10

## List of Plots

Plot 1. Radiated Spurious Emissions, 850 MHz, Low Channel, 30 MHz – 1 GHz.....	15
Plot 2. Radiated Spurious Emissions, 850 MHz, Low Channel, 1 GHz – 10 GHz .....	15
Plot 3. Radiated Spurious Emissions, 850 MHz, Mid Channel, 30 MHz – 1 GHz .....	15
Plot 4. Radiated Spurious Emissions, 850 MHz, Mid Channel, 1 GHz – 10 GHz .....	16
Plot 5. Radiated Spurious Emissions, 850 MHz, High Channel, 30 MHz – 1 GHz .....	16
Plot 6. Radiated Spurious Emissions, 850 MHz, High Channel, 1 GHz – 10 GHz.....	16
Plot 7. Radiated Spurious Emissions, 1900 MHz, Low Channel, 30 MHz – 1 GHz.....	17
Plot 8. Radiated Spurious Emissions, 1900 MHz, Low Channel, 1 GHz – 18 GHz .....	17
Plot 9. Radiated Spurious Emissions, 1900 MHz, Mid Channel, 30 MHz – 1 GHz .....	17
Plot 10. Radiated Spurious Emissions, 1900 MHz, Mid Channel, 1 GHz – 18 GHz .....	18
Plot 11. Radiated Spurious Emissions, 1900 MHz, High Channel, 30 MHz – 1 GHz .....	18
Plot 12. Radiated Spurious Emissions, 1900 MHz, High Channel, 1 GHz – 18 GHz.....	18

## List of Photographs

Photograph 1. EIRP, Test Setup, 850 MHz.....	11
Photograph 2. EIPR, Test Setup, 1900 MHz.....	11
Photograph 3. Radiated Emissions, Test Setup, Below 1 GHz .....	19
Photograph 4. Radiated Emissions, Test Setup, Above 1 GHz .....	19



## List of Terms and Abbreviations

<b>AC</b>	Alternating Current
<b>ACF</b>	Antenna Correction Factor
<b>Cal</b>	Calibration
<i>d</i>	Measurement Distance
<b>dB</b>	Decibels
<b>dB<math>\mu</math>A</b>	Decibels above one <b>microamp</b>
<b>dB<math>\mu</math>V</b>	Decibels above one <b>microvolt</b>
<b>dB<math>\mu</math>A/m</b>	Decibels above one <b>microamp per meter</b>
<b>dB<math>\mu</math>V/m</b>	Decibels above one <b>microvolt per meter</b>
<b>DC</b>	Direct Current
<b>E</b>	Electric Field
<b>DSL</b>	Digital Subscriber Line
<b>ESD</b>	Electrostatic Discharge
<b>EUT</b>	Equipment Under Test
<i>f</i>	Frequency
<b>FCC</b>	Federal Communications Commission
<b>GRP</b>	Ground Reference Plane
<b>H</b>	Magnetic Field
<b>HCP</b>	Horizontal Coupling Plane
<b>Hz</b>	Hertz
<b>IEC</b>	International Electrotechnical Commission
<b>kHz</b>	kilohertz
<b>kPa</b>	kilopascal
<b>kV</b>	kilovolt
<b>LISN</b>	Line Impedance Stabilization Network
<b>MHz</b>	Megahertz
<b><math>\mu</math>H</b>	<b>microhenry</b>
$\mu$	<b>microfarad</b>
$\mu$ s	<b>microseconds</b>
<b>NEBS</b>	Network Equipment-Building System
<b>PRF</b>	Pulse Repetition Frequency
<b>RF</b>	Radio Frequency
<b>RMS</b>	Root-Mean-Square
<b>TWT</b>	Traveling Wave Tube
<b>V/m</b>	<b>Volts per meter</b>
<b>VCP</b>	Vertical Coupling Plane



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Executive Summary  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## I. Executive Summary



## A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Guardtrax LLC Guard Trax 2.0 Model #: GT-900100, with the requirements of Part 22 Subpart H, Part 24 Subpart E and Part 15 Subpart B. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the Guard Trax 2.0 Model #: GT-900100. Guardtrax LLC should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Guard Trax 2.0 Model #: GT-900100, has been **permanently** discontinued.

## B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 22 Subpart H, Part 24 Subpart E and Part 15 Subpart B,, in accordance with Guardtrax LLC, purchase order number 1093.

Reference	IC Reference	Description	Compliance
§2.1046; §22.913, §24.232	RSS-132, Section 4.4 RSS-133, Section 6.4	RF Power Output	Compliant
§2.1047	RSS-132, Section 4.2 RSS-133 Section 6.2	Modulation Characteristics	Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G
§2.1049	RSS-GEN, Section 4.6	Occupied Bandwidth	Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G
§2.1051; §22.917, §24.238	RSS-132, Section 4.5 RSS-133, Section 6.5	Conducted Spurious Emissions at Antenna Terminals	Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G
§2.1053; §22.917, §24.238	RSS-132, Section 4.5 RSS-133, Section 6.5	Radiated Spurious Emissions from the Cabinet	Compliant
§2.1055; §22.355, §24.135	RSS-132, Section 4.3 RSS-133, Section 6.3	Frequency Stability	Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G
2-11-04/EAB/RF	RSS-132, Section 4.5.1 RSS-133, Section 6.5.1	Out of Band Rejection	Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G

Table 1. Executive Summary of EMC Compliance Testing



Intergis, LLC

Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Equipment Configuration  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## II. Equipment Configuration

## A. Overview

MET Laboratories, Inc. was contracted by Guardtrax LLC to perform testing on the Guard Trax 2.0 Model #: GT-900100, under Guardtrax LLC's purchase order number 1093.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Guardtrax LLC, Guard Trax 2.0 Model #: GT-900100.

The results obtained relate only to the item(s) tested.

<b>Model(s) Tested:</b>	Guard Trax 2.0 Model #: GT-900100	
<b>Model(s) Covered:</b>	Guard Trax 2.0 Model #: GT-900100	
<b>EUT Specifications:</b>	Primary Power: 4.2 V	
	FCC ID: ZAA-GT-900100 IC: 9528A-GT900100	
	Type of Modulations:	GSM
	Equipment Code:	PCS
	Peak EIRP:	30.731
	EUT Frequency Ranges:	824.0 – 849.0 MHz 1850.0 – 1910.0 MHz
<b>Analysis:</b>	The results obtained relate only to the item(s) tested.	
<b>Environmental Test Conditions:</b>	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
<b>Evaluated by:</b>	Lionel Gabrillo	
<b>Date(s):</b>	April 20, 2011	

**Table 2. EUT Summary Table**

## B. References

<b>CFR 47, Part 22, Subpart H</b>	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 22: Rules and Regulations for Cellular Devices.
<b>CFR 47, Part 24, Subpart E</b>	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 24: Rules and Regulations for Personal Communications Services
<b>RSS-132, Issue 2, September 2005</b>	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz
<b>RSS-133, Issue 5, February 2009</b>	2 GHz Personal Communications Services
<b>ANSI C63.4:2003</b>	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
<b>ANSI/NCSL Z540-1-1994</b>	Calibration Laboratories and Measuring and Test Equipment - General Requirements
<b>ANSI/ISO/IEC 17025:2000</b>	General Requirements for the Competence of Testing and Calibration Laboratories
<b>EIA/TIA-603-A-2001</b>	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards

**Table 3. Standard References**

## C. Test Site

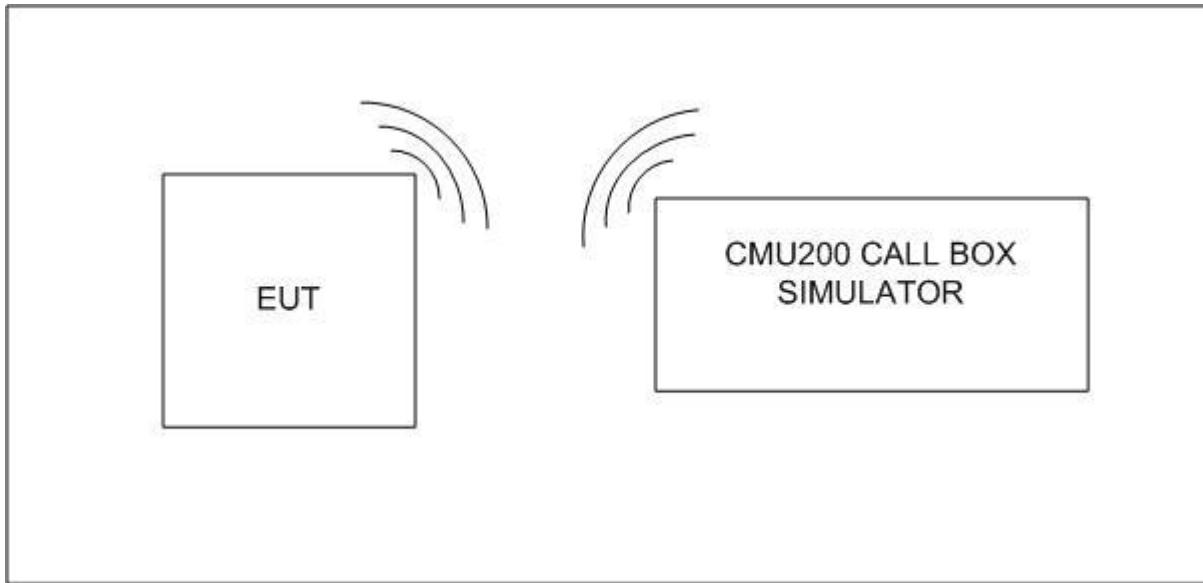
All testing was performed at MET Laboratories, Inc., 3162 Belick St., Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site).

## D. Description of Test Sample

The Guardtrax LLC Guard Trax 2.0 Model #: GT-900100, Equipment Under Test (EUT), is a hand held tracking device designed for the security industry. The Guard Trax incorporates GPS /GSM / RFID technology.

This design incorporates an Atmel ATMega128 8-bit microcontroller, a Telit combination Quad Band GSM Modem/ 20 channel GPS Receiver, 3V 8 position SIM card interface, a DS1371 Real Time Clock, TI TRF7960/1 RFID AFE subsystem, a 512Kx8 SPI FLASH, a LP3470 POR, temperature sensor, light sensor, motion sensors, 10 position keypad interface, microphone and speaker audio subsystem, power supply and battery charging subsystem, a custom LCD interface with electroluminescent backlighting driver, USB subsystem, and the specified interface/debug connectors.



**Figure 1. Block Diagram of Test Configuration**

## E. Equipment Configuration

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
1	GUARD TRAX 2.0	GT-900100	NA	358281007063385	2.4
1	Switch-Mode Power Supply	TCC22	NA	NA	NA

**Table 4. Equipment Configuration**

## F. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number
3	Laptop computer	Dell	XPS M1210

**Table 5. Support Equipment**

## G. Ports and Cabling Information

The EUT did not require any ports and cabling information for operation or monitoring.

## H. Mode of Operation

Internal CPU

## I. Modifications

### a) Modifications to EUT

No modifications were made to the EUT.

### b) Modifications to Test Standard

No modifications were made to the test standard.

## J. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Guardtrax LLC upon completion of testing.



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Intentional Radiators  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

### **III. Electromagnetic Compatibility Criteria for Intentional Radiators – Part 22/24**

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 2.1046 RF Power Output

**Test Requirements:** **§ 2.1046 Measurements required: RF power output:**

**§ 2.1046 (a)** For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

**§ 2.1046 (b)** For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters, the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and as applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

**§ 2.1046 (c)** For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

### § 22.913 Power and antenna height limits.

**§ 22.913(a):** The Effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 watts.

### § 24.232 Power and antenna height limits.

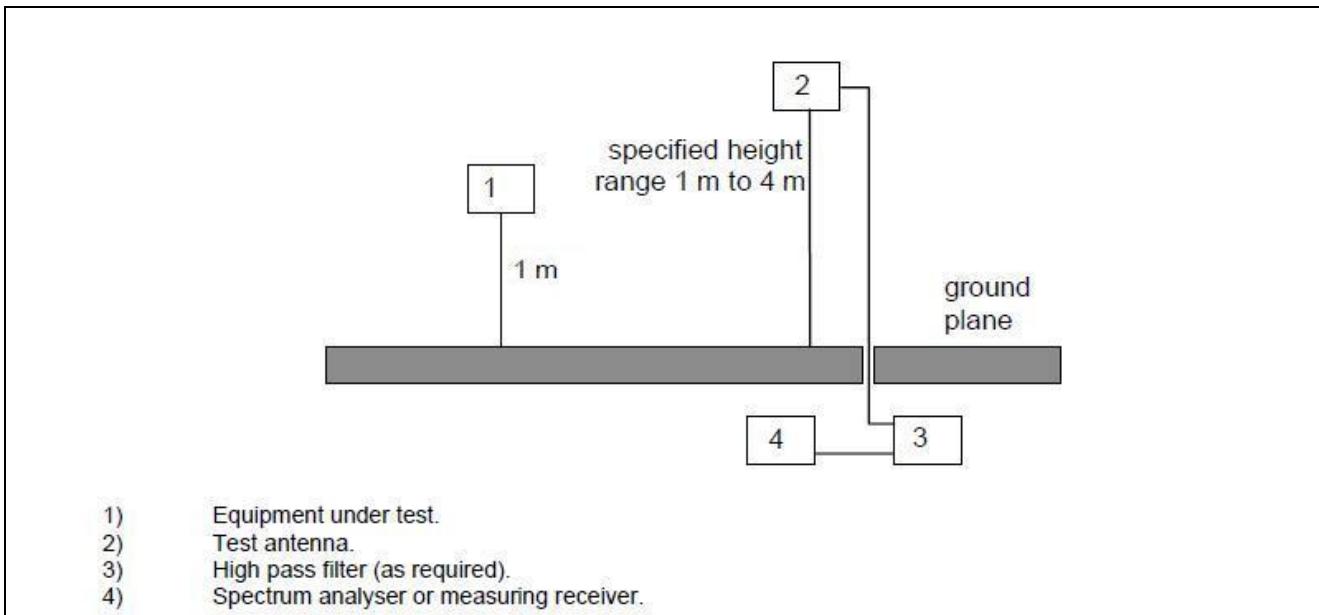
**§ 24.232 (b):** Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

**Test Procedures:** The EUT was setup on a turntable inside a semi anechoic chamber. This test was performed in all applicable modulations. The EUT was rotated about 360° and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value.

**Test Results:** The EUT complies with the requirements of this section. The EUT conducted power does not exceed limit at the carrier frequency.

**Test Engineer(s):** Lionel Gabrillo

**Test Date(s):** 02/07/11



**Figure 2. RF Power Output Test Setup**

Channel	Frequency (MHz)	EIRP
Low	824.2	27.666
Mid	836.6	27.457
High	848.8	27.373

**Table 6. EIRP, GSM850**

Channel	Frequency (MHz)	EIRP
Low	1850.2	28.372
Mid	1880.2	26.631
High	1909.8	30.731

**Table 7. EIRP, GSM1900**



Photograph 1. EIRP, Test Setup, 850 MHz



Photograph 2. EIPR, Test Setup, 1900 MHz

## § 2.1049 Occupied Bandwidth

**Test Requirement(s):** **§ 2.1049 Measurements required: Occupied bandwidth:** The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

**Test Results:** Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G.



## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 2.1053 Radiated Spurious Emissions

**Test Requirement(s):** § 2.1053 Measurements required: Field strength of spurious radiation.

**§ 2.1053 (a)** Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

**§ 2.1053 (b):** The measurements specified in paragraph (a) of this section shall be made for the following equipment:

- (1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.
- (2) All equipment operating on frequencies higher than 25 MHz.
- (3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
- (4) Other types of equipment as required, when deemed necessary by the Commission.

**§ 22.917 Emission limitations Cellular equipment, § 24.238 Emission limitations for Broadband PCS equipment:** The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

**§ 22.917 (a), § 24.238 (a):** Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$ .



**Test Procedures:** As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The spectrum analyzer was corrected to add cable loss, distance correction and cable loss. Harmonic emissions up to the 10<sup>th</sup> or 40GHz, which ever was the lesser, were investigated.

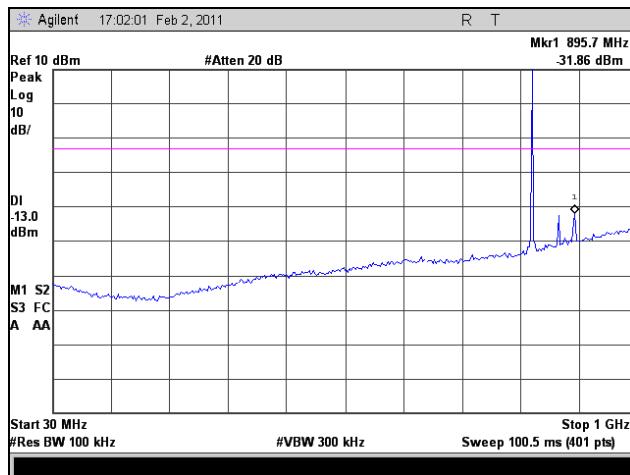
A modulated carrier generated by the signal generator carrier was connected to either the Uplink or Downlink RF port at a maximum level as determined by the OEM. A spectrum analyzer was connected to either the Uplink or Downlink port depending on the circuitry being measured. The spectrum analyzer was set to 1MHz RBW and 3MHz VBW. The spectrum was investigated from 30MHz to the 10<sup>th</sup> harmonic of the carrier.

**Test Results:** The EUT complies with the requirements of this section.

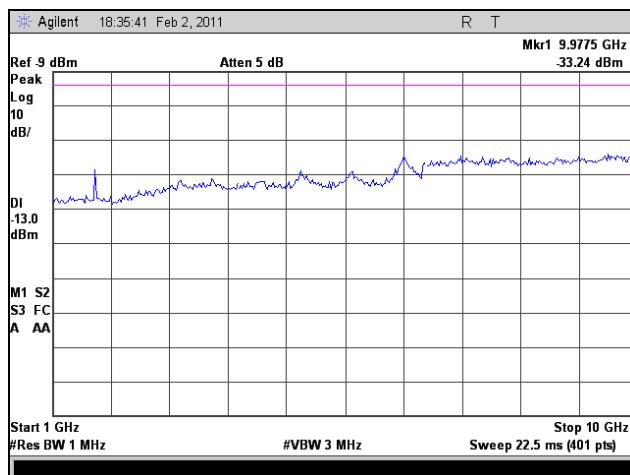
**Test Engineer:** Lionel Gabrillo

**Test Date(s):** 02/03/11

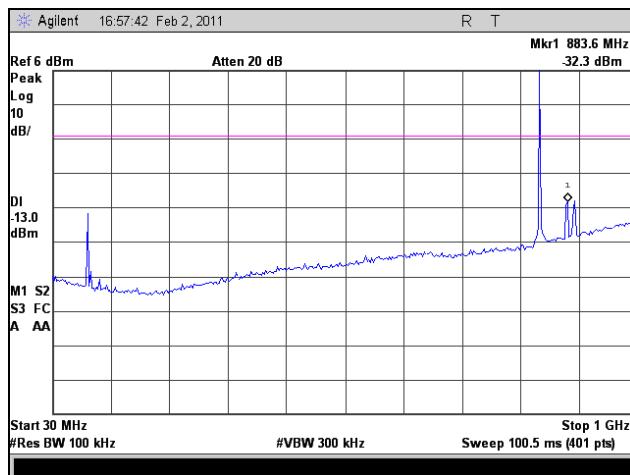
## 850 MHz



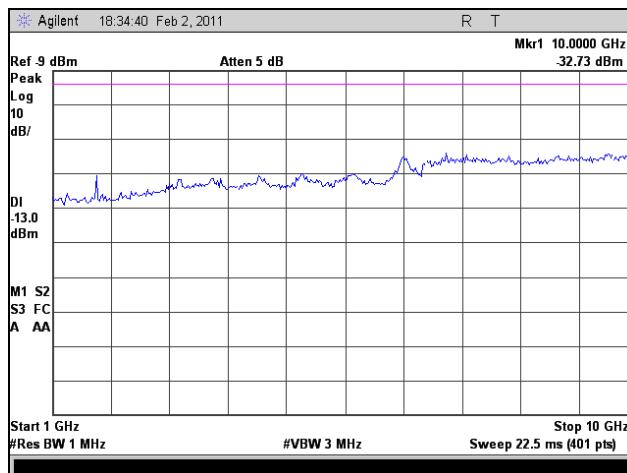
Plot 1. Radiated Spurious Emissions, 850 MHz, Low Channel, 30 MHz – 1 GHz



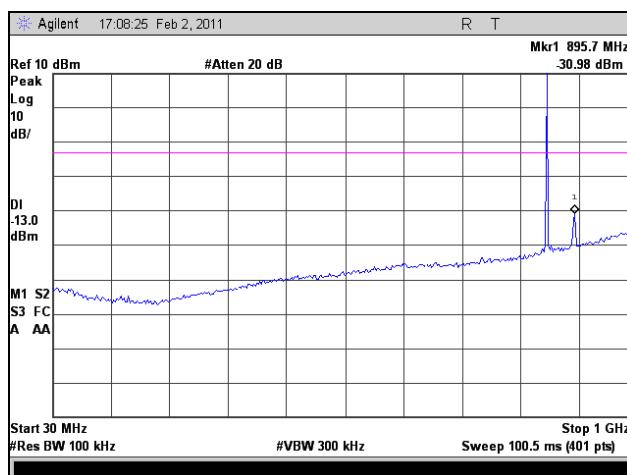
Plot 2. Radiated Spurious Emissions, 850 MHz, Low Channel, 1 GHz – 10 GHz



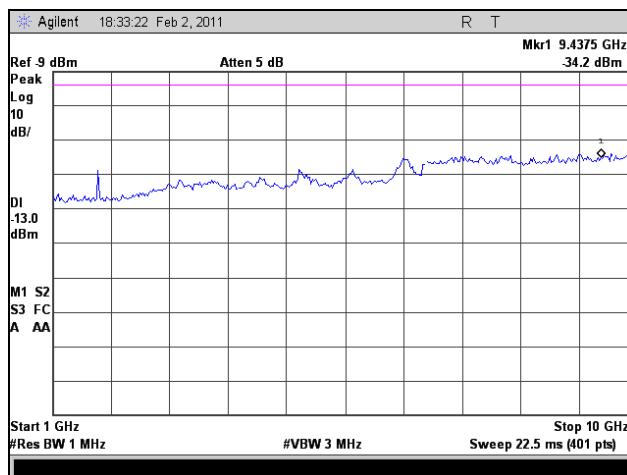
Plot 3. Radiated Spurious Emissions, 850 MHz, Mid Channel, 30 MHz – 1 GHz



Plot 4. Radiated Spurious Emissions, 850 MHz, Mid Channel, 1 GHz – 10 GHz

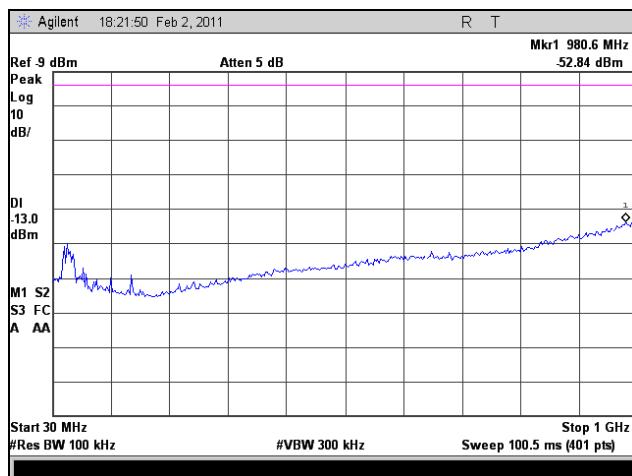


Plot 5. Radiated Spurious Emissions, 850 MHz, High Channel, 30 MHz – 1 GHz

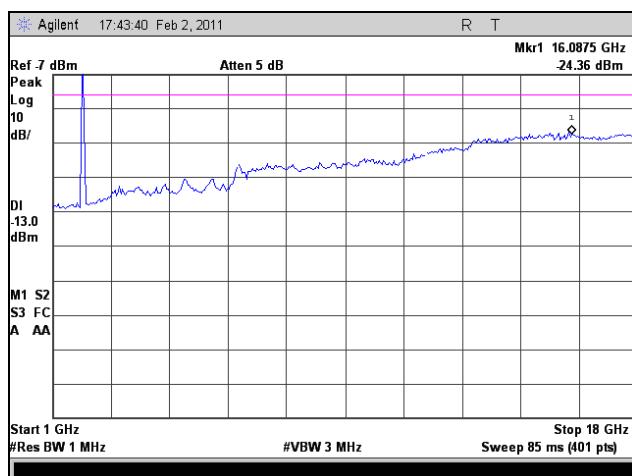


Plot 6. Radiated Spurious Emissions, 850 MHz, High Channel, 1 GHz – 10 GHz

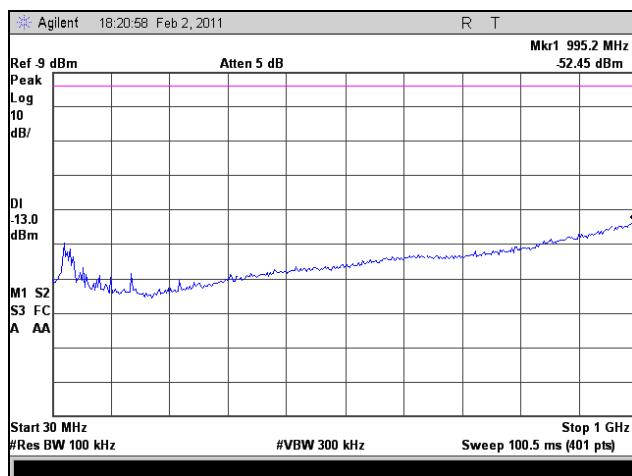
## 1900 MHz



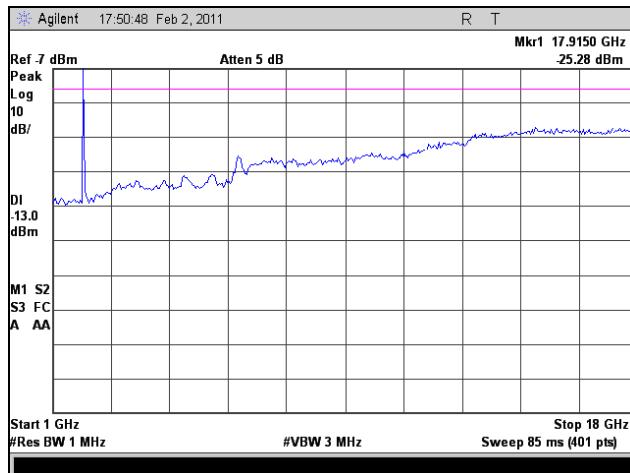
Plot 7. Radiated Spurious Emissions, 1900 MHz, Low Channel, 30 MHz – 1 GHz



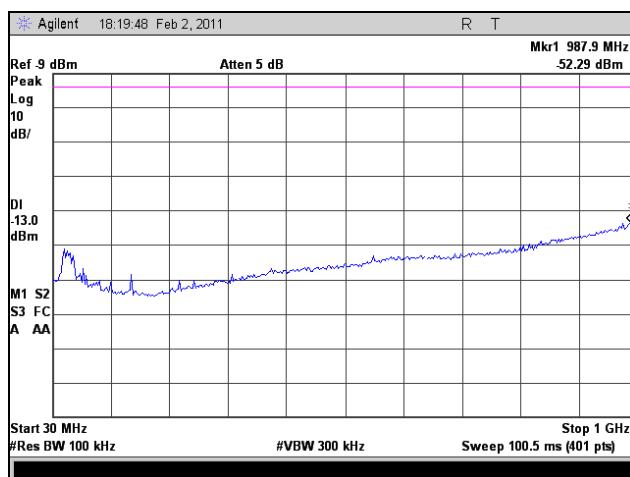
Plot 8. Radiated Spurious Emissions, 1900 MHz, Low Channel, 1 GHz – 18 GHz



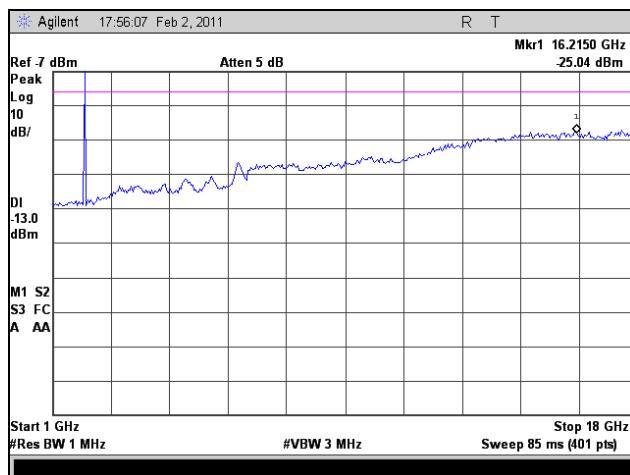
Plot 9. Radiated Spurious Emissions, 1900 MHz, Mid Channel, 30 MHz – 1 GHz



Plot 10. Radiated Spurious Emissions, 1900 MHz, Mid Channel, 1 GHz – 18 GHz

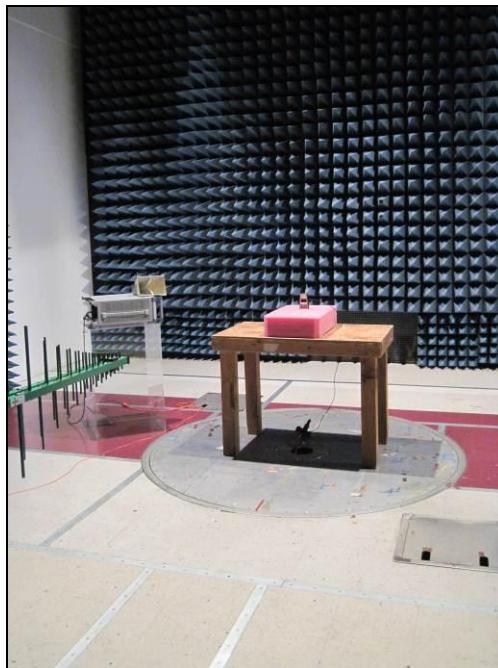


Plot 11. Radiated Spurious Emissions, 1900 MHz, High Channel, 30 MHz – 1 GHz



Plot 12. Radiated Spurious Emissions, 1900 MHz, High Channel, 1 GHz – 18 GHz

## Electromagnetic Compatibility Criteria for Intentional Radiators



Photograph 3. Radiated Emissions, Test Setup, Below 1 GHz



Photograph 4. Radiated Emissions, Test Setup, Above 1 GHz

## Electromagnetic Compatibility Criteria for Intentional Radiators

### § 2.1051 Spurious Emissions at Antenna Terminals

**Test Requirement(s):** **§ 2.1051 Measurements required: Spurious emissions at antenna terminals:** The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

**§ 22.917, §24.238 Emission limitations for Broadband PCS equipment:** The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

**§ 22.917 (a), § 24.238 (a)** Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

**Test Results:** Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Intentional Radiators  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## Electromagnetic Compatibility Criteria for Intentional Radiators

### Frequency Stability

**Test Results:** Refer to FCC ID: RI7GE863G and IC: 5131A-GE863G



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Test Equipment  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## IV. Test Equipment



## Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET #	Equipment	Manufacturer	Model#	Cal Date	Cal Due
1S2482	5 METER CHAMBER	PANASHIELD	641431	11/13/2010	11/13/2011
1S2484	BILOG ANTENNA	TESEQ	CBL6112D	1/27/2009	1/27/2011
1S2603	HORN ANTENNA	ETS-LINDGREN	3117	4/9/2009	4/9/2011
1S2460	SPECTRUM ANALYZER	AGILENT	E4407B	7/13/2010	7/13/2011
1S2198	HORN ANTENNA	EMCO	3115	9/22/2010	9/22/2011
1S2645	RF SIGNAL GENERATOR	AGILENT	N9310A	4/29/2010	4/29/2011
1S2447	AMPLIFIER	MINI- CURCUTS	ZHL-4240W-SMA	SEE NOTE	

**Table 8. Test Equipment List**

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Certification & User's Manual Information  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## V. Certification & User's Manual Information



## Certification & User's Manual Information

### A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

#### § 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

#### § 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
  - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
  - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

- (i) *Compliance testing;*
- (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
- (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
- (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
- (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.



## Certification & User's Manual Information

**The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:**

### § 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.<sup>1</sup> *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer,* be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

### § 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

---

<sup>1</sup> In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.



## Certification & User's Manual Information

### § 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.



## Certification & User's Manual Information

### Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

#### § 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

#### § 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
Certification & User's Manual Information  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

### § 15.105 Information to the user.

(a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Intergis, LLC  
Guard Trax 2.0 Model #: GT-900100

Electromagnetic Compatibility  
End of Report  
CFR Title 47 Part 22 H & RSS-132; Part 24 E & RSS-133

## End of Report