

# GPS RADIONOVA® RF Antenna Module

Part No. M10214-A1

Product Specification

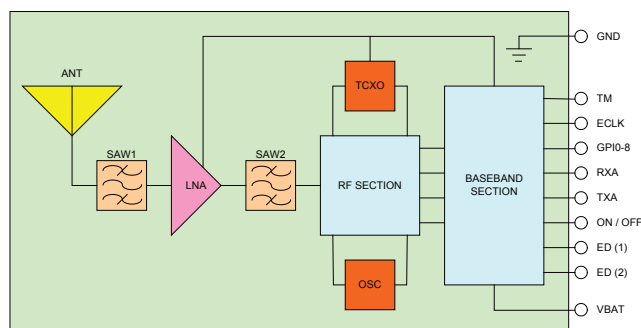
## Applications

- Personal Navigation Devices (PNDs)
- Portable Media Players (PMPs)
- Personal Digital Assistants (PDAs)
- Feature phones / Smart phones
- Ultra Mobile Devices (UMDs)
- Asset Tracking / Personal Safety

## Features

- Low cost single package GPS RF antenna module
- SiRF Star III GPS Chipset Architecture
- Low current consumption
- Easy to use 'drop-in solution'
- Built in filter allows co-existence with GSM / CDMA / UMTS / WLAN / BT
- Resistant to de-tuning

## Functional Block Diagram



## Product Description

GPS RADIONOVA M10214-A1 is a Flash based, highly integrated GPS RF Antenna Module suitable for L1-band GPS and A-GPS systems. The device is based on the high performance SiRF Star III GPS architecture combined with Antenna's high efficiency complementary antenna technology.

All front-end components are contained in a single package laminate base module for optimum performance. M10214-A1 operates on a single 3.6V positive bias supply with low power consumption and available low power modes for further power savings.

M10214-A1 is supported by SiRF stand alone software and uses a UART as the host processor interface.

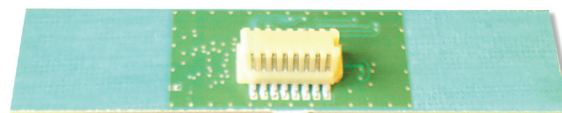
## Package Style

43 x 9 x 4mm RF Antenna Module

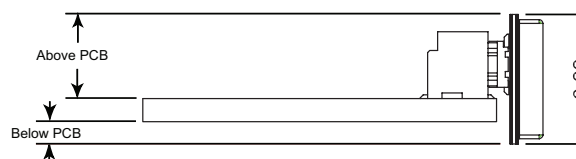
Top View (without shielding can)



Bottom View



Typical Mount (side view)



## Absolute Maximum Ratings

| Symbol           | Parameter                              | Min | Max | Unit |
|------------------|----------------------------------------|-----|-----|------|
| Vbat             | Supply Voltage                         |     | 5.5 | V    |
| RFin             | RF Input Power                         |     | 10  | dBm  |
| ESD              | Electrostatic Discharge Immunity (HBM) |     | TBD | kV   |
| T <sub>STG</sub> | Storage Temperature                    | -40 | +85 | °C   |

\*Exposure to absolute ratings may adversely affect reliability and may cause permanent damage.

## Recommended Operating Conditions

| Symbol | Parameter           | Min | Typ    | Max | Unit |
|--------|---------------------|-----|--------|-----|------|
| Ta     | Ambient Temperature | -20 | 25     | +85 | °C   |
| Vbat   | Main Supply Voltage | 3.3 | 3.6    | 5.5 | V    |
| Fref   | Reference Frequency |     | 16.369 |     | MHz  |

## DC Electrical Characteristics

Conditions: Vbat = 3.6V, Ta = 25 °C

| Symbol                                 | Parameter                               | Typ | Unit |
|----------------------------------------|-----------------------------------------|-----|------|
| I <sub>CC</sub> <sub>ACQ</sub>         | Total Supply Current (Acquisition Mode) | 50  | mA   |
| I <sub>CC</sub> <sub>TRK</sub>         | Track Mode                              | 33  | mA   |
| I <sub>CC</sub> <sub>(CLK)</sub>       | Clock Only                              | 16  | mA   |
| I <sub>CC</sub> <sub>(STAND BY)</sub>  | Stand By Mode                           | 7   | mA   |
| I <sub>CC</sub> <sub>(HIBERNATE)</sub> | Hibernate Mode                          | 30  | µA   |

\*Power Management modes above are automatically accessed and managed through SiRF software/Firmware.

## RF Specifications

Conditions: Vbat = 3.6V, Ta = 25 °C

| Symbol             | Parameter             | Typ | Unit |
|--------------------|-----------------------|-----|------|
| G <sub>LNA</sub>   | LNA Gain              | 18  | dB   |
| NF <sub>LNA</sub>  | LNA Noise Figure      | 1.1 | dB   |
| P <sub>1dB</sub>   | 1dB Compression Point | -65 | dBm  |
| ANT <sub>RL</sub>  | Antenna Return Loss   | -12 | dB   |
| ANT <sub>EFF</sub> | Antenna Efficiency    | 50  | %    |

## Band Rejection

| Frequency | Standard           | Typ | Unit |
|-----------|--------------------|-----|------|
| 824-849   | Cellular CDMA      | 89  | dBc  |
| 869-894   | GSM850             | 89  | dBc  |
| 880-915   | GSM900             | 89  | dBc  |
| 1710-1785 | DCS                | 74  | dBc  |
| 1850-1910 | PCS                | 84  | dBc  |
| 1920-1980 | WCDMA              | 84  | dBc  |
| 2400      | WLAN, BT and WiMAX | 80  | dBc  |

## System Performance

| Parameter                            | Specification                         |
|--------------------------------------|---------------------------------------|
| Data Output Protocol <sup>1</sup>    | SiRF Binary, NMEA 0183                |
| Host Interface                       | UART                                  |
| Baud Rate <sup>1</sup>               | SiRF Binary (57600), NMEA (4800\9600) |
| <b>Power Consumption<sup>2</sup></b> |                                       |
| Acquisition Mode                     | 150 mW                                |
| Tracking Mode                        | 110 mW                                |
| Trickle Power Mode                   | 50 mW                                 |
| <b>Position Accuracy</b>             |                                       |
| Autonomous                           | 2.5m                                  |
| <b>Sensitivity</b>                   |                                       |
| Acquisition                          | -142dBm                               |
| Tracking                             | -159dBm                               |
| <b>TTF</b>                           |                                       |
| Hot Start                            | <1s                                   |
| Warm Start                           | <35s                                  |
| Cold Start                           | <35s                                  |

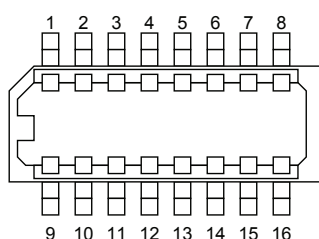
<sup>1</sup> Must use SiRF software to switch between output protocols.

<sup>2</sup> Vbat=3.3V

## Pin out Description

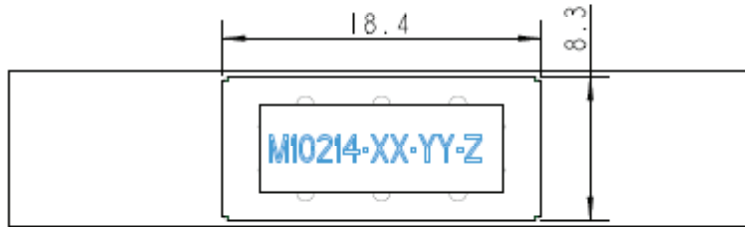
| Pin | Name     | Description                                                                                                                                                |
|-----|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | TM       | OUTPUT - Time Mark (1.8V)<br>(Mobile Phone A-GPS application, otherwise tie to GND)                                                                        |
| 2   | GND      | Ground connection                                                                                                                                          |
| 3   | GND      | Ground connection                                                                                                                                          |
| 4   | GND      | Ground connection                                                                                                                                          |
| 5   | GND      | Ground connection                                                                                                                                          |
| 6   | GND      | Ground connection                                                                                                                                          |
| 7   | GND      | Ground connection                                                                                                                                          |
| 8   | GND      | Ground connection                                                                                                                                          |
| 9   | ECLK     | INPUT - External clock for Frequency Aiding (1.8V)<br>(Mobile Phone A-GPS application, otherwise tie to GND)                                               |
| 10  | GPIO-8   | INPUT - Time Aiding (1.8V)<br>(Mobile Phone A-GPS application, otherwise tie to GND)                                                                       |
| 11  | RXA      | SERIAL INPUT - UART Receive Input (1.8V)<br>(Main message connection to host CPU)                                                                          |
| 12  | TXA      | SERIAL OUTPUT - UART Transmit Output (1.8V)<br>(Main message connection to host CPU)                                                                       |
| 13  | ON / OFF | INPUT - Power ON/OFF control line (1.2V). Momentary high pulse to turn on and off the device. Pulse duration >70µs with minimum inter-pulse interval of 1s |
| 14  | VBAT     | POWER SUPPLY (3.6V)                                                                                                                                        |
| 15  | ED (1)   | INPUT - Memory Boot mode Configuration (1.8V). External Bus Signal #1<br>(See table below)                                                                 |
| 16  | ED (0)   | INPUT - Memory Boot mode Configuration (1.8V). External Bus Signal #0<br>(See table below)                                                                 |

| Program Memory Bootstrap Selection |        |        |
|------------------------------------|--------|--------|
|                                    | ED (1) | ED (0) |
| Flash Mode                         | 0      | 0      |
| Reserved                           | 0      | 1      |
| Flash Loader Mode                  | 1      | 1      |
| ROM Mode (default)                 | 1      | 0      |

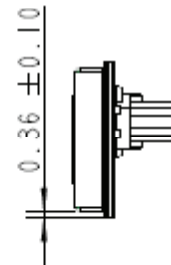


## Mechanical Drawing

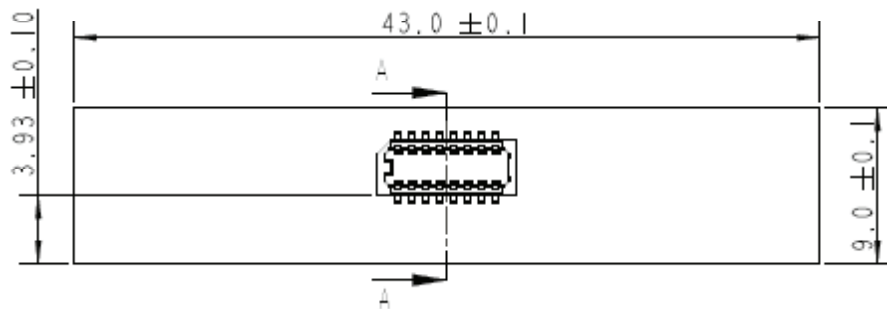
Front View (Component Side)



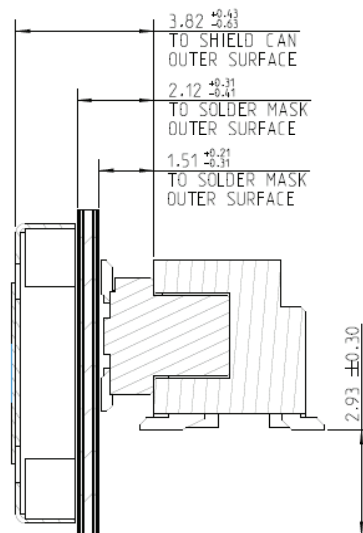
Side View



Back View (Connector Side)

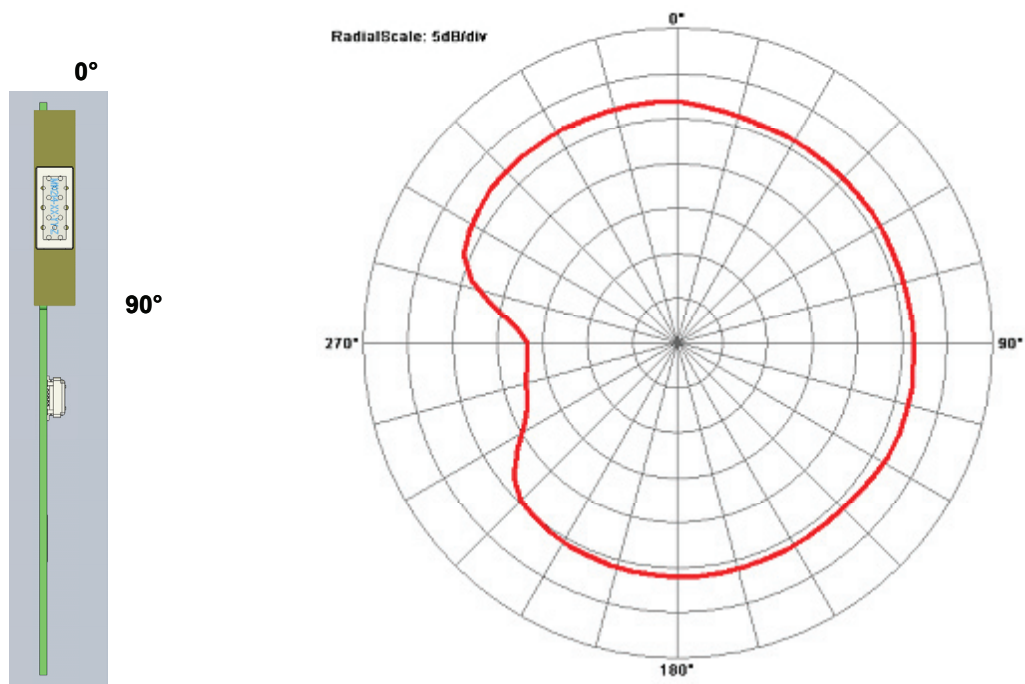
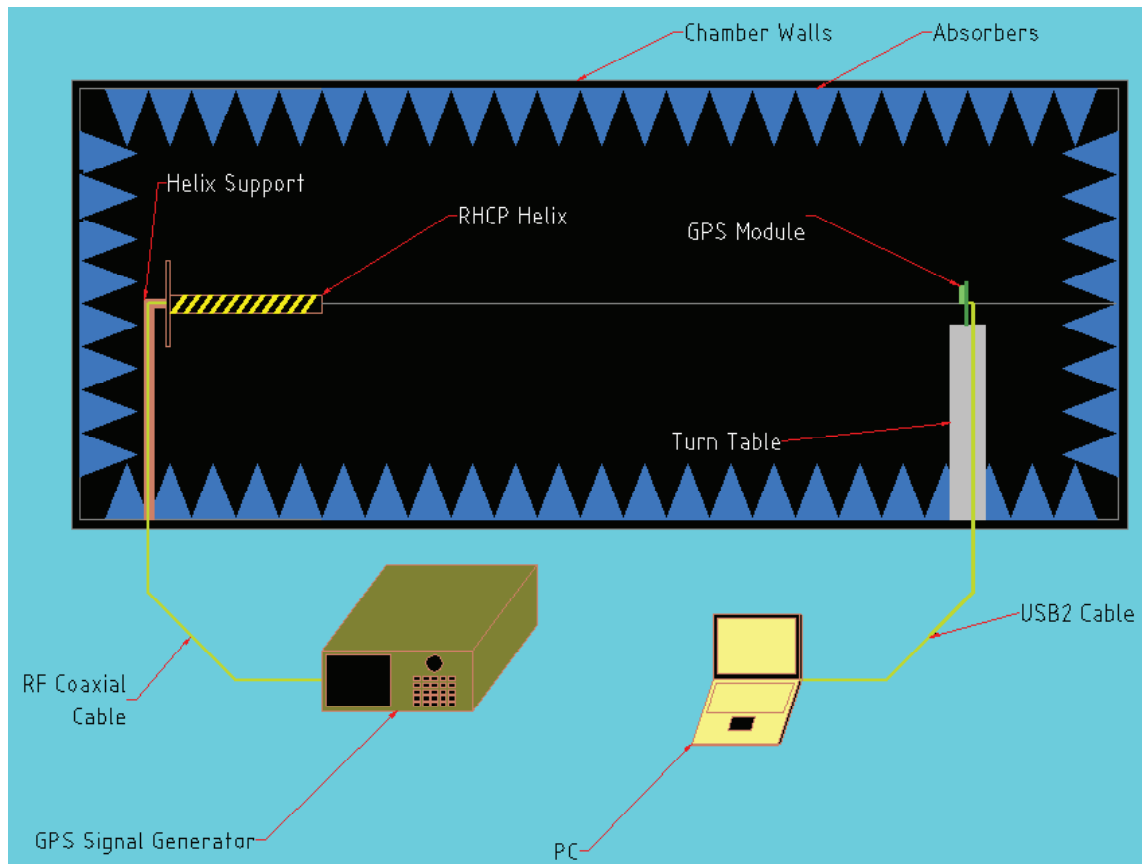


Side View  
(Mated with Female Connector)



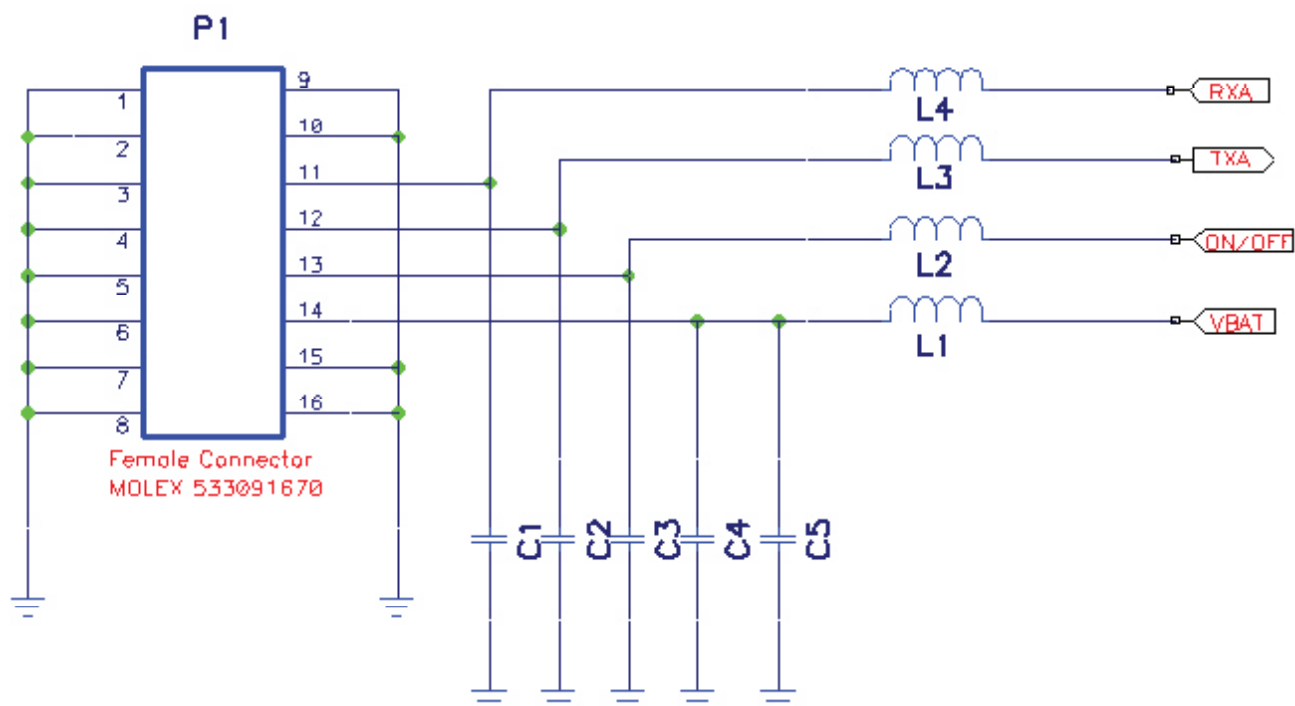
Notes: Units = mm

## Typical Chamber Performance



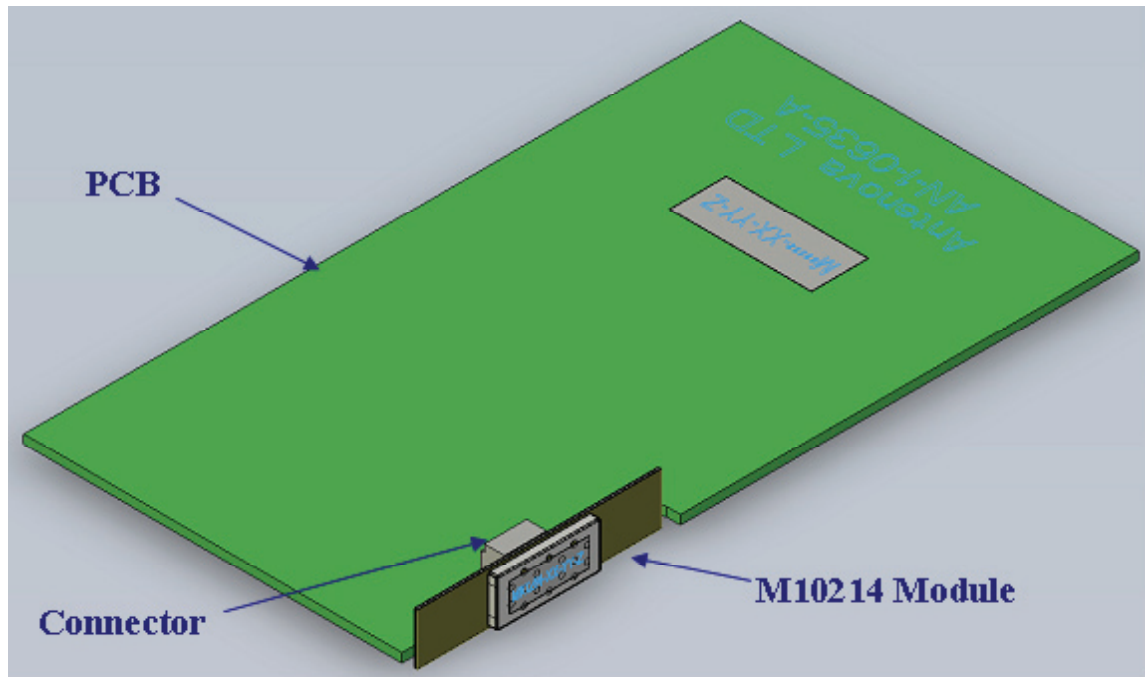
Note: Radiation pattern measured on Antenna's standard test board. Tuning may be needed in product integration to adjust radiation pattern.

## Recommended Application Schematic



| REFERENCE DESIGNATOR | VALUES | QTY | NOTES                |
|----------------------|--------|-----|----------------------|
| C1,C2,C3,C4          | 15pF   | 4   | 0402 size components |
| C5                   | 2.2uF  | 1   | 0402 size components |
| L1,L2,L3,4           | 47nH   | 4   | 0402 size components |
| P1                   | 16 Pin | 1   | Molex 533091670      |

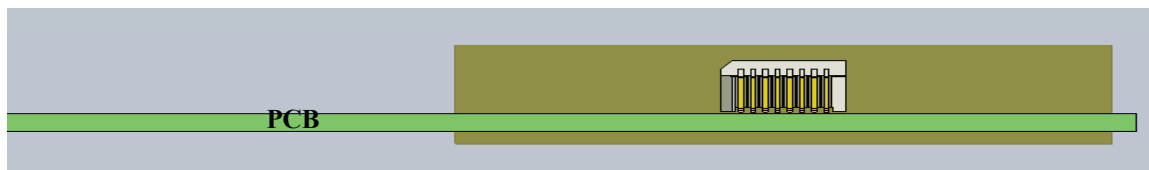
## Typical RF Antenna Module Placement



Front View



Back View



Side View





[www.antenova.com](http://www.antenova.com)

### Corporate Headquarters

#### Antenova Ltd.

Far Field House  
Albert Road  
Stow-cum-Quy  
Cambridge, CB25 9AR  
UK

**Tel:** +44 (0) 1223 810600  
**Fax:** +44 (0) 1223 810650  
**Email:** [sales@antenova.com](mailto:sales@antenova.com)

### USA Headquarters

#### Antenova USA

Rogers Business Park  
2541 Technology Drive, Suite 403  
Elgin, IL 60124  
USA

**Tel:** +1 (847) 551-9710  
**Fax:** +1 (847) 551-9719  
**Email:** [sales@antenova.com](mailto:sales@antenova.com)

### Asia Headquarters

#### Antenova Asia Ltd.

4F, No. 324, Sec. 1, Nei-Hu Road  
Nei-Hu District  
Taipei 11493  
Taiwan, ROC

**Tel:** +886 (0) 2 8797 8630  
**Fax:** +886 (0) 2 8797 6890  
**Email:** [sales@antenova.com](mailto:sales@antenova.com)

**Copyright® 2007 Antenova Ltd.** All Rights Reserved. Antenova® and RADIONOVA® are trademarks of Antenova Ltd. Any other names and/or trademarks belong to their respective companies.

The materials provided herein are believed to be reliable and correct at the time of print. Antenova does not warrant the accuracy or completeness of the information, text, graphics or other items contained within these information. Antenova further assumes no responsibility for the use of this information, and all such information shall be entirely at the user's risk.



Certificate No: 4598/04

# Integrated Antenna Solutions

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Antenova:](#)

[M10214-A1](#)