

## 9.9. SETUP PHOTOS

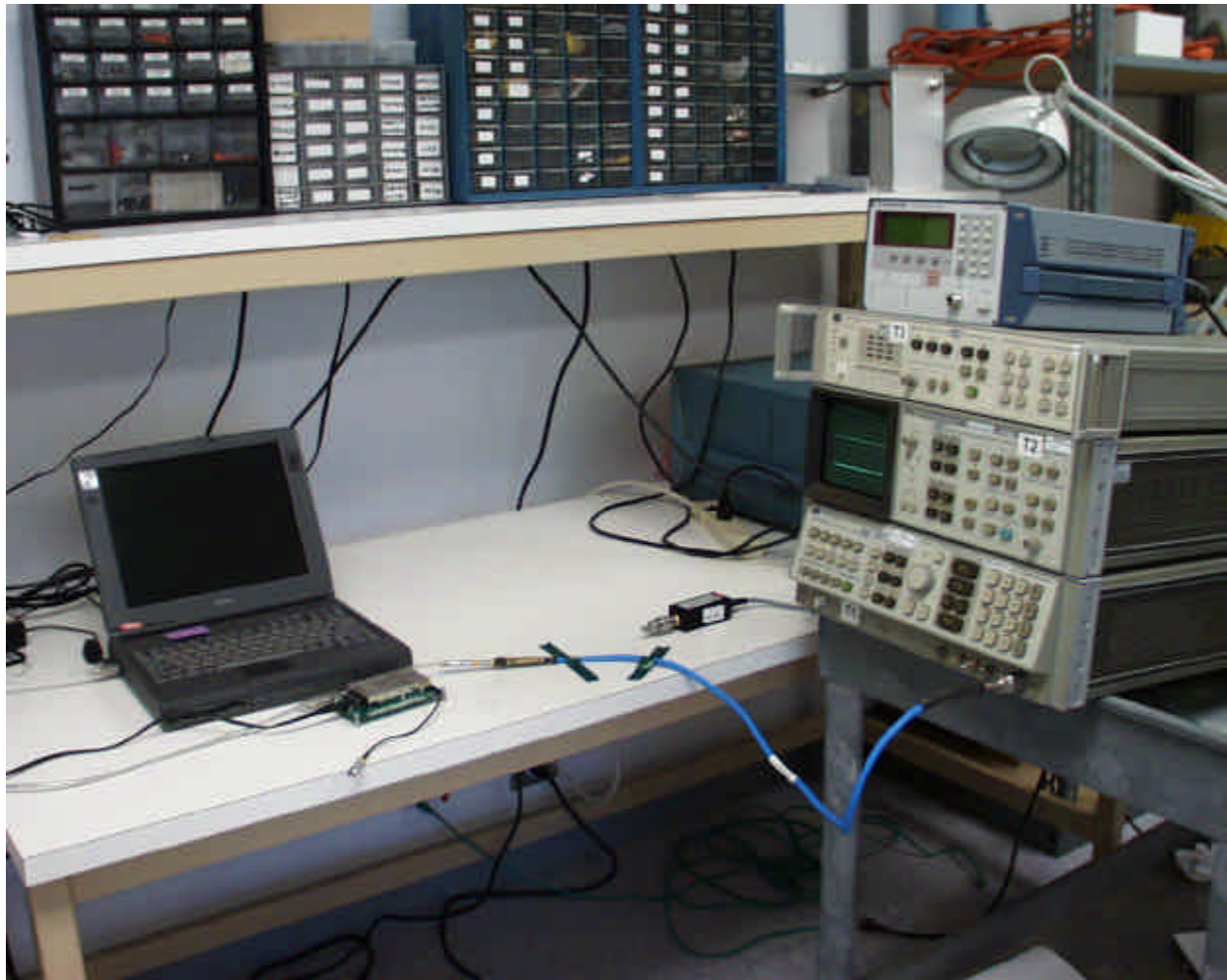
Radiated Emission photos.



Conducted Emission Photos



FCC testing to antenna port



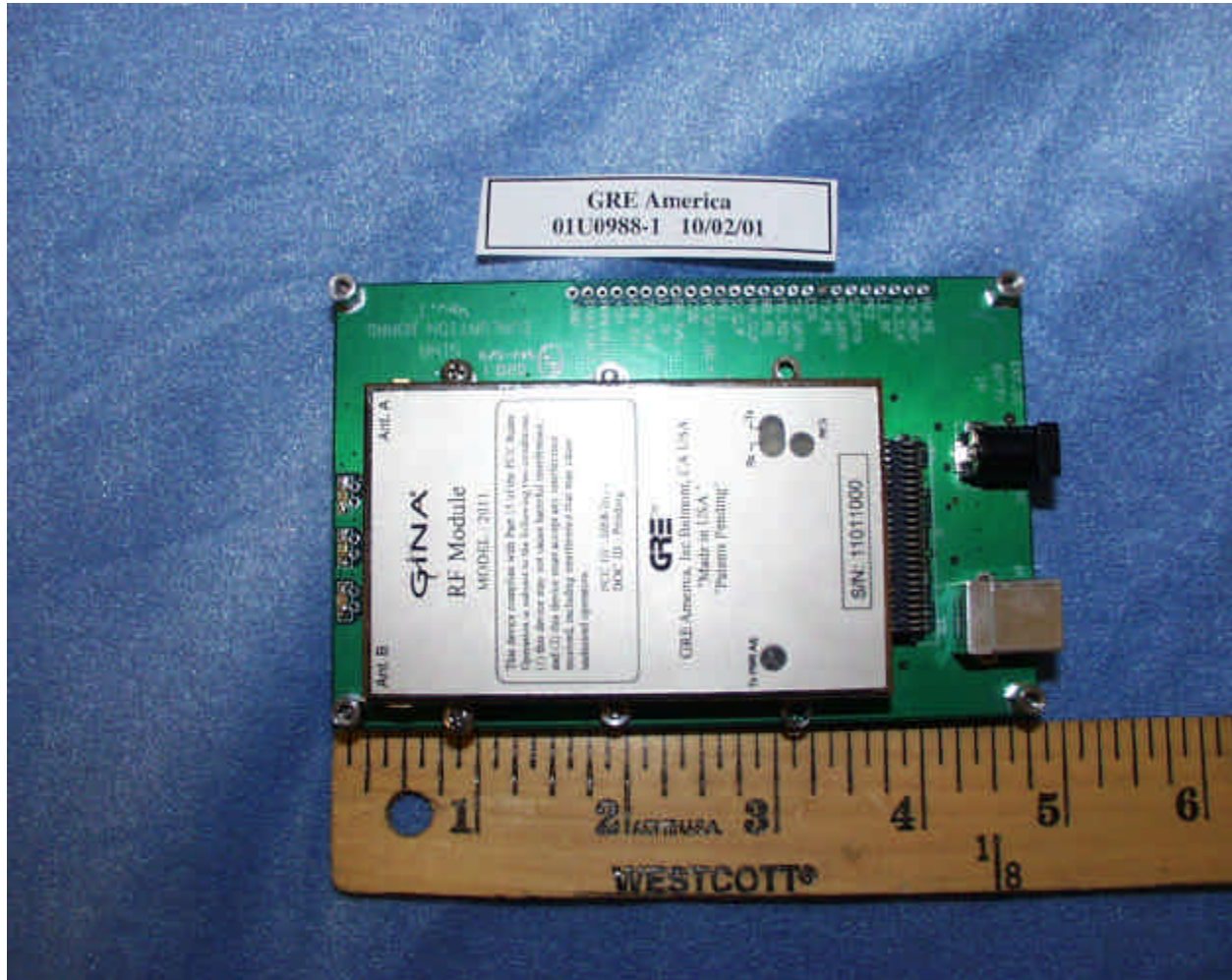


FCC testing above 1GIGHz

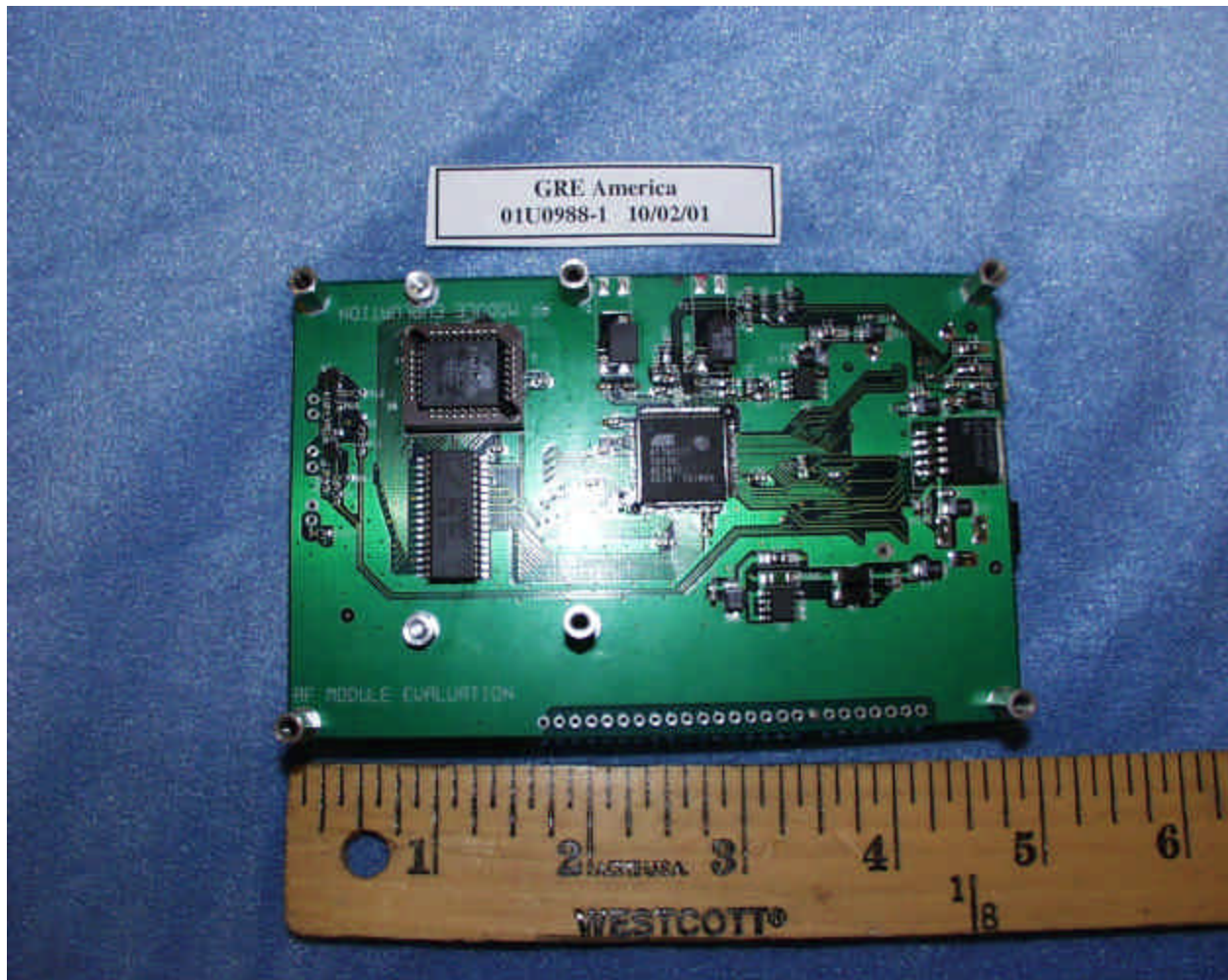


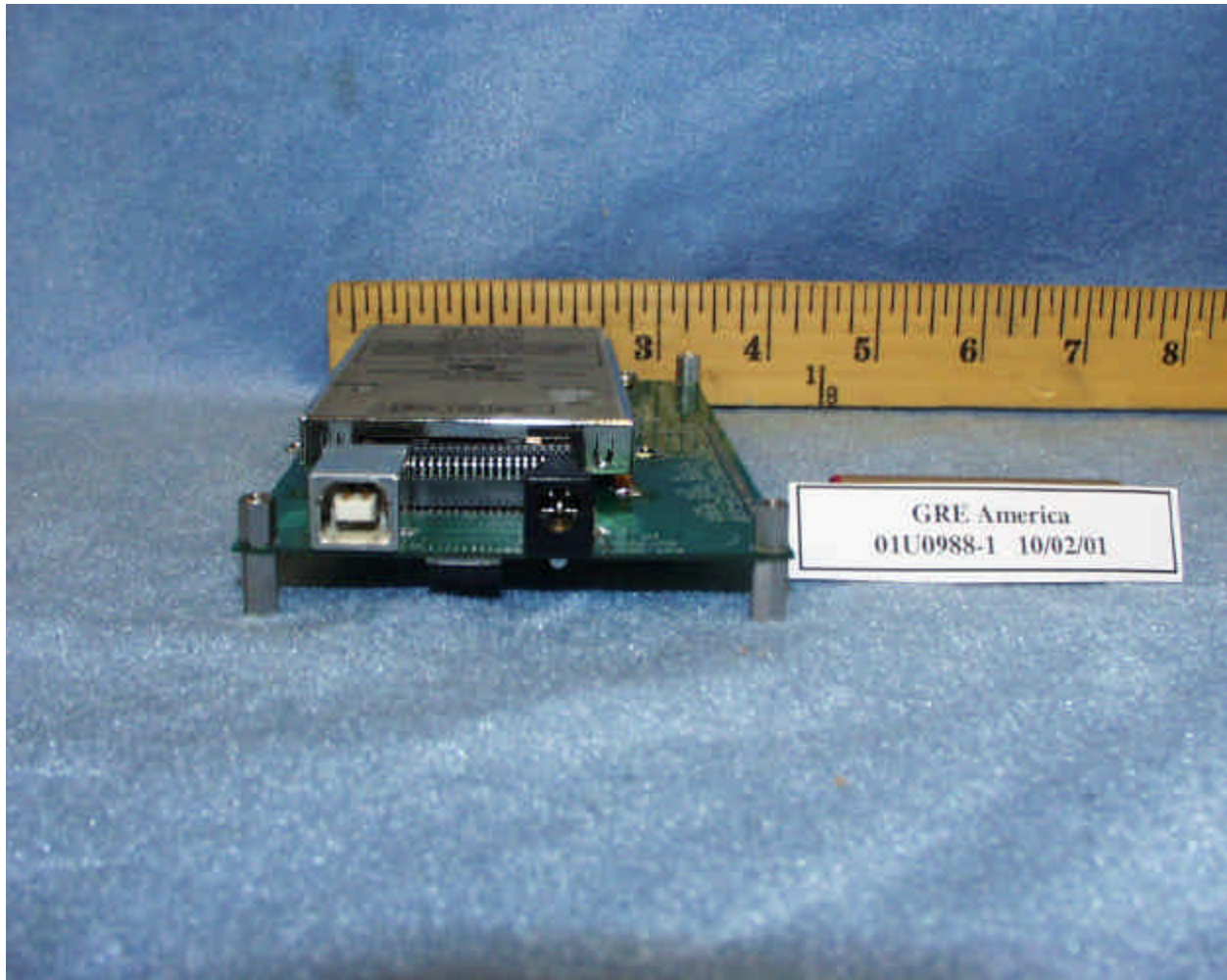
## ATTACHMENTS

## EUT PHOTOGRAPHS

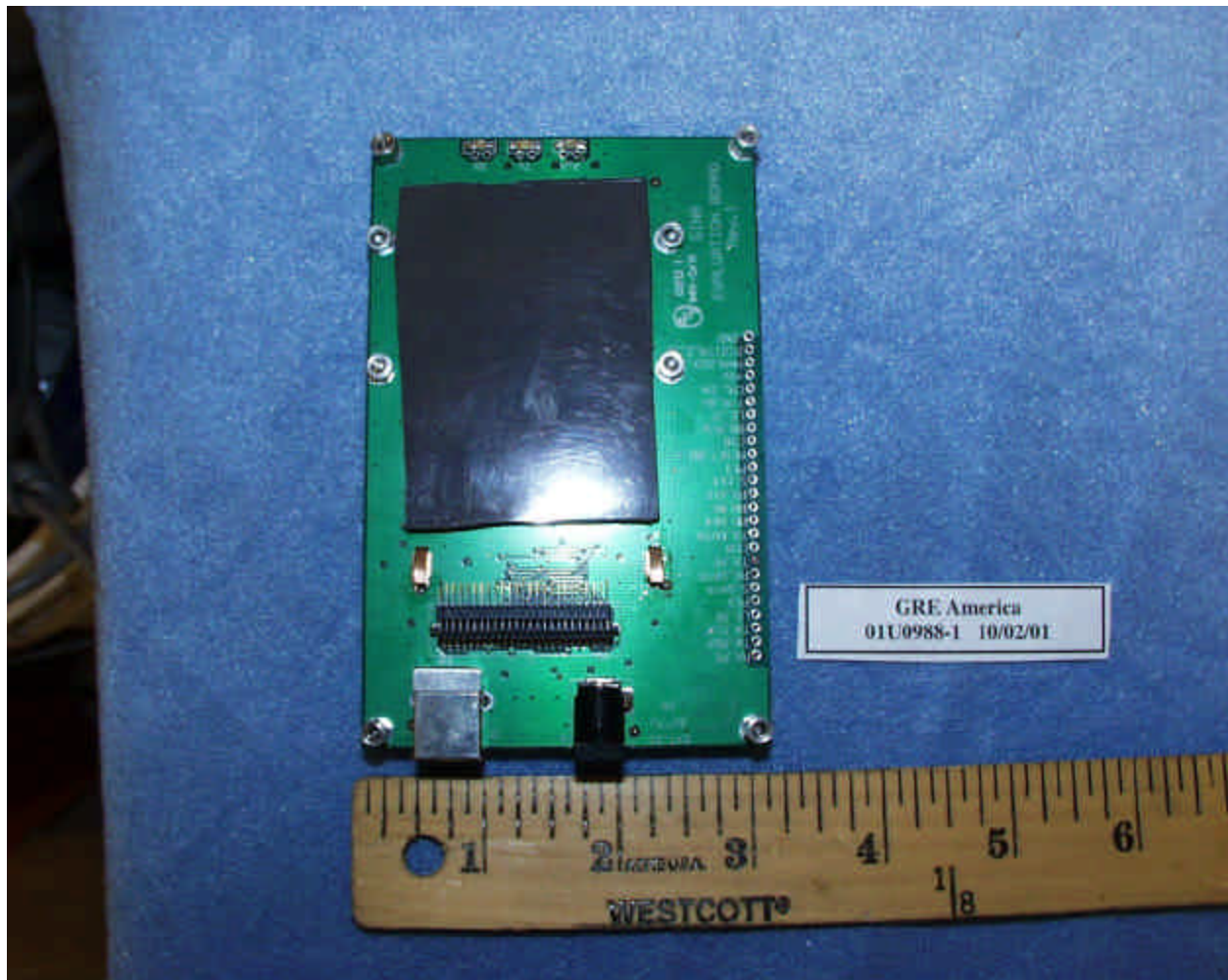


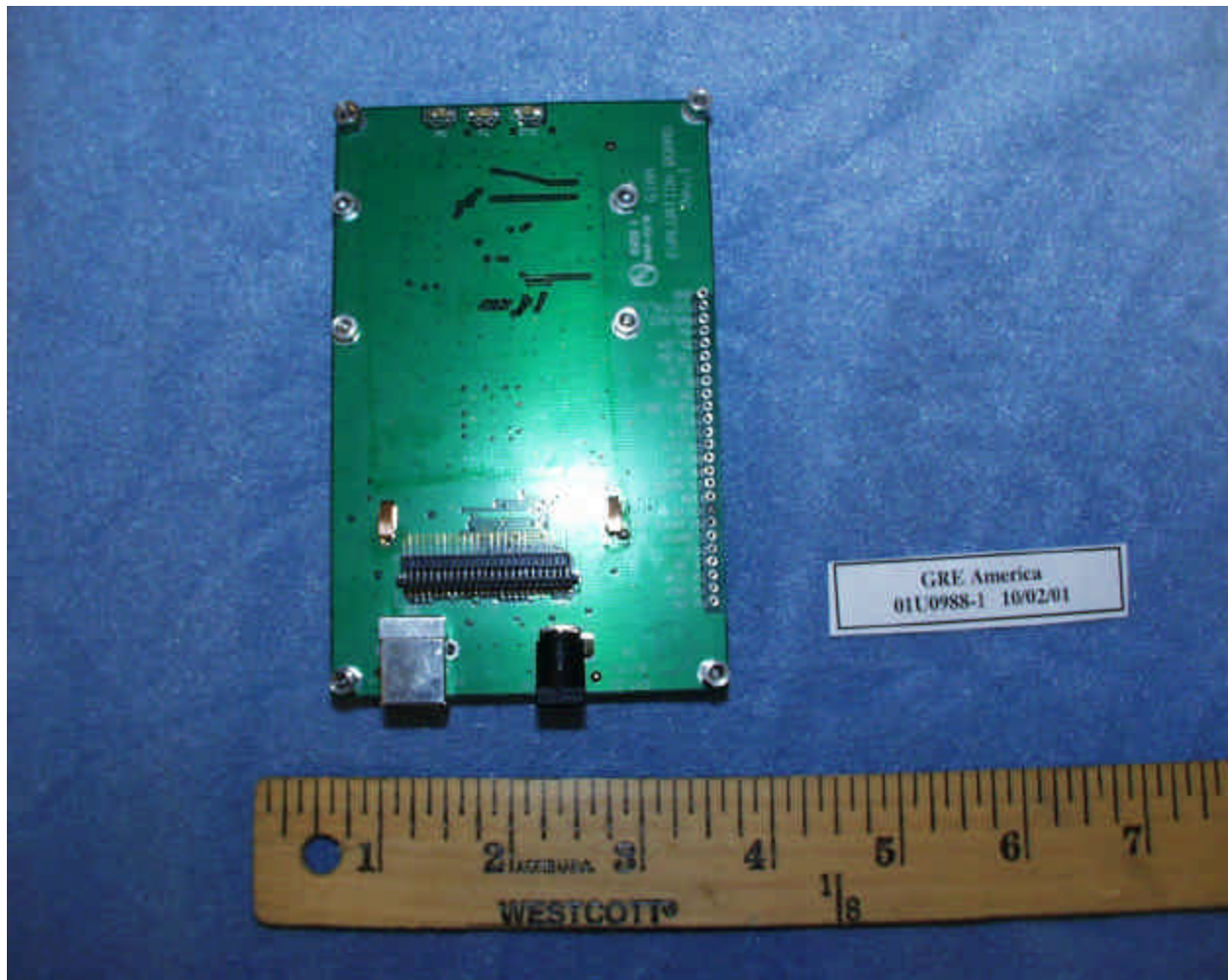










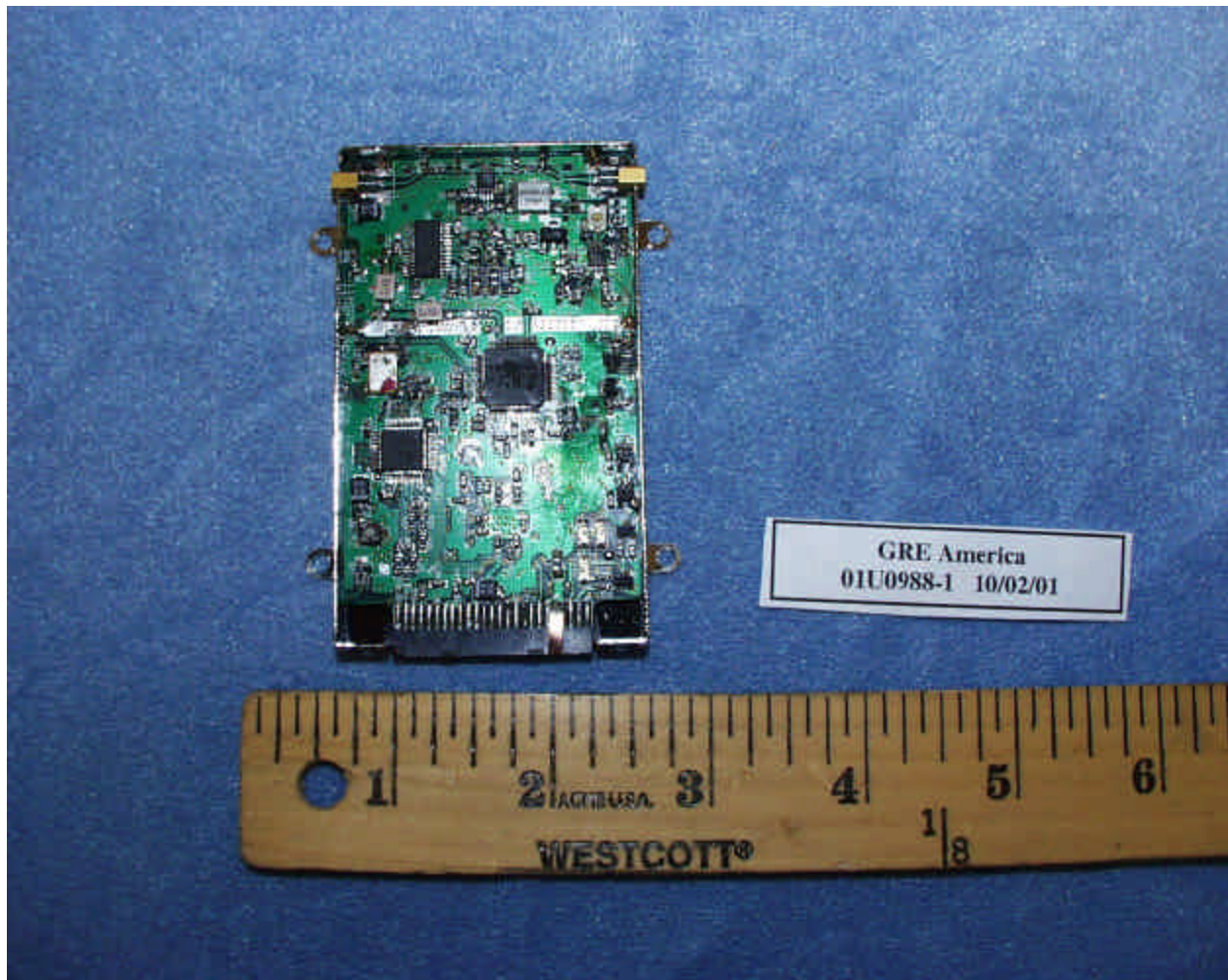




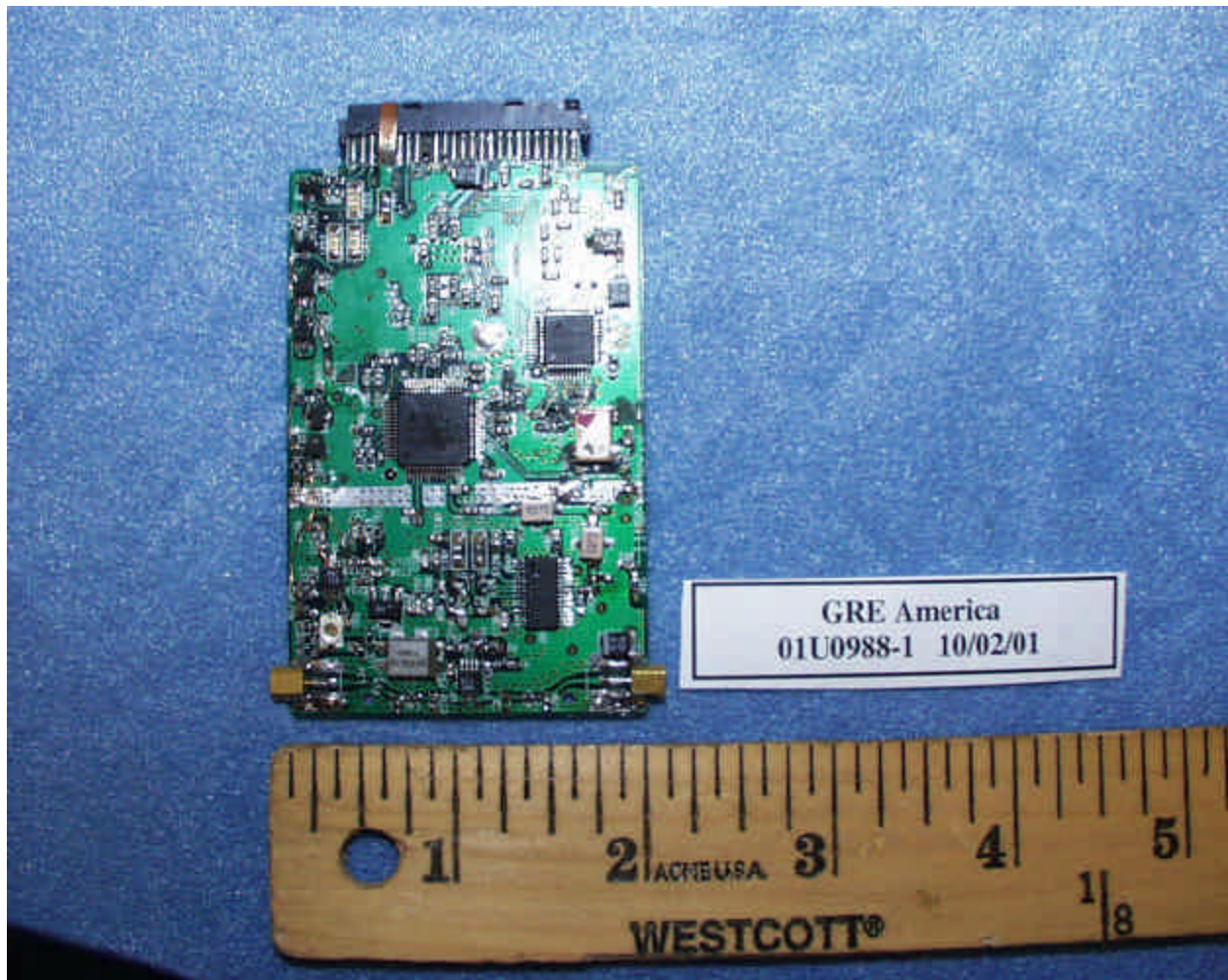




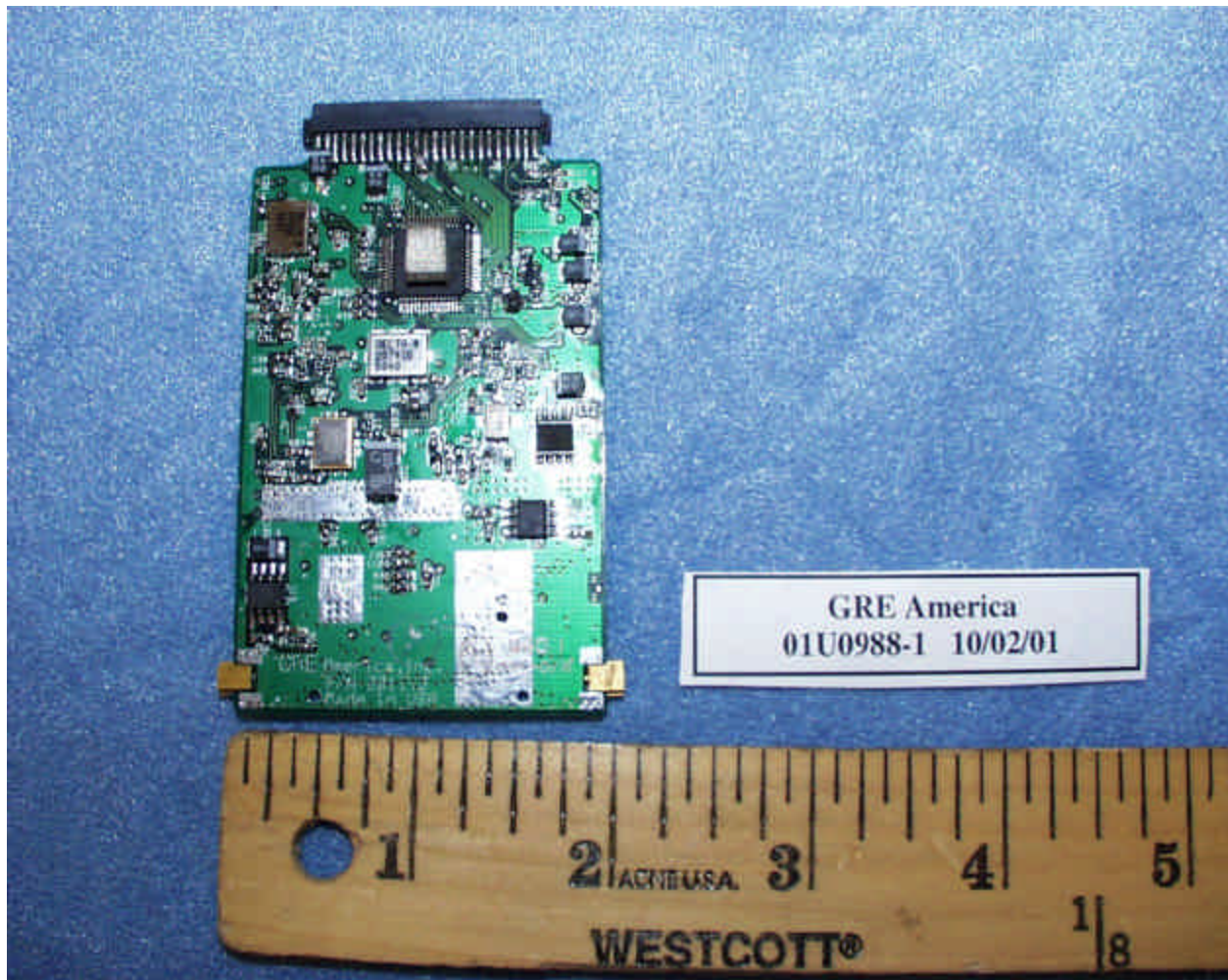








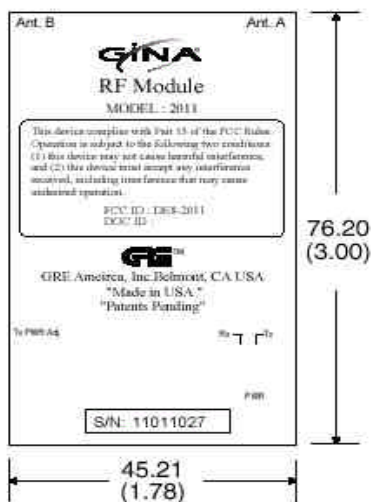






## PROPOSED FCC ID LABEL

### FCC LABEL INFORMATION

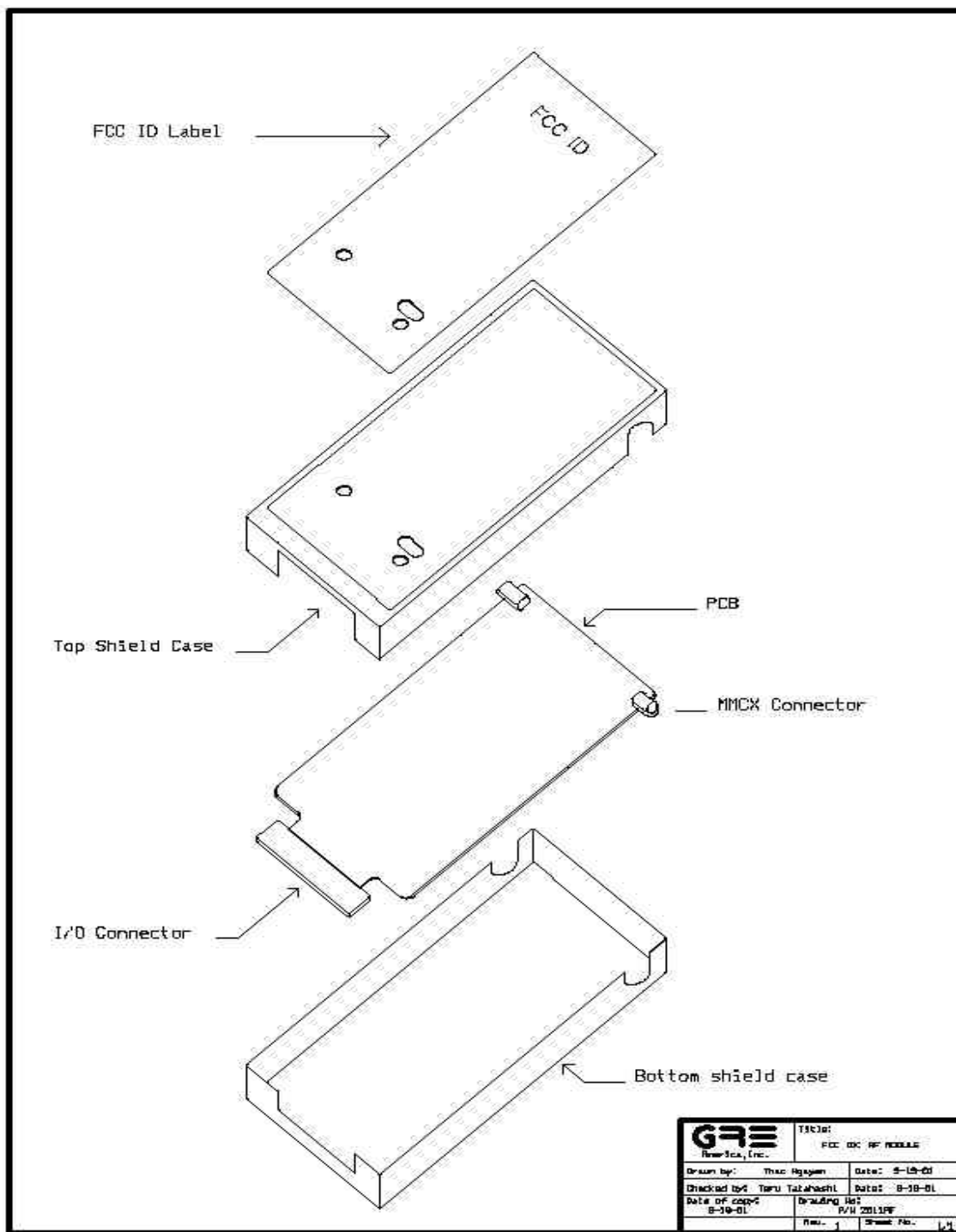


1. Tolerance is, 0.5
2. All legend to be black on silver background
3. Material: 0.13 (9.005) Mat silver aluminum foil, pressure sensitive adhesive backing.

**Note: Unless otherwise specified.**

|                                            |                    |                               |               |
|--------------------------------------------|--------------------|-------------------------------|---------------|
| <b>GRE</b> <sup>TM</sup> GRE America, Inc. |                    | GINA FCC LABEL<br>MODEL: 2011 |               |
| DRAWN BY:<br>Raj Gounder                   | DATE:<br>9/18/2001 | DRAWING No.                   | SCALE:<br>1:1 |
| APPROVED BY:                               | DATE:              | DATE OF COPY:<br>9/18/2001    | REV:          |





## AGENT AUTHORIZATION LETTER

425 Harbor Blvd.  
Belmont, California 94002

**GRE GRE AMERICA, INC.**

Tel: (650) 591-1400  
Fax: (650) 591-2001

### Agent Authorization Format ( Federal Communications Commission)

Sept. 28, 2001

Federal Communications Commission  
Authorization and Evaluation Division  
Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046

Gentleman:

We, the undersigned, hereby authorize Compliance Certification Services to act on our behalf in all matters relating to applications for equipment authorization, including the signing of all documents relating to these matters. Any and all acts carried out by COMPLIANCE certification Service on our behalf shall have the same effect as our own.

We also hereby certify that no party to the applications authorized hereunder is subject to a denial of benefits, that includes FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 853(a).

This agreement expires one year from the current date.

Sincerely,

  
Teru Takahashi  
President

## REQUEST FOR CONFIDENTIALITY

425 Harbor Blvd.  
Belmont, California 94002

**GRE GRE AMERICA, INC.**

Tel: (650) 591-1400  
Fax: (650) 591-2001

Sept. 28, 2001

Federal Communications Commission  
Authorization and Evaluation Division  
Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046

Gentleman:

In accordance with the 0.459 CRP47 FCC Rules, GRE America requests confidentiality for the Block Diagram/ Schematics/Theory of Operation of the attached test reports.

These documents contain detailed system and equipment description and related information about the product, which we consider to be proprietary, confidential, and a custom design and otherwise, would not be released to the public. Since this design is a basis from which future technological products will evolve, GRE America feels that this information will be of benefit to its competitors, and that the disclosure of the information in these documents would give our competitors an unfair advantage in the markets.

Sincerely,



Teru Takahashi  
President



## ANTENNA SPECIFICATION

425 Harbor Blvd.  
Belmont, California 94002



**GRE AMERICA, INC.**

Tel: (650) 591-1400  
Fax: (650) 591-2001

### ANTENNA GAIN & CABLE LOSS CALCULATIONS

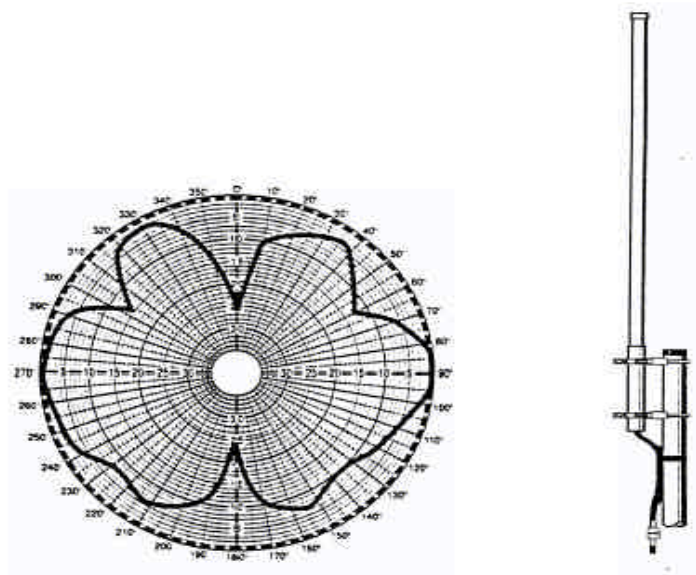
The two antennas are constructed with a 10' or 13' coaxial cable and non-standard MMCX connector. Below we have calculated the total net gain with the cable loss.

#### 1. OMNIDIRECTIONAL ANTENNA CUSHCRAFT S2403BP120

This antenna is constructed with a 10 ft. Ultralink cable Part number TL92463. The Connector and cable has a loss of 4.3 dB.

|                |            |
|----------------|------------|
| Antenna gain   | = 3.0 dBd  |
| Cable loss     | = 3.8 dBd  |
| Total gain     | = -0.8 dBd |
|                |            |
| Connector loss | = -0.5 dBd |
| Net gain       | = -1.3 dBd |
| Or             | = 0.84 dBi |

|                    |                    |
|--------------------|--------------------|
| Type               | Omni               |
| Frequency          | 2.404 to 2.478 GHz |
| Gain               | 3 dBd              |
| Front to Back      | N/A                |
| Bandwidth, 1.5:1   | 100 MHz            |
| Beamwidth          | -3 dB              |
| E-plane            | 45°                |
| H-plane            | 360°               |
| Connector Type     | MMCX               |
| Height             | 13.5"              |
| Enclosure Material | Fiberglass         |
| Weight             | 6 oz.              |
| Mount style        | Pipe clamp         |
| Max. Mast Diameter | 2"                 |

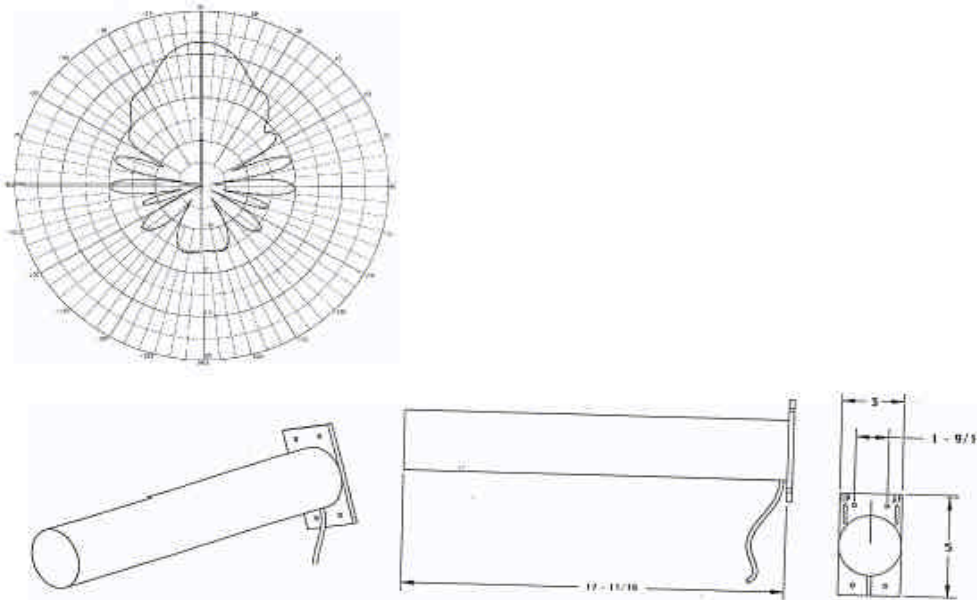


## 2. DIRECTIONAL ANTENNA TELEX 2415

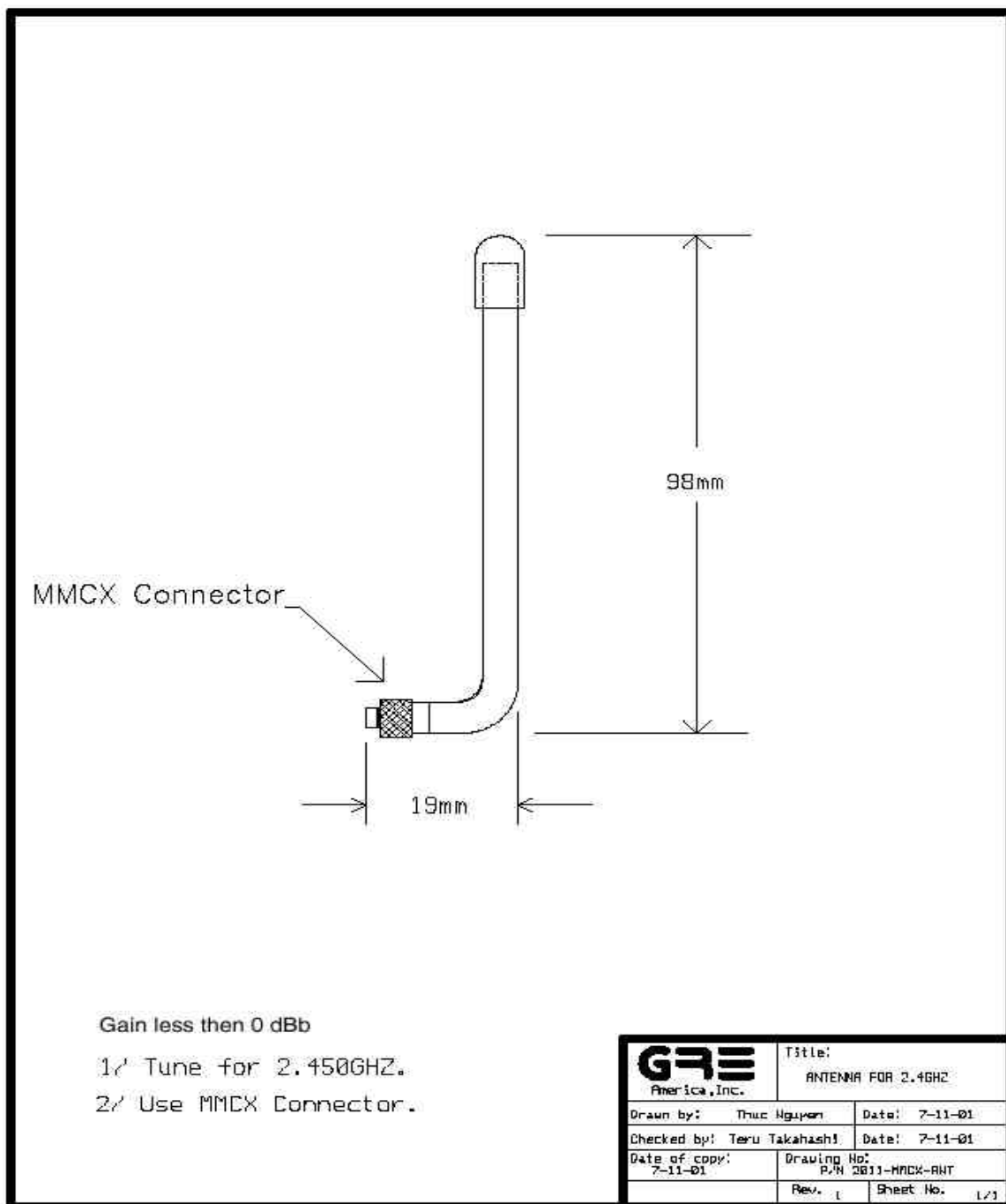
This antenna is constructed with a 13 ft. Ultralink cable Part number TL92463. Connector and cable for 13 ft is 4.3 dBd.

|                |            |
|----------------|------------|
| Antenna gain   | = 6.86 dBd |
| Cable loss     | = -3.8 dBd |
| Total gain     | = 3.06 dBd |
| Connector loss | = -0.5 dBd |
| Net gain       | = 2.56 dBd |
| Or             | = 4.7 dBi  |

|                      |                        |
|----------------------|------------------------|
| Polarity             | Vertical or Horizontal |
| Frequency            | 2.404 to 2.478 GHz     |
| Gain                 | 9 dBi or 6.86 dBd      |
| Diameter             | 3" x 18"               |
| Front to Back        | >20 dB                 |
| SWR                  | 1.5:1 maximum          |
| Half Power Beamwidth | 30°                    |
| Nominal Impedance    | 50 ohms                |
| Connector Type       | MMCX                   |
| Weight               | 25 oz                  |
| Mount                | U-Bolt Provided        |
| Max. Mast Diameter   | 1.52"                  |







## USER'S MANUAL



*Models : 2011 RF Module*

# User Manual



# GINA 2011 RF Module

## 11 Mbps RF Module



### "No more Wires"

#### Features

- Utilizing Intersil Prism II Technology
- 2.4 ~ 2.5 GHz ISM band operations
- Data rate up to 11 mbps
- Single heterodyne conversion
- Direct Sequence Spread Spectrum Technology
- +10 to +27 dBm transmitter power out
- Includes additional LNA for receiver front end.
- Diversity ANT for better receiver signal
- System targeting IEEE 802.11b standard except Tx power out. Set Tx power out as required by Application or per Country Regulation.
- Small size : 3.40" x 2.05" x 0.750" (86 x 52 x 19 mm).
- All Spec FCC part 15 ISM Band Non License compliant Radio.



#### Overview

The GINA-2011 is a small, versatile high performance RF Module that delivers data up to speeds of 11Mbps/s. The Module is designed to provide up to 0.5 watt ( 27dBm) output power. The GINA-2011 RF Module is available as a plug-in module for those Researcher who wish to interface it with their own designed controllers.

GINA-2011 operates at 2.4 GHz Direct Sequence Spread Spectrum (DSSS) Modulation physical layer can be compliant with IEEE 802.11b standard insures interoperability with other Wireless LAN products.

GINA-2011's highly integrated digital modulation transceiver module can also be used for factory automation equipment and barcode readers, embedded systems, and other applications.

#### APPLICATIONS

- |                            |                                     |                            |
|----------------------------|-------------------------------------|----------------------------|
| • Wireless Network         | • Last-Mile Telephone               | • PLC / Router Connections |
| • Wireless Internet        | • Camera Surveillance Control (PTZ) | • Computer Data Links      |
| • Mobile Scanner           | • Industrial Automation             | • Traffic Controls         |
| • Remote Guidance Vehicles | • GPS Data Link                     | • Remote Networking        |
| • Robotic Remote Control   | • Power & Gas Utilities             | • High Speed File Transfer |





# GINA 2011 RF Module

## 11 Mbps RF Module

### RECEIVER

#### Frequency Range :

- ▶ 2.4 ~ 2.4965 GHz

#### Data Rate :

- ▶ 1 ~ 11 Mbits/s

#### Sensitivity 10-6 @ :

- ▶ -96 dBm for 1 Mbit/s
- ▶ -93 dBm for 2 Mbits/s
- ▶ -89 dBm for 5.5 Mbits/s
- ▶ -87 dBm for 11 Mbits/s

#### Noise Figure :

- ▶ Less than 10 dB

#### Supply Current :

- ▶ 150 mA without sleep mode
- ▶ 100 mA with sleep mode

## "No more Wires"

### TRANSMITTER

#### Frequency Range :

- ▶ 2.4 ~ 2.4965 GHz

#### Data Rate :

- ▶ 1 ~ 11 Mbits/s

#### Output Power :

- ▶ +10 ~ +27 dBm (adjustable)

*Note : Tx supply voltage requires at least 6.0V DC for 25 ~ 27 dBm typical power output*

#### Spurious Output :

- ▶ FCC Part 15

#### Supply Current :

- ▶ 650 mA at Maximum Out.

### UNIT SPECIFICATION

#### Supply Voltage

- ▶ 3.3v DC required for basic voltage
- ▶ 6.0 v DC TX section to get MAX power 27 dBm
- ▶ 5.0 v DC to operate for TX section, but TX power will be 24 dBm

#### Supply Current :

- ▶ 300 mA for 3.3v line required at TX condition
- ▶ 500 mA for 6.0v or 5.0v line when TX is ON

#### TX Duty Cycle :

- ▶ 30 % for TX 70 % for RX

#### Temperature Range :

- ▶ -20°C ~ +60°C

#### Antenna Connector :

- ▶ 2x MMCX connector (for Diversity)

#### Interface Connector :

- ▶ 50 PIN 1.27 mm standard female connector  
(.050" x .050" SAMTEC SOCKET SFM Series)  
PIN : SFML-125-T1-S-D-4

#### LED Indicator :

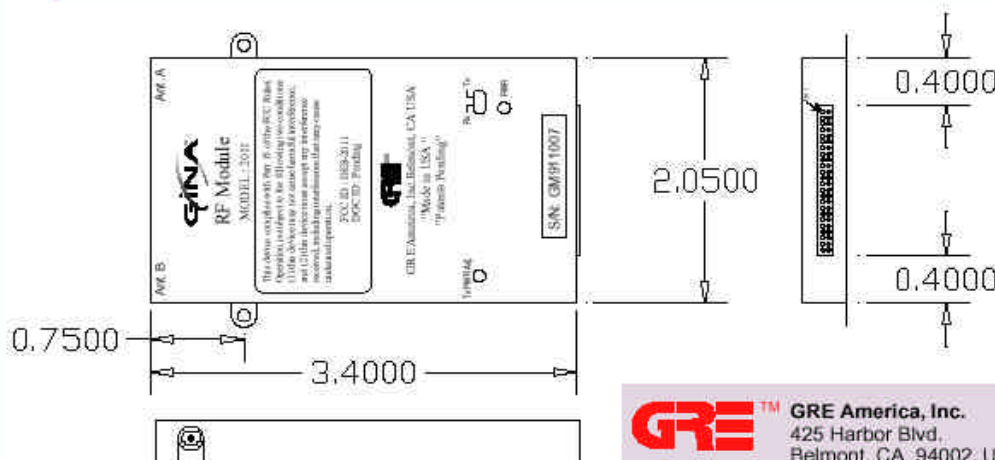
- ▶ DC PWR, TX ON, RX Receiver

#### Adjustment :

- ▶ TX power adjustment by POT volume

#### Approvals :

- ▶ Pending FCC



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POT is a trademark of Intrepid Corporation.

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**Warning**

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**WARNING**

**RADIATION.**

RF energy at microwave frequencies is present with this equipment. Personnel should not be exposed to high RF energies, and should not be in front of the antenna when the equipment is switched on.

All accessible RF connections must be terminated when the radio is powered on.

The radio should not be powered on with any of its covers removed.

**INFORMATION TO USERS.**

"Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

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**GINA 2011 RF Module Voltage Requirement**

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**GINA 2011 RF Module Voltage Requirement**

The GINA 2011 RF Module requires a device controller to set Local oscillator, Set BASEBAND processor for actual operating condition. It also requires proper I/O DC level because semiconductor is very tight margin for I/O level.

The RF Module requires 3.3V and 6 Volt DC. Module has internal regulator to support 3.0V and 2.8 Volt. The device controller must be designed with 3 Volt working Voltage for I/O to RF Module. However it is not suitable if apply beyond 3.5V DC because majority of semiconductor Chip I/O level will be cross to Maximum specification point.

The 5 volt line is used for Transmitter final amplifier chip. The module 2011 has Current source voltage control MOS FET device to protect final amplifier chip. The final transmitter device is not linear output power versus voltage source. More likely the transmitter out is linear out with negative bias to GATE of Final amplifier. Nature of this performance comes from GaAs HFET parameter.

This negative bias to the GATE is regulated from 3.3volt line, so that transmitter out is set for Maximum to 27 dBm level.

However the 6 volt should not exceed more than 6 volt, due to some of the control line using 3 volt line to execute switching device.

Transmitter **is not design to operate at 100% duty cycle.**  
Best performance is less than 30% duty cycle.

GINA 2011 RF Module **is not designed or intended** for any portable or handheld devices such as telephone set, PCMCIA devices or Portable PC's.

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GINA 2011 RF Module Data Specification Guide

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## GINA 2011 RF Module

### Overview

#### Introduction

GINA RF Module 2011 is designed with the Prism II 11Mbit Intersil chipset to obtain a maximum performance data rate up to 11Mbit/sec. We are also focusing beyond the IEEE 802.11b application standard. The RF Module can provide an adjustable transmitter output power from 10 dBm to 27dBm (500 mW). The Receiver front end is installed with an extra low noise amplifier in order to perform extended distance wireless communications.

The RF Module size is also as small as a name card so as to cover any typical OEM application to fit this very small size. However this RF Module cannot work without a Controller. The Prism II chipset requires that you configure each register value while programming from the other controller unit.

#### 2. Requirement

GINA RF Module uses the Prism II chip set. The base band chip, RF up / down chip and the IF chip are required to be programmed from the Controller (similar to a MAC device ). Therefore you should understand the basic theory about how it is necessary to program to these chips. The Data Book (included in this PDF download Application Notes from Intersil ) also describes a more detailed technical information on " How to Program ".

**Module are using chip as below.**

HFA3861B-----Base band  
HFA3783N-----IF  
HFA3683AIN-----RF up/down

**2a** The RF Module requires the User to basically enable the transmit or receive mode via the controller unit. You must also select the antenna port because the RF Module features a dual antenna port for diversity operations. This selection is executed via the base band chip - HFA3861.

**2b** DC voltage required to module.

3.3 v DC -----max current 300mA  
6.0v DC -----max current 650 mA  
(5.0 VDC still will operate however the Tx out power will be at 24 dBm maximum)

### Programming

**2c** Please be sure to follow these requirements when you are programming the RF Module.

Master clock -----44,000 Mhz  
IF center frequency -----374 Mhz

Therefore 1<sup>st</sup> LO frequency need to program to HFA3683AIN RF up/down chip.

**LO = Frx/tx – 374 Mhz** Frx/tx is receive or transmit frequency between 2400~2500 Mhz.

**2d** Also IF chip HFA 3783IN need to program .

Main clock -----44,000 Mhz

**LO required to program -----2 x 374 Mhz which is 748 Mhz.**

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## GINA 2011 RF Module Data Specification Guide

- 2e. Base band chip HFA 3861B must also be programmed.  
However this program will be up to the design of your system.  
You should be familiar with and understand the HFA 3861B programming requirement.  
**Main clock is 44.000 MHz**

### PIN Description

| RF Module PINOUTS                                              |          |      |                                                        |
|----------------------------------------------------------------|----------|------|--------------------------------------------------------|
| H=3v L=.5v or less O = out put from Module I = input to Module |          |      |                                                        |
| PIN No.                                                        | PIN Name | Type | DESCRIPTION                                            |
| 1                                                              | TR_SW_N  | I    | Control antenna switch.H for RX. L for TX on.          |
| 2                                                              | RADIO_PD | I    | Enable VCO. Normally set to H                          |
| 3                                                              | LE_RF    | I    | Programming HFA3683 (pin21)for PLL latch enable        |
| 4                                                              | GND      |      |                                                        |
| 5                                                              | GND      |      |                                                        |
| 6                                                              | GND      |      |                                                        |
| 7                                                              | S_DATA   | I    | Programming HFA3861B(pin 3,64 internally connected).   |
| 8                                                              | RX_DATA  | O    | Recovered RX data from HFA3861(pin53)                  |
| 9                                                              | TX_CLK   | O    | TX clock from HFA3861 (pin 55) to controller           |
| 10                                                             | TX_RDY   | O    | Output from HFA3861(pin 59)for other device            |
| 11                                                             | RX_PE    | I    | HFA3861(pin 61)receiver enable active H                |
| 12                                                             | NOT USE  |      |                                                        |
| 13                                                             | NOT USE  |      |                                                        |
| 14                                                             | NOT USE  |      |                                                        |
| 15                                                             | VCCS     | I    | HFA3861 digital voltage(pin2,8,37,41,57) 3.3V required |
| 16                                                             | NOT USE  |      |                                                        |
| 17                                                             | 3.3v     | I    | Supply voltage to Module.current will up to 300 ma     |
| 18                                                             | 3.3v     | I    | Same as above                                          |
| 19                                                             | 3.3v     | I    | Same as above                                          |
| 20                                                             | NOT USE  |      |                                                        |
| 21                                                             | NOT USE  |      |                                                        |
| 22                                                             | CAL_EN   | I    | Controlled HFA3783(pin42)                              |
| 23                                                             | LE_IF    | I    | HFA3783(pin20) PLL latch enable                        |

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**GINA 2011 RF Module Data Specification Guide**

| <b>RF Module PINOUTS</b>                                       |            |   |                                                                                                   |
|----------------------------------------------------------------|------------|---|---------------------------------------------------------------------------------------------------|
| H=3v L=.5v or less O = out put from Module I = input to Module |            |   |                                                                                                   |
| 24                                                             | PA_PE      | I | Enable TX amplifier .normally set to H                                                            |
| 25                                                             | 6.0v       | I | Using TX final AMP stage and RX LNA.It is required 650mA current when TX is on.20mA for RX is on. |
| 26                                                             | TR_SW      | I | Control antenna switch H for TX, L for Receive.                                                   |
| 27                                                             | PE1        | I | power enable control for HFA 3783,3683(PE1 pin)                                                   |
| 28                                                             | PE2        | I | power enable control for HFA 3783,3683(PE2 pin)                                                   |
| 29                                                             | SCLK_RF_IF | I | clock to program PLL for HFA3783(pin18)3683(pin23)                                                |
| 30                                                             | SD_RF_IF   | I | data to program PLL for HFA3783(pin19) ,3683(pin22)                                               |
| 31                                                             | NOT USE    |   |                                                                                                   |
| 32                                                             | RX_CLK     | O | Receive clock out from HFA3861 (pin52)                                                            |
| 33                                                             | MD_RDY     | O | Data packet ready from HFA3861 (pin54)                                                            |
| 34                                                             | TX_DATA    | I | Transmit data to HFA3861 (pin58)                                                                  |
| 35                                                             | CCA        | O | Clear Channel Assessment out from HFA3861(pin60)                                                  |
| 36                                                             | TX_PE      | I | HFA3861(pin62) transmitter control, Active H                                                      |
| 37                                                             | RESET_BB   | I | Reset for HFA3861(pin63)                                                                          |
| 38                                                             | NOT USE    |   |                                                                                                   |
| 39                                                             | S_CLK      | I | Clock for programming HFA3861(pin4)                                                               |
| 40                                                             | BB_R/W     | I | Input to HFA3861(pin5) for programming                                                            |
| 41                                                             | CS_BB      | I | Chip select input to HFA3861(pin6) for programming                                                |
| 42                                                             | NOT USE    |   |                                                                                                   |
| 43                                                             | NOT USE    |   |                                                                                                   |
| 44                                                             | NOT USE    |   |                                                                                                   |
| 45                                                             | NOT USE    |   |                                                                                                   |
| 46                                                             | NOT USE    |   |                                                                                                   |
| 47                                                             | NOT USE    |   |                                                                                                   |
| 48                                                             | NOT USE    |   |                                                                                                   |
| 49                                                             | 6.0v       | I | Same voltage as pin 25                                                                            |
| 50                                                             | 6.0v       | I | Same voltage as pin 25                                                                            |

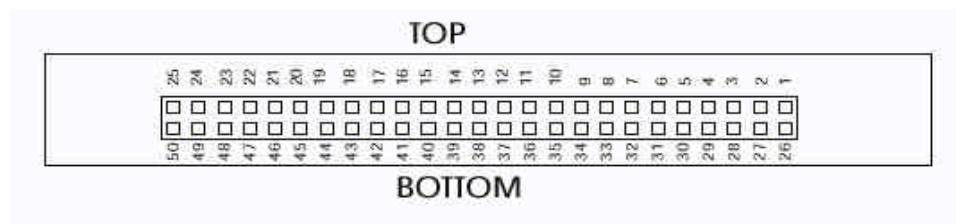
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## GINA 2011 RF Module Data Specification Guide

### Connector Layout



### LED Indicator

#### 3 LED indicator

Module has 3 different LED located inside of shield case.

Power on RED color LED

TX on RED color LED

RX condition by GREEN color LED,-----sharing CCA output from HFA3861.

#### 4 Antenna connector

Module has two antenna connector located on right side and left side.

Marked "A" on Right side

Marked "B" on Left side

**NOTE:** You can program and select A or B by HFA3861B CR9 and CR40. This will depend upon how you elect to configure your system either for a single antenna or diversity antenna.

#### 5 Technical information

GRE America Inc. cannot provide any schematic diagram (s) or component (s) specifications for any Customers / End Users for any reasons. GRE America will however provide a Block Diagram for reference and in order to familiarize you with the RF Module.

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**GINA Warranty**

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## **Warranty**

### **Limited Warranty**

#### **General**

GRE America, Inc. warrants all parts of each new product to be of sound design, good material and workmanship, and will repair or exchange any parts proven to be defective under normal use at no charge for a period of 12 months from the date of sale to the end user.

Defects will be corrected by GRE America. There will be no charge for labor for a period of 12 months from the date of original sale, except as provided below. Overtime premiums and/or expedited handling and shipping costs must be paid by the owner.

#### **Warranty Limitations**

This warranty does not apply to equipment or parts that have been subject to accident, abuse, incorrect service, alterations, service by non-authorized service personnel, misuse, or on units upon which the warranty seal has been removed, altered, or mutilated.

A copy of the warranty certificate or purchase receipt must be supplied to GRE America when requesting service.

Equipment must be sent to GRE America at the owner's expense and will be returned via surface carrier at no cost to the owner.

This warranty is strictly limited to the terms indicated herein, and no other warranties or remedies thereunder, express or implied, shall be binding on GRE America.

#### **Contact**

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Website : <http://www.greamerica.com>

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1/01



## PART LIST

GRE AMERICA

PROPRIETARY

| Circuit function of the device discription |           |                          |               |                                |                |
|--------------------------------------------|-----------|--------------------------|---------------|--------------------------------|----------------|
| RF MODULE                                  |           |                          |               |                                |                |
| Model 2011 FCC ID:DE8-2011                 |           |                          |               |                                |                |
| ECN#                                       |           |                          |               |                                |                |
| REVISION: B                                |           |                          |               |                                |                |
| DATE REVISED: 2/22/01                      |           |                          |               |                                |                |
| DATE PRINTED: 9/28/01                      |           |                          |               |                                |                |
| ITEM                                       | TOTAL QTY | MANUFACTURER P/N         | MANUFACTURER  | PART DISCRIPTION               | PART LOCATION  |
| 1                                          | 1         | HFA3861B                 | INTERSIL      | BASE BAND CHIP                 | U1             |
| 2                                          | 1         | HFA37931N                | INTERSIL      | IF CHIP                        | U2             |
| 3                                          | 1         | HFA3683AIN               | INTERSIL      | UP/DOWN CHIP                   | U3             |
| 4                                          | 1         | HFA3963IV                | INTERSIL      | TX PWR AMP                     | U9             |
| 5                                          | 1         | DMP/VCX74896             | DELTA         | VCO                            | U4             |
| 6                                          | 1         | DMP/VCX204796            | DELTA         | VCO                            | U5             |
| 7                                          | 1         | MIC5205 2 8BM5           | MICREL        | 2.8V REG                       | U15            |
| 8                                          | 1         | MIC5205 3 0BM5           | MICREL        | 3.0V REG                       | U6             |
| 9                                          | 2         | HMC174M58                | HITTITE       | ANT SW                         | U7,8           |
| 10                                         | 1         | ICL7660CSA               | MAXIM         | NEG REG                        | U10            |
| 11                                         | 1         | SHF0589                  | STANFORD      | FET TX AMP                     | U11            |
| 12                                         | 1         | RF1K49093                | INTERSIL      | MOS FET                        | U12            |
| 13                                         | 1         | HMC286                   | HITTITE       | LOW NOISE AMP                  | U13            |
| 14                                         | 1         | EC2645TX-44-00           | ECLIPTEK      | 44 MHZ OSC                     | U14            |
| 15                                         | 2         | 9ML LX1206IC-TR          | LUMEX         | RED LED                        | LED2,3         |
| 16                                         | 1         | 9ML LX1206GC-TR          | LUMEX         | GREEN LED                      | LED1           |
| 17                                         | 1         | SAWTECH855653            | SAWTECH       | FILTER                         | FL1            |
| 18                                         | 3         | LFJ30-C3824429094        | MURATA        | 2.4GHZ FILTER                  | FL2,5,6        |
| 19                                         | 1         | TDFM1B2450T10            | TOKO          | 2.4GHZ FILTER                  | FL4            |
| 20                                         | 2         | MGSF1N02LT / IRLML2402TR | MOTOROLA / IR | FET                            | Q1,5           |
| 21                                         | 1         | MGSF1P02LT / IRLML6902TR | MOTOROLA / IR | FET                            | Q2             |
| 22                                         | 3         | 2SC3265-EY               | TOSHIBA       | TRANSISTOR                     | Q3,4,6         |
| 23                                         | 5         | EXC.ML20A390U            | PANASONIC     | BEAD CORES SIZE 805            | L1,11,12,16,17 |
| 24                                         | 3         | ELJ-RE1N5ZF2             | PANASONIC     | CHIP INDUCTOR 1.5nH (SIZE 603) | L8,9,10        |
| 25                                         | 1         | ELJ-RE3N3ZF2             | PANASONIC     | CHIP INDUCTOR 3.3nH (603)      | L13            |
| 26                                         | 4         | ELJ-RE6N8ZF2             | PANASONIC     | CHIP INDUCTOR 6.8nH            | L15,19,20,21   |
| 26                                         | 1         | ELJ-RE1ANGF2             | PANASONIC     | CHIP INDUCTOR 1.8nH(SIZ 603)   | L4             |

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|    |    |                 |                |                               |                                        |
|----|----|-----------------|----------------|-------------------------------|----------------------------------------|
| 27 | 4  | ELJ-RE39NGF2    | PANASONIC      | CHIP INDUCTOR 33nH(SIZE 603)  | L2,3,6,7                               |
| 28 | 2  | ELJ-RE39NGF2    | PANASONIC      | CHIP INDUCTOR 39nH(SIZE 603)  | 5,5,14                                 |
| 29 | 1  | ELJ-RE22JF3     | PANASONIC      | CHIP INDUCTOR 220nH (0603)    | L18                                    |
| 30 | 1  | 2930107X901002T | SPRAGUE/VISHEY | CHIP TANT CAP 100uF/10V       | C65                                    |
| 31 | 1  | ECJ1VB0J474K    | PANASONIC      | CHIP CAP 47uF(SIZE 603)       | C108                                   |
| 32 | 10 | 2930106X9020B   | SPRAGUE/VISHEY | CHIP TANT CAP 10uF/10V        | C1,3,27,36,38,47,112,105,106,145       |
| 33 | 1  | ECJ1VB0J684K    | PANASONIC      | CHIP CAP 68uF(SIZE 603)       | C70                                    |
| 34 | 27 | CL10B104K0NC    | SAMSUNG        | CHIP CAP 1uF (SIZE 603)       | C2,4,5,6,10,11,13,16,17,18,19,20,22,31 |
|    |    |                 |                |                               | 32,35,37,39,46,48,49,51,62,67          |
|    |    |                 |                |                               | 72,75,83                               |
| 35 | 12 | CL10B103K2NC    | SAMSUNG        | CHIP CAP 01uF (SIZE 603)      | C7,9,50,52,53,58,61,63,64,66,69,102    |
| 36 | 12 | MCH185C102KK    | ROHM           | CHIP CAP .001uF (SIZE 603)    | C15,33,34,74,78,100,101,103,104,92     |
|    |    |                 |                |                               | 116,122                                |
| 37 | 1  | CL10B223KANC    | SAMSUNG        | CHIP CAP .022uF(SIZE 603)     | C34                                    |
| 38 | 1  | S060W683K1HRN   | PGA            | CHIP CAP 68uF                 | C71                                    |
| 39 | 1  | ECJ1VB1A224K    | PANASONIC      | CHIP CAP 22uF                 | C25                                    |
| 40 | 8  | 140-CC504N1 0C  | XICON          | CHIP CAP .1PF (SIZE 603)      | C94,97,98,110,111,130,147,176          |
| 41 | 8  | CE0R5C1NO       | MARUWA         | CHIP CAP 0.5PF(SIZE 603)      | C8,89,126,129,132,144,148,149          |
| 42 | 3  | CE020C1NO       | MARUWA         | CHIP CAP 2PF (SIZE 603)       | C26,93,109                             |
| 43 | 1  | MCH185A030CK    | ROHM           | CHIP CAP 3PF (SIZE 603)       | C134                                   |
| 44 | 6  | MCH185A050CK    | ROHM           | CHIP CAP 5PF(SIZE 603)        | C54,57,59,124,133,138                  |
| 45 | 12 | MCH185A070CK    | ROHM           | CHIP CAP 7PF(SIZE 603)        | C41,42,43,44,45,56,77,95,117,118,135   |
|    |    |                 |                |                               | 143                                    |
| 46 | 2  | MCH185A100DK    | ROHM           | CHIP CAP 10PF (SIZE 603)      | C81,82                                 |
| 47 | 9  | MCH185A220JK    | ROHM           | CHIP CAP 22PF(SIZE 603)       | C84,85,96,120,123,126,137,141,146      |
| 48 | 1  | MCH185A330JK    | ROHM           | CHIP CAP 33PF(SIZE 603)       | C90                                    |
| 49 | 1  | MCH185A680JK    | ROHM           | CHIP CAP 68PF (SIZE 603)      | C28                                    |
| 50 | 12 | MCH185A101JK    | ROHM           | CHIP CAP 100PF(SIZE 603)      | C12,21,23,29,30,73,107,114,115         |
|    |    |                 |                |                               | 119,127,128                            |
| 51 | 1  | MCH185A151JK    | ROHM           | CHIP CAP 150PF (SIZE 603)     | C40                                    |
| 52 | 10 | CE221J1NO       | MARUWA         | CHIP CAP 220PF (SIZE 603)     | C56,60,68,79,80,86,87,139,140,142      |
| 53 | 1  | CE271J1NO       | MARUWA         | CHIP CAP 270PF(SIZE 603)      | C88                                    |
| 54 | 1  | J2060           | VOLTRONICS     | TRIMMER CAP .6PF              | C125                                   |
| 55 | 1  | RC1608J000CS    | SAMSUNG        | 0 OHM CHIP RESISTOR(SIZE 603) | R70                                    |
| 56 | 2  | RC1608J100CS    | SAMSUNG        | 10 OHM CHIP RES. (SIZE 603)   | R46,47                                 |
| 57 | 1  | RC1608J220CS    | SAMSUNG        | 22 OHM CHIP RES. (SIZE 603)   | R63                                    |
| 58 | 2  | MCR03J330       | ROHM           | 33 OHM CHIP RES.(SIZE 603)    | R42,50                                 |
| 59 | 1  | MCR03J390       | ROHM           | 39 OHM CHIP RES.(SIZE 603)    | R10                                    |

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|    |    |                   |           |                               |                                |
|----|----|-------------------|-----------|-------------------------------|--------------------------------|
| 60 | 1  | RC1608F49R9CS     | SAMSUNG   | 49.9 OHM CHIP RES (SIZE 603)  | R35                            |
| 61 | 1  | ERJ3GSYJ560       | PANASONIC | 56 OHM CHIP RES (SIZE 603)    | R28                            |
| 62 | 7  | RM73B1J101J       | KOA       | 100 OHM CHIP RES (SIZE 603)   | R33,34,43,45,58,66,75          |
| 63 | 4  | 9C06031A1240FHFT  | PHYCOMP   | 124 OHM CHIP RES (SIZE 603)   | R23,24,29,30                   |
| 64 | 3  | RC1608F1500CS     | SAMSUNG   | 150 OHM CHIP RES (SIZE 603)   | R37,39,41                      |
| 65 | 4  | 9C06031A1800JLHFT | PHYCOMP   | 180 OHM CHIP RES (SIZE 603)   | R1,2,56,57                     |
| 67 | 2  | CROW603-271JRT1   | DALE      | 270 OHM CHIP RES (SIZE 603)   | R67,68                         |
| 68 | 1  | ERJ3GSYJ331       | PANASONIC | 330 OHM CHIP RES (SIZE 603)   | R52                            |
| 69 | 3  | 9C06031A3900JLHFT | PHYCOMP   | 390 OHM CHIP RES (SIZE 603)   | R55,64,69                      |
| 71 | 2  | 9C06031A5360FHFT  | PHYCOMP   | 536 OHM CHIP RES (SIZE 603)   | R25,31                         |
| 72 | 1  | ERJ3GSYJ561       | PANASONIC | 560 OHM CHIP RES (SIZE 603)   | R13                            |
| 73 | 2  | 9C06031A6800JLHFT | PHYCOMP   | 680 OHM CHIP RES (SIZE 603)   | R11,14                         |
| 74 | 1  | 9C06031A8200JLHFT | PHYCOMP   | 820 OHM CHIP RES (SIZE 603)   | R39                            |
| 75 | 11 | RM73B1J102J       | KOA       | 1 KOHM CHIP RES (SIZE 603)    | R3,7,8,15,27,36,40,51,72,73,74 |
| 76 | 1  | RM73B1J22J        | KOA       | 1.2KOHM CHIP RES (SIZE 603)   | R71                            |
| 77 | 2  | RM73B1J152J       | KOA       | 1.5 KOHM CHIP RES (SIZE 603)  | R5,12                          |
| 78 | 1  | RM73B1J202J       | KOA       | 2 KOHM CHIP RES (SIZE 603)    | R44                            |
| 79 | 2  | RM73B1J332J       | KOA       | 3.2 KOHM CHIP RES (SIZE 603)  | R48,49                         |
| 80 | 1  | RC1608F4021CS     | SAMSUNG   | 4.02 KOHM CHIP RES (SIZE 603) | R65                            |
| 81 | 4  | 9C06031A470JLHFT  | PHYCOMP   | 4.7 KOHM CHIP RES (SIZE 603)  | R53,54,61,62                   |
| 82 | 1  | RC1608F9531CS     | SAMSUNG   | 9.53 KOHM CHIP RES (SIZE 603) | R6                             |
| 83 | 1  | RM73B1J103J       | KOA       | 10 KOHM CHIP RES (SIZE 603)   | R16                            |
| 84 | 1  | 9C06031A1152FHFT  | PHYCOMP   | 11.5 KOHM CHIP RES (SIZE 603) | R4                             |
| 85 | 1  | 9C06031A1212FHFT  | PHYCOMP   | 12.1 KOHM CHIP RES (SIZE 603) | R22                            |
| 86 | 2  | 9C06031A1912FHFT  | PHYCOMP   | 19.1 KOHM CHIP RES (SIZE 603) | R21,20                         |
| 87 | 1  | ST3A501           | B C COMP  | 500 OHM POT SMD               | VR1                            |
| 88 | 2  | 135-3711-901      | JOHNSON   | SMD RF CONNECTOR MMCK         |                                |
| 89 | 1  |                   | GRE       | SHIELD CASE                   |                                |
| 90 | 1  |                   | EMI       | ARC SHIELD YT-721-1-24        |                                |
| 91 | 1  | SFML125-T1-S-D-A  | SAMTEC    | 50 PIN C/F CONNECTOR          |                                |
| 92 | 1  | 2011-3            | ICPC      | PCB                           |                                |
| 94 | 1  |                   | GRE       | MODEL&FCC LABEL               |                                |
| 95 | 1  | GR-d 3.5          | FIJIPOLY  | HEAT-SINK PAD35X15x3.5mm      |                                |
|    |    |                   |           |                               |                                |
|    |    |                   |           |                               |                                |

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## PRODUCT SPECIFICATION

# GINA 2011 RF Module

## 11 Mbps RF Module

### "No more Wires"



#### Features

- Utilizing Intersil Prism II Technology
- 2.4 ~ 2.5 GHz ISM band operations
- Data rate up to 11 mbps
- Single heterodyne conversion
- Direct Sequence Spread Spectrum Technology
- +10 to +27 dBm transmitter power out
- Includes additional LNA for receiver front end.
- Diversity ANT for better receiver signal
- System targeting IEEE 802.11b standard except Tx power out. Set Tx power out as required by Application or per Country Regulation.
- Small size : 3.40" x 2.05" x 0.750" (86 x 52 x 19 mm).
- All Spec FCC part 15 ISM Band Non License compliant Radio.



#### Overview

The GINA-2011 is a small, versatile high performance RF Module that delivers data up to speeds of 11Mbps/s. The Module is designed to provide up to 0.5 watt ( 27dBm) output power. The GINA-2011 RF Module is available as a plug-in module for those Researcher who wish to interface it with their own designed controllers.

GINA-2011 operates at 2.4 GHz Direct Sequence Spread Spectrum (DSSS) Modulation physical layer can be compliant with IEEE 802.11b standard insures interoperability with other Wireless LAN products.

GINA-2011's highly integrated digital modulation transceiver module can also be used for factory automation equipment and barcode readers, embedded systems, and other applications.

#### APPLICATIONS

- |                            |                                     |                            |
|----------------------------|-------------------------------------|----------------------------|
| • Wireless Network         | • Last-Mile Telephone               | • PLC / Router Connections |
| • Wireless Internet        | • Camera Surveillance Control (PTZ) | • Computer Data Links      |
| • Mobile Scanner           | • Industrial Automation             | • Traffic Controls         |
| • Remote Guidance Vehicles | • GPS Data Link                     | • Remote Networking        |
| • Robotic Remote Control   | • Power & Gas Utilities             | • High Speed File Transfer |





# GINA 2011 RF Module

## 11 Mbps RF Module

### RECEIVER

#### Frequency Range :

- ▶ 2.4 ~ 2.4965 GHz

#### Data Rate :

- ▶ 1 ~ 11 Mbits/s

#### Sensitivity 10-6 @ :

- ▶ -96 dBm for 1 Mbit/s
- ▶ -93 dBm for 2 Mbits/s
- ▶ -89 dBm for 5.5 Mbits/s
- ▶ -87 dBm for 11 Mbits/s

#### Noise Figure :

- ▶ Less than 10 dB

#### Supply Current :

- ▶ 150 mA without sleep mode
- ▶ 100 mA with sleep mode

## "No more Wires"

### TRANSMITTER

#### Frequency Range :

- ▶ 2.4 ~ 2.4965 GHz

#### Data Rate :

- ▶ 1 ~ 11 Mbits/s

#### Output Power :

- ▶ +10 ~ +27 dBm (adjustable)
- Note : Tx supply voltage requires at least 6.0V DC for 25 ~ 27 dBm typical power output*

#### Spurious Output :

- ▶ FCC Part 15

#### Supply Current :

- ▶ 650 mA at Maximum Out.

## UNIT SPECIFICATION

#### Supply Voltage

- ▶ 3.3v DC required for basic voltage
- ▶ 6.0 v DC TX section to get MAX power 27 dBm
- ▶ 5.0 v DC to operate for TX section, but TX power will be 24 dBm

#### Supply Current :

- ▶ 300 mA for 3.3v line required at TX condition
- ▶ 500 mA for 6.0v or 5.0v line when TX is ON

#### TX Duty Cycle :

- ▶ 30 % for TX 70 % for RX

#### Temperature Range :

- ▶ -20°C ~ +60°C

#### Antenna Connector :

- ▶ 2x MMCX connector (for Diversity)

#### Interface Connector :

- ▶ 50 PIN 1.27 mm standard female connector
- (.050" x .050" SAMTEC SOCKET SFM Series)  
P/N : SFML-125-T1-S-A*

#### LED Indicator :

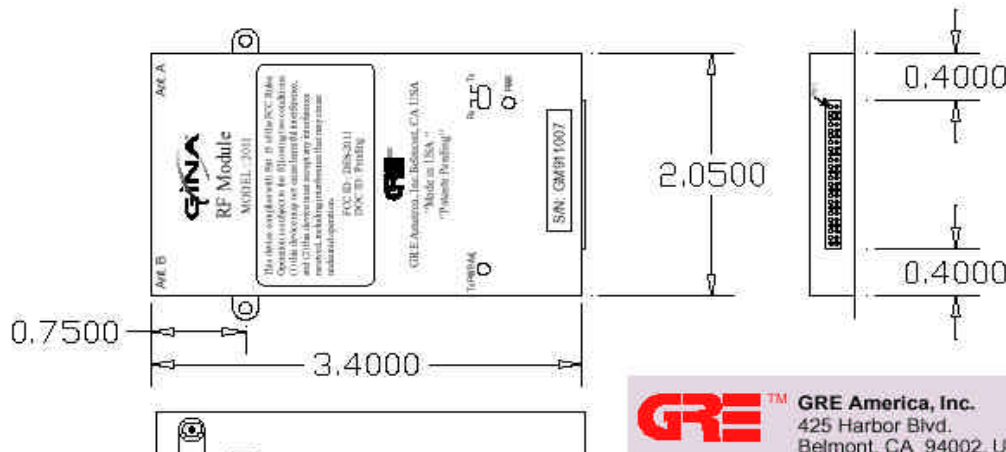
- ▶ DC PWR, TX ON, RX Receiver

#### Adjustment :

- ▶ TX power adjustment by POT volume

#### Approvals :

- ▶ Pending FCC



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## PROCESSING GAIN

## THEORY OF OPERATION

## **RF BLOCK DIAGRAM & SCHEMATIC DIAGRAM**