



Installation Manual

SIMATIC NET

Rugged Multi Service Platforms

RUGGEDCOM RX1400

https://www.siemens.com/ruggedcom

SIEMENS

Preface

Introduction	1
	ſ
Installing the Device	2
	_
Device Management	3
Communication Ports	4
Technical Specifications	5
Certification	6

SIMATIC NET

Rugged Multi Service Platforms RUGGEDCOM RX1400

Installation Manual

Legal Information

Warning Notice System

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

\land DANGER

indicates that death or severe personal injury will result if proper precautions are not taken.

indicates that death or severe personal injury may result if proper precautions are not taken.

\triangle caution

indicates that minor personal injury can result if proper precautions are not taken.

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper Use of Siemens Products

Note the following:

rightarrow WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by [®] are registered trademarks of Siemens Canada Ltd.. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of Contents

Prefa	ace		. v
		icuments	. v
	SIMATIC N Registered	Trademarks	v
	Warranty		. v vi
	Training		. vi
	Customer S	Support	vi
	Contacting	Siemens	vii
1	Introduction	on	. 1
	1.1	Feature Highlights	. 1
	1.2	Description	. 2
	1.3	Article Number	. 4
	1.4	Required Tools and Materials	. 6
	1.5	Decommissioning and Disposal	. 7
	1.6	Cabling Recommendations	. 7
	1.6.1	Protection On Twisted-Pair Data Ports	. 7
	1.6.2	Gigabit Ethernet 1000Base-TX Cabling Recommendations	. 8
	1.6.3	Supported Fiber Optic Cables	. δ
2	Installing	the Device	11
	2.1	General Procedure	12
	2.2	Unpacking the Device	12
	2.3	Mounting the Device	13
	2.3.1	Mounting the Device on a DIN Rail	13
	2.3.2	Mounting the Device to a Panel	15
	2.3.3	Mounting the Device to a Rack	16
	2.4	Connecting the Antennas	17
	2.4.1	Antenna Ports	18
	2.4.2	Available Antennas	18
	2.4.5	Connecting a GPS Antenna	20
	2.4.5	Connecting WLAN Antennas	24
	2.5	Connecting the Failsafe Alarm Relay	25
	2.6	Connecting Power	25
	2.6.1	Connecting High AC/DC Power	26
	2.6.2	Connecting Low DC Power	27
3	Device Ma	nagement	29
	3.1	Connecting to the Device	29

	3.2	Configuring the Device	30
	3.3	Installing the SIM Cards	30
	3.4	Inserting/Removing the MicroSD Card	31
4	Communio	cation Ports	33
	4.1	Fast Ethernet Ports	33
	4.2	SFP Transceivers	34
	4.3	Serial Ports	35
5	Technical	Specifications	37
	5.1	Power Supply Specifications	37
	5.2	Failsafe Alarm Relay Specifications	37
	5.3	Fast Ethernet Port Specifications	37
	5.4	Serial Port Specifications	38
	5.5 5.5.1 5.5.2	Cellular Modem Specifications LTE Specifications GNSS Specifications	38 38 40
	5.6	WLAN Specifications	41
	5.7	Operating Environment	41
	5.8	Mechanical Specifications	41
	5.9	Dimension Drawings	42
6	Certificatio	on	45
	$\begin{array}{c} 6.1\\ 6.1.1\\ 6.1.2\\ 6.1.3\\ 6.1.4\\ 6.1.5\\ 6.1.6\\ 6.1.7\\ 6.1.8\\ 6.1.9\\ 6.1.10\\ 6.1.11\\ 6.1.12\\ 6.1.13\\ 6.1.14\end{array}$	Approvals	45 45 46 47 48 51 51 51 52 52 52 53 53
	6.2	EMC and Environmental Type Tests	53

Preface

This guide describes the RUGGEDCOM RX1400. It describes the major features of the device, installation, commissioning and important technical specifications.

It is intended for use by network technical support personnel who are responsible for the installation, commissioning and maintenance of the device. It is also recommended for use by network and system planners, system programmers, and line technicians.

Related Documents

Other documents that may be of interest include:

Document Title	Link
RUGGEDCOM ROX II CLI Configuration Manual	https://support.industry.siemens.com/cs/ww/en/ view/109481696
RUGGEDCOM ROX II Web Interface Configuration Manual	https://support.industry.siemens.com/cs/ww/en/ view/109481698
RUGGEDCOM SFP Transceivers Catalog	https://support.industry.siemens.com/cs/ww/en/ view/109482309

SIMATIC NET Glossary

The SIMATIC NET Glossary describes special terms that may be used in this document.

The glossary is available online via Siemens Industry Online Support (SIOS) at:

https://support.industry.siemens.com/cs/ww/en/view/50305045

Registered Trademarks

RUGGEDCOM[®], ROS[®], RCDP[®], and RUGGEDCOM Discovery Protocol[®] are registered trademarks of Siemens Canada Ltd.

Linux[®] is the registered trademark of Linus Torvalds in the United States and other countries.

The registered trademark Linux[®] is used pursuant to a sublicense from LMI, the exclusive licensee of Linus Torvalds, owner of the mark on a world-wide basis.

Other designations in this manual might be trademarks whose use by third parties for their own purposes would infringe the rights of the owner.

Warranty

Warranty

Siemens warrants this product for a period of five (5) years from the date of purchase, conditional upon the return to factory for maintenance during the warranty term. This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void. The warranties set forth in this article are exclusive and are in lieu of all other warranties, performance guarantees and conditions whether written or oral, statutory, express or implied (including all warranties and conditions of merchantability and fitness for a particular purpose, and all warranties and conditions arising from course of dealing or usage or trade). Correction of nonconformities in the manner and for the period of time provided above shall constitute the Seller's sole liability and the Customer's exclusive remedy for defective or nonconforming goods or services whether claims of the Customer are based in contract (including fundamental breach), in tort (including negligence and strict liability) or otherwise.

For warranty details, visit https://www.siemens.com or contact a Siemens customer service representative.

Training

Siemens offers a wide range of educational services ranging from in-house training of standard courses on networking, Ethernet switches and routers, to on-site customized courses tailored to the customer's needs, experience and application.

Siemens' Educational Services team thrives on providing our customers with the essential practical skills to make sure users have the right knowledge and expertise to understand the various technologies associated with critical communications network infrastructure technologies.

Siemens' unique mix of IT/Telecommunications expertise combined with domain knowledge in the utility, transportation and industrial markets, allows Siemens to provide training specific to the customer's application.

For more information about training services and course availability, visit https:// www.siemens.com or contact a Siemens Sales representative.

Customer Support

Customer support is available 24 hours, 7 days a week for all Siemens customers. For technical support or general information, contact Siemens Customer Support through any of the following methods:



Online

Visit http://www.siemens.com/automation/support-request to submit a Support Request (SR) or check on the status of an existing SR.



Telephone

Call a local hotline center to submit a Support Request (SR). To locate a local hotline center, visit https://w3.siemens.com/aspa_app/?lang=en.

Mobile App

Install the Industry Online Support app by Siemens AG on any Android, Apple iOS or Windows mobile device and be able to:

- Access Siemens' extensive library of support documentation, including FAQs and manuals
- Submit SRs or check on the status of an existing SR
- Contact a local Siemens representative from Sales, Technical Support, Training, etc.
- Ask questions or share knowledge with fellow Siemens customers and the support community

Contacting Siemens

Address	Siemens Canada Ltd.
	Digital Industries
	Process Automation
	300 Applewood Crescent
	Concord, Ontario
	Canada, L4K 5C7
Telephone	Toll-free: 1 888 264 0006
	Tel: +1 905 856 5288
	Fax: +1 905 856 1995
E-Mail	info.ruggedcom@siemens.com
Web	https://www.siemens.com

Preface

Contacting Siemens

1

Introduction

The RUGGEDCOM RX1400 is a multi-protocol intelligent node that combines Ethernet switch, routing and firewall functionality with various wide area connectivity options.

The RUGGEDCOM RX1400 switch, with its rugged metal housing, is designed for DIN rail, panel or rack mounting.

The RUGGEDCOM RX1400 provides a high level of immunity to electromagnetic interference, heavy electrical surges, extreme temperature and humidity for reliable operation in harsh environments.

The device has IP40 degree protection, does not use internal fans for cooling and supports a -40 to 85 $^{\circ}$ C (-40 to 185 $^{\circ}$ F) extended temperature range.

Primary benefits include:

- Cost effective solution for large scale deployments
- Space-saving installation
- Reduced maintenance costs
- Customer data protection
- Support for additional applications

The RUGGEDCOM RX1400 is designed to support primary communications over public mobile networks and leverage enhanced capabilities of mobile networks, while making reliable and secure connections for mission critical applications in electric utility substations, traffic control cabinets, railway applications, oil and gas and other harsh environment applications.

Note

To comply with FCC regulations, this device must only be used for mobile and fixed applications.

1.1 Feature Highlights

Cellular Interface

- LTE: 700- B13, B17, 800/900/1800/2100/2600 MHz
- UMTS/HSPA+: 850/900/1900/2100 MHz
- Quad-Band EDGE/GPRS/GSM
- GNSS

WLAN Interface

 WLAN Access Point and Client: WLAN Direct[®] (multi-channel, multi-role) dual band transceiver support of IEEE 802.11a/b/g/n for 2.4 GHz and 5 GHz 1.2 Description

Power Supply

- 12 to 24 VDC
- ±12 to 24 VDC
- ±48 VDC
- HI VAC/VDC

Ethernet Interfaces

• 4 x 10/100Base-T RJ45 ports

Optical SFP Pluggable Transceivers

• 2 x 1000 Mbps ports

Other Interfaces

- Isolated built-in power input
- RS-232 console port for local management/diagnostics on the device
- SMA connectors for cellular, GPS and RF interfaces
- R-SMA connectors for WLAN RF interface

Serial Interfaces with Isolation

• 2 x RS232/422/485 ports

1.2 Description

The RUGGEDCOM RX1400 features various ports, controls and indicator LEDs on the front panel for connecting, configuring and troubleshooting the device.



- (5) ANT1 Port
- Fast Ethernet Ports
- ANT2 Port
- SFP Transceiver Ports
- Failsafe Alarm Relay
- (10) ANT3 Port

- 1) ANT4 Port
- Power Supply Terminal Block
- (3) RS232 Serial Console Port (DB9)
- (4) ANT5 Port
- 15 POWER LED
- 16 ALARM LED
- TO CELL LED

Figure 1.1 RUGGEDCOM RX1400

Product Label	The product label details the product compliance, etc. It also defines the the hardware configuration.	uct name, barcode, standards e article number, which describes
	For more information about how t refer to "Article Number" (Page 4).	to interpret the article number,
POWER LED	Illuminates when power is being s	supplied to the device.
ALARM LED	Illuminates when an alarm conditi	on exists.
CELL LED	Indicates when the cellular modem is connected to the network.	
	• Solid = Activity	
	• Off = No activity	
Port Status LEDs	Indicate the status of each port:	
	State	Description
	Solid	Link established
	Blinking	Link activity
	Off	No link/activity
Access Plate	The removable access plate provides access to the Micro SD card and SIM card slots.	
	Use a Micro SD card to store the device	he firmware and configuration for
	Use a single or dual (recomme LTE network	ended) SIM cards to connect to an
RS232 Serial Console Port	The serial console port is for interfacing directly with the device and accessing initial management functions. For information about connecting to the device via the serial console port, refer to "Connecting to the Device" (Page 29).	
ANT Ports	SMA ports for connecting to an LTE network or Global Navigation Satellite System (GNSS). For more information, refer to:	
	• "Connecting the Antennas" (Pa	age 17)
	Cellular Modem Specification	s" (Page 38)
Failsafe Alarm Relay	Latches to default state when a po condition occurs. For more inform	ower disruption or other alarm aation, refer to:
	"Connecting the Failsafe Alarn	n Relay" (Page 25)
	"Failsafe Alarm Relay Specifica	itions" (Page 37)
Power Supply Terminal Block	Jy Terminal Block A pluggable terminal block. For more information, refer to:	
	"Connecting Power" (Page 25)	
	 "Power Supply Specifications" 	(Page 37)

1.3 Article Number

The article number defines the device's hardware configuration. It is generated from the options selected in the RUGGEDCOM Selector at the time of ordering and printed on the product label affixed to the device.



- L3 Software
- 10 LTE Antenna
- (1) Virtual Processing Engine (VPE)

Figure 1.2 Article Number

Power Module Options

Option	Description
1	12/24 VDC
2	48 VDC
3	HI

Mounting Kit Options

Option	Description
А	None
В	DIN Rail Mount Kit
С	Panel Mount Kit
D	19" Rack Mount Kit

Manufacturing Modification Options

Option	Description
0	None
1	Conformal Coating

LTE Radio Options

Option	Description
A00	None
A01	LTE Europe
A02	LTE NAM ATT/RGRS/TLS/BLL
A03	LTE NAM Verizon
A04	LTE APAC
A06	LTE Global
A07	LTE NAM ATT/VZW/RGRS/TLS/BLL

WLAN Modem Options

Option	Description
B00	None
B01	WLAN Modem US
B02	WLAN Modem Non-US

SFP Transceiver (Port 5) Options

Option	Description
C00	None
C01	SFP, MM, 500 m, 850 nm, 1000SX (-20C to +85C)
C02	SFP, SM, 10 km, 1310 nm, 1000LX (-40C to +85C)
C03	SFP, SM, 25 km, 1310 nm, 1000LX (-40C to +85C)
C04	SFP, SM, 40 km, 1550 nm, 1000ZX (-20C to +85C)
C05	SFP, SM, 70 km, 1550 nm, 1000ZX (-20C to +85C)
C06	SFP, SM, 100 km, 1550 nm, 1000ZX (0C to +85C)
C07	SFP, SM, 10 km, 1310 nm TX, 1490 nm RX, 1000BX (-40C to +85C)
C08	SFP, SM, 40 km, 1310 nm TX, 1490 nm RX, 1000BX (-40C to +85C)
C09	SFP, SM, 10 km, 1490 nm TX, 1310 nm RX, 1000BX (-40C to +85C)
C10	SFP, SM, 40 km, 1490 nm TX, 1310 nm RX, 1000BX (-40C to +85C)
C11	SFP, SM, 2 km, 1310 nm, 100FX (-40C to +85C)

SFP Transceiver (Port 6) Options

Option	Description
D00	None
D01	SFP, MM, 500 m, 850 nm, 1000SX (-20C to +85C)
D02	SFP, SM, 10 km, 1310 nm, 1000LX (-40C to +85C)
D03	SFP, SM, 25 km, 1310 nm, 1000LX (-40C to +85C)
D04	SFP, SM, 40 km, 1550 nm, 1000ZX (-20C to +85C)
D05	SFP, SM, 70 km, 1550 nm, 1000ZX (-20C to +85C)
D06	SFP, SM, 100 km, 1550 nm, 1000ZX (0C to +85C)

Introduction

1.4 Required Tools and Materials

Option	Description
D07	SFP, SM, 10 km, 1310 nm TX, 1490 nm RX, 1000BX (-40C to +85C)
D08	SFP, SM, 40 km, 1310 nm TX, 1490 nm RX, 1000BX (-40C to +85C)
D09	SFP, SM, 10 km, 1490 nm TX, 1310 nm RX, 1000BX (-40C to +85C)
D10	SFP, SM, 40 km, 1490 nm TX, 1310 nm RX, 1000BX (-40C to +85C)
D11	SFP, SM, 2 km, 1310 nm, 100FX (-40C to +85C)

Ethernet Connection Options

Option	Description		
E00	Standard RJ45 Ports		
E01	Secure Collar for FastConnect Cables		

L3 Software Options

Option	Description		
F00	Layer 3 Standard Edition		
F01	Layer 3 Security Edition		

LTE Antenna Options

Option	Description		
G00	None		
G01	Single Direct Connect LTE Swivel Antenna		
G02	Two Direct Connect LTE Swivel Antennas		

Virtual Processing Engine (VPE) Options

Option	Description		
V00	VPE Disabled		
V01	VPE Enabled		
V02	RUGGEDCOM CloudConnect for VPE1400		
V03	RUGGEDCOM CROSSBOW ADM for VPE1400		

1.4 Required Tools and Materials

The following tools and materials are required to install the RUGGEDCOM RX1400:

Tool/Material	Available For Purchase From Siemens ^a
WLAN, LTE and/or GPS antennas	\checkmark
Antenna N-connect and/or SMA cables	\checkmark
AC/DC power cord (16 AWG)	×

Tool/Material	Available For Purchase From Siemens ^a
Lightning protector	×
Shielded coaxial cables	×
SIM card(s) provided by the network carrier	×
Flathead screwdriver for mounting the device to a DIN rail	×
Phillips screwdriver for mounting the device to a rack or panel	×
Braided or equivalent ground wire for grounding the device	×

^a For more information, contact a Siemens Sales representative.

1.5 Decommissioning and Disposal

Proper decommissioning and disposal of this device is important to prevent malicious users from obtaining proprietary information and to protect the environment.

Decommissioning

This device may include sensitive, proprietary data. Before taking the device out of service, either permanently or for maintenance by a third-party, make sure it has been fully decommissioned.

For more information, refer to the associated "Configuration Manual".

Recycling and Disposal

For environmentally friendly recycling and disposal of this device and related accessories, contact a facility certified to dispose of waste electrical and electronic equipment. Recycling and disposal must be done in accordance with local regulations.

1.6 Cabling Recommendations

Siemens recommends using SIMATIC NET industrial Ethernet shielded cables for all Ethernet ports.

1.6.1 Protection On Twisted-Pair Data Ports

All copper Ethernet ports on RUGGEDCOM products include transient suppression circuitry to protect against damage from electrical transients and conform with IEC 61850-3 and IEEE 1613 Class 1 standards. This means that during a transient electrical event, communications errors or interruptions may occur, but recovery is automatic.

1.6.2 Gigabit Ethernet 1000Base-TX Cabling Recommendations

Siemens also does not recommend using copper Ethernet ports to interface with devices in the field across distances that could produce high levels of ground potential rise (i.e. greater than 2500 V), during line-to-ground fault conditions.

1.6.2 Gigabit Ethernet 1000Base-TX Cabling Recommendations

The IEEE 802.3ab Gigabit Ethernet standard defines 1000 Mbit/s Ethernet communications over distances of up to 100 m (328 ft) using all 4 pairs in category 5 (or higher) balanced, unshielded twisted-pair cabling. For wiring guidelines, system designers and integrators should refer to the Telecommunications Industry Association (TIA) TIA/EIA-568-A wiring standard that characterizes minimum cabling performance specifications required for proper Gigabit Ethernet operation. For reliable, error-free data communication, new and pre-existing communication paths should be verified for TIA/EIA-568-A compliance.

Cabling Category	1000Base- TX Compliant	Required Action
< 5	No	New wiring infrastructure required.
5	Yes	Verify TIA/EIA-568-A compliance.
5e	Yes	No action required. New installations should be designed with Category 5e or higher.
6	Yes	No action required.
> 6	Yes	Connector and wiring standards to be determined.

The following table summarizes the relevant cabling standards:

Follow these recommendations for copper data cabling in high electrical noise environments:

- Data cable lengths should be as short as possible, preferably 3 m (10 ft) in length. Copper data cables should not be used for inter-building communications.
- Power and data cables should not be run in parallel for long distances, and should be installed in separate conduits. Power and data cables should intersect at 90° angles when necessary to reduce inductive coupling.

1.6.3 Supported Fiber Optic Cables

The following fiber optic cable types are supported under the stated conditions.

Cable Type	Wavelength (nm)	Modal Bandwidth (MHz·km)		Distance (m)	
			100Base-FX	1000Base-SX	10GBase-SR
OM1 (62.5/125)	850	200	_	275	33
	1300	500	2000		
OM2 (50/125)	850	500	—	550	82
	1300	500	2000	—	
OM3 (50/125) ^a	850	1500		550	300

1.6.3 Supported Fiber Optic Cables

Cable Type	Wavelength (nm)	Modal Bandwidth		Distance (m)	
		(MHz∙km)	100Base-FX	1000Base-SX	10GBase-SR
	1300	500	2000	—	
OM4 (50/125) ^a	850	3500		550	400
	1300	500	2000		

^a Laser optimized.

Introduction

1.6.3 Supported Fiber Optic Cables

Installing the Device

This chapter describes how to install the device, including mounting the device, connecting power, and connecting the device to the network.



\land DANGER

Electrocution hazard – risk of serious personal injury and/or damage to equipment.

Before performing any maintenance tasks, make sure all power to the device has been disconnected and wait approximately two minutes for any remaining energy to dissipate.



Radiation hazard – risk of serious personal injury.

This product contains a laser system and is classified as a *CLASS 1 LASER PRODUCT*. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



${ m eal}$ warning

Radiation hazard – risk of Radio Frequency (RF) exposure.

This device is compliant with the requirements set forth in FCC 47 CFR, section 1.1307, addressing Radio Frequency (RF) exposure from radio frequency base stations, as defined in FCC OET Bulletin 65 [http://transition.fcc.gov/Bureaus/ Engineering_Technology/Documents/bulletins/oet65/oet65.pdf]. The emitted radiation should be as little as possible. To achieve minimum RF exposure, install the device when it is configured not to transmit and set it to operational mode remotely, rather than having a technician enable transmission on-site. For maintenance of the device, or other operations which require RF exposure, the exposure should be minimized in time and according to the regulations set forth by the country of installation or the Federal Communications Commission (FCC).



Burn hazard – risk of personal injury

The surface of the device may be hot during operation, or as a result of the ambient air temperature.

Wear appropriate personal protective equipment and use caution when working with or around the device.

This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.

Changes or modifications not expressly approved by Siemens Canada Ltd. could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the equipment.

This product should be installed in a *restricted access location* where access can only be gained by authorized personnel who have been informed of the restrictions and any precautions that must be taken. Access must only be possible through the use of a tool, lock and key, or other means of security, and controlled by the authority responsible for the location.

2.1 General Procedure

The general procedure for installing the device is as follows:

Note

The user is responsible for the operating environment of the device, including maintaining the integrity of all protective conductor connections and checking equipment ratings. Make sure to review all operating and installation instructions before commissioning or performing maintenance on the device.

- 1. Review the relevant certification information for any regulatory requirements. For more information, refer to "Approvals" (Page 45).
- 2. Mount the device.
- 3. Connect an antenna or antennas.
- 4. For LTE antennas only, install SIM cards.
- 5. Connect the failsafe alarm relay.
- 6. Connect power to the device and ground the device to safety Earth.
- 7. Connect the device to the network.
- 8. Configure the device.

2.2 Unpacking the Device

When unpacking the device, do the following:

- 1. Inspect the package for damage before opening it.
- 2. Visually inspect each item in the package for any physical damage.

3. Verify all items are included.

Note

If any item is missing or damaged, contact Siemens for assistance.

2.3 Mounting the Device

The RUGGEDCOM RX1400 is designed for maximum mounting and display flexibility. It can be equipped with brackets that allow it to be installed in a rack, on a DIN rail, or directly on a panel.

Note

Heat generated by the device is channeled outwards from the enclosure. As such, it is recommended that 2.5 cm (1 in) of space be maintained on all open sides of the device to allow for some convectional airflow.

Forced airflow is not required. However, any increase in airflow will result in a reduction of ambient temperature and improve the long-term reliability of all equipment mounted in the rack space.

Note

For detailed dimensions of the device with either rack, DIN rail or panel hardware installed, refer to "Dimension Drawings" (Page 42).

2.3.1 Mounting the Device on a DIN Rail

For DIN rail installations, the RUGGEDCOM RX1400 can be ordered with a DIN rail adapter preinstalled on the back of the chassis. Use the adapter to mount the device to a standard 35 mm (1.4 in) IEC/EN 60715 or TS35 DIN rail.

Mounting the Device

To mount the device to a DIN rail, do the following:

1. Hook the top teeth of the adapter onto the DIN rail.

Note

The adapter features a sliding release with a slot at the bottom for a flathead screwdriver.

2.3.1 Mounting the Device on a DIN Rail



2 **DIN Rail Adapter**

Figure 2.1 Mounting the Device to a DIN Rail

- 2. Insert a flathead screw driver into the slot of the sliding release and move it down.
- 3. Push the device against the bottom of the DIN rail.
- 4. Let go of the sliding release to latch the device.

Removing the Device

To remove the device from a DIN rail, do the following:

1. Insert a flathead screwdriver into the slot of the sliding release and move it down.



2 DIN Rail Adapter

Figure 2.2 Removing the Device from a DIN Rail

- 2. Swing the bottom of the device away from the DIN rail.
- 3. Lift the device off the DIN rail.

2.3.2 Mounting the Device to a Panel

For panel installations, the RUGGEDCOM RX1400 can be equipped with panel adapters pre-installed on each side of the chassis. The adapters allow the device to be attached to a panel using screws.

To mount the device to a panel, do the following:

1. Place the device against the panel and align the adapters with the mounting holes.

2.3.3 Mounting the Device to a Rack



2. Install the supplied screws to secure the adapters to the panel.

2.3.3 Mounting the Device to a Rack

For rack mount installations, the RUGGEDCOM RX1400 can be equipped with rack mount adapters pre-installed on the chassis.

Electrical/mechanical hazard – risk of damage to the device

Before installing the device in a rack, make sure of the following:

- When installing the device in a closed or multi-device rack, be aware the operating ambient temperature of the rack may be higher than the ambient temperature of the room. Make sure the rack is installed in a suitable environment that can withstand the maximum ambient temperature generated by the rack.
- Make sure each device in the rack is separated by at least one rack-unit of space, or 44 mm (1.75 in), to promote convectional airflow. Forced airflow is not required. However, any increase in airflow will result in a reduction of ambient temperature and improve the long-term reliability of all equipment mounted in the rack space.
- Do not exceed the maximum number of devices or weight restrictions specified by the rack manufacturer.
- Do not overload the supply circuit. Refer to the over-current protection and power supply ratings specified by the rack manufacturer.

• Make sure the rack and all devices have a proper ground-to-Earth connection. Pay particular attention to power supply connections other than direct connections to the branch circuit (e.g. power strips).

To secure the device to a standard 48 cm (19 in) rack, do the following:

1. Make sure the rack mount adapters are installed.



- 2. Insert the assembly into the rack.
- 3. Secure the adapters to the rack using the supplied hardware.

2.4 Connecting the Antennas

The RUGGEDCOM RX1400 can be connected to external antennas for access to wireless networks. For increased signal coverage and improved performance, antennas are intended to be installed in a remote location separate from the RUGGEDCOM RX1400.

Note

The antenna installation must be as per Article 810 of the National Electric Code (NEC). Specifically, the grounding conductor must not be less than 10 AWG (Cu). The scheme should be either:

- In accordance with UL 96 and 96A Lightning Protection Components and Installation Requirements for Lightning Protection Systems (LPS)
- Tested in accordance with UL 50 and UL 497

Note

For technical specifications, refer to "Cellular Modem Specifications" (Page 38).

2.4.1 Antenna Ports

The RUGGEDCOM RX1400 features the following antenna ports:



Port	Туре	Function
ANT1	SMA	LTE SISO
ANT2	SMA	GPS
ANT3	RP/SMA	WLAN SISO
ANT4	RP/SMA	WLAN MIMO
ANT5	SMA	LTE MIMO

2.4.2	Available Antennas

The RUGGEDCOM RX1400 supports the following antennas.

Cellular, GPS and WLAN Antennas

Antenna	Туре	Operating Frequency (GHz)	Gain (dBi)	Article Number	Reference
ANT1995-4MM	1MM Omni- Directional	2.4	2.5	6GK6000-8NS01-1AA0	https://
		Directional	tional 5.0		
		0.7 to 1.0	3.0 to 4.0		C3/WW/CH//ICW/109740405
		1.7 to 2.7			

Cellular and GPS Antennas

Antenna	Туре	Operating Frequency (GHz)	Gain (dBi)	Article Number	Reference
ANT1096-4ME	Omni-	0.7	3.0	6GK6000-8NT01-1AA0	https://
	Directional	2.7			support.industry.siemens.com cs/ww/en/view/109477766
ANT1096-4MA	Omni-	0.7	3.0	6GK6000-8NT01-0AA0	https://
	Directional	2.7			support.industry.siemens.com cs/me/en/view/109477585

GPS Antennas

Antenna	Туре	Operating Frequency (GHz)	Gain (dBi)	Article Number	Reference
ANT1390-4ML	Omni- Directional	1.5	3.0	6GK6000-8NT01-0AA0	https:// support.industry.siemens.com cs/ww/en/view/109477767

WLAN Antennas

Antenna	Туре	Operating Frequency (GHz)	Gain (dBi)	Article Number	Reference
ANT792-4DN	Omni- Directional	2.4	4.0	6GK5792-4DN00-0AA6	-
ANT792-6MN	Omni- Directional	2.4	6.0	6GK5792-6MN00-0AA6	https:// support.industry.siemens.com cs/ww/en/view/26210199
ANT792-8DN	Directional	2.4	14.0	6GK5792-8DN00-0AA6	https:// support.industry.siemens.com cs/ww/en/view/26229510
ANT793-4MN	Omni- Directional	5.0	6.0	6GK5792-4MN00-0AA6	—
ANT793-6DG ^a	Directional	5.0	9.0	6GK5793-6DG00-0AA0	https:// support.industry.siemens.com cs/ww/en/view/60509676
ANT793-6DT ^a b	Omni- Directional	5.0	8.0 ^c	6GK5793-6DT00-0AA0	https:// support.industry.siemens.com cs/ww/en/view/60510334
ANT793-6MN	Omni- Directional	5.0	5.0	6GK5793-6MN00-0AA6	https:// support.industry.siemens.com cs/ww/en/view/26228205
ANT793-8DJ ^a d	Directional	5.0	18.0 ^e	6GK5793-8DJ00-0AA0	https:// support.industry.siemens.com cs/ww/en/view/60509959
ANT793-8DP ^a b	Directional	5.0	13.5 ^f	6GK5793-8DP00-0AA0	https:// support.industry.siemens.com cs/ww/en/view/89534905

Installing the Device

2.4.3 Connecting LTE Antennas

Antenna	Туре	Operating Frequency (GHz)	Gain (dBi)	Article Number	Reference
ANT795-4MA	Omni-	2.4	3.0	6GK5795-4MA00-0AA0	https://
	Directional	5.0	5.0		support.industry.siemens.com cs/ww/en/view/61199227
ANT795-4MC	Omni-	2.4	3.0	6GK5795-4MC00-0AA0	https://
	Directional	5.0	5.0		support.industry.siemens.com cs/ww/en/view/61199227
ANT795-4MD	Omni-	2.4	3.0	6GK5795-4MD00-0AA0 https:// support.industry cs/ww/en/view/6	https://
	Directional	5.0	5.0		support.industry.siemens.com cs/ww/en/view/61199227
ANT795-4MX	Omni-	2.4	2.0	6GK5795-4MX00-0AA0	https://
	Directional	5.0	2.5	support.industry.siem cs/ww/en/view/10232	support.industry.siemens.com cs/ww/en/view/102325861
ANT795-6DC	Directional	2.4	9.0	6GK5795-6DC00-0AA0	https://
		5.0 ^a		suppor cs/ww/	support.industry.siemens.com cs/ww/en/view/60510336
ANT795-6MN ^b	Directional	2.4	6.0	6GK5795-6MN10-0AA6	https://
	Omni- Directional	5.0 ^a	8.0 ^c		support.industry.siemens.com cs/ww/en/view/26536615
ANT795-6MT ^b	Directional	2.4	5.0	6GK5795-6MT00-0AA0	https://
	Omni- Directional	5.0 ^a	7.0 ^g		support.industry.siemens.com cs/ww/en/view/60510908

^a Not for use in Canada.

 b Must always be used with a 5 m (16 ft) cable (6X1875-5CH50).

^c Total gain is 3.6 dBi when connected via a 5 m (16 ft) cable (6X1875-5CH50) with a 4.4 dB loss.

^d Must always be used with a 10 m (33 ft) cable (6X1875-5CN10).

^e Total gain is 9.2 dBi when connected via a 10 m (33 ft) cable (6X1875-5CN10) with an 8.8 dB loss.

^f Total gain is 9.1 dBi when connected via a 5 m (16 ft) cable (6X1875-5CH50) with a 4.4 dB loss.

^g Total gain is 2.6 dBi when connected via a 5 m (16 ft) cable (6X1875-5CH50) with a 4.4 dB loss.

2.4.3 Connecting LTE Antennas

Install a single 4G LTE (Long Term Evolution) antenna for Single-Input Single-Output (SISO) or dual antennas for Multiple-Input Multiple-Output (MIMO).

To install an LTE antenna, do the following:

Radiation hazard – risk of Radio Frequency (RF) exposure.

Antennas must be placed at a distance of at least 35 cm (13.8 in) from all persons during normal operation. The antennas used for this product must not be located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

Configuration hazard – risk of reduced performance.

Each antenna and connecting cable must have a nominal impedance of 50 Ω with a return loss of better than 10 dB across each frequency band. If the nominal impedance is different, Radio Frequency (RF) performance will be reduced.

Note

The antenna installation must be as per Article 810 of the National Electric Code (NEC). Specifically, the grounding conductor must not be less than 10 AWG (Cu). The scheme should be either:

- In accordance with UL 96 and 96A Lightning Protection Components and Installation Requirements for Lightning Protection Systems (LPS)
- Tested in accordance with UL 50 and UL 497

Note

A Radio Frequency (RF) site survey is recommended prior to any installation to help determine the best location for the LTE antennas. For assistance, contact a Siemens Sales representative.

Note

The cellular modem supports SISO (Single Input Single Output) and MIMO (Multiple Input Multiple Output) modes. At minimum, a single antenna connected to the **LTE MAIN** port is required for SISO mode and to support lower generation wireless standards, such as GSM or EDGE. A separate diversity (secondary) antenna is required for MIMO performance.

Note

For mobile and fixed operating configurations, in accordance with R&TTE Directive 1999/5/EC, the maximum antenna gain is 3 dBi for 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz.

Note

For mobile and fixed operating configurations, in accordance with FCC 47 CFR, section 2.1091, the antenna gain, including cable loss must not exceed:

- 6.0 dBi at 700 MHz
- 3.0 dBi at 800/850 MHz
- 6.0 dBi at 1700 MHz
- 3.0 dBi at 1900 MHz

Under no conditions may an antenna gain be used that would exceed the ERP and/or EIRP power limits specified in FCC 47 CFR Parts 22, 24, 27 and 90.

Note

For technical specifications, refer to "Cellular Modem Specifications" (Page 38).

Note

A specific brand of antenna is not specified.

1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.

Note

MIMO is not certified for use in the Republic of Korea (South Korea).

2. Using shielded coaxial cables, connect the antenna to either the **ANT1** (SISO) or **ANT5** (MIMO) port on the device. Make sure the cable is routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

If needed, install a lightning protect between the antenna and the device.



2.4.4 Connecting a GPS Antenna

For increased signal coverage and improved performance, the GPS antenna is intended to be installed in a remote location separate from the RUGGEDCOM RX1400. The signals received from the GPS satellite network are at a frequency of 1575.42 MHz. The GPS antenna must therefore have a clear view of the sky to receive the low power signals and track the maximum number of satellites. Structures, such as rooftops, that are clear of obstructions and have a clear view of the horizon are ideal.

Note

A site survey is recommended prior to any installation to help determine the best location for the GPS antenna. For assistance, contact a Siemens Sales representative.

Note

Although it is impossible to protect the antenna from a direct lightning strike, the antenna and connected components can be protected from secondary effects through site selection and by installing protection devices.

Install the antenna at least 15 m (49 ft) away from and lower than any structures that attract lightning. GPS antenna damage is usually not the result of a direct lightning strike, but due to high currents induced by the effects of a lightning strike on a nearby structure. Lightning arrestors should also be installed in the antenna line to protect the receiver and connected devices. If a lightning arrestor is installed, it is important to make sure it has a low impedance path to ground.

To promote signal reception and avoid signal saturation at the receiver input, the overall GPS system requires a relative gain between 5 and 18 dBi.

Use only low loss, 50 Ω coaxial cabling when connecting the GPS and any other optional components to the RUGGEDCOM RX1400.

Note

Using any length of coaxial cable will add some time delay to the GPS signal, which degrades the accuracy of the calculated time and position. The time delay is dependent on the type of dielectric material in the cable and ranges from 1 to 2 ns/ft. The table below gives some examples of the delay that can be expected based on the dielectric type.

Dielectric Type	Time Delay (ns/ft)	Propagation Velocity (% of c)
Solid Polyethylene (PE)	1.54	65.9
Foam Polyethylene (FE)	1.27	80.0
Foam Polystyrene (FS)	1.12	91.0
Air Space Polyethylene (ASP)	1.15 to 1.21	84 to 88
Solid Teflon (ST)	1.46	69.4
Air Space Teflon (AST)	1.13 to 1.20	85 to 90

To connect a GPS antenna, do the following:

- 1. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment. Make sure 90° of the sky is visible to the antenna.
- 2. If required, connect the optional lightning arrestor, line amplifier or bandpass filter to the antenna.

2.4.5 Connecting WLAN Antennas



Figure 2.7 Antenna and Lightning Protector Assembly (Optional)

3. Using shielded coaxial cables, connect the antenna assembly to the **ANT2** port on the device.

2.4.5 Connecting WLAN Antennas

Install a single WLAN antenna for Single-Input Single-Output (SISO) or dual antennas for Multiple-Input Multiple-Output (MIMO).

To install a WLAN antenna, do the following:

- 1. Select an appropriate antenna. For a list of available WLAN antennas, refer to "Available Antennas" (Page 18).
- 2. Mount the antenna to a pole or wall in an area that provides good signal coverage and is away from any signal noise emanating from other communications equipment.
- 3. Using shielded coaxial cables, connect the antenna to either the **ANT3** (SISO) or **ANT4** (MIMO) port on the device. Make sure the cable is routed away from any noise sources, such as Switch-Mode Power Supplies (SMPS).

If needed, install a lightning protect between the antenna and the device.



① RUGGEDCOM RX1400

- Shielded Coaxial Cable
- 3 Lightning Protector
- WLAN Antenna

Figure 2.8 Antenna and Lightning Protector Assembly (Optional)

2.5 Connecting the Failsafe Alarm Relay

The failsafe relay can be configured to latch based on alarm conditions. The NO (Normally Open) contact is closed when the unit is powered and there are no active alarms. If the device is not powered or if an active alarm is configured, the relay opens the NO contact and closes the NC (Normally Closed) contact.

Note

Control of the failsafe relay output is configurable through RUGGEDCOM RX1400. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the "RUGGEDCOM ROX II Configuration Manual" for the RUGGEDCOM RX1400.

The following shows the proper relay connections.



- Normally Closed
- ② Common
- ③ Normally Open

Figure 2.9 Failsafe Alarm Relay Wiring

2.6 Connecting Power

The RUGGEDCOM RX1400 supports a single integrated high AC/DC or low DC power supply.

Note

Before installing the device, note the following:

- An appropriately rated AC or DC circuit breaker must be installed.
- Use minimum #16 gage copper wiring when connecting terminal blocks.

• Equipment must be installed according to applicable local wiring codes and standards.

2.6.1 Connecting High AC/DC Power

To connect a high AC/DC power supply to the device, do the following:

\triangle NOTICE

Electrical hazard - risk of damage to equipment

Do not connect AC power cables to terminals for DC power. Damage to the power supply may occur.

1. Connect the power supply terminal block to the device.



- Negative/Neutral (-/N) Terminal
- Positive/Live (+/L) Terminal
- ④ Braided Ground Cable
- Power Supply Terminal Block

Figure 2.10 Terminal Block Wiring

- 2. Connect the positive wire from the power source to the positive/live (+/L) terminal on the terminal block.
- 3. Connect the negative wire from the power source to the negative/neutral (-/N) terminal on the terminal block.

- 4. Using a braided wire or other appropriate grounding wire, connect the surge ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.
- 5. Connect the ground terminal on the power source to the chassis ground terminal on the device.

2.6.2 Connecting Low DC Power

To connect a low DC power supply to the device, do the following:

1. Connect the power supply terminal block to the device.



- ① Surge Ground Terminal
- Negative Terminal
- ③ Positive Terminal
- (4) Braided Ground Cable
- **(5)** Power Supply Terminal Block

```
Figure 2.11 Terminal Block Wiring
```

- 2. Connect the positive wire from the power source to the positive terminal on the terminal block.
- 3. Connect the negative wire from the power source to the negative terminal on the terminal block.
- 4. Using a braided wire or other appropriate grounding wire, connect the surge ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.

5. Connect the ground terminal on the power source to the chassis ground terminal on the device.

Device Management

This section describes how to connect to and manage the device.

3.1 Connecting to the Device

The following describes the various methods for accessing the RUGGEDCOM RX1400 console and Web interfaces on the device. For more detailed instructions, refer to the "RUGGEDCOM ROX II Configuration Manual" for the RUGGEDCOM RX1400.

Serial Console Port

Connect a PC or terminal directly to the serial console port to access the boot-time control and RUGGEDCOM ROX II console interface.

Note

The serial console port is intended to be used only as temporary connections during initial configuration or troubleshooting.

The serial console port implements RS-232 on a female DB9 connector. The following is the pin-out for the port:





Pin	Name
1	Reserved (Do Not Connect)
2	Output Signal
3	Input Signal
4	Reserved (Do Not Connect)
5	Ground
6	Reserved (Do Not Connect)

3.2 Configuring the Device

Pin	Name
7	Reserved (Do Not Connect)
8	Reserved (Do Not Connect)
9	Reserved (Do Not Connect)

For information about how to connect to the device via the serial console port, refer to the "RUGGEDCOM ROX II CLI Configuration Manual" for the RUGGEDCOM RX1400.

Communication Ports

Connect any of the available Ethernet ports on the device to a management switch and access the RUGGEDCOM RX1400 console and Web interfaces via the device's IP address. The factory default IP address for the RUGGEDCOM RX1400 is https://192.168.0.2.

For more information about available ports, refer to "Communication Ports" (Page 33).

Note

Single-mode fiber ports only support Ultra Physical Contact (UPC) cable connectors.

3.2 Configuring the Device

Once the device is installed and connected to the network, it must be configured. All configuration management is done via the RUGGEDCOM RX1400 interface. For more information about configuring the device, refer to the "RUGGEDCOM ROX II Configuration Manual" associated with the installed software release.

3.3 Installing the SIM Cards

The RUGGEDCOM RX1400 supports dual micro-SIM cards for the LTE modem to provide a fail-over mechanism should one of the SIM cards lose connectivity with the network.

To install micro-SIM cards from a regional cellular carrier, do the following:

\land ΝΟΤΙCΕ

Static electricity hazard – risk of damage to equipment

Take appropriate anti-static precautions before accessing the SIM cards.

1. Remove the SIM card access panel.

3.4 Inserting/Removing the MicroSD Card



Figure 3.2 Accessing the SIM Cards

- 2. Insert the SIM cards into the slots. Slot 1 is for the primary SIM card and slot 2 is for the secondary (backup) SIM card.
- 3. Close the access panel and secure it with the two screws.
- 4. Once the device is fully installed, activate the micro-SIM cards for the LTE modem. For more information, refer to the "RUGGEDCOM ROX II Configuration Manual" for the RUGGEDCOM RX1400.

3.4 Inserting/Removing the MicroSD Card

The RUGGEDCOM RX1400 accepts a microSD card for storing configuration files and/ or software updates.

Configuration hazard – risk of data loss.

The microSD card must not be removed or replaced during normal operation of the device. Make sure the device is powered down before removing or inserting the card.

Mechanical/electrical hazard – risk of damage to the microSD card

- Do not expose the microSD card to extreme temperatures or humidity.
- Do not expose the microSD card to large magnetic or static electric fields.
- Do not bend or drop the microSD card.

Security hazard – risk of unauthorized access and/or exploitation

Make sure to remove the microSD card before decommissioning the device or sending the device to a third-party.

To insert or remove a microSD card, do the following:

- 1. Power down the device.
- 2. Disconnect all network, alarm and console cables.
- 3. Unscrew the retention screw and remove the access plate.



- ① MicroSD Card
- 2 Access Plate



3 Inserting/Removing a MicroSD Card

- 4. Without touching the contacts on the card, insert or remove the microSD card.
- 5. Install the access plate and finger-tighten the retention screw.
- 6. Power up the device.

Communication Ports

The RUGGEDCOM RX1400 can be equipped with various types of communication ports to enhance its abilities and performance.



- Serial Ports
- Access Plate
- ③ ANT1 Port
- Fast Ethernet Ports
- S ANT2 Port
- 6 SFP Transceiver Ports
- ⑦ ANT3 Port
- (8) ANT4 Port
- Image: ANT5 Port

Figure 4.1 Port Assignment

Note

For information about the LTE MAIN, LTE MIMO or GPS ports and the cellular modem, refer to "Cellular Modem Specifications" (Page 38).

4.1 Fast Ethernet Ports

The RUGGEDCOM RX1400 features four 10/100Base-TX fast Ethernet (FE) ports with RJ45 connectors. The RJ45 connectors are directly connected to the chassis ground on the device and can accept CAT-5 shielded twisted-pair (STP) cables.

For technical specifications, refer to "Fast Ethernet Port Specifications" (Page 37).

Each port features an LED that indicates its link state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

The following are the pin-out descriptions for the RJ45 connectors:



Figure 4.2 RJ45 Ethernet Port Pin Configuration

Pin	10/100Base-TX	Description	
1	RX+	Receive Data+	
2	RX-	Receive Data-	
3	TX+	Transmit Data+	
4	Reserved (Do Not Connect)		
5	Reserved (Do Not Connect)		
6	TX-	Transmit Data-	
7	Reserved (Do Not Connect)		
8	Reserved (Do Not Connect)		

4.2 SFP Transceivers

The RUGGEDCOM RX1400 features two Small Form-Factor Pluggable (SFP) transceiver sockets, which are compatible with a wide array of SFP transceivers available from Siemens.

LEDs

Each socket features an LED that indicates its link state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

Compatible SFP Transceivers

For more information about which SFP transceivers are compatible with the RUGGEDCOM RX1400, as well as instructions for ordering and installation/

removal, refer to the "RUGGEDCOM SFP Transceiver Catalog [https:// support.industry.siemens.com/cs/ca/en/view/109482309]".

Note

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

4.3 Serial Ports

The RUGGEDCOM RX1400 supports two serial ports with female DB9 connectors, which can be run in RS-232, RS-485, or RS-422 mode. For technical specifications, refer to "Serial Port Specifications" (Page 38).

The following is the pin-out description for DB9 serial ports:

Serial DB9 Port



Figure 4.3 Serial DB9 Port Pin Configuration

Pin	Mode						
	RS-232	RS-422	RS-485				
1		Reserved (Do Not Connect)					
2	RX ^a	RX-					
3	TX ^a	TX-	RX-/TX-				
4	Reserved (Do Not Connect)						
5	Common (Isolated) Ground						
6		Reserved (Do Not Connect)					
7	RTS	TX+	RX+/TX+				
8	CTS	RX+					
9	Reserved (Do Not Connect)						
Shield		Chassis Ground					

^a In RS-232 mode, ports are wired as DTE (Data Terminal Equipment). They transmit on pin 3 and receive on pin 2.

Each RS-485 port can communicate with multiple RS-485 devices by wiring devices together in sequence over a single twisted-pair with transmit and receive signals on

the same two wires (half duplex). For reliable, continuous communication, adhere to the following guidelines:

- To minimize the effects of ambient electrical noise, use shielded cabling.
- The correct polarity must be observed throughout a single sequence or ring.
- The number of devices wired should not exceed 32, and total distance should be less than 1219 m (4000 ft) at 100 kbps.
- The Common terminals should be connected to the common wire inside the shield.
- The shield should be connected to earth ground at a single point to avoid loop currents.
- The twisted pair should be terminated at each end of the chain.

The following shows the recommended RS485 wiring.



- ① RUGGEDCOM RX1400 Device
- Common (Isolated Ground)
- ③ Negative
- (4) Positive
- (5) Shield to Earth (Connected At a Single Point)
- (6) RS-485 Devices (32 Total)

Figure 4.4

Recommended RS-485 Wiring

Technical Specifications

This chapter provides important technical specifications related to the device.

5.1 Power Supply Specifications

The RUGGEDCOM RX1400 includes one of the following internal power supplies:

Power Supply Type	Input Range	Internal Fuse Rating ^a	Maximum Power Consumption ^b	
	88-264 VAC			
	98-300 VDC	3.15 A(T)		
±48V VDC	±36-72 VDC		< 15 W	
12-24 VDC	9-36 VDC	6 2 A(T)		
±12-24 VDC	±36 VDC	0.5 A(1)		

^a (T) denotes time-delay fuse.

^b Power consumption varies based on the device configuration.

5.2 Failsafe Alarm Relay Specifications

Max Switching Voltage	240 VAC
	125 VDC
Rated Switching Current	2 A @ 240 VAC
	0.15 A @ 125 VDC
	2 A @ 30 VDC
Maximum Switching Capacity	150 W
	500 VA

5.3 Fast Ethernet Port Specifications

The RUGGEDCOM RX1400 features four 10/100Base-TX fast Ethernet (FE) ports with RJ45 connectors. For more information about the serial ports, refer to "Fast Ethernet Ports" (Page 33).

Speed ^a	100 Mbps
Connector	RJ45
Duplex ^a	FDX/HDX
Cable Type ^b	> CAT-5

5.4 Serial Port Specifications

Wiring Standard ^c	TIA/EIA T568A/B
Maximum Distance	100 m (328 ft)
Isolation ^d	1.5 kV

^a Auto-negotiating.

^b Shielded or unshielded.

^c Auto-crossover and auto-polarity.

^d RMS 1 minute.

5.4 Serial Port Specifications

The RUGGEDCOM RX1400 supports two serial ports with female DB9 connectors. For more information about the serial ports, refer to "Serial Ports" (Page 35).

Baud Rate	1200 to 230400 kbps
Connector	DB9
Isolation	2.5 kV

5.5 Cellular Modem Specifications

The following specifications detail the LTE, GNSS and WLAN capabilities of the cellular modem.

5.5.1 LTE Specifications

LTE capabilities of the device are dependent on the LTE modem installed.

The device can be ordered with any of the following LTE modem options:

Modem Option	Region	Supported Network(s)
A01	Europe	Generic
A02	North America	AT&T, Rogers, Telus, Bell
A03	North America	Verizon
A04	Asia Pacific	Generic
A06	Global	Generic
A07	North America	AT&T, Verizon, Rogers, Telus, Bell

The article number printed on the device label indicates which LTE modem is installed. For more information about the article number, refer to "Article Number" (Page 4).

Band			Modem	n Option			Frequency	Transmit (Tx)	Receive (Rx)
	A01	A02	A03	A04	A06	A07			
1	•			•	•		2100	1920-1980	2110-2170
2		•	•		•	•	1900	1850-1910	1930-1990
3	•			•	•		1800	1710-1785	1805-1880
4		•	•		•	•	1700	1710-1755	2110-2155
5		•	•		•	•	850	824-849	869-894
7	•			•	•		2600	2500-2570	2620-2690
8	•			•	•		900	880-915	925-960
12		•			•	•	700	699-716	729-746
13			•		•	•	700	777-787	746-756
14						•	700	788-798	758-768
17					•		700	704-716	734-746
20	•			•	•		800	832-862	791-821
25					•		1900	1850-1915	1930-1995
26					•		850	814-849	859-894
28					•		700	703-748	758-803
29					•		700	_	717-728
30					•		2300	2305-2315	2350-2360
38					•		2600	2570	-2620
40					•		2300	2300	-2400
41					•		2500	2496	-2690
66					•	•	1700	1710-1780	2210-2200
71						•	600	663-698	617-652

Supported LTE Frequency Bands

Supported HSPA+ Frequency Bands

Band			Modem	o Option			Frequency	Transmit (Tx)	Receive (Rx)
	A01	A02	A03	A04	A06	A07			
1	•			•	•		2100	1920-1980	2110-2170
2		•			•	•	1900	1850-1910	1930-1990
3	•			•			1800	1710-1785	1805-1800
4		•			•	•	1700	1710-1755	2110-2155
5		•			•	•	850	824-849	869-894
8	•			•	•		900	880-915	925-960

Supported GSM/EDGE Frequency Bands

Band	Modem Option						Frequency	Transmit (Tx)	Receive (Rx)
	A01	A02	A03	A04	A06	A07			
GSM	•			•			DCS1800	1710.2-1784.8	1805.2-18798

5.5.2 GNSS Specifications

Band	Modem Option						Frequency	Transmit (Tx)	Receive (Rx)
	A01	A02	A03	A04	A06	A07			
EDGE	•			•			E-GSM 900	880-915	925-960

5.5.2 GNSS Specifications

GNSS Specifications

Satellite Channels	12 channel, continuous tracking			
Protocols	IMEA 0183 v3.0			
Acquisition Time	Hot start: 1 s			
	Warm start: 29 s			
	• Cold start: 32 s			
Accuracy	• Horizontal: < 2 m or 6.6 ft (50 %), < 5 m or 16.4 ft (90 %)			
	• Altitude: < 4 m or 13.1 (50 %), < 8 m or 26.2 (90 %)			
	• Velocity: < 0.2 m/s or 0.7 ft/s			
Sensitivity	Tracking: -161 dBm			
	Acquisition (Assisted, Non-LTE): -158 dBm			
	Acquisition (Assisted, LTE): -153 dBm			
	Acquisition (Standalone): -145 dBm			
Operational Limits	Altitude < 6000 m (3.7 mi) or velocity < 100 m/s (328 ft/s) ^a			

^a Either limit may be exceeded, but not both

GNSS Standalone Antenna Requirements

Frequency Range	 Narrow-band GPS: 1572.42 MHz ± 2 MHz minimum Wide-band GPS and GLONASS: 1565 to 1606 MHz recommended 	
Field of View (FoV)	Omni-directional in azimuth	
	• -45° to 90° in elevation	
Polarization (average Gv/Gh)	$> 0 dB^{a}$	
Free space average gain (Gv +Gh) over FoV	> -3 (preferred) or -6 dBi ^b	
Gain	 Maximum gain and uniform coverage in the high elevation angle and zenith 	
	Gain in azimuth plane is not desired	
Average 3D gain	> -5 dBi	
Isolation between GNSS and LTE Main (Primary)	> 10 dB in all uplink bands	
Typical VSWR	< 2:5:1	
Polarization	Any other than LHCP (Left-Hand Circular Polarized) is acceptable.	

^a Vertical linear polarization is sufficient.

 b Gv and Gh are measured and averaged over -45 to 90° in elevation, and ± 180° in azimuth.

5.6 WLAN Specifications

Supported Standards	IEEE 802.11a	
	IEEE 802.11b	
	IEEE 802.11g	
	IEEE 802.11n	
Maximum Throughput	TCP: 80 Mbps at 2.4 GHz	
	UDP: 100 Mbps at 2.4 GHz	
Diversity	2.4 GHz MRC support for extended range	
	5.0 GHz diversity capable	
Host Interface	4-Bit SDIO	
Maximum EIRP	< 200 mW at 5250 to 5350 MHz	

5.7 Operating Environment

The RUGGEDCOM RX1400 is rated to operate under the following environmental conditions.

Ambient Operating Temperature ^{ab}	-40 to 85 °C (-40 to 185 °F) ^c
Ambient Storage Temperature	-40 to 85°C (-40 to 185 °F)
Ambient Relative Humidity ^d	5% to 95%
Maximum Altitude	2000 m (6562 ft)
Maximum Altitude	2000 m (6562 ft)

^a Ambient Temperature as measured from a 30 cm radius surrounding the center of the enclosure.

^b Operating temperature may vary based on the limitations of installed SFPs. Refer to the "RUGGEDCOM SFP Transceivers Catalog" for SFP temperature ratings.

^c Maximum ambient operating temperature is 70 °C (158 °F) when the device is installed along with Underwriter Laboratories (UL) listed devices.

^d Non-condensing

5.8 Mechanical Specifications

Weight	2.5 kg (5.5 lb)
Ingress Protection	IP30
Enclosure	Aluminum

5.9 Dimension Drawings

Note

All dimensions are in millimeters, unless otherwise stated.



Figure 5.1 Overall Dimensions







Panel Mount Dimensions





Din Rail Mount Dimensions

Certification

The RUGGEDCOM RX1400 device has been thoroughly tested to guarantee its conformance with recognized standards and has received approval from recognized regulatory agencies.

6.1 Approvals

This section details the standards to which the RUGGEDCOM RX1400 complies.

Note

All relevant certificates and test reports are available on Siemens Industry Online Support [https://support.industry.siemens.com].

6.1.1 UKCA

This device is certified for use in Great Britain and bears the United Kingdom Certified Assessed (UKCA) marking. The marking is printed on the body of the device, along with the identification number of the notified body.

UK CA

6.1.2 TÜV SÜD

This device is certified by TÜV SÜD to meet the requirements of the following standards:

- CAN/CSA-C22.2 NO. 62368-1 (R2014) Information Technology Equipment – Safety – Part 1: General Requirements (Bi-National standard, with UL 62368-1)
- UL 62368-1
 - Information Technology Equipment Safety Part 1: General Requirements

The device is marked with a TÜV SÜD symbol that indicates compliance with both Canadian and U.S. requirements.



6.1.3 European Union (EU)

This device is declared by Siemens Canada Ltd. to comply with essential requirements and other relevant provisions of the following EU directives:

• Directive 1999/5/EC

Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on Radio Equipment and Telecommunications Terminal Equipment and the Mutual Recognition of their Conformity

• EN 62368-1

Information Technology Equipment – Safety – Part 1: General Requirements

• EN 61000-6-2

Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments

EN 60825-1

Safety of Laser Products – Equipment Classification and Requirements

• EN 62368-1

Information Technology Equipment – Safety – Part 1: General Requirements

• EN 63000

Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances

• EN 55032

Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements

• EN 62311:2008

Assessment of Electronic and Electrical Equipment Related to Human Exposure Restrictions for Electromagnetic Fields (0 Hz – 300 GHz)

• EN 301 489-1 (v1.9.2)

Electromagnetic compatibility and radio spectrum matters (ERM) – Electromagnetic Compatibility for Radio Equipment and Services – Part 1: Common Technical Requirements

• EN 301 489-3 (v1.6.1)

Electromagnetic compatibility and radio spectrum matters (ERM) – Electromagnetic Compatibility for Radio Equipment and Services – Part 3: Specific Conditions for Short-Range Devices (SRD) Operating on Frequencies Between 9 kHz and 246 GHz • EN 301 489-7 (v1.3.1)

Electromagnetic compatibility and radio spectrum matters (ERM) – Electromagnetic Compatibility for Radio Equipment and Services – Part 7 : Specific Conditions for Mobile and Portable Radio and Ancillary Equipment of Digital Cellular Radio Telecommunications Systems (GSM and DCS)

• EN 301 489-24 (v1.5.1)

Electromagnetic Compatibility and Radio Spectrum Matters (ERM) – Electromagnetic Compatibility for Radio Equipment and Services – Part 24: Specific Conditions for Mobile and Portable IMT-2000 CDMA Direct Spread (UTRA) Radio and Ancillary Equipment

• EN 301 511 (v9.0.2)

Global System for Mobile communications (GSM) – Harmonized EN for Mobile Stations in the GSM 900 and GSM 1800 Bands Covering Essential Requirements of Article 3.2 of the R&TTE Directive (1999/5/EC)

• EN 301 908-1 (v6.2.1)

IMT Cellular Networks – Harmonized EN Covering the Essential Requirements of Article 3.2 of the R&TTE Directive – Part 1: Introduction and common requirements

• EN 301 908-2 (v6.2.1)

IMT Cellular Networks – Harmonized EN Covering the Essential Requirements of Article 3.2 of the R&TTE Directive – Part 2: CDMA Direct Spread (UTRA FDD) User Equipment (UE)

Notices specific to the European Union

Note

For mobile and fixed operating configurations, in accordance with R&TTE Directive 1999/5/EC, the maximum antenna gain is 3 dBi for 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz.

CE Marking

The device is marked with a CE symbol and can be used throughout the European community.

CE

6.1.4 FCC

This device 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 device is operated in a commercial environment.

This device 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 device does cause harmful interference to radio or television reception, which can be determined by turning the device 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 device and receiver.
- Connect the device into an outlet on a circuit different from that to which the receiver is connected
- Contact Siemens Customer Support for assistance

Notes specific to the FCC:

Note

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device.

Note

This device is to be used only for mobile and fixed applications. The antenna(s) used for this transmitter must be installed to provide a separate distance of at least 35 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

This device contains FCC ID: N7NMC7355 WWAN Cellular/PCS GSM/EDGE/CDMA/ WCDMA/LTE Modem.

The WWAN antenna gain, including cable loss, must not exceed 3 dBi at 850 MHz, 3 dBi at 1900 MHz, 6 dBi at 700 MHz and 6 dBi at 1700 MHz.

6.1.5 FDA/CDRH

This device meets the requirements of the following U.S. Food and Drug Administration (FDA) standard:

 Title 21 Code of Federal Regulations (CFR) – Chapter I – Sub-chapter J – Radiological Health

6.1.6 ISED

This device is declared by Siemens Canada Ltd. to meet the requirements of the following ISED (Innovation Science and Economic Development Canada) standard:

• CAN ICES-3 (B)/NMB-3 (B)

Notices specific to ISED:

Note

This device is unable to transmit on the 5600 to 5650 MHz frequency band. As per RSS-247 Section 6.2.3, this is to prevent interference with Environment Canada's weather radars, which operate on this band.

Note

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause interference
- This device must accept any interference, including interference that may cause undesired operation of the device

Note

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the Equivalent Isotropically Radiated Power (EIRP) is not more than that necessary for successful communication.

Note

This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct/index-eng.php.

Note

Operation in the band 5150-5250 MHz is only allowed for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

Note

When the device is operating in bands 5250-5350 MHz or 5470-5725 MHz, the maximum antenna gain permitted must comply with the EIRP limit

Note

The maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the EIRP limits specified for point-to-point and non point-to-point operation as appropriate.

Users are advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Note

The maximum EIRP of the device is less than 200 mW when operating in the 5250 to 5350 MHz band. As such, the device is exempt from the elevation mask requirements outlined in RSS-247 Issue 2, Section 6.2.2.3.

Note

This device is to be used only for mobile and fixed applications. The antenna(s) used for this transmitter must be installed to provide a separate distance of at least 35 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter evaluation procedures.

This device contains IC ID: 2417C-MC7355 WWAN Cellular/PCS GSM/EDGE/CDMA/ WCDMA/LTE Modem.

The WWAN antenna gain, including cable loss, must not exceed 3 dBi at 850 MHz, 3 dBi at 1900 MHz, 6 dBi at 700 MHz and 6 dBi at 1700 MHz.

Note

This radio transmitter IC: 4997A-VG5RX1400 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna	Article Number
ANT792-4DN	6GK5792-4DN00-0AA6
ANT792-6MN	6GK5792-6MN00-0AA6
ANT792-8DN	6GK5792-8DN00-0AA6
ANT793-4MN	6GK5792-8DN00-0AA6
ANT793-6MN	6GK5793-6MN00-0AA6
ANT795-4MA	6GK5795-4MA00-0AA0
ANT795-4MC	6GK5795-4MC00-0AA0
ANT795-4MD	6GK5795-4MD00-0AA0
ANT795-4MX	6GK5795-4MX00-0AA0
ANT795-6DC	6GK5795-6DC00-0AA0
ANT795-6MN	6GK5795-6MN10-0AA6
ANT795-6MT	6GK5795-6MT00-0AA0

For more information about each approved antenna, refer to "Available Antennas" (Page 18).

6.1.7 ISO

This device was designed and manufactured using a certified ISO (International Organization for Standardization) quality program that adheres to the following standard:

• ISO 9001:2015 Quality management systems – Requirements

6.1.8 SRRC/NAL

This device meets the requirements of the following standards and is certified for use in the People's Republic of China (PRC):

- State Radio Regulation of China (SRRC), CMIIT ID 2020CJ3887
- Network Access License (NAL)

6.1.9 RRA

This device has been registered by the Korean Radio Research Agency (RRA) under Clause 3, Article 58-2 of the Radio Waves Act. As such, the device is marked with a KC symbol and can be used in the Republic of Korea (South Korea) as a Class B product in a commercial, industrial or business environment.



A copy of the KC Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page vii).

Notices specific to the RRA:

Class B Equipment (Industrial Broadcasting and Communication Equipment)

This device complies with the limits of a Class B electromagnetic wave device and is intended for use outside of a residential environment. The seller or user must be aware.

/ 경고

B급 기기 (업무용 방송통신기자재)

이 기기는 업무용(B급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시 기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

6.1.10 ANATEL

This device meets the requirements of the following standards established by the Agência Nacional de Telecomunicações (ANATEL) and is certified for use in Brazil:

Anexo à Resolução Anatel nº 442/2006

Notices specific to ANATEL:

Note

The RUGGEDCOM RX1400 is not certified for use on 2G, 3G or 4G LTE networks in Brazil.

Note

This equipment operates on a secondary basis. That is, it is not entitled to protection against harmful interference, even from the same type of station, and may not cause interference to systems operating on a primary basis.

Note

This equipment has no right to be protected from harmful interference and may not cause interference in duly authorized systems.

6.1.11 ICASA

This device meets the requirements of the following standards established by the Independent Communications Authority of South Africa and is certified for use in South Africa:

Electronic Communications Act 2005

6.1.12 ACMA

This device meets the requirements of the following Australian Communications and Media Authority (ACMA) standards under certificate ABN 98 004 347 880:

- Radiocommunications (Compliance Labelling Devices) Notice 2014 made under Section 182 of the Radiocommunications Act 1992
- Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2008 made under Section 182 of the Radiocommunications Act 1992
- Radiocommunications (Compliance Labelling Electromagnetic Radiation) Notice 2003 made under Section 182 of the Radiocommunications Act 1992
- Telecommunications Labelling (Customer Equipment and Customer Cabling) Notice 2001 made under Section 407 of the Telecommunication Act 1997

The device is marked with an RCM symbol to indicate compliance when sold in the Australian region.



A copy of the Declaration of Conformity is available via Siemens Industry Online Support at https://support.industry.siemens.com/cs/ww/en/view/109747499.

6.1.13 RoHS

This device is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment:

• China RoHS 2

Administrative Measure on the Control of Pollution Caused by Electronic Information Products

A copy of the Material Declaration is available online at https:// support.industry.siemens.com/cs/ww/en/view/109738831.

6.1.14 Other Approvals

This device meets the requirements of the following additional standards:

- IEEE 1613 IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations
 - IEC 61850-3 General Requirements
 - IEC 61000-6-2
 Electromagnetic Compatibility (EMC) Part 6-2: Generic Standards Immunity
 for Industrial Environments
 - NEMA TS-2

Traffic Controller Assemblies with NTCIP Requirements

6.2 EMC and Environmental Type Tests

The RUGGEDCOM RX1400 has passed the following Electromagnetic Compatibility (EMC) and environmental tests.

6.2 EMC and Environmental Type Tests

EMC Type Tests per IEC 61850-3

Test	Description		Test Levels	Severity Levels
IEC 61000-4-2	ESD	Enclosure Contact	± 8 kV	4
	-	Enclosure Air	± 15 kV	_
IEC 61000-4-3	Radiated RFI	Enclosure Ports	20 V/m	Note ^a
IEC 61000-4-4	Burst (Fast Transient)	Signal Ports	± 4 kV @ 2.5 kHz, 5 kHz	_
		DC Power Ports	± 4 kV @ 2.5 kHz, 5 kHz	4
	-	AC Power Ports	± 4 kV	_
		Earth Ground Ports	± 4 kV @ 2.5 kHz, 5 kHz	
IEC 61000-4-5	Surge Immunity	Signal Ports	± 4 kV Line-to-Earth	
			± 2 kV Line-to-Line	
		DC Power Ports	± 2 kV Line-to-Earth	3
			± 1 kV Line-to-Line	
		AC Power Ports	± 4 kV Line-to-Earth	4
			± 2 kV Line-to-Line	
IEC 61000-4-6	Induced (Conducted) RFI	Signal Ports	10 V	3
		DC Power Ports		
	-	AC Power Ports		
		Earth Ground Ports		
IEC 61000-4-8	Magnetic Field	Enclosure Ports	100 A/m Continuous	5
			1000 A/m for 1 s	
IEC 61000-4-9	Pulse Magnetic Field	Enclosure Ports	300 A/m	4
IEC 61000-4-11	Voltage Dips & Interrupts	AC Power Ports	30% for 0.5 Cycles	
			60% for 5 Cycles	
			100% for 250 Cycles	
IEC 61000-4-16	Mains Frequency Voltage	Signal Ports	30 V Continuous	4
	-	DC Power Ports	300 V for 1s	
IEC 61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3
IEC 61000-4-18	Damped Oscillatory Wave	Slow Damped	2.5 kV Common	3
			100 kHz or 1 MHz	
IEC 61000-4-29	Voltage Dips	DC Power Ports	30% for 0.1 s	
	and Interrupts		60% for 0.1 s	
			100% for 0.05 s	
IEC 60255-27	Dielectric Strength	Signal Ports	2 kV	
		DC Power Ports		
		AC Power Ports		
	HV Impulse	Signal Ports	5 kV	
		DC Power Ports		

^a Siemens-specified severity levels

EMC Immunity Type Tests per IEEE 1613

Note

The RUGGEDCOM RX1400 meets Class 1 requirements for copper ports, which allows for temporary communication loss.

Test	Description		Test Levels
IEEE 1613	HV Impulse	Signal Ports	5 kV
		DC Power Ports	
	Dielectric Strength	Signal Ports	2828 VDC or 2 kV
		DC Power Ports	
	Fast Transient (SWC)	Signal Ports	± 4 kV @ 2.5 kHz, 5 kHz
		DC Power Ports	
		Earth Ground Ports	
	Oscillatory (SWC)	Signal Ports	2.5 kV Common mode @1 MHz
		DC Power Ports	2.5 kV Common Mode
			1 kV Differential Mode @ 1 MHz
	Radiated RFI	Enclosure ports	35 V/m
	ESD	Enclosure Contact	± 8 kV
		Enclosure Air	± 15 kV
IEEE 1613.1/ IEC 61000-4-10	Damped Oscillating Magnetic Field	Enclosure Ports	100 A/m for 1 s (100 kHz and 1 MHz)

Environmental Type Tests

Test	Description		Test Levels
IEC 60068-2-1	Cold Temperature	Test Ad	-40 °C (-40 °F), 16 Hours
	Cold Storage	Test Ab	-40 °C (-40 °F), 16 hours
IEC 60068-2-2	Dry Heat	Test Bd	85 °C (185 °F), 16 Hours
	Dry Heat Storage	Test Bb	85 °C (185 °F), 16 hours
IEC 60068-2-30	Humidity (Damp Heat, Cyclic)	Test Db	95% (Non-Condensing), 55 °C (131 °F), 6 cycles
IEC 60068-78	Humidity (Damp Heat, Steady State)		10 days @ 55 °C (131 °F) and 93% Relative Humidity
IEC 60255-21-1	Vibration		2 g @ 10-150 Hz
IEC 60255-21-2	Shock		30 g @ 11 ms
IEC 60255-21-3	Seismic		Method A, Class 2
IEC 60068-1-14	Change of Temperature		5 Cycles (-40 to 85 °C or -40 to 185 °F)

Certification

6.2 EMC and Environmental Type Tests

For more information

Siemens RUGGEDCOM https://www.siemens.com/ruggedcom

Industry Online Support (service and support) https://support.industry.siemens.com

Industry Mall https://mall.industry.siemens.com

Siemens Canada Ltd. Digital Industries Process Automation 300 Applewood Crescent Concord, Ontario, L4K 4E5 Canada

© 2022 Siemens Canada Ltd. Subject to change