

FINANCE & ADMINISTRATION

SENT BY: \_\_\_\_\_

DEPARTMENT: \_\_\_\_\_

**DO NOT MET**

**RECEIVED**

2020 SEP 16 PM 1:26

FINANCE-PROCUREMENT

**INTERDEPARTMENTAL MAIL**

FAX NUMBER: N/A

9/16/2020  
1:27 pm  
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State of West Virginia  
Agency Request for Quote

<b>Proc Folder:</b> 764540			<b>Reason for Modification:</b>
<b>Doc Description:</b> 63210009 AT&T FirstNet Compatible Cellular Wireless Router			
<b>Proc Type:</b> Agency Purchase Order			
<b>Date Issued</b>	<b>Solicitation Closes</b>	<b>Solicitation No</b>	<b>Version</b>
2020-09-01	2020-09-16 14:30	ARFQ 0803 DOT2100000006	1

**BID RECEIVING LOCATION**

FINANCE & ADMINISTRATION  
DIVISION OF HIGHWAYS  
BLDG 5, RM A-220  
1900 KANAWHA BLVD E  
CHARLESTON WV 25302  
US

**VENDOR**

**Vendor Customer Code:** 000000186A39  
**Vendor Name:** Pillar Innovations  
**Address:**  
**Street:** 104 Corporate Drive  
**City:** Morgantown  
**State:** WV **Country:** USA **Zip:** 26501  
**Principal Contact:** Todd Hetrick  
**Vendor Contact Phone:** 304-983-8900 **Extension:** 2425

**FOR INFORMATION CONTACT THE BUYER**

Fina L Lewis  
304-414-6859  
fina.l.lewis@wv.gov

**Vendor Signature X**  **FEIN#** 43-2114580 **DATE** 9/15/2020

All offers subject to all terms and conditions contained in this solicitation

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	AT&T FirstNet Compatible Cellular Wireless Router	12.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
43222609			

**Extended Description:**  
AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal System

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Associate Power Supply for AT&T FirstNet Compatible Router	12.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
39121004			

**Extended Description:**  
Associate Power Supply for AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal Systems

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	Antenna for AT&T FirstNet Compatible Cellular Wireless Route	12.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
43221727			

**Extended Description:**  
Antenna for AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal

**SCHEDULE OF EVENTS**

Line	Event	Event Date
1	TECHNICAL QUESTIONS DUE BY 10:00AM	2020-09-09

	Document Phase	Document Description	Page
DOT2100000006	Final	63210009 AT&T FirstNet Compatible Cellular Wireless Router	4

**ADDITIONAL TERMS AND CONDITIONS**

See attached document(s) for additional Terms and Conditions

**INSTRUCTIONS TO VENDORS SUBMITTING BIDS  
(Agency Delegated Procurements Only)**

**1. REVIEW DOCUMENTS THOROUGHLY:** The attached documents contain a solicitation for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a Vendor's bid. All bids must be submitted in accordance with the provisions contained in these instructions and the Solicitation. Failure to do so may result in disqualification of Vendor's bid.

**2. MANDATORY TERMS:** The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the Solicitation will result in bid disqualification.

**2A. PREBID MEETING:** The item identified below shall apply to this Solicitation.

A pre-bid meeting will not be held prior to bid opening

A MANDATORY PRE-BID meeting will be held at the following place and time:

All Vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-bid meeting shall result in disqualification of the Vendor's bid. No one individual is permitted to represent more than one vendor at the pre-bid meeting. Any individual that does attempt to represent two or more vendors will be required to select one vendor to which the individual's attendance will be attributed. The vendors not selected will be deemed to have not attended the pre-bid meeting unless another individual attended on their behalf. The required attribution of attendance to a single vendor should be addressed during the pre-bid but may occur at any time deemed appropriate by the Purchasing Division.

An attendance sheet provided at the pre-bid meeting shall serve as the official document verifying attendance. Any person attending the pre-bid meeting on behalf of a Vendor must list on the attendance sheet his or her name and the name of the Vendor he or she is representing.

Additionally, the person attending the pre-bid meeting should include the Vendor's E-Mail address, phone number, and Fax number on the attendance sheet. It is the Vendor's responsibility to locate the attendance sheet and provide the required information. Failure to complete the attendance sheet as required may result in disqualification of Vendor's bid.

All Vendors should arrive prior to the starting time for the pre-bid. Vendors who arrive after the starting time but prior to the end of the pre-bid will be permitted to sign in, but are charged with knowing all matters discussed at the pre-bid.

Questions submitted at least five business days prior to a scheduled pre-bid will be discussed at the pre-bid meeting if possible. Any discussions or answers to questions at the pre-bid meeting are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

**3. BID SUBMISSION:** All bids must be submitted electronically through wvOASIS or signed and delivered by the Vendor to the Agency on or before the date and time of the bid opening. Any bid received by the Agency staff is considered to be in the possession of the Agency and will not be returned for any reason.

### **3A. BID SUBMISSION**

A bid that is not submitted electronically through wvOASIS should contain the information listed below on the face of the envelope or the bid may be rejected by the Agency.

SEALED BID: 63210009 AT&T FirstNet Compatible Cellular Wireless Router  
BUYER: Tina Lewis  
SOLICITATION NO.: ARFQ DOT2100000006  
BID OPENING DATE: 09/16/2020  
BID OPENING TIME: 2:30PM  
FAX NUMBER: N/A

**4. ADDENDUM ACKNOWLEDGEMENT:** Changes or revisions to this Solicitation will be made by an official addendum issued by the Agency. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

**5. BID FORMATTING:** Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.

**6. ALTERNATE MODEL OR BRAND:** Unless the box below is checked, any model, brand, or specification listed in this Solicitation establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the State at its sole discretion. Any Vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a Vendor's bid.

This Solicitation is based upon a standardized commodity established under West Virginia Code § 5A-3-61. Vendors are expected to bid the standardized commodity identified. Failure to bid the standardized commodity will result in your firm's bid being rejected.

Revised 01/09/2020

**7. EXCEPTIONS AND CLARIFICATIONS:** The Solicitation contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or other proposed modifications in its bid. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the Solicitation may result in bid disqualification.

**8. REGISTRATION:** Prior to Contract award, the apparent successful Vendor must be properly registered with the West Virginia Purchasing Division and must have paid the \$125 fee, if applicable.

**9. UNIT PRICE:** Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.

**10. PREFERENCE:** Vendor Preference may be requested in purchases of motor vehicles or construction and maintenance equipment and machinery used in highway and other infrastructure projects. Any request for preference must be submitted in writing with the bid, must specifically identify the preference requested with reference to the applicable subsection of West Virginia Code § 5A-3-37, and must include with the bid any information necessary to evaluate and confirm the applicability of the requested preference. A request form to help facilitate the request can be found at: <http://www.state.wv.us/admin/purchase/vrc/Venpref.pdf>.

**10A. RECIPROCAL PREFERENCE:** The State of West Virginia applies a reciprocal preference to all solicitations for commodities and printing in accordance with W. Va. Code § 5A-3-37(b). In effect, if reciprocal preference is requested by a West Virginia resident vendor, non-resident vendors receiving a preference in their home states, will see that same preference granted to West Virginia resident vendors bidding against them in West Virginia. Any request for reciprocal preference must include with the bid any information necessary to evaluate and confirm the applicability of the preference. A request form to help facilitate the request can be found at: <http://www.state.wv.us/admin/purchase/vrc/Venpref.pdf>.

**11. SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES:** For any solicitations publicly advertised for bid, in accordance with West Virginia Code §5A-3-37(a)(7) and W. Va. CSR § 148-22-9, any non-resident vendor certified as a small, women-owned, or minority-owned business under W. Va. CSR § 148-22-9 shall be provided the same preference made available to any resident vendor. Any non-resident small, women-owned, or minority-owned business must identify itself as such in writing, must submit that writing to the Purchasing Division with its bid, and must be properly certified under W. Va. CSR § 148-22-9 prior to contract award to receive the preferences made available to resident vendors. Preference for a non-resident small, women-owned, or minority owned business shall be applied in accordance with W. Va. CSR § 148-22-9.

**12. ELECTRONIC FILE ACCESS RESTRICTIONS:** Vendor must ensure that its submission in wvOASIS can be accessed and viewed by the Agency staff immediately upon bid opening. The Agency will consider any file that cannot be immediately access and viewed at the time of the bid opening (such as, encrypted files, password protected files, or incompatible files) to be blank or incomplete as context requires, and therefore unacceptable. A vendor will not be permitted to unencrypt files, remove password protections, or resubmit documents after bid opening to make a file viewable if those documents are required with the bid. A Vendor may be required to provide document passwords or removed access restrictions



to allow the Agency to print or electronically save documents provided that those documents are viewable by the Agency prior to obtaining the password or removing the access restriction.

**13. NON-RESPONSIBLE:** The Purchasing Division Director reserves the right to reject the bid of any vendor as Non-Responsible in accordance with W. Va. Code of State Rules § 148-1-5.3, when the Director determines that the vendor submitting the bid does not have the capability to fully perform, or lacks the integrity and reliability to assure good-faith performance.”

**14. ACCEPTANCE/REJECTION:** The State may accept or reject any bid in whole, or in part in accordance with W. Va. Code of State Rules § 148-1-4.5. and § 148-1-6.4.b.”

**15. YOUR SUBMISSION IS A PUBLIC DOCUMENT:** Vendor’s entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., 5G-1-1 et seq. and the Freedom of Information Act in West Virginia Code §§ 29B-1-1 et seq.

**DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.**

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled “confidential,” “proprietary,” “trade secret,” “private,” or labeled with any other claim against public disclosure of the documents, to include any “trade secrets” as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

**GENERAL TERMS AND CONDITIONS:  
(Agency Delegated Procurements Only)**

**1. CONTRACTUAL AGREEMENT:** Issuance of a Award Document signed by the Agency and approved as to form by the Attorney General's office, if required, constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

**2. DEFINITIONS:** As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.

**2.1. "Agency" or "Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.

**2.2. "Bid" or "Proposal"** means the vendors submitted response to this solicitation.

**2.3. "Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.

**2.4. "Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.

**2.5. "Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.

**2.6. "Award Document"** means the document signed by the Agency that identifies the Vendor as the contract holder.

**2.7. "Solicitation"** means the official notice of an opportunity to supply the State with goods or services.

**2.8. "State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.

**2.9. "Vendor" or "Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

**3. CONTRACT TERM; RENEWAL; EXTENSION:** The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

**Term Contract**

**Initial Contract Term:** This Contract becomes effective on \_\_\_\_\_ and extends for a period of \_\_\_\_\_ year(s).

**Renewal Term:** This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor. Any request for renewal should be delivered to the Agency thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Unless otherwise specified below, renewal of this Contract is limited to \_\_\_\_\_ successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed the total number of months available in all renewal years combined. Automatic renewal of this Contract is prohibited.

**Alternate Renewal Term** – This contract may be renewed for \_\_\_\_\_ successive \_\_\_\_\_ year periods or shorter periods provided that they do not exceed the total number of months contained in all available renewals. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor and Agency.

**Delivery Order Limitations:** In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

**Fixed Period Contract:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within \_\_\_\_\_ days.

**Fixed Period Contract with Renewals:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within \_\_\_\_\_ days. Upon completion of the work covered by the preceding sentence, the vendor agrees that maintenance, monitoring, or warranty services will be provided for \_\_\_\_\_ year(s) thereafter.

**One Time Purchase:** The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

**Other:** See attached.

**4. NOTICE TO PROCEED:** Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Award Document will be considered notice to proceed.

**5. QUANTITIES:** The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

**Open End Contract:** Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

**Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.

**Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

**One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

**6. EMERGENCY PURCHASES:** The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute a breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

**7. REQUIRED DOCUMENTS:** All of the items checked below must be provided to the Agency by the Vendor as specified below.

**PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of 100% of the contract value. The performance bond must be received by the Agency prior to Contract award.

**LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be received by the Agency prior to Contract award.

**MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Agency prior to Contract award.

**LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section of the General Terms and Conditions entitled Licensing, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits upon request and in a form acceptable to the State. The request may be prior to or after contract award at the State's sole discretion.

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications regardless of whether or not that requirement is listed above.

**8. INSURANCE:** The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed in this section.

Vendor must maintain:

**Commercial General Liability Insurance** in at least an amount of:  
1,000,000.00 per occurrence.

**Automobile Liability Insurance** in at least an amount of: \_\_\_\_\_ per occurrence.

**Professional/Malpractice/Errors and Omission Insurance** in at least an amount of: \_\_\_\_\_ per occurrence. Notwithstanding the forgoing, Vendor's are not required to list the State as an additional insured for this type of policy.

**Commercial Crime and Third Party Fidelity Insurance** in an amount of: \_\_\_\_\_ per occurrence.

**Cyber Liability Insurance** in an amount of: \_\_\_\_\_ per occurrence.

**Builders Risk Insurance** in an amount equal to 100% of the amount of the Contract.

**Pollution Insurance** in an amount of: \_\_\_\_\_ per occurrence.

**Aircraft Liability** in an amount of: \_\_\_\_\_ per occurrence.

**\*\*STATE OF WV MUST BE LISTED AS ADDITIONAL INSURED ON INSURANCE CERTIFICATE**

**\*\*INSURANCE CERTIFICATE HOLDER SHOULD READ AS FOLLOWS:  
STATE OF WV  
1900 KANAWHA BLVD E, BLDG 5, CHARLESTON, WV 25305**

**9. WORKERS' COMPENSATION INSURANCE:** The apparent successful Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

**10. LIQUIDATED DAMAGES:** This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy. Vendor shall pay liquidated damages in the amount specified below or as described in the specifications:

\_\_\_\_\_ for \_\_\_\_\_

Liquidated Damages Contained in the Specifications

**11. ACCEPTANCE:** Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the State that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the Solicitation unless otherwise indicated.

**12. PRICING:** The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification. Notwithstanding the foregoing, Vendor must extend any publicly advertised sale price to the State and invoice at the lower of the contract price or the publicly advertised sale price.

**13. PAYMENT IN ARREARS:** Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears.

**14. PAYMENT METHODS:** Vendor must accept payment by electronic funds transfer or P-Card. (The State of West Virginia's Purchasing Card program, administered under contract by a banking institution, processes payment for goods and services through state designated credit cards.)

**15. ADDITIONAL FEES:** Vendor is not permitted to charge additional fees or assess additional charges that were not either expressly provided for in the solicitation published by the State of West Virginia or included in the unit price or lump sum bid amount that Vendor is required by the solicitation to provide. Including such fees or charges as notes to the solicitation may result in rejection of vendor's bid. Requesting such fees or charges be paid after the contract has been awarded may result in cancellation of the contract.

**16. TAXES:** The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

**17. FUNDING:** This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.

**18. CANCELLATION:** The State reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Agency may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-5.2.b.

**19. TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.

**20. APPLICABLE LAW:** This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.

**21. COMPLIANCE WITH LAWS:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances. Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to comply with all applicable laws, regulations, and ordinances.

**22. ARBITRATION:** Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

**23. MODIFICATIONS:** This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary, no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor.

**24. WAIVER:** The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

**25. SUBSEQUENT FORMS:** The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

**26. ASSIGNMENT:** Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency and any other government agency or office that may be required to approve such assignments.



**27. WARRANTY:** The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

**28. STATE EMPLOYEES:** State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.

**29. PRIVACY, SECURITY, AND CONFIDENTIALITY:** The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>

**30. YOUR SUBMISSION IS A PUBLIC DOCUMENT:** Vendor's entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

**31. LICENSING:** In accordance with West Virginia Code of State Rules § 148-1-6.1.e, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities. Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed, in good standing, and up-to-date on all state and local obligations as described in this section.

**32. ANTITRUST:** In submitting a bid to, signing a contract with, or accepting an Award Document from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.

**33. VENDOR CERTIFICATIONS:** By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein. Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on

Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

**34. VENDOR RELATIONSHIP:** The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing. Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

**35. INDEMNIFICATION:** The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

**36. PURCHASING AFFIDAVIT:** In accordance with West Virginia Code §§ 5A-3-10a and 5-22-1(i), the State is prohibited from awarding a contract to any bidder that owes a debt to the State or a political subdivision of the State, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Purchasing Division affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

**37. CONFLICT OF INTEREST:** Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

**38. REPORTS:** Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at [purchasing.requisitions@wv.gov](mailto:purchasing.requisitions@wv.gov).

**39. BACKGROUND CHECK:** In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry. After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision. The State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

**40. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS:** Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.

b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open heath, basic oxygen, electric furnace, Bessemer or other steel making process. The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:

c. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or

d. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

**41. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL:** In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a "substantial labor surplus area", as defined by the United States Department of Labor, the cost of

Revised 01/09/2020

domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products. This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

**42. PROHIBITION AGAINST USED OR REFURBISHED:** Unless expressly permitted in the solicitation published by the State, Vendor must provide new, unused commodities, and is prohibited from supplying used or refurbished commodities, in fulfilling its responsibilities under this Contract.

## ADDITIONAL TERMS AND CONDITIONS (Construction Contracts Only)

**1. CONTRACTOR'S LICENSE:** West Virginia Code § 21-11-2 requires that all persons desiring to perform contracting work in this state be licensed. The West Virginia Contractors Licensing Board is empowered to issue the contractor's license. Applications for a contractor's license may be made by contacting the West Virginia Division of Labor. West Virginia Code § 21-11-11 requires any prospective Vendor to include the contractor's license number on its bid. If an apparent low bidder fails to submit a license number in accordance with this section, the Purchasing Division will promptly request by telephone and electronic mail that the low bidder and the second low bidder provide the license number within one business day of the request. Failure of the bidder to provide the license number within one business day of receiving the request shall result in disqualification of the bid. Vendors should include a contractor's license number in the space provided below.

Contractor's Name: Pillar Innovations, LLC

Contractor's License No.: WV- 042833

The apparent successful Vendor must furnish a copy of its contractor's license prior to the issuance of a contract award document

**2. AIA DOCUMENTS:** All construction contracts that will be completed in conjunction with architectural services procured under Chapter 5G of the West Virginia Code will be governed by the attached AIA documents, as amended by the Supplementary Conditions for the State of West Virginia, in addition to the terms and conditions contained herein.

**2A. PROHIBITION AGAINST GENERAL CONDITIONS:** Notwithstanding anything contained in the AIA Documents or the Supplementary Conditions, the State of West Virginia will not pay for general conditions, or winter conditions, or any other condition representing a delay in the contract. The Vendor is expected to mitigate delay costs to the greatest extent possible and any costs associated with Delays must be specifically and concretely identified. The state will not consider an average daily rate multiplied by the number of days extended to be an acceptable charge.

**3. GREEN BUILDINGS MINIMUM ENERGY STANDARDS:** In accordance with § 22-29-4, all new building construction projects of public agencies that have not entered the schematic design phase prior to July 1, 2012, or any building construction project receiving state grant funds and appropriations, including public schools, that have not entered the schematic design phase prior to July 1, 2012, shall be designed and constructed complying with the ICC International Energy Conservation Code, adopted by the State Fire Commission, and the ANSI/ASHRAE/IESNA Standard 90.1-2007: Provided, That if any construction project has a commitment of federal funds to pay for a portion of such project, this provision shall only apply to the extent such standards are consistent with the federal standards.

**ADDITIONAL TERMS AND CONDITIONS  
(Architectural and Engineering Contracts Only)**

- 1. PLAN AND DRAWING DISTRIBUTION:** All plans and drawings must be completed and available for distribution at least five business days prior to a scheduled pre-bid meeting for the construction or other work related to the plans and drawings.
- 2. PROJECT ADDENDA REQUIREMENTS:** The Architect/Engineer and/or Agency shall be required to abide by the following schedule in issuing construction project addenda. The Architect/Engineer shall prepare any addendum materials for which it is responsible, and a list of all vendors that have obtained drawings and specifications for the project. The Architect/Engineer shall then send a copy of the addendum materials and the list of vendors to the State Agency for which the contract is issued to allow the Agency to make any necessary modifications. The addendum and list shall then be forwarded to the Purchasing Division buyer by the Agency. The Purchasing Division buyer shall send the addendum to all interested vendors and, if necessary, extend the bid opening date. Any addendum should be received by the Purchasing Division at least fourteen (14) days prior to the bid opening date.
- 3. PRE-BID MEETING RESPONSIBILITIES:** The Architect/Engineer shall be available to attend any pre-bid meeting for the construction or other work resulting from the plans, drawings, or specifications prepared by the Architect/Engineer.
- 4. AIA DOCUMENTS:** All construction contracts that will be completed in conjunction with architectural services procured under Chapter 5G of the West Virginia Code will be governed by the attached AIA documents, as amended by the Supplementary Conditions for the State of West Virginia, in addition to the terms and conditions contained herein. The terms and conditions of this document shall prevail over anything contained in the AIA Documents or the Supplementary Conditions.
- 5. GREEN BUILDINGS MINIMUM ENERGY STANDARDS:** In accordance with West Virginia Code § 22-29-4, all new building construction projects of public agencies that have not entered the schematic design phase prior to July 1, 2012, or any building construction project receiving state grant funds and appropriations, including public schools, that have not entered the schematic design phase prior to July 1, 2012, shall be designed and constructed complying with the ICC International Energy Conservation Code, adopted by the State Fire Commission, and the ANSI/ASHRAE/IESNA Standard 90.1-2007: Provided, That if any construction project has a commitment of federal funds to pay for a portion of such project, this provision shall only apply to the extent such standards are consistent with the federal standards.



**DESIGNATED CONTACT:** Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.



(Name, Title)

Todd Hetrick - Dept Manager - Tower Services & Telecommunications

(Printed Name and Title)

104 Corporate Drive, Morgantown, WV 26501

(Address)

301-616-6344/ 304-983-8905

(Phone Number) / (Fax Number)

toddherrick@pillarinnovations.com

(email address)

**CERTIFICATION AND SIGNATURE:** By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Pillar Innovations LLC

(Company)

 Justin Stephens, VP of Operations

(Authorized Signature) (Representative Name, Title)

Justin Stephens - Vice President of Operations

(Printed Name and Title of Authorized Representative)

9/15/2020

(Date)

304-983-8900/ 304-983-8905

(Phone Number) (Fax Number)



**ADDENDUM ACKNOWLEDGEMENT FORM**

**SOLICITATION NO.:**

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification. Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:  
*(Check the box next to each addendum received)*

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6  |
| <input type="checkbox"/> Addendum No. 2            | <input type="checkbox"/> Addendum No. 7  |
| <input type="checkbox"/> Addendum No. 3            | <input type="checkbox"/> Addendum No. 8  |
| <input type="checkbox"/> Addendum No. 4            | <input type="checkbox"/> Addendum No. 9  |
| <input type="checkbox"/> Addendum No. 5            | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Pillar Innovations, LLC  
Company

*Justin Stephens*  
Authorized Signature

9/15/2020  
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

REQUEST FOR QUOTATION  
AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems

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SPECIFICATIONS

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of WVDOH to establish a contract for the one time purchase of (36) Thirty-six AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems.
  
2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.
  - 2.1 **“Contract Item”** means item identified in Section 3.1 below and on the Pricing Page as more fully described by these specifications.
  - 2.2 **“Pricing Page”** means the pages, contained in wvOASIS or attached as Exhibit A, upon which Vendor should list its proposed price for the Contract Items.
  - 2.3 **“Solicitation”** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.
  - 2.4 **“WVDOH”** means West Virginia Division of Highways.
  - 2.5 **“Mbps”** means Megabits per second.
  - 2.6 **“AT&T”** means American Telephone and Telegraph.
  - 2.7 **“4G”** means fourth generation of cellular communications.
  - 2.8 **“LTE”** means Long Term Evolution
  - 2.9 **“FCC”** means Federal Communications Commission.
  - 2.10 **“Band 14”** means the frequency band provisioned by the 2012 Spectrum Act for first responders.
  - 2.11 **“AC”** means Alternating Current.
  - 2.12 **“SIM”** means Subscriber Identification Module.
  - 2.13 **“IP”** means Internet Protocol.
  - 2.14 **“GPS”** means Global Positioning System.

REQUEST FOR QUOTATION  
**AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems**

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**3. GENERAL REQUIREMENTS:**

**3.1 Mandatory Contract Item Requirements:** Contract Item must meet or exceed the mandatory requirements listed below.

**3.1.1 Contract Item #1 – (12) Twelve AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal Systems**

**3.1.1.1** Contract Item #1 shall consist of a modular 4G LTE AT&T FirstNet compatible cellular wireless router.

**3.1.1.2** Contract Item #1 shall meet the following specifications and requirements:

The modular 4G LTE AT&T FirstNet compatible cellular wireless router shall have a maximum download speed of 600 Mbps and a maximum upload speed of 150 Mbps. The router shall be certified with the FCC and shall support Band 14. The router shall be compatible with AT&T's North American FirstNet Network and SIM cards. The router shall be remote manageable, capable of port filtering to limit only certain ports from accessing the router while still being remote manageable, capable of setting trusted IP ranges to lock out all other IP addresses outside of a selected range, and capable of port forwarding. The router shall be a Cradlepoint Model #IBR900-1200M-B, or a Sierra Wireless Model #RV55, or a Digi International Model #WR54-A146, or equal. The router shall include a 5-year warranty. The router shall comply with the operating temperature range, shock and vibration specifications for NEMA TS2 requirements. The router must be compatible with the associated other components required (the power supply assembly and antenna, see the following Contract Items #2 and #3). It is the vendor's responsibility to address and ensure issues with compatibility.

Note: Detailed technical documentation shall be submitted with the bid response. Failure to provide documentation may result in disqualification. Adequate, acceptable documentation shall be provided in order that the item submitted may be evaluated and

REQUEST FOR QUOTATION  
**AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems**

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confirmation be made that the product submitted meets the requirements of the project specifications.

**3.1.2 Contract Item #2 – (12) Twelve Associated Power Supply for AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal Systems**

3.1.2.1 Contract Item #2 shall consist of the manufacturer's associated power supply for the modular 4G LTE AT&T FirstNet compatible cellular wireless router specified in preceding Section 3.1.1 for Contract Item #1.

3.1.2.2 Contract Item #2 shall meet the following specifications and requirements:

The manufacturer's associated power supply for the router (see Contract Item #1) will adapt/convert/transform 120-volt, single-phase AC line power to the appropriate power for the router and include the required AC line cord and plug for connection with a standard convenience outlet. The power supply and line cord/plug assembly shall comply with the operating temperature range, shock and vibration specifications for NEMA TS2 requirements. The power supply assembly must be compatible with the associated router. It is the vendor's responsibility to address and ensure issues with compatibility.

Note: Detailed technical documentation shall be submitted with the bid response. Failure to provide documentation may result in disqualification. Adequate, acceptable documentation shall be provided in order that the item submitted may be evaluated and confirmation be made that the product submitted meets the requirements of the project specifications.

**3.1.3 Contract Item #3 – (12) Twelve Antenna for AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal Systems**

3.1.3.1 Contract Item #3 shall consist of an antenna for the modular 4G LTE AT&T FirstNet compatible cellular wireless router specified in preceding Section 3.1.1 for Contract Item #1.

REQUEST FOR QUOTATION  
**AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems**

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**3.1.3.2** Contract Item #3 shall meet the following specifications and requirements:

The antenna shall be a 5-in-1, low-profile, impact-resistant, vandal-resistant design product with integrated connecting cables that are a minimum of 1-meter long. The antenna will have two (2) cellular wireless connections, two (2) wi-fi connections, and one (1) GPS connection according to the router manufacturer's recommendations. The approved antennae manufacturers are Panorama Antennas, Sierra Wireless, MobileMark or equal. The antenna shall comply with the operating temperature range, shock and vibration specifications for NEMA TS2 requirements. The antenna must be compatible with the associated router (see Contract Item #1). It is the vendor's responsibility to address and ensure issues with compatibility.

Note: Detailed technical documentation shall be submitted with the bid response. Failure to provide documentation may result in disqualification. Adequate, acceptable documentation shall be provided in order that the item submitted may be evaluated and confirmation be made that the product submitted meets the requirements of the project specifications.

#### **4. CONTRACT AWARD:**

**4.1 Contract Award:** The Contract is intended to provide Agencies with a purchase price for the Contract Items. The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall total cost as shown on the Pricing Pages.

**4.2 Pricing Page:** Vendor should complete the Pricing Page by providing a cost in the box listed as unit price and the calculated extended cost and grand total. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified.

Vendor should type or electronically enter the information into the Pricing Page to prevent errors in the evaluation.

REQUEST FOR QUOTATION  
AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems

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**5. PAYMENT:**

**5.1 Payment:** Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.

**6. DELIVERY AND RETURN:**

**6.1 Shipment and Delivery:** Vendor shall ship the Contract Items immediately after being awarded this Contract and receiving a purchase order or notice to proceed. Vendor shall deliver the Contract Items within 30 working days after receiving a purchase order or notice to proceed. Contract Items must be delivered to Agency at WVDOH – Traffic Services Complex  
180 Dry Branch Drive  
Charleston, West Virginia 25306

**6.2 Late Delivery:** The Agency placing the order under this Contract must be notified in writing if the shipment of the Contract Items will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the Contract, and/or obtaining the Contract Items from a third party.

Any Agency seeking to obtain the Contract Items from a third party under this provision must first obtain approval of the Purchasing Division.

**6.3 Delivery Payment/Risk of Loss:** Vendor shall deliver the Contract Items F.O.B. destination to the Agency's location.

**6.4 Return of Unacceptable Items:** If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable, or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.

**6.5 Return Due to Agency Error:** Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original

REQUEST FOR QUOTATION  
AT&T FirstNet Compatible Cellular Wireless Routers for Traffic Signal Systems

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packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

**7 VENDOR DEFAULT:**

**7.1** The following shall be considered a vendor default under this Contract.

7.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.

7.1.2 Failure to comply with other specifications and requirements contained herein.

7.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.

7.1.4 Failure to remedy deficient performance upon request.

**7.2** The following remedies shall be available to Agency upon default.

7.2.1 Immediate cancellation of the Contract.

7.2.2 Immediate cancellation of one or more release orders issued under this Contract.

7.2.3 Any other remedies available in law or equity.

**West Virginia Ethics Commission**  
**Disclosure of Interested Parties to Contracts**

(Required by *W. Va. Code* § 6D-1-2)

**Name of Contracting Business Entity:** Pillar Innovations LLC **Address:** 104 Corporate Drive  
Morgantown, WV 26501

**Name of Authorized Agent:** Justin Stephens **Address:** Same as above

**Contract Number:** CRFQ0439EBA2100000003 **Contract Description:** Tower Maintenance

**Governmental agency awarding contract:** West Virginia Educational Public Broadcasting Authority

**Check here if this is a Supplemental Disclosure**

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below (*attach additional pages if necessary*):

**1. Subcontractors or other entities performing work or service under the Contract**

Check here if none, otherwise list entity/individual names below.

**2. Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)**

Check here if none, otherwise list entity/individual names below.

100% - Beitzel Corporation - 333 Corporate Drive, Grantsville, MD 21536

**3. Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)**

Check here if none, otherwise list entity/individual names below.

Signature: *Justin Stephens*

Date Signed: 9/15/2020

**Notary Verification**

State of West Virginia, County of Monogalia



I, Justin Stephens, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

Taken, sworn to and subscribed before me this 15th day of September, 2020

*Judy D. Sankbeil*  
Notary Public's Signature

**To be completed by State Agency:**

Date Received by State Agency: \_\_\_\_\_

Date submitted to Ethics Commission: \_\_\_\_\_

Governmental agency submitting Disclosure: \_\_\_\_\_



## EXHIBIT A

Item Number	Estimated Quantity	Unit of Measure	Description	UNSPC CODE	Unit Price	Extended Price
1	12	ea	AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal System		\$ 887.92	\$10,655.04
2	12	ea	Associated Power Supply for AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal Systems		\$ 28.05	\$ 336.60
3	12	ea	Antenna for AT&T FirstNet Compatible Cellular Wireless Router for Traffic Signal Systems		\$ 359.32	\$ 4,311.84
<b>GRAND TOTAL</b>					→	<b>\$15,303.48</b>



## Sierra Wireless AirLink® Antenna: 5-in-1 Dome

The 5-in-1 Dome is a custom single antenna solution for the RV55 Dual Wi-Fi, tested and certified for mobile application.

The antenna has a low-profile design that contains five isolated high performance antenna elements in a single housing for optimal coverage; two ultra-wideband elements spanning 617-6000MHz; a high performance GNSS antenna with an integrated 26dB gain LNA; and two dual band 2.4/5GHz omni-directional Wi-Fi elements.

		Specification	
PART NO.		6001275	
<b>ELECTRICAL DATA</b>			
Frequency Range	3G/4G Elements	617-960MHz / 1710-6000	
	Wi-Fi Elements	2.4/4.9-6GHz	
Peak gain: Isotropic*	3G/4G Elements	617-960MHz	4dBi
		1710-3800MHz	8dBi
	Wi-Fi Elements	4900-6000MHz	9dBi
		2.4 GHz	9dBi
4.9-6.0GHz	9dBi		
Isolation*	3G/4G Elements	> 15dB	
	Wi-Fi Elements	> 18dB	
Typical Efficiency	3G/4G Elements	> 50%	
	Wi-Fi Elements	> 70%	
Correlation Co-efficient	3G/4G Elements	<0.2	
Pattern		Omni-directional	
Impedance		50Ω	

\*Simulated off a groundplane and does not include cable attenuation

Sierra Wireless  
AIRLINK® ANTENNA: 5-IN-1 DOME

		Specification
<b>GPS/GNSS DATA</b>		
Frequency Range		1562-1612MHz
VSWR		<2.1 ± 4MHz
Gain: LNA		26dB
Typical Noise Figure		-2.7dB
Operating Voltage		3-5V DC
Typical Current		15mA
<b>MECHANICAL DATA</b>		
Dimensions	Height	80mm (3.1")
	Diameter	180mm (7.1")
Operating Temp		-40° / +80°C (-40° / +176°F)
Colour		Black
Ingress Protection		IP69K
<b>MOUNTING DATA</b>		
Mounting Type		Bolt Mount
Mounting Hole		19mm (3/4")
<b>CABLE DATA</b>		
Cell / LTE Cables	Type	C32
	Length	5m (16')
	Termination	SMA (m)
GPS Cable	Type	CS29
	Length	5m (16')
	Termination	SMA (m)
Wi-Fi Cables	Type	C32
	Length	5m (16')
	Termination	RP-SMA Plug

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Sierra Wireless (NASDAQ: SWIR) (TSX: SW) is the leading IoT solutions provider that combines devices, network and software to unlock value in the connected economy. Companies globally are adopting IoT to improve operational efficiency, create better customer experiences, improve their business models and create new revenue streams. Whether it's a solution to help a business securely connect edge devices to the cloud, or a software/API solution to help manage processes associated with billions of connected assets, or a platform to extract real-time data to make the best business decisions, Sierra Wireless will work with you to create the right industry-specific solution for your next IoT endeavor. Sierra Wireless has more than 1,300 employees globally and operates R&D centers in North America, Europe and Asia.

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## AirLink® RV55 Rugged LTE-A Pro Router

- Centrally managed, secure LTE broadband connectivity for remote fixed or vehicle applications in harsh environments
- Public safety agencies can quickly connect to critical equipment such as body cameras
- Ultra-Low Power consumption, ideal for solar or battery powered installations.
- Connect your field workers and devices with flexible dual Wi-Fi, and ethernet
- Reduces complexity in connecting legacy equipment with dual serial, ethernet, and multi-protocol support
- Powerful remote cloud-based or on-premises management solutions
- Proven reliability and over 3 million AirLink routers and gateways deployed
- Includes 1 year of AirLink Complete – network management, technical support, and extended warranty

## Compact, Industrial Grade, Low Power LTE-Advanced Connectivity

The AirLink® RV55 is the industry's most rugged, compact, LTE-Advanced Pro router. Simple to install, and easy to manage, the RV55 router is designed to connect critical infrastructure, remote assets, and mobile fleets.

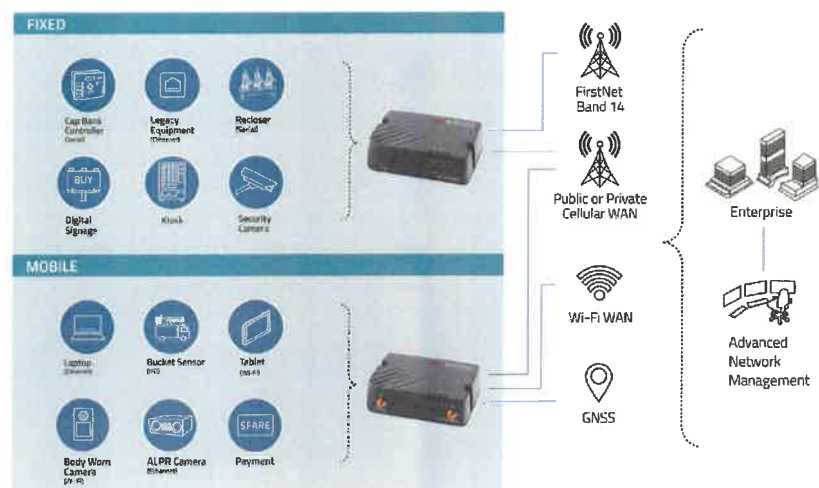
The RV55 is well suited for applications in public safety, energy, utilities, rail, ports, and smart cities.

## Pick the One That Suits Your Needs

The high-performance LTE-Advanced Pro RV55 has dual Wi-Fi radios and supports GNSS, FirstNet, and CBRS. It is ideal for public safety vehicles, commercial fleets, and mobile workforces. You can securely connect critical peripherals such as cameras and tablets.

The LTE variant is ideal for industrial applications connecting via Ethernet or Serial, such as SCADA and distribution management.

The LTE-M/NB-IoT variant is well-suited for remote or hard-to-reach locations with enhanced coverage.



**AirLink® RV55**  
Rugged LTE-A Pro Router

RV55					
	North America	EMEA	North America	Global	Global
	LTE		LTE-A Pro		LTE-M/ NB-IoT
<b>LTE CATEGORY</b>	Cat 4 (WP7610/WP7607)		Cat 12 (EM7511 EM7565)		Cat M1/NB1 (WP7702)
<b>Peak D/L</b>	Up to 150 Mbps		Up to 600 Mbps		Cat-M1: 300kbps Cat-NB1: 27kbps
<b>Peak U/L</b>	Up to 50 Mbps		Up to 150 Mbps		Cat-M1: 375kbps Cat-NB1: 65kbps
<b>4G LTE</b>					
<b>Frequency Bands</b>	1900(B2), AWS(B4), 850(B5), 700(B12), 700(B13), 700(B17), 1700(B66)	2100(B1), 1800(B3), 2600(B7), 900(B8), 800(B20), 700(B28)	2100(B1), 1900(B2), 1800(B3), AWS(B4), 850(B5), 2600(B7), 900(B8), 1800(B9), 700(B12), 700(B13), 700(B14), 850(B18), 850(B19), 800(B20), 850(B26), 700(B29), 2300(B30), 1500(B32), TDD B41, TDD B42, TDD B43, TDD B46, CBRS B48, 1700(B66)	2100(B1), 1900(B2), 1800(B3), AWS(B4), 850(B5), 2600(B7), 900(B8), 1800(B9), 700(B12), 700(B13), 850(B18), 850(B19), 800(B20), 850(B26), 700(B29), 2300(B30), 1500(B32), TDD B41, TDD B42, TDD B43, TDD B46, CBRS B48, 1700(B66)	2100(B1), 1900(B2), 1800(B3), AWS(B4), 850(B5), 900(B8), 700(B12), 700(B13), 700(B17), 850(B18), 850(B19), 800(B20), 850(B26), 700(B28)
<b>3G HSPA/HSPA+</b>					
<b>Frequency Bands*</b>	1900(B2), AWS(B4), 850(B5)	2100(B1), 900(B8)	2100(B1), 1900(B2), AWS(B4), 850(B5), 800(B6), 900(B8), 1700(B9), 650(B19)	2100(B1), 1900(B2), AWS(B4), 850(B5), 800(B6), 900(B8), 1700(B9), 650(B19)	
<b>2G EDGE/GSM/GPRS</b>					
<b>Frequency Bands</b>		900, 1800			850, 900, 1800, 1900
<b>APPROVALS</b>					
<b>Regulatory</b>	FCC, IC, PTCRB	GCF, CE	FCC, IC, PTCRB	FCC, IC, PTCRB, GCF, CE, RCM, IFT, Anatel	FCC, IC, PTCRB, GCF, CE, RCM
<b>Carrier</b>	Verizon, AT&T		Verizon, AT&T/FirstNet, US Cellular, Sprint, Telus	Verizon, AT&T, Telstra(Planned)	Verizon(Cat-M), AT&T(Cat-M)
<b>PART NUMBER</b>	1104335	1104337	1104303, 1104302 (Wi-Fi)	1104332, 1104331 (Wi-Fi)	1104333

\*For carrier-specific band support please refer to the hardware user guide.

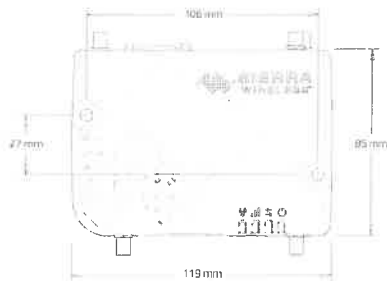
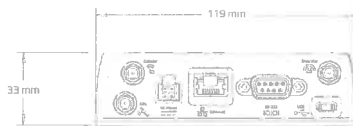
	Specification
<b>HOST INTERFACES</b>	10/100/1000 Ethernet (RJ45) RS-232 serial port (DB-9) USB 2.0 Micro-B Connector 3 SMA antenna (cellular, diversity, GNSS) 2 RP-SMA antenna (1x1 Wi-Fi, Optional) LTE-M/NB-IoT: 1 SMA (cellular) only, no GNSS or Wi-Fi Active GPS antenna support
<b>WI-FI (Optional)</b>	Dual Band 2.4/5GHz Wi-Fi Dual Radio, 802.11 b/g/n/ac (Wave2 Client Mode) Support for 10 clients, WPA2 Enterprise per radio Output power 16dBm Configurable as Dual Band Access Point (AP) or AP+Client Mode Single SSID Support per radio Captive Portal
<b>INPUT/OUTPUT</b>	Configurable I/O pin on power connector <ul style="list-style-type: none"> <li>Digital Input ON Voltage: 2.7 to 36 VDC</li> <li>Configurable Pull-up for dry contact input</li> <li>Digital Open Collector Output &gt; sinking 500 mA</li> <li>Analog Input: 0.5-36 VDC</li> </ul>
<b>LAN (ETHERNET/USB)</b>	DHCP Server IP Passthrough <b>VLAN</b> Host Interface Watchdog PPPoE

	Specification
<b>SATELLITE NAVIGATION (GNSS)</b>	LTE-A Pro Variant: 30 Channel GPS and GLONASS Receiver (Tracking Sensitivity: -160dBm) LTE Variant: 48 Channel Dedicated GNSS Receiver (Tracking Sensitivity: -162 dBm) Accuracy: <2 m (50%), <5 m (90%), <0.2 m/s Acquisition Time: 1s Hot Start Reports: NMEA 0183 V3.0, TAIP, RAP, XORA Multiple Redundant Servers Reliable Store and Forward
<b>SECURITY</b>	Remote Authentication (LDAP, RADIUS, TACACS+, DMZ) Inbound and Outbound Port filtering Inbound and Outbound Trusted IP MAC Address Filtering PCI compatible Secure Firmware Update
<b>NETWORK MANAGEMENT</b>	Secure mobile network & asset management application available in the cloud or licensed platform in the enterprise data center Fleet wide firmware upgrade delivery Router configuration and template management Router staging over the air and local Ethernet connection Over-the-air software and radio module firmware updates Device Configuration Templates Configurable monitoring and alerting Remote provisioning and airtime activation (where applicable)

# AirLink® RV55 Rugged LTE-A Pro Router

## Specification

<b>SERIAL</b>	TCP/UDP PAD Mode Modbus (ASCII, RTU, Variable) PPP DNP3 Interoperability Dual Serial option (with an accessory)
<b>NETWORK AND ROUTING</b>	Network Address Translation (NAT)    Reliable Static Route Port Forwarding    Dynamic DNS Policy Routing    Verizon PNTM NEMO/DMNR    IPV6 Gateway VRRP
<b>VPN</b>	IPsec, GRE, and OpenVPN Client Up to 5 concurrent tunnels Split Tunnel Dead Peer Detection (DPD) FIPS 140-2 compatible
<b>APPLICATION FRAMEWORK</b>	ALEOS Application Framework (AAF) LUA Scripting Language
<b>POWER</b>	Input Voltage: 7 to 36 VDC LTE Idle Power: 900mW (75 mA @ 12VDC) Standby Mode Power: 53 mW (4.4 mA @ 12 VDC) triggered on low voltage, I/O or periodic timer Low voltage disconnect to prevent battery drain Built-in protection against voltage transients including 5 VDC engine cranking and +200 VDC load dump Ignition Sense with time delay shutdown Configurable features and ports to optimize power consumption
<b>DIMENSIONS</b>	119 mm x 33 mm x 85 mm (102 mm including wi-fi connectors) 4.69 in x 1.34 in x 3.35 in (3.70 in including connectors) Weight: 320 g



## Specification

<b>ROUTER MANAGEMENT</b>	ALMS Local web user interface AT Command Line Interface (Telnet/SSH/Serial) SMS Commands SNMP
<b>EVENTS ENGINE</b>	Custom event triggers and reports Configurable interface, no programming Event Types: Digital Input, Network Parameters, Data Usage, Timer, Power, Device Temperature and Voltage Report Types: RAP, SMS, Email, SNMP Trap, TCP (Binary, XML, CSV) Event Actions: Drive Relay Output
<b>ENVIRONMENTAL</b>	Operating Temperature: -40°C to +70°C / -40°F to +158°F Operating Temperature (Wi-Fi variant): -30°C to +70°C / -22°F to +158°F Storage Temperature: -40°C to +85°C / -40°F to +185°F Humidity: 95% RH @ 60°C Military Spec MIL-STD-810G conformance to shock, vibration, thermal shock, and humidity IP64 rated ingress protection
<b>INDUSTRY CERTIFICATIONS</b>	Safety: IECCE Certification Bodies Scheme (CB Scheme), UL 60950** Vehicle Usage: E-Mark (UN ECE Regulation 10.04), Rail Usage: EN50155 ISO7637-2, SAE J1455 (Shock & Vibration) Hazardous Environments: Class 1 Div 2 – Ambient temperatures of -30°C to +60°C Environmental: RoHS, REACH, WEEE
<b>SUPPORT AND WARRANTY</b>	Includes 1st Year AirLink Complete: <ul style="list-style-type: none"> <li>AirLink Management Service (ALMS)</li> <li>Direct 24/7 Technical Support</li> <li>3-year standard warranty; optional 2-year warranty extension</li> </ul> 1-day Accelerated Hardware Replacement available through participating resellers
<b>ACCESSORIES</b>	In the Box: DC Power Cable, and Quick Start Guide Other Accessories (sold separately): 2000579 AC Adapter, 12VDC 6000659 DIN Rail Bracket For Antenna options visit: <a href="http://sierrawireless.com/antennas">sierrawireless.com/antennas</a>

\*\* Ambient temperatures of -30C to +60C

## AirLink Networking Solution - Related Products

### AIRLINK NETWORK MANAGEMENT SOLUTIONS

#### AIRLINK MANAGEMENT SERVICE (ALMS)



- Secure, Cloud-based network and asset management
- Remotely deploy, configure, monitor and manage AirLink devices
- Carrier-grade, high availability, secure, global infrastructure

#### AIRLINK MANAGER / MOBILITY MANAGER (AM/AMM)



- Deployable in the enterprise data center (on-premises) or in the cloud
- Advanced, end-to-end network and asset management for both fixed and mobile networks.
- Remote, real-time configuration, control and troubleshooting of AirLink devices

### AIRLINK VPN APPLIANCE

#### AIRLINK CONNECTION MANAGER



- VPN appliance built from the ground up for Airlink routers & gateways
- Simplify deployment and management of your VPN solution, extending the enterprise to the network edge for fixed and mobile endpoints
- Carrier agnostic – ACM doesn't require fixed and/or public IP
- Compatible with FIPS 140-2, and always-on VPN capability

#### About Sierra Wireless

Sierra Wireless (NASDAQ: SWIR) (TSX: SW) is the leading IoT solutions provider that combines devices, network and software to unlock value in the connected economy. Companies globally are adopting IoT to improve operational efficiency, create better customer experiences, improve their business models and create new revenue streams. Whether it's a solution to help a business securely connect edge devices to the cloud, or a software/API solution to help manage processes associated with billions of connected assets, or a platform to extract real-time data to make the best business decisions, Sierra Wireless will work with you to create the right industry-specific solution for your next IoT endeavor. Sierra Wireless has more than 1,300 employees globally and operates R&D centers in North America, Europe and Asia.

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# AirLink RV55

## Hardware User Guide



**SIERRA**  
WIRELESS®

41113042  
Rev. 1



## Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless product are used in a normal manner with a well-constructed network, the Sierra Wireless product should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless product, or for failure of the Sierra Wireless product to transmit or receive such data.

## Safety and Hazards

Do not operate the Sierra Wireless product in areas where blasting is in progress, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the Sierra Wireless product **MUST BE POWERED OFF**. The Sierra Wireless product can transmit signals that could interfere with this equipment.

The driver or operator of any vehicle should not operate the Sierra Wireless product while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

The RV55 platform is classified to ANSI/ISA 12.12.01-2016 and CSA C22.2#213 and are suitable for use in Class 1, Division 2, Groups A, B, C and D T4, and Class I Zone 2 Group IIC T4 classified Hazardous Locations.

The following warnings and instructions apply:

---

**Warning:** EXPLOSION HAZARD—SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 and CLASS I, ZONE 2.

---

---

**Avertissement:** RISQUE D'EXPLOSION-LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2 et CLASSE I, ZONE 2.

---

---

**Warning:** EXPLOSION HAZARD—DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.

---

---

**Avertissement:** RISQUE D'EXPLOSION-NE PAS DEBRANCHER TANT QUE LE CIRCUIT EST SOURS TENSION, A MOINES QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.

---

---

**Warning:** DO NOT USE THE USB CONNECTOR IN A HAZARDOUS AREA.

---

---

**Avertissement:** NE PAS UTILISER DE CONNECTEUR USB DANS LES ENVIRONNEMENTS DANGEREUX.

---

---

**Warning:** *DO NOT USE THE RESET BUTTON IN A HAZARDOUS AREA.*

---

**Avertissement:** *NE PAS UTILISER LE BOUTON DE RESET DANS UN ENVIRONNEMENT DANGEREUX.*

---

This device is suitable for use in Class 1 Div 2 Groups A, B, C, and D T4 locations. Ambient temperatures of -30C to +60C. UL Listed for use in ambient temperatures not exceeding 60C.

---

**Warning:** *Explosion Hazard. Do not connect or disconnect while circuit is live or unless the area is known to be free of ignitable concentrations.*

---

Cet appareil est certifié pour l'usage dans la Classe I, des endroits Division 2, Groupes atmosphérique A, B, C et de D, T4. La temp ambiante -30C à +60C. UL Listed pour utilisation dans des températures ambiantes ne dépassant pas 60C.

---

**Avertissement :** *Risque D'Explosion. Ne pas débrancher tant que le circuit est électrisé sauf si il n'y a aucune concentration de vapeurs combustible.*

---

The device is required to be installed in a tool-secured enclosure with the appropriate type rating.

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## Contact Information

Sales information and technical support, including warranty and returns	Web: <a href="http://sierrawireless.com/company/contact-us/">sierrawireless.com/company/contact-us/</a> Global toll-free number: 1-877-687-7795 6:00 am to 5:00 pm PST
Corporate and product information	Web: <a href="http://sierrawireless.com">sierrawireless.com</a>

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# >> 1: Introduction to the AirLink RV55

The Sierra Wireless® AirLink® RV55 LTE-A Pro router is a compact, intelligent and fully-featured communications platform that provides real-time wireless capabilities for fixed and mobile applications. It is intended for use in industrial settings such as:

- Remotely monitoring and controlling infrastructure and surveillance equipment on pipelines, meters, pumps and valves in any energy, utility, or industrial application
- Tracking the location of heavy equipment and assets in the field
- Providing reliable Internet access to a mobile workforce

The RV55 router has multiple communication ports including serial, Ethernet, and USB ports. The power connector has one GPIO pin for remote monitoring and control and one ignition sense pin to turn the router on and off.

The RV55 is an LTE-Advanced cellular router that supports LTE and HSPA+ radio bands.

The RV55 routers, with their rich feature set, configurable with the included ALEOS software, are the perfect choice for a broad set of IoT solutions.

## Key Features

- High-performance LTE-Advanced Pro (Cat-12)
- LTE-M/NB-IoT
- LTE performance at 2G power consumption (less than 1 W in idle mode)
- State of the art LTE coverage:
  - 21 LTE frequency bands, with support for band 48 Private Network (CBRS)
- Product variants:
  - Single product variant for all major North American operators
  - Single for global
- FirstNet support (Band 14)
- Dual Wi-Fi 2.4/5 GHz
- Dual serial port mode (accessory required)
- Fully automatic network operator switching; just insert the SIM card
- Provides network connectivity via Ethernet, Serial, and USB
- Gigabit Ethernet support (10/100/1000)
- Remote configuration, software update, and monitoring with AirLink Management Service (ALMS)
- Meets industrial-grade certifications including Class 1 Div 2, Class I Zone 2, MIL-STD-810G, IP64 ingress protection
- Supports up to 5 VPN tunnels to support secure communications over cellular networks
- Events engine for alert reporting to third party server platforms
- ALEOS Application Framework (AAF) offers real-time onboard data processing
- Built-in, class-leading voltage transient protection provides superior reliability and continuous operation
- E-Mark and SAEJ1455 for shock and vibration
- Active GNSS for tracking equipment
- Preprogrammed low voltage disconnect to prevent battery drain
- Security via Remote Authentication (RADIUS, TACACS+, LDAP) to centrally manage router access

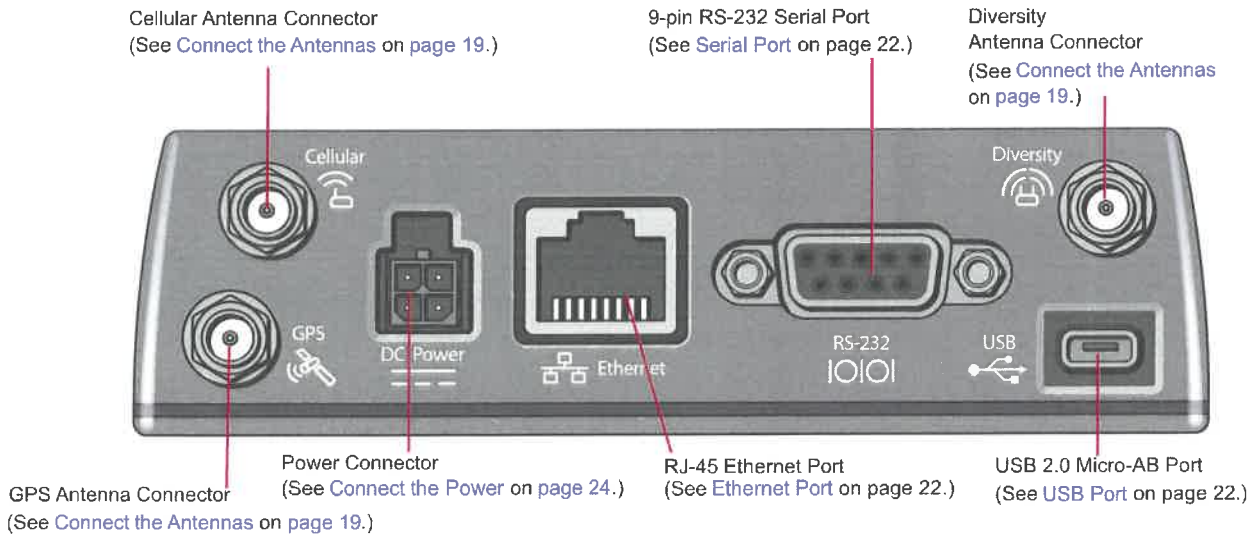
- Industry leading warranty includes support, software updates, and advance replacement
- **Power Saving Features**, including:
  - Processor Power Saving Mode
  - LED power saving mode
  - Standby mode
  - Power saving strategies such as turning off unused interfaces (USB, Serial, Ethernet), turning off GNSS, and adjusting the Ethernet data rate
- Multi-function digital input, analog input, switchable low side current sink, and high side configurable pull-up

For information on configuring these features, refer to the ALEOS Software Configuration User Guide for the RV55.



# Description

## Back Panel



## Front Panel

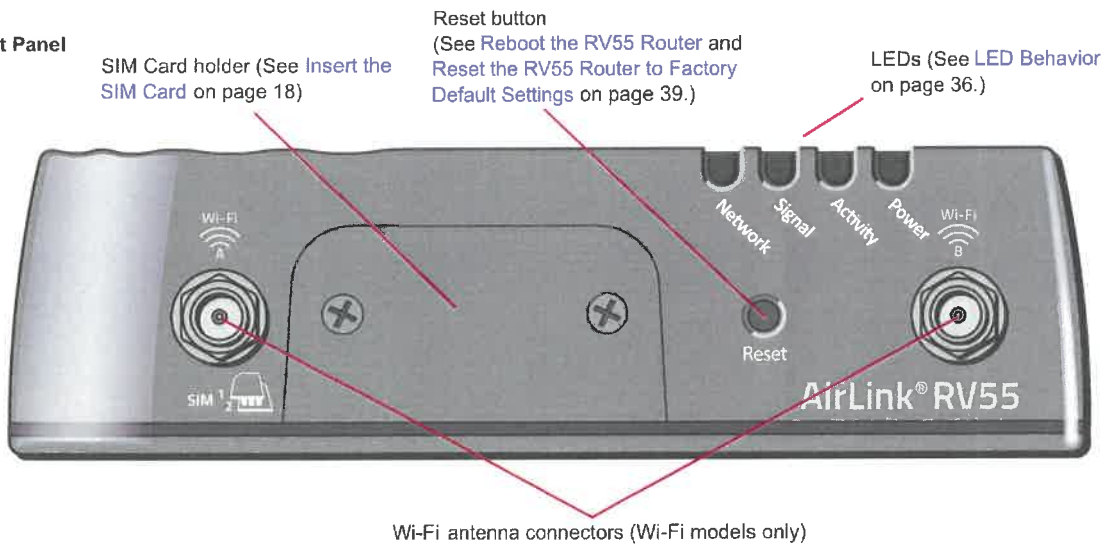


Figure 1-1: RV55 Router Connectors, LEDs and SIM Card Holder

## Router Configuration and Management

You can configure and manage your RV55 router using:

- **ACEmanager**—a browser-based router management application  
Refer to the ALEOS Software Configuration User Guide available for download at [source.sierrawireless.com](http://source.sierrawireless.com).
- **AirLink Management Service (ALMS)**—a cloud-based router management service provided by Sierra Wireless  
For more information, visit [www.sierrawireless.com/ALMS](http://www.sierrawireless.com/ALMS) or contact your Sierra Wireless distributor.
- **AirLink Mobility Manager (AMM)**—a Network Management solution that provides a consolidated view of the entire vehicle fleet and enables simplified management, control and monitoring of connected AirLink routers.
- **AT Commands**  
For a complete list of AT Commands, refer to the ALEOS Software Configuration User Guide.

## Power Modes

The AirLink RV55 router has three power modes:

- **On**—The CPU and the radio are on. The current draw is 900 mW (75 mA @ 12 VDC) when the router is idle (i.e. no traffic is being sent or received).
- **Standby**—The CPU and the radio are off, but can be woken by an I/O input or at a configured time. Current draw is 53 mW (4.4 mA @ 12 VDC).
- **Off**—All power is switched off. Ignition is low, but Vin remains connected. Current draw is 5 mW (400  $\mu$ A @ 12 VDC).

## Power Saving Features

Table 1-1 provides a quick reference to the RV55 power saving features. For more information, refer to the ALEOS Software Configuration User Guide.

**Table 1-1: Power Saving Features**

Feature	Where to configure in ACEmanager	Notes
<b>Processor Power Savings Mode</b>	Services > Power Management	This feature optimizes idle power consumption. Recommended for customers who require the best power consumption efficiency, for example in battery or solar powered applications. Enabling this feature saves energy by reducing performance where possible.
<b>LED Power Saving</b>		In LED power saving mode: <ul style="list-style-type: none"> <li>• Signal LED is off when the signal strength is good or average, but still alerts you when there is no signal or a poor signal.</li> <li>• Network LED is off when there is a network connection, but alerts you when the router is connecting to a network and when there is a problem with the network connection.</li> </ul> For more details, see <a href="#">LED Behavior</a> on page 36.
<b>Disable USB Port</b>	LAN > USB	
<b>Disable Ethernet Port</b>	LAN > Ethernet	
<b>Set Ethernet Data Rate</b>	LAN > Ethernet > Advanced	Ethernet data rates can be set to Auto, 100 Mbits, 10 Mbits. If your use case does not require a Gigabit Ethernet connection, choosing a slower rate results in substantial power savings. When set to 10 or 100 Mbits, both sides of the link must be set to the same fixed speed and duplex settings. If you are unable to ensure that both sides of the link have exactly the same fixed settings, it is best to use Auto.
<b>Disable Serial Port</b>	Serial > Port Configuration	
<b>Disable GNSS</b>	GPS > Global Settings	GNSS is disabled by default.
<b>Ignition Shutdown Delay</b>	Services > Power Management	If the RV55 router is installed in a vehicle, connect the ignition sense pin (Pin 3) on the DC power cable to the vehicle ignition and configure the RV55 router to shut down after a configured delay once the ignition is turned off.
<b>Low Voltage Disconnect</b>		The RV55 router enters standby mode when the voltage reaches a user-defined threshold to prevent excessive battery drain in battery-operated systems.
<b>Standby (Time-based)</b>		The RV55 router is in standby mode and automatically wakes up periodically, for example hourly or daily.
<b>Standby (I/O-based)</b>		The RV55 router is in standby mode and automatically wakes up on configured I/O input.

## Sample Power Consumption Scenarios

Note: All power consumption figures are preliminary.

Table 1-2: Power Consumption Scenarios

Scenario	Radio	Ethernet	Serial	USB	GNSS	Processor Power Saving Mode	LED Power Saving Mode	Power <sup>a</sup>
<b>Standby Mode</b>	—	—	—	—	—	—	—	38 mW (3.14 mA)
<b>Low Power — Serial</b>	Idle Attached	Disabled	Enabled	Disabled	Disabled	Enabled	Enabled	834 mW (68.8 mA)
<b>Low Power — Ethernet</b>	Idle Attached	10 BaseT Full duplex	Disabled	Disabled	Disabled	Enabled	Enabled	874 mW (72.2 mA)
<b>Low Power — Wi-Fi<sup>b</sup></b>	Idle Attached	Disabled	Disabled	Disabled	Disabled	Enabled	Enabled	1.295 W (107 mA)
<b>Typical without Power Saving Features</b>	Attached and connected (+20 dBm LTE)	100 BaseT Full duplex	Enabled Idle	Enabled Idle	Enabled Active antenna	Disabled	Disabled	3700 mW (308.3 mA)
<b>Maximum without Power Saving Features</b>	Attached and connected (+23 dBm LTE-A)	1000 BaseT Full duplex (maximum throughput)	Enabled	Enabled	Enabled Active antenna	Disabled	Disabled	5500 mW (458.3 mA)
<b>Peak without Power Saving Features<sup>c</sup></b>	Attached and connected (+32 dBm 1 up/ 1 down GSM/ GPRS/ EDGE bursts)	1000 BaseT Full duplex (maximum throughput)	Enabled	Enabled	Enabled Active antenna	Disabled	Disabled	8000 mW (666.6 mA)
<b>Inrush Current</b>	1.5 A @ 12 V (Averaged over 100 μs)							

a. Power consumption was measured at 12 V.

b. Wi-Fi A and B set up as access points with nothing connected to them.

c. Peak without power saving is similar to Maximum without power saving, but measured as a maximum burst over a limited time.

## Dual SIM

The AirLink RV55 router has two SIM card slots. You can decide which slot is the Primary SIM card. When the router is powered on or reboots, it automatically connects to the network associated with the Primary SIM card. If no card is present in that slot, it connects to the network associated with the Secondary SIM card. If configured to do so, data usage is tracked independently on both SIM cards. SIM PIN configuration is also available for both SIM cards. This feature allows users to install SIM cards for two different network operators, use one SIM card initially and later change network operators by configuring the new SIM card to be the Primary SIM card.

## Network Operator Switching

The North American AirLink RV55 comes preloaded with multiple versions of radio module firmware. When the router is powered on, it checks the stored radio module firmware versions and automatically loads the appropriate version for the installed Primary SIM card onto the radio module. While Network Operator Switching is in progress, the LEDs sequentially flash green (green LED chase).

If there is no SIM card installed in the Primary SIM card slot, the router uses the firmware associated with the SIM card in the Secondary SIM card slot.

This feature, which is intended for North American products, makes it possible to use a single hardware variant on multiple operator networks.

## Accessories

The following items come with the RV55 router:

- DC power cable
- Mounting screws
- Quick Start Guide

The following items can be ordered separately from Sierra Wireless:

- Universal AC power adapter
  - Voltage input: 100–240 VAC
  - Current output: 1.5 A
  - Part number: 2000579
- DIN rail mounting bracket (part number 6000659, see [DIN Rail Mount](#) on page 18)
- Serial Y-cable for dual serial port mode operation
  - Part number: 6001238

## Warranty

The RV55 router comes with a 3-year warranty, and has an optional 2-year warranty extension.

## >> 2: Installation and Startup

This chapter shows how to connect, install and start the Sierra Wireless RV55 router. It also describes the front panel LEDs, and I/O functionality.

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*Note: Field wiring and connections in hazardous locations must be connected as per the wiring methods requirement for Class 2 circuits mentioned in the National Electric Code and the Canadian Electric Code.*

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*Note: The RV55 router installation must be done by a qualified technician.*

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### Tools and Materials Required

- Power supply — AC or DC (DC power cable is supplied by Sierra Wireless)
- A SIM card (provided by your mobile network operator)
- #1 Phillips screwdriver
- Laptop computer with Ethernet cable
- LTE MIMO antennas — Main and Diversity
- Optional—GPS antenna
- Optional—a 9-pin connection cable for the RS-232 port
- Optional—DIN Rail Mounting Bracket kit (available from Sierra Wireless)

---

**Caution:** *The router has a hardened case for use in industrial and extreme environments. If you are installing it in these types of environments, use cables designed and specified for use in these types of environments to avoid cable failure.*

---

### Installation Overview

The steps for a typical installation are:

1. Insert the SIM card(s)—[page 16](#).
2. Mount the RV55 router—[page 17](#).

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*Note: Depending on where you are installing the RV55 router, you may want to mount the router after connecting the antenna, cables and power, and confirming correct operation.*

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3. Connect the antennas—[page 19](#).
4. Connect the data cables—[page 21](#).
5. Connect the power—[page 24](#).
6. Check the router operation—[page 35](#).
7. Connect a laptop and configure ACEmanager—[page 38](#).

The following sections describe these steps in detail.

## Step 1—Insert the SIM Cards

The AirLink RV55 router has two mini-SIM (2FF) card slots. The upper slot is Slot 1 and the lower slot is Slot 2. ACEmanager references these slot numbers, and by default, the SIM card in Slot 1 is the Primary SIM card. If you are using only one SIM card, Sierra Wireless recommends that you install it in Slot 1.

If the SIM card (or SIM cards) have not already been installed, insert the SIM cards into the router before connecting any external equipment or power to the router.

To install the SIM cards:

1. Use a #1 Phillips screwdriver to remove the SIM card cover.
2. Orient the SIM card(s), as shown in [Figure 2-1](#). The gold contacts on the upper SIM card face down, and the gold contacts on the lower SIM card face up. If you are using only one SIM card, insert it in the upper SIM slot (Slot 1).
3. Gently slide the SIM cards into the slots until they click into place.

To remove a SIM card, press the SIM card in, and release it. Gently grip the SIM card and pull it out.

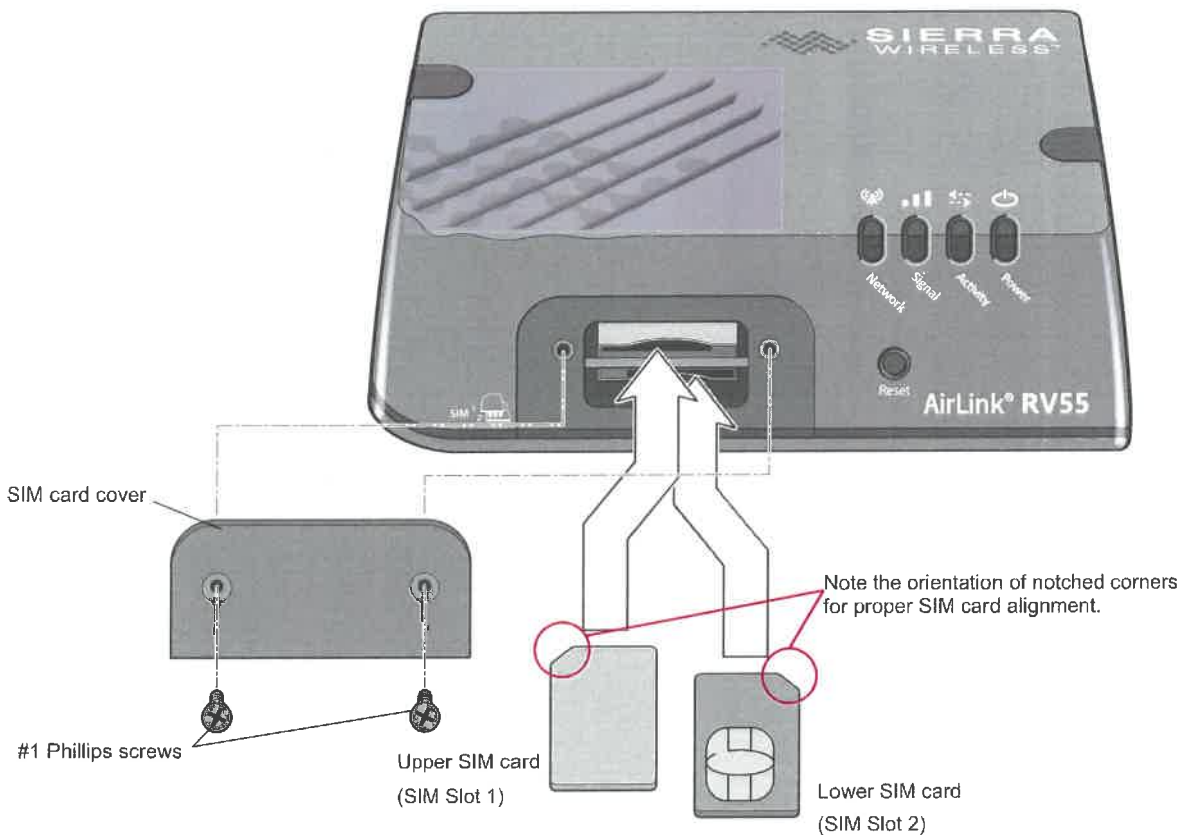


Figure 2-1: Installing the SIM Card

4. Replace the SIM card cover.



## Step 2—Mounting the RV55 Router

**Warning:** This router is not intended for use close to the human body. Antennas should be at least 8 inches (20 cm) away from the operator.

Mount the router where:

- There is easy access to the cables
- Cables are not bent, constricted, close to high amperages or exposed to extreme temperatures
- The front panel LEDs are easily visible
- There is adequate airflow
- It is away from direct exposure to the elements, such as sun, rain, dust, etc.
- It will not be hit or come into contact with people, cargo, tools, equipment, etc.

### Mounting Brackets

The RV55 router comes with mounting screws. An optional DIN rail mounting bracket (P/N 6000659) is available from Sierra Wireless.

### Flat Surface Mount

If you are mounting the RV55 router on a flat surface, use the mounting screws that come with the router.

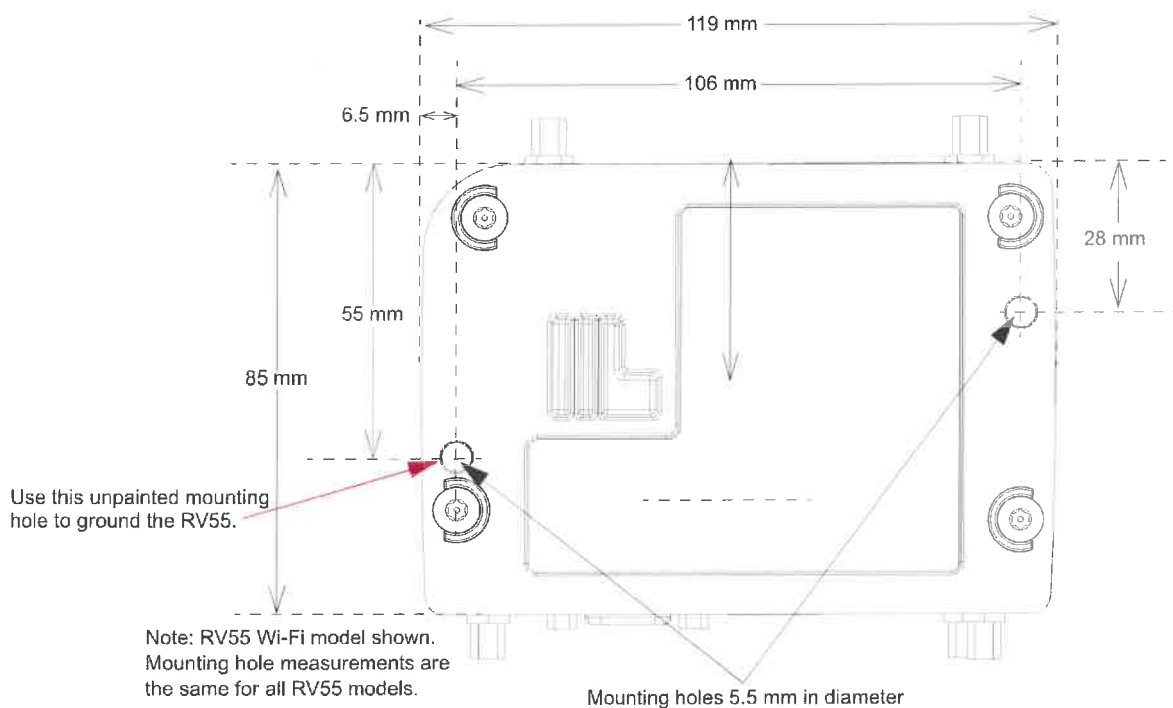


Figure 2-2: RV55 Router Mounting Hole Locations and Dimensions



## DIN Rail Mount

If you are mounting the RV55 router on a DIN rail, order DIN rail mounting bracket kit (P/N 6000659) from Sierra Wireless. The kit contains:

- L-shaped DIN Rail Mounting Bracket—Qty 1
- DIN Rail Clip (35 mm EN 50022)—Qty 1
- Screws

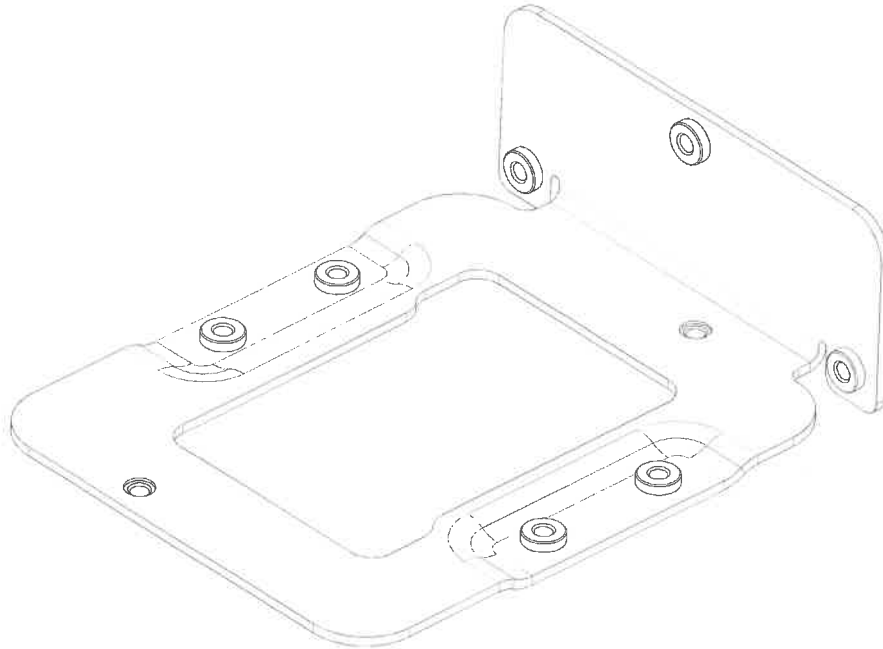


Figure 2-3: DIN Rail Mounting Bracket

To attach the RV55 router to a horizontally mounted DIN rail, in a variety of orientations:

1. Install the SIM card. (See [Step 1—Insert the SIM Cards](#) on page 16.)
2. Test the network connectivity.  
Connect the RV55 router. Power it up and ensure that you have network connectivity. (See [Step 5—Connect the Power](#) on page 24.)
3. Place the router on the DIN rail mounting bracket, lining up the mounting holes on the underside of the router with the holes on the DIN rail mounting bracket.
4. Use the screws provided to attach the router to the bracket. Torque the screws to a maximum of 1.1 N-m (10 in-lb.).
5. Use the screws provided to attach the DIN rail clip to the bracket.
6. Attach the DIN rail clip to a horizontal DIN rail, with the spring clip at the bottom, taking into account the location information described in [Power Consumption Scenarios](#) on page 13.

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*Note:* The DIN rail mounting bracket and clip in the Sierra Wireless kit should only be used on horizontally-mounted DIN rail.

---

## Grounding the RV55 Router Chassis

For DC installations (with a fixed “system” ground reference), Sierra Wireless strongly recommends always grounding the RV55 chassis to this system ground reference.

To ensure a good grounding reference, either:

- Attach the RV55 to a grounded metallic surface.
- Connect one end of a short 18 AWG or larger gauge wire to the unpainted upper left mounting hole (see [Figure 2-2](#)) and connect the other end to the system ground reference or (if mounted in a vehicle) the vehicle chassis.

---

*Note: In some routers the upper left mounting hole is painted. If you use the mounting screw and washer included with your router, this mounting hole still provides an effective ground, as the washer removes enough paint to allow contact between the wire and the metal chassis.*

---

## Step 3—Connect the Antennas

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**Warning:** This router is not intended for use close to the human body. Antennas should be at least 8 inches (20 cm) away from the operator.

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The RV55 router has up to three female SMA antenna connectors. The number of connectors depends on product variant:

- Cellular Main antenna connector
- Cellular Diversity antenna connector: Required for 4G/LTE networks<sup>1</sup>
- GPS antenna connector<sup>1</sup>

In addition, the RV55 with Wi-Fi has two male SMA antenna connectors (see [Figure 2-4](#) on page 20).

For regulatory requirements concerning antennas, see [Maximum Antenna Gain](#) on page 60.

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*Note: The antenna should not exceed the maximum gain specified in [RF Exposure](#) on page 59. In more complex installations (such as those requiring long lengths of cable and/or multiple connections), you must follow the maximum dBi gain guidelines specified by the radio communications regulations of the Federal Communications Commission (FCC), Industry Canada, or your country's regulatory body.*

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*Note: Take extra care when attaching the antennas to the SMA connectors. Finger tight (approximately 0.6 – 0.8 Nm/5 – 7 in-lb.) is sufficient and the max torque should not go beyond 1.1 Nm (10 in-lb.).*

---

---

1. Not on LTE-M/NB-IoT variant

To install the antennas:

1. Connect the cellular antenna to the SMA cellular antenna connector.  
Mount the cellular antenna so there is at least 20 cm between the antenna and the user or bystander.
2. Connect a second antenna to the SMA Diversity antenna connector.  
For 3G networks, the second antenna operates as a diversity antenna, providing a second receive path.  
For 4G networks, the second antenna operates as a MIMO antenna, providing a second receive path and a second transmit path.
3. If used, connect a GPS antenna to the SMA GPS antenna connector.  
Mount the GPS antenna where it has a good view of the sky (at least 90°).

---

*Note: ALEOS is configured by default for an active GPS / GNSS antenna. If you are using a passive antenna, after the router is installed, launch ACEmanager, go to Location > Advanced and set the GNSS Antenna Bias field to Disable.*

---

4. For Wi-Fi-capable routers, connect the Wi-Fi antennas to the SMA Wi-Fi connectors.

---

*Note: If any antenna is located away from the router, keep the cables as short as possible to prevent the loss of antenna gain. Route the cables so that they are protected from damage and will not be snagged or pulled on. There should be no binding or sharp corners in the cable routing. Excess cabling should be bundled and tied off. Make sure the cables are secured so their weight will not loosen the connector from the router over time.*

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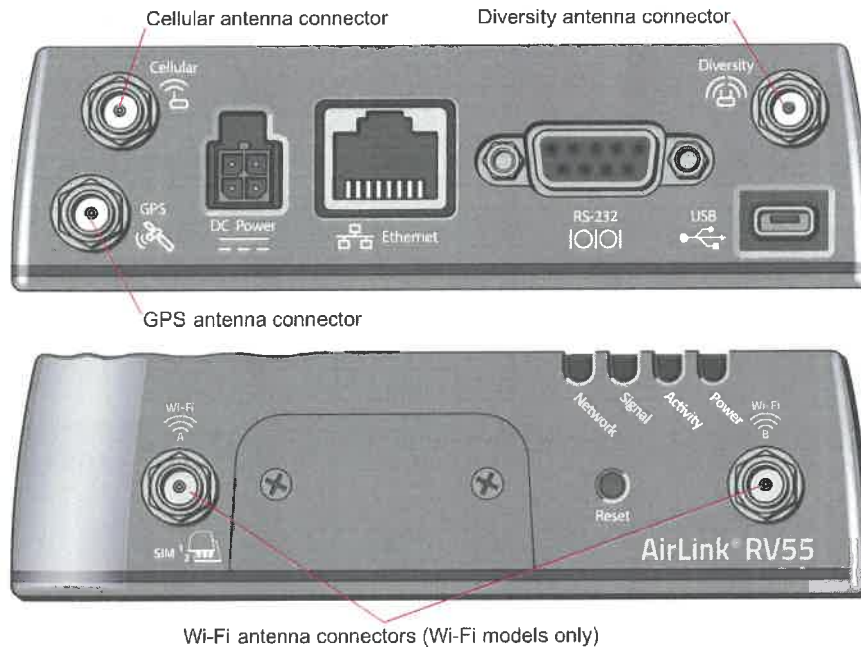


Figure 2-4: Antenna Connectors

## Recommended Antenna Separation

The recommended antenna separation is related to the band frequency/wavelength. To accommodate the shortest frequency/longest wavelength band supported by the RV55, Sierra Wireless recommends a minimum antenna separation of 214 mm for best results, and if necessary, a separation of 107 mm for acceptable results.

**Table 2-1: Recommended Antenna Separation**

Service	Frequency (MHz)	Wavelength ( $\lambda$ ) (mm)	Best Antenna Separation (mm) ( $1/2 \lambda$ )	Good Antenna Separation (mm) ( $1/4 \lambda$ )
LTE	700	428	214	107
LTE	800	375	187	94
LTE	900	333	167	83
LTE	1800	167	83	42
LTE	2100	143	71	36
LTE	2600	115	58	29
WCDMA	850	353	176	88
WCDMA	900	333	167	83
WCDMA	1900	158	79	39
WCDMA	2100	143	71	36
GSM/GPRS/EDGE	850	353	176	88
GSM/GPRS/EDGE	900	333	167	83
GSM/GPRS/EDGE	1800	167	83	42
GSM/GPRS/EDGE	1900	158	79	39

## Step 4—Connect the Data Cables

The RV55 router has the following ports for connecting data cables:

- **USB Port** (Micro-AB)
- **Ethernet Port** (RJ-45)—Use a Cat 5e or Cat 6 Ethernet cable
- **Serial Port** (9-pin RS-232)

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## USB Port

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**Warning:** Do not use the USB port in a potentially explosive environment.

---

The USB port complies with USB Version 2.0 for high speed operation and can be configured to operate in one of two modes:

- **Virtual Ethernet Port:** The RV55 behaves as if the PC were connected to an Ethernet port, allowing access to the Internet and the router's internal web server. This is the default setting.
- **Virtual Serial Port:** The RV55 behaves as if it was connected to a standard serial port. The primary use of this interface is for the AT command line interface of ALEOS and for diagnostic access to the radio module.

A Windows driver must be installed on the PC in order to support USB virtual serial port mode. You can download the drivers from

[source.sierrawireless.com/resources/airlink/software\\_downloads/airlink\\_usb\\_driver/](http://source.sierrawireless.com/resources/airlink/software_downloads/airlink_usb_driver/)

For information about setting the USB mode and installing the USB driver, see the ALEOS Software Configuration User Guide.

Sierra Wireless recommends you:

- Use a USB 2.0 cable
- Connect directly to your computer for best throughput.

## Ethernet Port

- IEEE 802.3 Ethernet specification for 1000 Mbps speed (Gigabit Ethernet) with fallback to 100 or 10 Mbps (Cat 5e or Cat 6 cable is required for Gigabit Ethernet)
- Auto-crossover support
- Auto-negotiation detects the speed of the connecting device for 1000 baseT, 100 baseT, or 10 baseT

## Serial Port

The RV55 9-pin serial port connects directly to most computers or other devices with a standard serial straight-through cable.

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*Note: If you have a DCE device, you need to use a null modem (cross-over) cable.*

---

The same serial port can be configured as a dual 4-wire serial port, and connect to devices with a Y cable (Sierra Wireless part number 6001238). The Dual Port Mode setting is available in ACEmanager under Serial > RS232 Configuration > General.

- Used for connecting serial devices and configuration
- Complies with the EIA RS-232D specification for DCE equipment
- Output driver levels swing from -7 VDC to +7 VDC with normal loading

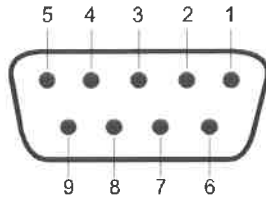


Figure 2-5: DB-9 Female Serial Connector

**Table 2-2: Serial Connector Pin-out (Single Port Mode)**

Name	Pin	Description	Type
DCD	1	Data Carrier Detect	OUT
TXD	2	Transmit Data	OUT
RXD	3	Receive Data	IN
DTR	4	Data Terminal Ready	IN
GND	5	Main GND. Connected internally to BOARD GND	GND
DSR	6	Data Set Ready	OUT
RTS	7	Ready To Send	IN
CTS	8	Clear To Send	OUT
RI	9	Not connected	—

**Table 2-3: Serial Connector Pin-out (Dual Port Mode)**

Name	Pin	Description	Type
CTS	1	Port 2 Clear To Send	OUT
TXD	2	Port 1 Transmit Data	OUT
RXD	3	Port 1 Receive Data	IN
RXD	4	Port 2 Receive Data	IN
GND	5	Main GND. Connected internally to BOARD GND	GND
TXD	6	Port 2 Transmit Data	OUT
RTS	7	Port 1 Ready To Send	IN
CTS	8	Port 1 Clear To Send	OUT
RTS	9	Port 2 Ready To Send	IN

## Step 5—Connect the Power

The AirLink RV55 router comes with a 3 meter (10 ft.) DC power cable. You can also purchase an optional AC adapter.

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*Note: Electrical installations are potentially dangerous and should be performed by personnel thoroughly trained in safe electrical wiring procedures.*

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The RV55 router supports a voltage range between 7 V and 36 V, but since low voltage standby mode is enabled by default, you must supply greater than 9 volts at startup.

If you want to operate the router at a lower voltage, change the low voltage settings once the router is up and running. For more information, refer to the ALEOS Software Configuration User Guide (Services chapter).

### Cable Strain Relief

Sierra Wireless recommends using cable strain relief for installations in high-vibration environments.

Place the cable strain relief within 200 mm (8 in.) of the RV55 router to reduce the mass of cable supported by the power connector under vibration. Ideally, the strain relief mounting for the DC cable should be attached to the same object as the router, so both the router and cable vibrate together. The strain relief should be mounted such that it does not apply additional stress on the power connector, i.e. the cable should not be taut and should not pull the power connector at an angle.

### Fusing

For DC installations, Sierra Wireless recommends fusing the power input using a 4.0 A fast-acting fuse.

### DC Voltage Transients

The AirLink RV55 router has built-in protection against vehicle transients including engine cranking (down to 5.0 V) and load dump, so there is no need for external power conditioning circuits. For details, see [Industry Certification for Vehicles](#) on page 41.

## Power Connector on the RV55 Router

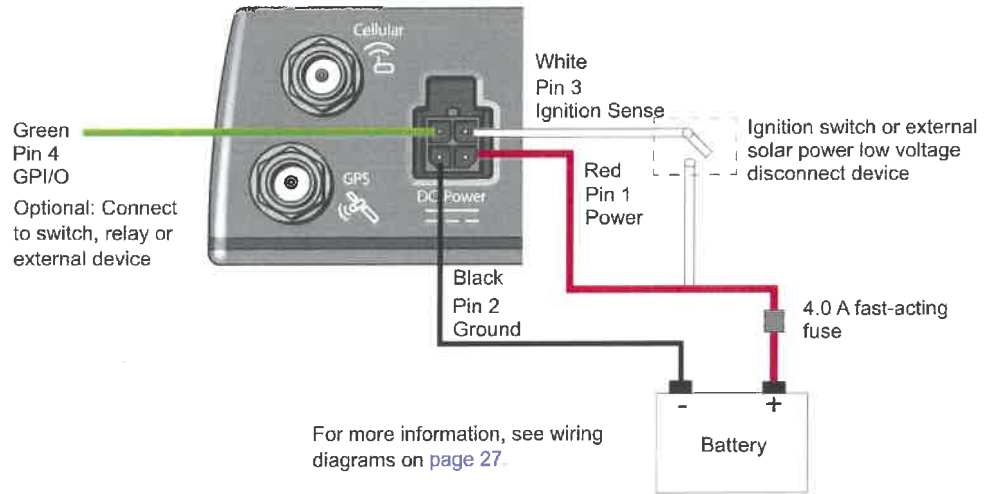


Figure 2-6: DC Power Cable Connections (Colors indicate DC cable wire colors.)

Table 2-4: Power Connector Pin and DC Cable Wires

Pin	Name	DC Cable Wire Color	Description	Type
1	Power	Red	Main power supply for device  <i>Note: When the router switches to Low Power mode based on a Low Voltage trigger, the voltage is monitored on the Red (Power) wire.</i>	PWR
2	Ground	Black	Main device ground	PWR



**Table 2-4: Power Connector Pin and DC Cable Wires**

Pin	Name	DC Cable Wire Color	Description	Type
3	Ignition Sense	White	<p>Sierra Wireless recommends using the Ignition Sense wire to turn the router off. It should not be turned off by disconnecting the power.</p> <hr/> <p><i>Note: If you do not connect pin 3 to the ignition, you MUST connect it to the positive terminal of your power supply or battery. If you are using a Sierra Wireless AC adapter, the connection is inside the cable.</i></p> <hr/> <p>For installations where the router is turned on/off, use the white wire in the DC cable connected to Pin 3 to:</p> <ul style="list-style-type: none"> <li>• Turn the router on/off with the vehicle ignition</li> </ul> <hr/> <p><i>Note: To turn the router on/off with the vehicle ignition, Sierra Wireless strongly recommends using an unswitched VCC on Pin 1 (Red, Power wire on DC cable) with Pin 3 (White, Ignition sense wire on DC cable) connected to the ignition.</i></p> <hr/> <ul style="list-style-type: none"> <li>• Turn the router on/off with a low voltage disconnect device</li> </ul> <hr/> <p><i>Note: For solar applications, if you want the router to turn off when the voltage drops below a defined level, connect Pin 3 to an external low voltage disconnect.</i></p> <hr/>	I
4	GPIO	Green	<p>User configurable digital input/output or analog voltage sensing input. Connect to switch, relay or external device. For more information, see <a href="#">I/O Configuration</a> on page 29 and the ALEOS Software Configuration User Guide.</p>	I/O

## Wiring Diagrams

### Recommended Vehicle Installation

For vehicle installations, Sierra Wireless recommends connecting the white Ignition Sense wire to the vehicle's ignition switch, as shown in the following illustration.

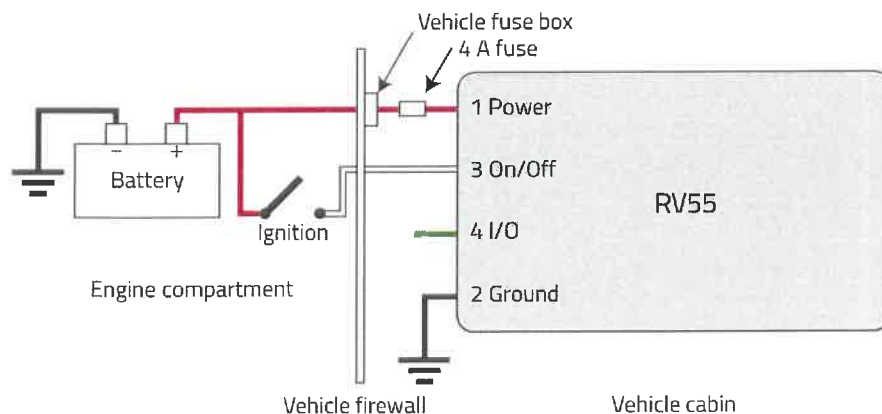


Figure 2-7: Recommended Vehicle Installation

The recommended vehicle installation allows the router to operate with the vehicle. When the vehicle ignition is off, the router is off. If desired, you can configure a delay between the time the vehicle's ignition shuts off, and the time the router shuts down. A delayed shutdown is especially useful if you want to maintain a network connection while the vehicle's engine is shut off for short periods, such as in a delivery vehicle.

- Pin 1 (Power)—Use the red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0 A fast-acting fuse in the input power line. Sierra Wireless recommends using a continuous (unswitched) DC power source.
- Pin 2 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground. See also [Grounding the RV55 Router Chassis](#) on page 19.
- Pin 3 (Ignition Sense)—Sierra Wireless recommends always using the Ignition Sense wire (Pin 3) to turn the router off. It should not be turned off by disconnecting the power.

### Alternate Vehicle Installation

The main difference between this installation and the standard vehicle installation is that you can configure a timer to turn the router on at set intervals for a configured length of time; for example 20 minutes once every 24 hours when the ignition is off. Also, instead of the router turning on and off, the router alternates between on and standby mode.

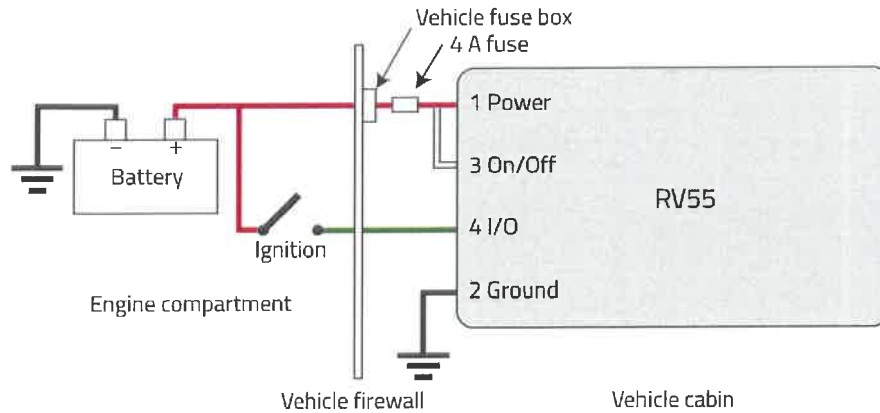


Figure 2-8: Alternate Vehicle Installation

- Pin 1 (Power)—Use the red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0 A fast-acting fuse in the input power line. Sierra Wireless recommends using a continuous (unswitched) DC power source.
- Pin 2 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground. See also [Grounding the RV55 Router Chassis](#) on page 19.
- Pin 3 (Ignition Sense)—Connected to power
- Pin 4 (I/O)—Connected to ignition

### Fixed Installation

For fixed installations, connect the wires as shown in the figure below. You can configure Low voltage disconnect to force the router into Standby mode when the voltage is low.

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*Note: When the router switches to Low Power mode based on a Low Voltage trigger, the voltage is monitored on the Red, Power wire.*

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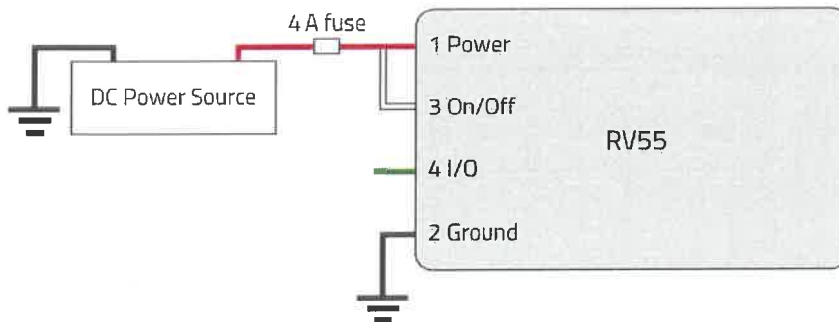


Figure 2-9: Fixed Installation without I/O

- Pin 1 (Power)—Use the red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0 A fast-acting fuse in the input power line. Sierra Wireless recommends using a continuous (unswitched) DC power source.
- Pin 2 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground. See also [Grounding the RV55 Router Chassis](#) on page 19.
- Pin 3 (Ignition Sense)—Connected to power

## Fixed Installation with I/O Input Triggered by Standby Mode

If you have a fixed installation where you want to use the I/O to monitor an external device such as a motion detector, remote solar panel, or a remote camera, refer to [Figure 2-10](#). You can configure the I/O line to wake the router up for a configured length of time, and use Low voltage disconnect to put the router in Standby mode if the voltage falls below a configured value.

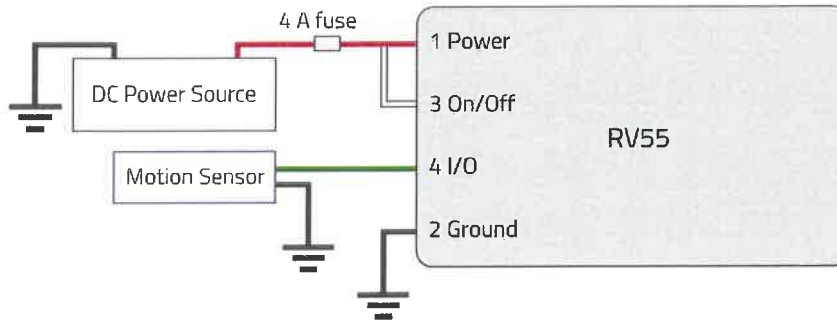


Figure 2-10: Fixed Installation with I/O

- Pin 1 (Power)—Use the red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0 A fast-acting fuse in the input power line. Sierra Wireless recommends using a continuous (unswitched) DC power source.
- Pin 2 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground. See also [Grounding the RV55 Router Chassis](#) on page 19.
- Pin 3 (Ignition Sense)—Connected to power
- Pin 4 (GPIO)—Use the green wire for I/O configurations. See [I/O Configuration](#).

## I/O Configuration

You can use the Pin 4 (GPIO) green wire as:

- A pulse counter  
(See [Table 2-5](#) on page 30 and [Figure 2-11](#) on page 30.)
- A digital input  
(See [Table 2-5](#) on page 30 and [Figure 2-12](#) on page 31.)
- A high side pull-up/dry contact switch input  
(See [Table 2-7](#) on page 32 and [Figure 2-13](#) on page 32.)
- An analog input  
(See [Table 2-8](#) on page 33 and [Figure 2-14](#) on page 33.)
- A low side current sink  
(See [Table 2-9](#) on page 34 and [Figure 2-16](#) on page 34.)
- A digital output/open drain  
(See [Table 2-10](#) on page 35 and [Figure 2-17](#) on page 35.)

For more information, refer to the ALEOS Software Configuration User Guide.

---

*Note:* You can configure the GPIO Pin 4 in ACEmanager or ALMS to trigger standby mode, to sink current, or to pull up the voltage. If you are using the I/O line to trigger standby mode, you cannot configure it to sink current or pull up the voltage. Likewise, if you are using the I/O line to either sink current or pull up the voltage, you cannot use it to trigger standby mode.

---

*Note: During bootup, the I/O settings remain in their default state: the internal pull-up resistor is disabled, and output current sink switch is open. After bootup, any custom I/O settings are applied. This may take approximately 30 seconds after the router is restarted or powered on.*

You can use Pin 4 in conjunction with events reporting to configure the RV55 router to send a report when the state of the monitored router changes, for example when a switch is opened or closed. For more information, refer to the ALEOS Software Configuration User Guide (Events Reporting chapter).

### Pulse Counter

You can use the green wire to connect Pin 4 to a pulse counter. The digital pulse counter is not available in Standby mode.

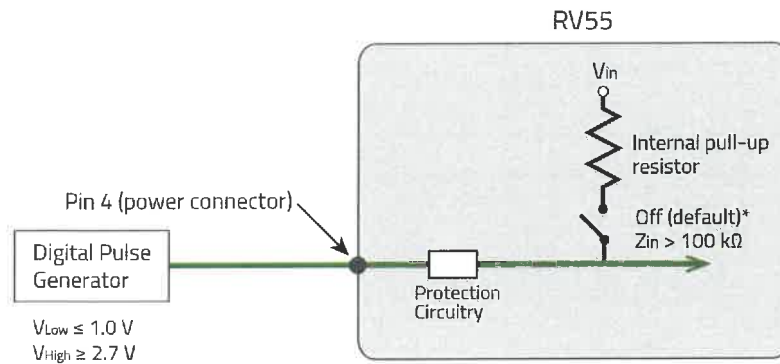


Figure 2-11: Digital Input / Pulse Counter

*Note: Values may vary, depending on signal noise.*

**Table 2-5: Pulse Counter**

Pull-up	State	Minimum	Typical	Maximum	Units
Off	Low	—	—	1.0	V
	High	2.7	—	$V_{in}$	V

## Digital Input

You can use the green wire to connect Pin 4 to a digital input to detect the state of a switch such as a vehicle ignition, or to monitor an external device such as a motion detector, a remote solar panel, or a remote camera. Digital input can also be used with the standby timer.

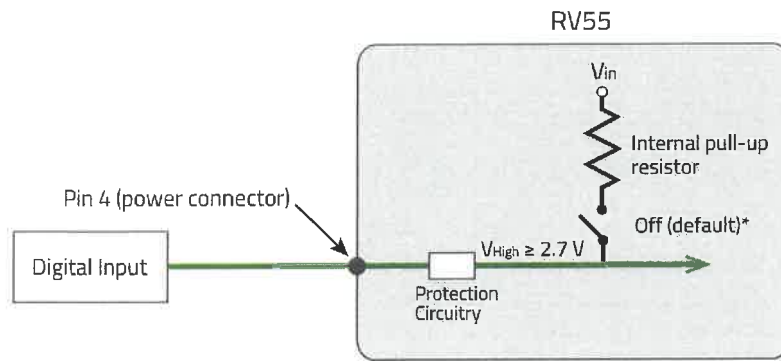


Figure 2-12: Digital Input

Table 2-6: Digital Input

Pull-up	State	Minimum	Typical	Maximum	Units
Off	Low	—	—	1.0	V
	High	2.7	—	V <sub>in</sub>	V

## High Side Pull-up / Dry Contact Switch Input

You can use the green wire to connect Pin 4 to a dry contact switch. The dry contact switch is not available in Standby mode.

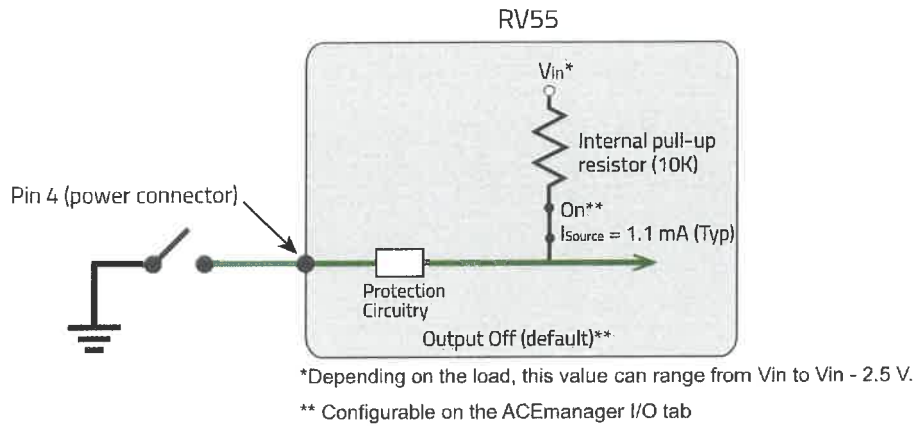


Figure 2-13: High Side Pull-up / Dry Contact Switch Input

Table 2-7: High Side Pull-up / Dry Contact Switch Input

	Minimum	Typical	Maximum	Units	Comments
<b>Source Current</b>	0.6 $V_{in} = 7$ V	1.1 $V_{in} = 12$ V	3.5 $V_{in} = 36$ V	mA	Maximum current the voltage output can provide (depends on $V_{in}$ )
<b><math>V_{out}</math></b>	$V_{in} - 2.5$	—	$V_{in}$	V	The voltage on Pin 4 when the high side pull-up is enabled (depends on $V_{in}$ and power consumption)

## Analog Input

You can use the green wire to connect Pin 4 to an analog sensor. As an analog input (voltage sensing pin), the router monitors voltage changes in small increments. This allows you to monitor equipment that reports status as an analog voltage.

Pin 4 detects inputs of 0.5–36 V referenced to ground. When used with a sensor to transform values into voltages, the pin can monitor measurements such as temperatures, sensors, or input voltage.

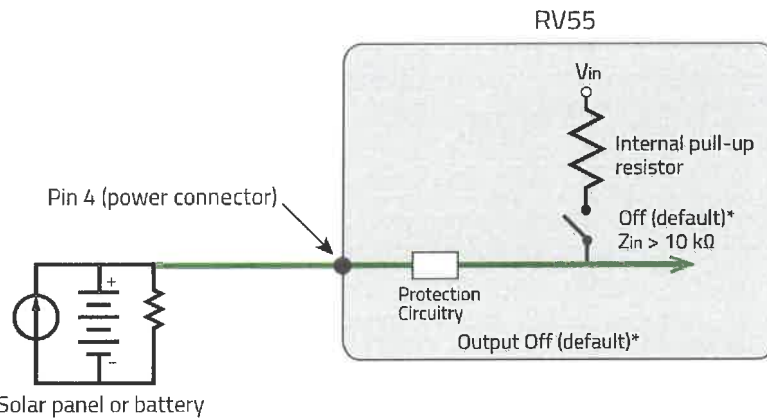


Figure 2-14: Analog Input

Table 2-8: Analog Input

Pull-up		Minimum	Typical	Maximum	Units	Comments
Off	<b>Analog Input Range</b>	0.5	—	36	V	—
	<b>Analog Input Accuracy</b>	-1.5%	0.50%	1.5%	—	—

Data sampling is handled by a dedicated microprocessor. In order to filter noisy signals, twenty measurements are taken over a 250 ms interval and they are averaged to generate a sample. If the change since the last sample is significant, a notification is sent to the CPU for updating the current value displayed in the user interface and for use by Events Reporting.

Changes are considered significant if the change is 150 mV or more. If there has not been a significant change to the parameter being monitored, the CPU reads a sample every 2.5 minutes, which detects small changes.

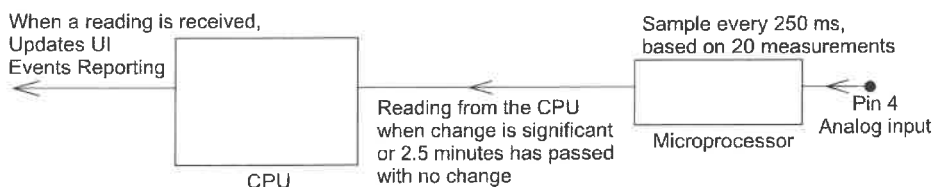


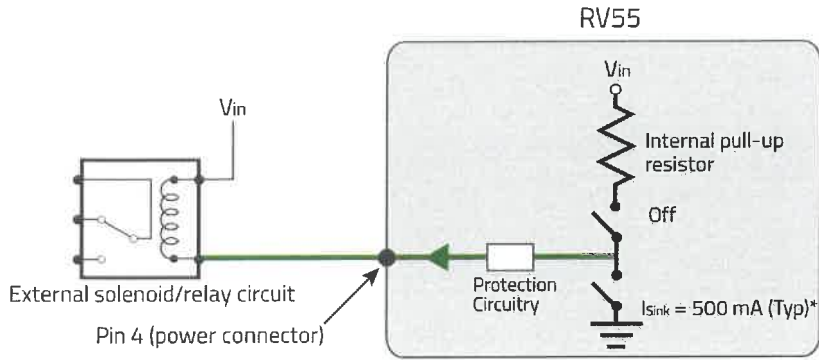
Figure 2-15: Analog Input Sampling and Reading

*Note: The same method is used to sample the input voltage and the internal board temperature for Events Reporting. The significant changes are 300 mV for the input voltage and 1 °C for the board temperature.*



## Low Side Current Sink Output

You can use Pin 4 as a low side current sink, for example, to drive a relay.



\* See Table 2-9 on page 34 for more details.

Figure 2-16: Low Side Current Sink

Table 2-9: Low Side Current Sink

Pull-up	State	Minimum	Typical	Maximum	Units	Comments
Off	On	250	500	1000	mA	$I_{\text{Typical}} = 25^{\circ}\text{C}$ $I_{\text{Min}} = 70^{\circ}\text{C}$ $I_{\text{Max}} = -40^{\circ}\text{C}$
Off	Off	—	0	—	mA	$V_{in} = 12$

*Note: The router protection circuitry has a high-impedance ( $\sim 125 \text{ k}\Omega$ ) path to ground. If Pin 4 is connected to 12 V, there will be a small current flow ( $\sim 100 \mu\text{A}$ ) into Pin 4 during bootup. This flow is countered when the internal pull-up resistor ( $10 \text{ k}\Omega$ ) becomes active after bootup. Depending on your application, you may need to install an external pull-up resistor ( $10 \text{ k}\Omega$ ) in order to nullify the small input current flow for the first 30 seconds during bootup.*

## Digital Output/Open Drain

You can use Pin 4 as an open drain to drive an external digital input

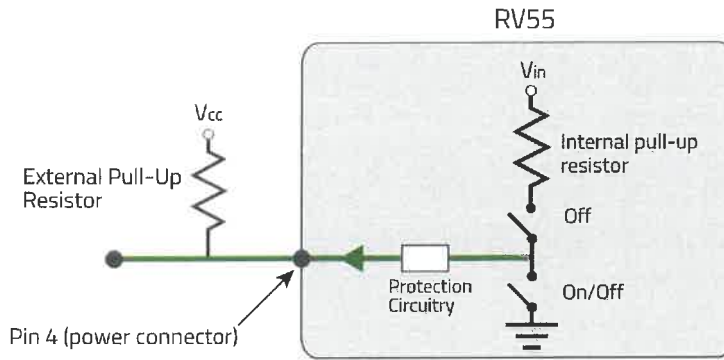


Figure 2-17: Digital Output/Open Drain

Table 2-10: Digital Output / Open Drain

Pull-up	State	Minimum	Typical	Maximum	Units	Comments
Off	Off	Open Circuit	—	—	—	—
	Active Low	—	—	0.5	V	5 mA, ≤ 5 V

## Step 6—Check the Router Operation

- When power is supplied to the AirLink RV55 router, it powers up automatically, as indicated by the flashing LEDs. If it does not turn on, ensure that the:
  - Power connector is plugged in and supplying voltage between 7–36 V.

*Note: Although the RV55 router operates in the range 7–36 V, low voltage standby mode is enabled by default, so in order to avoid the router powering into standby mode, ensure that it is supplied with more than 9 V at startup. (If desired, you can change the low voltage standby settings once the router is operational.) If the Power LED is red, the router is in standby mode.*

- Ignition Sense (pin 3) is connected to the battery or power source (see [Step 5—Connect the Power](#) on page 24 for details)

## LED Behavior

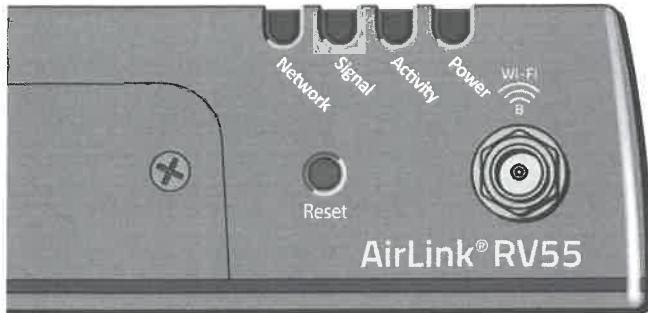






Figure 2-18: LED location

Table 2-11: LED Behavior

LED	Color/Pattern	Description	LED Power Saving Mode <sup>a</sup>
<b>Power</b> 	<b>Off</b>	No power or input voltage $\geq 36$ VDC or $\leq 7$ VDC	
	<b>Solid Green</b>	Power is present.	
	<b>Green with Amber Flash</b>	Power is present and the router has a GPS fix.	
	<b>Solid Red</b>	Standby mode	
	<b>Flashing Green</b>	When you press the reset button, flashing green indicates when to release the reset button to reboot the router.	
	<b>Flashing Red</b>	When you press the reset button, flashing red indicates when to release the reset button to reset the router to the factory default settings.	
	<b>Flashing Amber</b>	When you press the reset button for more than 20 seconds, flashing amber indicates when to release the reset button to enter Recovery mode. (See <a href="#">Recovery Mode</a> on page 40.)	
<b>Signal</b> 	<b>Solid Green</b>	Good signal (equivalent to 4–5 bars)	Off
	<b>Solid Amber</b>	Fair signal (equivalent to 2–3 bars)	Off
	<b>Flashing Amber</b>	Poor signal (equivalent to 1 bar) If possible, Sierra Wireless recommends moving the router to a location with a better signal.	
	<b>Flashing Red</b>	Inadequate (equivalent to 0 bars) Sierra Wireless recommends moving the router to a location with a better signal.	

*Note: The quality of the signal strength is measured using the appropriate parameters for the radio technology in use.*

**Table 2-11: LED Behavior**

LED	Color/Pattern	Description	LED Power Saving Mode <sup>a</sup>
<b>Network</b>  	<b>Solid Green</b>	Connected to an LTE network	Off
	<b>Solid Amber</b>	Connected to a 3G or 2G network	Off
	<b>Flashing Green</b>	Connecting to the network	
	<b>Flashing Green (3 sec. on/1 sec. off)</b>	Network Ready—WAN over Wi-Fi (router is in Wi-Fi client mode)	
	<b>Flashing Red</b>	No network available	
	<b>Flashing Red/Amber</b>	Network Operator Switching is enabled, but the router is unable to locate the required firmware. For more information, refer to the ALEOS Software Configuration User Guide (Admin chapter).	
<b>Activity</b>  	<b>Flashing Green</b>	Traffic is being transmitted or received over the WAN interface.	
	<b>Flashing Red</b>	Traffic is being transmitted or received over the serial port. This behavior only appears if the RV55 router is configured to display it. For more information, refer to the ALEOS Software Configuration Guide (Serial chapter).	
	<b>Flashing Amber</b>	Traffic is being transmitted or received over both the WAN interface and the serial port. This behavior only appears if the RV55 router is configured to display it. Refer to the ALEOS Software Configuration Guide (Serial chapter).	
<b>ALL</b>	<b>Green LED chase</b>	Radio module reconfiguration/firmware update or Network Operator Switching is in progress.	
	<b>Amber LED chase</b>	ALEOS software update is in progress.	
	<b>Red LED chase</b>	Recovery mode	

a. To configure LED Power Saving Mode, refer to the ALEOS Software Configuration User Guide (Services chapter).

## Ethernet LEDs

The Ethernet connector has two LEDs that indicate speed and activity. When looking into the connector:

- **Activity**—The right LED is solid amber when a link is present and flashing amber when there is activity.
- **Connection Speed**—The left LED indicates the Ethernet connection speed:
  - Solid Green—1000 Mbps
  - Solid Amber—100 Mbps
  - Off—10 Mbps

## Step 7—Startup and Software Configuration

You can configure the ALEOS software on the RV55 router using:

- [ACEmanager](#) (browser-based application)
- [AirLink Management Service](#) (cloud-based application)
- [AirLink Mobility Manager](#) (AMM)
- [AT Commands](#)

### Configuring with ACEmanager

To access ACEmanager:

1. Connect a laptop to the router with an Ethernet cable.
2. Launch your web browser and go to **http://192.168.13.31:9191**.

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*Note: It takes the router 2–3 minutes to respond after power up.*

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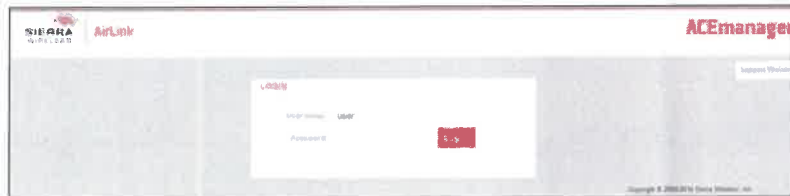


Figure 2-19: ACEmanager login window

3. Enter the default password (printed on the device label) and click Log In.

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*Note: For system security, ensure that you change the default password as soon as possible.*

---

4. Refer to the ALEOS Software Configuration User Guide for information on how to use ACEmanager to configure your RV55 router.

### Configuring with AirLink Management Service

AirLink Management Service (ALMS) allows remote management of all your routers from one user interface.

Some of its features include:

- Centralized, remote monitoring for all your AirLink routers and gateways
- Continuous status monitoring of important health data such as signal strength
- Location monitoring, including world map views
- Complete ALEOS reporting and configuration, including historical views of ALEOS information
- Configure individual routers and gateways or use templates to perform batch configurations of your AirLink devices
- Single click over-the-air firmware updates to all your routers and gateways
- Compatible with all carriers or mobile network operators

To get started, contact your Sierra Wireless Partner or visit [www.sierrawireless.com/ALMS](http://www.sierrawireless.com/ALMS)

## Configuring with AMM

AirLink Mobility Manager (AMM) is a Network Management solution that provides a consolidated view of the entire vehicle fleet and enables simplified management, control and monitoring of connected AirLink routers. AMM is a licensed, unified software platform deployed in the enterprise data center. It enables:

- Mobile network and asset management
- Over-the-air registration, configuration and software updates
- Consolidated network view of an entire fleet, in-field applications and mobile assets, using a virtual dashboard to monitor, report, manage, and troubleshoot all mobile resources as required.

If you require a network management solution deployed in your data center, contact your Sierra Wireless sales representative for a demonstration of AMM capabilities.

## Configuring with AT Commands

For a complete list of AT commands, refer to the ALEOS Software Configuration User Guide.

## Reboot the RV55 Router

To reboot the RV55 router, use one of the following methods:

- On the router, press the Reset button for 1–5 seconds. (Release the button when the Power LED flashes green.)
- In ACEmanager, click the Reboot button on the toolbar.

## Reset the RV55 Router to Factory Default Settings

To reset the router to the factory default settings:

- On the router, press the Reset button for more than 5 seconds. (Release the button when the Power LED flashes red.)  
Once the LEDs resume their normal operating behavior, the reset is complete.
- In ACEmanager, go to Admin > Advanced and click the Reset to Factory Default button.

---

**Tip:** In ACEmanager, you can configure the RV55 router to preserve mobile network authentication settings such as the network ID, network password, custom APNs, Primary SIM, and Mobile Network Operator firmware when the router is reset to the factory default settings. For more details, refer to the ALEOS Software Configuration User Guide (Admin chapter).

---

## Recovery Mode

If the router fails to boot properly, it automatically enters recovery mode, or, if the router is unresponsive to ACEmanager input and AT commands, you can manually put the router into recovery mode.

Recovery mode enables you to update the ALEOS software and return the router to working order. (For details, refer to the ALEOS Software Configuration User Guide—Configuring your router chapter.)

To enter Recovery mode manually:

- On the router, press the Reset button for more than 20 seconds. (Release the button when the Power LED flashes amber.)

To recover the router:

- Update ALEOS using the Recovery mode interface. Once the new ALEOS version is successfully uploaded and installed, the router reboots and exits recovery mode. When the process is complete, the ACEmanager login screen appears.

---

*Note: After the recovery, you need to reload the radio module firmware store and templates.*

---

To exit Recovery mode, if it has been inadvertently entered, do one of the following:

- Press the reset button on the router to reboot it.
- Click the Reboot button on the Recovery screen.
- Wait 10 minutes. If no action is taken within 10 minutes of the device entering Recovery mode (for example, if the Recovery screen has not been loaded by the web browser), it automatically reboots and exits Recovery mode.

For more information, refer to the ALEOS Software Configuration User Guide (Configuring your router chapter).

## >> 3: Specifications at a Glance

This chapter provides the specifications for the RV55 router.

### Certification and Interoperability

<b>Emissions/Immunity</b>	<ul style="list-style-type: none"> <li>FCC</li> <li>Industry Canada</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>CB Scheme</li> <li>UL 60950</li> </ul>
<b>Industry Certification for Vehicles</b>	<ul style="list-style-type: none"> <li>E-Mark (UN ECE Regulation 10.04), ISO7637-2</li> <li>SAE J1455 (Shock &amp; Vibration)</li> </ul>
<b>Environmental Compliance</b>	<ul style="list-style-type: none"> <li>RoHS 2011/65/EU (RoHS 2)</li> <li>WEEE</li> <li>REACH</li> <li>Halogen-free PCB</li> </ul>
<b>GSM/UMTS Certifications</b>	<ul style="list-style-type: none"> <li>PTCRB</li> <li>GCF-CC</li> <li>RED</li> </ul>

### Environmental Testing

Test Method	Category	Description
MIL-STD-810G, Test method 514.6 IEC 60068-2-64	Vibration	Frequency range: 10 Hz–150 Hz Spectrum level: 2.24G on all axes for 8 hours/axis Operating mode: powered on
MIL-STD-810G, Test method 516.6	Mechanical Shock	Half-sine 40G, 15–23 ms, (+/-X, +/-Y, +/-Z directions, 10 times per axis) Operating mode: powered on
MIL-STD-810G, Test methods 501.5, 502.5	Temperature	Rugged category: -30 °C to 70 °C 2-hour soak each temp high/low 3 cycles ramp <= 3 °C/minute Operating mode: powered on
MIL-STD-810G, Test methods 501.5, 502.5	Temperature	Rugged category: -40 °C to 85 °C 2-hour soak each temp high/low 50 cycles ramp <= 3 °C/minute Operating mode: unpowered



Test Method	Category	Description
MIL-STD-810G, Test method 507.5	Humidity	10 × 48-hour cycles: <ul style="list-style-type: none"> <li>4-hour ramp to 60 °C (95% humidity), hold 8 hours</li> <li>4-hour ramp down to 30 °C (85% to 95% relative humidity), hold 21 hours</li> <li>1-hour ramp down to 20 °C, hold 4 hours</li> <li>1-hour ramp up to 30 °C, hold 5 hours</li> </ul> Operating mode: powered on
IEC 60529	Water Resistance	Subject to spraying water. Water sprayed at an angle up to 60° on either side of the vertical for 10 minutes. Operating mode: unpowered
IEC 61000-4-2	Electrostatic Discharge	+/-8 kV (Contact), +/-15 kV (Air) +/-15 kV (Air at antenna connector) Operating mode: powered on
IEC 60068-2-32	Free Fall Test	1 m drop height 6 drops onto concrete, 2 per axis: X, Y, Z Operating mode: unpowered
IEC 60068-2-70 Part 2, Test Xb	Marking	The markings are rubbed with water for 10 cycles, then with lubricating oil for 10 cycles. Operating mode: unpowered
ISTA 2A 2001, test categories 1, 4, 5, & 6	Package	In shipping packaging. Cargo vibration and drop test.
IP rating	IP64	

## Reliability Specifications

The RV55 router has an MTBF (Ground Benign, 25°C) as follows:

- RV55 North America: 878875 hours (100.2 years)
- RV55 International: 933291 hours (106.4 years)
- RV55 North America and EMEA: 1413853 hours (161.4 years)
- RV55 Asia Pacific: 1605817 hours (183.3 years)

MTBF calculations are performed per:

- Telcordia “Reliability Prediction Procedure for Electronic Equipment” document number SR-332, Method I, Issue 3

## Mobile Network Operator Certification

- Verizon Wireless
  - AT&T/FirstNet
  - Rogers<sup>a</sup>
  - Bell Mobility<sup>a</sup>
  - Telus<sup>a</sup>
  - Telstra<sup>a</sup>
- a. Certification planned

## Host Interfaces

<p><b>Antenna connectors</b></p>	<ul style="list-style-type: none"> <li>• LTE-M/NB-IoT model:             <ul style="list-style-type: none"> <li>• Cellular (LTE)</li> </ul> </li> <li>• Base Cat 4/6/12 model:             <ul style="list-style-type: none"> <li>• Cellular (LTE) SMA</li> <li>• LTE Diversity</li> <li>• Active GPS</li> </ul> </li> <li>• Wi-Fi Cat 4/6/12 model:             <ul style="list-style-type: none"> <li>• Cellular (LTE) SMA</li> <li>• LTE Diversity</li> <li>• Active GPS</li> <li>• Wi-Fi × 2</li> </ul> </li> </ul>
<p><b>USB</b></p>	<hr/> <p><i>Note: Do not use the USB port in a potentially explosive environment.</i></p> <hr/> <ul style="list-style-type: none"> <li>• USB 2.0 Micro-AB connector complies with USB Version 2.0 for high speed operation</li> <li>• Can be configured to operate in one of two modes:             <ul style="list-style-type: none"> <li>• Virtual Ethernet Port: The RV55 behaves as if the PC were connected to an Ethernet port, allowing access to the Internet and the RV55's internal web server. This is the default setting.</li> <li>• Virtual Serial Port: The RV55 behaves as if it was connected to a standard serial port. The primary use of this interface is for the AT command line interface of ALEOS and for diagnostic access to the radio module.</li> </ul> <p>By default, the USB port is configured as a virtual Ethernet port.</p> </li> <li>• A Windows driver must be installed on the PC in order to support USB use. The drivers are available for download on Sierra Wireless' support web site:  <a href="http://source.sierrawireless.com/resources/airlink/software_downloads/airlink_usb_driver/">source.sierrawireless.com/resources/airlink/software_downloads/airlink_usb_driver/</a> </li> <li>• The ALEOS Software Configuration User Guide contains the details of USB mode configuration and driver installation.</li> <li>• Sierra Wireless recommends you:             <ul style="list-style-type: none"> <li>• Use a USB 2.0 cable</li> <li>• Connect directly to your computer for best throughput.</li> </ul> </li> </ul>

<b>Ethernet</b>	<ul style="list-style-type: none"> <li>• 10/100/1000 Base-T RJ-45 Ethernet</li> <li>• IEEE 802.3 Ethernet specification for 1000 Mbps speed (Gigabit Ethernet) with fallback to 100 or 10 Mbps (Cat 5e or Cat 6 cable is required for Gigabit Ethernet)</li> <li>• Auto-crossover support</li> <li>• Auto-negotiation detects the speed of the connecting device</li> </ul>
<b>Serial Port</b>	<ul style="list-style-type: none"> <li>• 9-pin RS232 serial port connects directly to most computers or other devices with a standard serial straight-through cable</li> </ul> <hr/> <p><i>Note: If you have a DCE device, you need to use a null modem (cross-over) cable.</i></p> <hr/> <ul style="list-style-type: none"> <li>• Operational as single 8-wire serial port or 2 × 4-wire serial port (requires a DB9 Y cable)             <ul style="list-style-type: none"> <li>• For pin-out information, see <a href="#">Serial Port</a> on page 22</li> </ul> </li> <li>• Used for connecting serial devices and configuration</li> <li>• Complies with the EIA RS232D specification for DCE equipment</li> <li>• Output driver levels swing from -7 VDC to +7 VDC with normal loading</li> </ul>

## SIM Card Interface

- The RV55 has two 6-pin SIM sockets for a mini-SIM (2FF) SIM cards, operated at 1.8 V/3.3 V.
- This interface is compliant with the applicable 3GPP standards for USIM.

## Operating Voltage

By default, the router is configured to enter Standby mode at 9 V. If you want to operate the router at less than 9 volts, power it on using at least 9 V, launch ACEmanager, go to Services > Power Management and adjust the Standby mode settings.

The maximum ripple voltage to guarantee analog input accuracy must be 100 mVpp.

## Power Specifications

Table C-1: Power Supply Specifications

Pin	Name	Specification	Parameter	Minimum	Maximum
1	VCC	Voltage range	VCC	7 V	36 V

Table C-2: Ignition Sense Specifications

Pin	Name	Input Impedance (Typ)	Specification	Parameter	Minimum	Maximum
3	IS (Input only)	80 kΩ (minimum)	Input low state voltage (maximum)	$V_{IL}$	—	1.0 V
			Input high state voltage (minimum guaranteed)	$V_{IH}$	3.3 V	$V_{in}$

*Note: If you do not connect this pin to the ignition, you **MUST** connect it to the positive terminal of your power supply or battery. The device looks for a qualified voltage on this pin as part of the power up sequence. If it doesn't see it, the device will not turn on. If you are using a Sierra Wireless AC power adapter, the connection is inside the cable.*

## GNSS Technology

<b>Satellite channels</b>	Maximum 48 tracking channels and 2 fast acquisition channels
<b>Constellations</b>	<ul style="list-style-type: none"> <li>• GPS</li> <li>• Galileo</li> <li>• GLONASS</li> <li>• BeiDou</li> <li>• QZSS</li> </ul>
<b>Protocol</b>	NMEA 0183 V3.0
<b>Acquisition time (Time to first fix)</b>	<ul style="list-style-type: none"> <li>• Hot start: 1 second</li> <li>• Cold start: 30 seconds</li> </ul>
<b>Sensitivity</b>	Indoor sensitivity (tracking mode): -162 dBm

## Protocols

- Network: TCP/IP, UDP/IP, DNS
- Routing: NAT, Host Port Routing, DHCP, PPPoE, VLAN, VRRP, Reliable Static Route
- Applications: SMS, Telnet/SSH, Reverse Telnet, SMTP, SNMP, SNTP
- Serial: TCP/UDP PAD mode, Modbus (ASCII, RTU, Variable), PPP
- GNSS: NMEA 0183 V 3.0, TAIP, RAP, Xora

## Wi-Fi Performance

Technology	Frequency	MIMO	20 MHz <sup>a</sup>	40 MHz <sup>a</sup>	80 MHz <sup>a</sup>
802.11n	2.4 GHz	1 × 1	72 Mbps		
	5 GHz	1 × 1	100 Mbps	150 Mbps	
802.11ac	5 GHz	1 × 1	87 Mbps	200 Mbps	433 Mbps

a. Theoretical maximum performance. Actual data rates vary.

## Wi-Fi Channels Supported

2.4 GHz	5 GHz
1 - 2.412 GHz	Ch. 36 (5.180 GHz) 20 MHz, 20/40 MHz, 80 MHz
2 - 2.417 GHz	Ch. 40 (5.200 GHz) 20 MHz, 20/40 MHz, 80 MHz
3 - 2.422 GHz	Ch. 44 (5.220 GHz) 20 MHz, 20/40 MHz, 80 MHz
4 - 2.427 GHz	Ch. 48 (5.240 GHz) 20 MHz, 20/40 MHz, 80 MHz
5 - 2.432 GHz	Ch. 149 (5.745 GHz) 20 MHz, 20/40 MHz, 80 MHz
6 - 2.437 GHz	Ch. 153 (5.765 GHz) 20 MHz, 20/40 MHz, 80 MHz
7 - 2.442 GHz	Ch. 157 (5.786 GHz) 20 MHz, 20/40 MHz, 80 MHz
8 - 2.447 GHz	Ch. 161 (5.805 GHz) 20 MHz, 20/40 MHz, 80 MHz
9 - 2.452 GHz	Ch. 165 (5.825 GHz) 20 MHz
10 - 2.457 GHz	
11 - 2.462 GHz	

## Radio Frequency Bands

Use the following table as a guide to the radio frequencies supported by the RV55 radio modules.

To determine which radio module your router has, refer to the label on the bottom of the router, or in ACEmanager, go to Status > About, and check the Radio Module Type field.

	RV55 Wi-Fi		RV55
<b>Radio Module</b>	EM7511	EM7565	WP7702
<b>Radio Frequency Bands</b>	<a href="#">Table 3-3</a>	<a href="#">Table 3-5</a>	<a href="#">Table 3-7</a>
<b>Radio Module Transmit Power</b>	<a href="#">Table 3-4</a>	<a href="#">Table 3-6</a>	<a href="#">Table 3-8</a>
<b>GNSS Technology/ GNSS Bands Supported</b>	<a href="#">Table 3-9</a>		

Table 3-3: RV55 LTE-A Pro Radio Module EM7511 North America

Radio Technology	SKU			Band	Frequency (Tx)	Frequency (Rx)
	Generic	Verizon Wireless	AT&T			
LTE	✓		✓	Band 1	1920–1980 MHz	2110–2170 MHz
	✓	✓	✓	Band 2	1850–1910 MHz	1930–1990 MHz
	✓		✓	Band 3	1710–1785 MHz	1805–1880 MHz
	✓	✓	✓	Band 4	1710–1755 MHz	2110–2155 MHz
	✓	✓	✓	Band 5	824–849 MHz	869–894 MHz
	✓		✓	Band 7	2500–2570 MHz	2620–2690 MHz
	✓		✓	Band 8	880–915 MHz	925–960 MHz
	✓		✓	Band 9	1749.9–1784.9 MHz	1844.9–1879.9 MHz
	✓		✓	Band 12	699–716 MHz	729–746 MHz
	✓	✓	✓	Band 13	777–787 MHz	746–756 MHz
	✓		✓	Band 14	788–798 MHz	758–768 MHz
	✓		✓	Band 18	815–830 MHz	860–875 MHz
	✓		✓	Band 19	830–845 MHz	875–890 MHz
	✓		✓	Band 20	832–862 MHz	791–821 MHz
	✓		✓	Band 26	814–849 MHz	859–894 MHz
	✓		✓	Band 29	n/a	717–728 MHz
				Band 30	n/a	2350–2360 MHz
	✓		✓	Band 32	n/a	1452–1496 MHz
	✓		✓	Band 41	2496–2690 MHz (TDD)	
	✓		✓	Band 42	3400–3600 MHz (TDD)	
✓		✓	Band 43	3600–3800 MHz (TDD)		
✓		✓	Band 46		5150–5925 MHz (TDD)	
✓		✓	Band 48	3550–3700 MHz (TDD)		
✓	✓	✓	Band 66	1710–1780 MHz	2110–2200 MHz	



**Table 3-3: RV55 LTE-A Pro Radio Module EM7511 North America (Continued)**

Radio Technology	SKU			Band	Frequency (Tx)	Frequency (Rx)
	Generic	Verizon Wireless	AT&T			
HSPA	✓	✓	✓	Band 1	1920–1980 MHz	2110–2170 MHz
	✓	✓	✓	Band 2	1850–1910 MHz	1930–1990 MHz
	✓	✓	✓	Band 4	1710–1755 MHz	2110–2155 MHz
	✓	✓	✓	Band 5	824–849 MHz	869–894 MHz
	✓	✓	✓	Band 6	830–840 MHz	875–885 MHz
	✓	✓	✓	Band 8	880–915 MHz	925–960 MHz
	✓	✓	✓	Band 9	1749.9–1784.9 MHz	1844.9–1879.9 MHz
	✓	✓	✓	Band 19	830–845 MHz	875–890 MHz

**Table 3-4: Radio Module EM7511 Conducted Transmit Power**

Band	Conducted Tx Power (dBm)	Notes
<b>LTE</b>		
Band 1      Band 13 Band 2      Band 14 Band 3      Band 18 Band 4      Band 19 Band 5      Band 20 Band 8      Band 26 Band 9      Band 30 Band 12     Band 66	+23±1	
Band 7      Band 42 Band 41     Band 43 Band 48	+22±1	
<b>UMTS</b>		
Band 1 (IMT 2100 12.2 kbps) Band 2 (UMTS 1900 12.2 kbps) Band 4 (AWS 1700/2100 12.2 kbps) Band 5 (UMTS 850 12.2 kbps) Band 6 (UMTS 800 12.2 kbps) Band 8 (UMTS 900 12.2 kbps) Band 9 (UMTS 1700 12.2 kbps) Band 19 (UMTS 800 12.2 kbps)	+23±1	Connectorized (Class 3)

**Table 3-5: RV55 LTE-A Pro Radio Module EM7565 Global**

Radio Technology	SKU		Band	Frequency (Tx)	Frequency (Rx)
	Generic	Telstra			
LTE	✓	n/a	Band 1	1920–1980 MHz	2110–2170 MHz
	✓		Band 2	1850–1910 MHz	1930–1990 MHz
	✓		Band 3	1710–1785 MHz	1805–1880 MHz
	✓		Band 4	1710–1755 MHz	2110–2155 MHz
	✓		Band 5	824–849 MHz	869–894 MHz
	✓		Band 7	2500–2570 MHz	2620–2690 MHz
	✓		Band 8	880–915 MHz	925–960 MHz
	✓		Band 9	1749.9–1784.9 MHz	1844.9–1879.9 MHz
	✓		Band 12	699–716 MHz	729–746 MHz
	✓		Band 13	777–787 MHz	746–756 MHz
	✓		Band 18	815–830 MHz	860–875 MHz
	✓		Band 19	830–845 MHz	875–890 MHz
	✓		Band 20	832–862 MHz	791–821 MHz
	✓		Band 26	814–849 MHz	859–894 MHz
	✓		Band 28	703–748 MHz	758–803 MHz
	✓		Band 29	n/a	717–728 MHz
	✓		Band 30	n/a	2350–2360 MHz
	✓		Band 32	n/a	1452–1496 MHz
	✓		Band 41	2496–2690 MHz (TDD)	
	✓		Band 42	3400–3600 MHz (TDD)	
✓		Band 43	3600–3800 MHz (TDD)		
✓		Band 46	n/a	5150–5925 MHz (TDD)	
✓		Band 48	3550–3700 MHz (TDD)		
✓		Band 66	1710–1780 MHz	2110–2200 MHz	

**Table 3-5: RV55 LTE-A Pro Radio Module EM7565 Global (Continued)**

Radio Technology	SKU		Band	Frequency (Tx)	Frequency (Rx)
	Generic	Telstra			
HSPA	✓	n/a	Band 1	1920–1980 MHz	2110–2170 MHz
	✓		Band 2	1850–1910 MHz	1930–1990 MHz
	✓		Band 4	1710–1755 MHz	2110–2155 MHz
	✓		Band 5	824–849 MHz	869–894 MHz
	✓		Band 6	830–840 MHz	875–885 MHz
	✓		Band 8	880–915 MHz	925–960 MHz
	✓		Band 9	1749.9–1784.9 MHz	1844.9–1879.9 MHz
	✓		Band 19	830–845 MHz	875–890 MHz

**Table 3-6: Radio Module EM7565 Conducted Transmit Power**

Band	Conducted Tx Power (dBm)	Notes
<b>LTE</b>		
Band 1      Band 13 Band 2      Band 18 Band 3      Band 19 Band 4      Band 20 Band 5      Band 26 Band 8      Band 28 Band 9      Band 30 Band 12     Band 66	+23±1	
Band 7      Band 42 Band 41     Band 43 Band 48	+22±1	
<b>UMTS</b>		
Band 1 (IMT 2100 12.2 kbps) Band 2 (UMTS 1900 12.2 kbps) Band 4 (AWS 1700/2100 12.2 kbps) Band 5 (UMTS 850 12.2 kbps) Band 6 (UMTS 800 12.2 kbps) Band 8 (UMTS 900 12.2 kbps) Band 9 (UMTS 1700 12.2 kbps) Band 19 (UMTS 800 12.2 kbps)	+23±1	Connectorized (Class 3)

**Table 3-7: RV55 Radio Module WP7702**

Radio Technology	SKU			Band	Frequency (Tx)	Frequency (Rx)
	Generic	Verizon	AT&T			
LTE	✓			Band 1	1920–1980 MHz	2110–2170 MHz
	✓		✓	Band 2	1850–1910 MHz	1930–1990 MHz
	✓			Band 3	1710–1785 MHz	1805–1880 MHz
	✓	✓	✓	Band 4	1710–1755 MHz	2110–2155 MHz
	✓		✓	Band 5	824–849 MHz	869–894 MHz
	✓			Band 8	880–915 MHz	925–960 MHz
	✓		✓	Band 12	699–716 MHz	729–746 MHz
	✓	✓		Band 13	777–787 MHz	746–756 MHz
	✓			Band 17	704–716 MHz	734–746 MHz
	✓			Band 18	815–830 MHz	860–875 MHz
	✓			Band 19	830–845 MHz	875–890 MHz
	✓			Band 20	832–862 MHz	791–821 MHz
	✓			Band 26	814–849 MHz	859–894 MHz
	✓			Band 28	703–748 MHz	758–803 MHz
GSM/GPRS/EDGE	✓	✓	✓	Band 850	824–849 MHz	869–894 MHz
	✓	✓	✓	Band 900	880–915 MHz	925–960 MHz
	✓	✓	✓	Band 1800	1710–1785 MHz	1805–1880 MHz
	✓	✓	✓	Band 1900	1850–1910 MHz	1930–1990 MHz

**Table 3-8: Radio Module WP7702 Conducted Transmit Power**

Band	Conducted Tx Power (dBm)	Notes
<b>LTE</b>		
Bands 1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 26, 28	+23±1	
<b>GSM/GPRS/EDGE</b>		
GSM 850	+32±1	GMSK mode (Class 4; 2 W, 33 dBm)
	+27±1	8PSK mode (Class E2; 0.5 W, 27 dBm)
E-GSM 900	+32±1	GMSK mode (Class 4; 2 W, 33 dBm)
	+27±1	8PSK mode (Class E2; 0.5 W, 27 dBm)

**Table 3-8: Radio Module WP7702 Conducted Transmit Power (Continued)**

Band	Conducted Tx Power (dBm)	Notes
DCS 1800	+29±1	GMSK mode (Class 1; 1 W, 30 dBm)
	+26±1	8PSK mode (Class E2; 0.4 W, 26 dBm)
PCS 1900	+29±1	GMSK mode (Class 1; 1 W, 30 dBm)
	+26±1	8PSK mode (Class E2; 0.4 W, 26 dBm)

## GNSS Bands supported

**Table 3-9: GNSS Bands Supported**

Band	Frequency
<b>GPS</b>	1575.42 MHz
<b>GLONASS</b>	1602 MHz
<b>Galileo</b>	1575.42 MHz
<b>BeiDou</b>	1561.098 MHz
<b>QZSS</b>	1176.45–1575.42 MHz

## GNSS Technology

**Table 3-10: GNSS DC Bias Voltage**

Signal	Description	Current/Voltage		
		Minimum	Typical	Maximum
<b>GNSS Signal</b>	Active bias on GNSS port	50 mA	75 mA	100 mA
	Maximum voltage output at 75 mA	—	—	3.3 V

# Mechanical Specifications

- Housing — The RV55 router is made of ruggedized powder-coated aluminum.
- RoHS — The RV55 router complies with the Restriction of Hazardous Substances Directive (RoHS). This directive restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment.

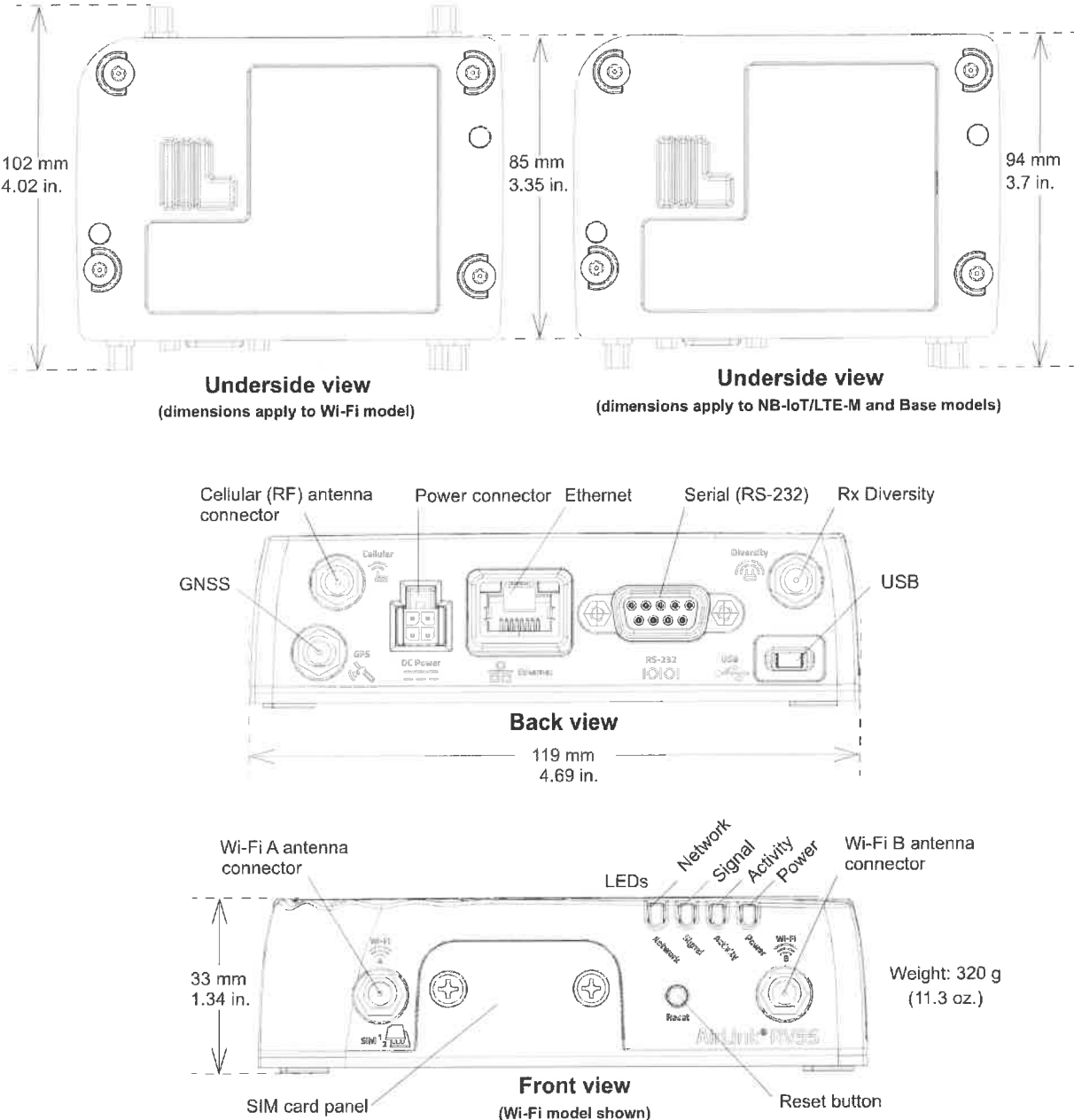


Figure 3-1: RV55 Router Mechanical Specifications



## Screw Torque Settings

- DIN rail mount screws: 1.1 N-m (10 in-lb)
- Antennas: Finger tight (5–7 in-lb) is sufficient. The max torque should not go beyond 1.1 N-m (10 in-lb).

## >> 4: Regulatory Information

### Important Information for North American Users

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*Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.*

---

**Warning:** Changes or modifications to this device not expressly approved by Sierra Wireless could void the user's authority to operate this equipment.

---

### RF Exposure

In accordance with FCC/IC requirements of human exposure to radio frequency fields, the radiating element shall be installed such that a minimum separation distance of 20 cm should be maintained from the antenna and the user's body.

---

**Warning:** This product is only to be installed by qualified personnel.

---

To comply with FCC/IC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain must not exceed the specifications listed below for the device used.

## Maximum Antenna Gain

The antenna gain must not exceed the limits and configurations shown in the following table:

Device	Frequency Band	Gain Limit (Standalone)	Gain Limit (Collocated)
AirLink RV55 (EM7511): N7NEM75S 2417C-EM75S	WCDMA Band 2/LTE B2	6 dBi	4 dBi
	WCDMA Band 4/LTE B4	6 dBi	4 dBi
	WCDMA Band 5/LTE B5	6 dBi	4 dBi
	Band 7	9 dBi	4 dBi
	Band 12	6 dBi	4 dBi
	Band 13	6 dBi	4 dBi
	Band 14	6 dBi	4 dBi
	Band 26	6 dBi	4 dBi
	Band 41	9 dBi	4 dBi
	Band 66	6 dBi	4 dBi
AirLink RV55 (EM7565): N7NEM75L 2417C-EM75L	WCDMA Band 2/LTE B2	6 dBi	4 dBi
	WCDMA Band 4/LTE B4	6 dBi	4 dBi
	WCDMA Band 5/LTE B5	6 dBi	4 dBi
	Band 7	9 dBi	4 dBi
	Band 12	6 dBi	4 dBi
	Band 13	6 dBi	4 dBi
	Band 26	6 dBi	4 dBi
	Band 30	6 dBi	4 dBi
	Band 41	9 dBi	4 dBi
	Band 66	6 dBi	4 dBi

Device	Frequency Band	Gain Limit (Standalone)	Gain Limit (Collocated)
AirLink RV55 (WP7702): N7NWP77B 2417C-WP77B	LTE Band 2	9 dBi	8 dBi
	LTE Band 4	6 dBi	6 dBi
	LTE Band 5	7 dBi	6 dBi
	LTE Band 12	6 dBi	6 dBi
	LTE Band 13	6 dBi	6 dBi
	LTE Band 17	6 dBi	6 dBi
	LTE Band 26	7 dBi	6 dBi
	GSM 850	4 dBi	3 dBi
	PCS 1900	3 dBi	3 dBi

## EU

Sierra Wireless hereby declares the AirLink RV55 devices are in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

The RV55 devices display the CE mark.



**Warning:** Changes or modifications to this device not expressly approved by Sierra Wireless could void the user's authority to operate this equipment.

**Warning:** This product is only to be installed by qualified personnel.

## Declaration of Conformity

The Declaration of Conformity made under Directive 2014/53/EU is available for viewing at:

[source.sierrawireless.com/resources/airlink/certification\\_and\\_type\\_approval/RV55\\_ce\\_declaration\\_of\\_conformity/](http://source.sierrawireless.com/resources/airlink/certification_and_type_approval/RV55_ce_declaration_of_conformity/)

## WEEE Notice



If you purchased your AirLink RV55 device in Europe, please return it to your dealer or supplier at the end of its life. WEEE products may be recognized by their wheeled bin label on the product label.

# >> A: Accessories

## DC Power Cable (Black Connector)

Table A-1: DC Power Cable

DC Power Cable	
Part Number	2000522
Product Release	2016

### Components:

- ① 1 UL2464 20 AWG × 4 core cable
- ② 4 Molex female crimp terminals /AWG 20-24, 250 V, 4 A Max, phosphor bronze tin-plated (part number 43030-0001)
- ③ 1 Molex male 2×2P Ph: 3.0 mm housing, 250 V, 5 A max, PA65 black UL94V-O (part number 43025-0408)

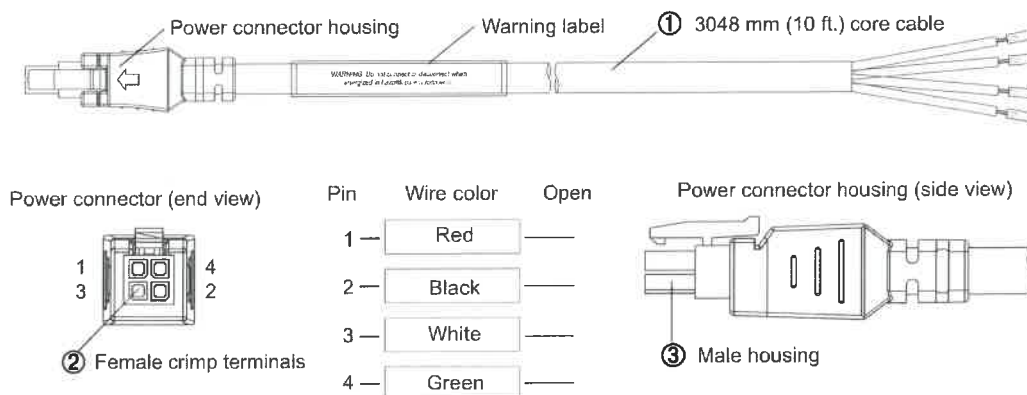


Figure A-1: DC Cable Specifications

## AC Power Adapter (Black Connector)

*Note: Please note that the AC power adapter is not available for sale in New Zealand (as of June 1, 2018).*

AC Power Adapter	
Part Number	2000579
Product Release Date	2016

## AC Power Adapter Input

**Table A-2: Input Specifications**

	Minimum	Typical	Maximum
<b>Input</b>			
Input Voltage	90 VAC	100–240 VAC	264 VAC
Input Frequency	47 Hz	50/60 Hz	63 Hz

*Note: Input voltage range is 90 VAC to 264 VAC.  
Maximum input current is 500 mA at 100–240 VAC.  
Inrush current will not exceed 75 A at 100–240 VAC input and maximum load from a cold start at 25°C.*

## AC Power Adapter Output

**Table A-3: AC Power Adapter Output Specifications**

	Minimum	Typical	Maximum	Test conditions
Output Voltage	11.4 VDC	12.0 VDC	12.6 VDC	0 ~ 1.5 A loading

## AC Power Adapter Environmental Specifications

**Table A-4: AC Power Adapter Environmental Specifications**

<b>Operating</b>	
Operating Temperature	0°C ~ 40°C (operates normally)
Relative Humidity	10% ~ 90%
Altitude	Sea level to 2,000 meters
Vibration	1.0 mm, 10–55 Hz, 15 minutes per cycle for each axis (X, Y, Z)
<b>Non-operating</b>	
Storage Temperature	-30°C ~ 70°C
Relative Humidity	10% ~ 90%
Vibration and Shock	MIL-STD-810D, method 514

## AC Power Adapter Reliability and Quality Control

### AC Power Adapter MTBF

When the power supply is operating within the limits of this specification, the MTBF is at least 200,000 hours at 25°C (MIL-HDBK-217F).

---

*Note: For router MTBF, see [Reliability Specifications](#) on page 54.*

---

## AC Power Adapter Safety Standards

The power supply is certified with the following international regulatory standards:

**Table 1-5: AC Power Adapter Safety Standards**

<b>Regulatory Agency</b>	<b>Country or Region</b>	<b>Certified</b>	<b>Standard</b>
UL	USA	Approved	UL60950-1
GS	Europe	Approved	EN60950-1
CE	Europe	Approved	EN60950-1
SAA	Australia	Approved	AS/NZS 60950
CCC	China	Approved	GB4943
CUL	Canada	Approved	CSA C22.2 NO.60950-1

---

## AC Power Adapter EMC Standards

The power supply meets the radiated and conducted emission requirements for EN55022, FCC Part 15, Class B, GB9254.

## AC Power Adapter Hazardous Substances

- EU Directive 2011/65/EU “RoHS”
- EU Directive 2012/19/EU “WEEE”
- REACH

## AC Power Adapter Energy Efficiency

The AC adapter complies with International Efficiency Levels, as shown in [Table A-6](#).

**Table A-6: AC Adapter Energy Efficiency**

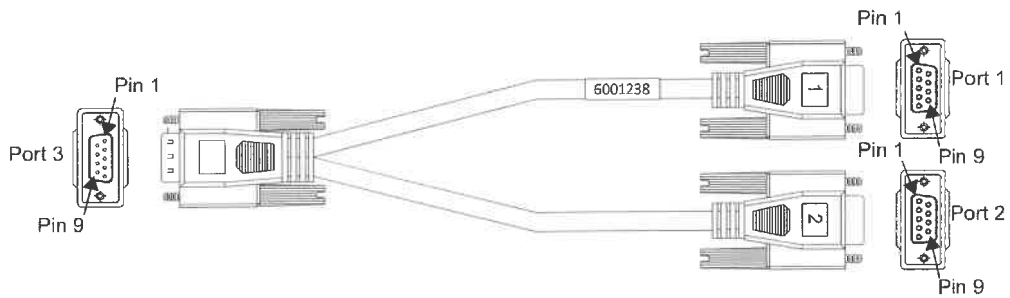
Supplied Input	No-load power consumption	Average active mode efficiency	International Efficiency Level
115 VAC, 60 Hz	Less than 0.1 W	Greater than 85%	<b>VI</b>
230 VAC, 50 Hz	Less than 0.3 W	Greater than 80.4%	<b>V</b>



## Dual Serial Port Adapter Cable

**Table A-7: Dual Serial Port Adapter Cable**

DC Power Cable	
Part Number	6001238
Product Release	2019



**Table A-8: Serial Connector Pin Assignment**

Description	Type	Port 3 Pin	Port 1 Pin	Port 2 Pin
Port 2 Clear To Send	OUT	1	—	8
Port 1 Transmit Data	OUT	2	2	—
Port 1 Receive Data	IN	3	3	—
Port 2 Receive Data	IN	4	—	3
Main GND. Connected internally to BOARD GND	GND	5	5	5
Port 2 Transmit Data	OUT	6	—	2
Port 1 Ready To Send	IN	7	7	—
Port 1 Clear To Send	OUT	8	8	—
Port 2 Ready To Send	IN	9	-	7

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