

E71-314
Sierra™
User's Manual



ASTRONICS
CONNECTIVITY SYSTEMS & CERTIFICATION


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Inflight Entertainment and Connectivity Systems

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CAUTION: Changes or modifications not expressly approved could void your authority to use this equipment.

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

INDUSTRY CANADA COMPLIANCE STATEMENT

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

EUROPEAN UNION COMPLIANCE STATEMENT

Hereby, Astronics CSC, declares that this Sierra™ Portable Inflight Entertainment (IFE) System is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: <https://www.astronics.com/subsidiary?subsidiaryItem=astronics%20connectivity%20systems%20and%20certification>

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1 User Information

This User's Manual describes the features supported by Astronics CSC third generation streaming portable Inflight Entertainment (IFE) system, branded as *Sierra™* and provides detailed instructions for setting up and configuring the Sierra IFE portable system.

This guide is intended for administrators who configure and use Sierra.

1.1 Support Documentation

In addition to this document, the following table describes Astronics CSC support documentation:

Table 1-1: Astronics CSC Support Documentation

Document Number	Description
E71-314-XXX-OL*	Outline Drawing, Sierra Kit Assembly, Removable SSD
E71-319-01-OL	Outline Drawing, Assembly, Sierra Base Unit
E54-576-XX-OL*	Outline Drawing, Assembly, Removable SSD
PS-E71-314	Product Specification, Sierra
44-20-45	Component Maintenance Manual (CMM), Sierra
ATP-E71-314	Acceptance Test Procedure (ATP), Sierra
FMEA-E71-314	Failure Modes and Effects Analysis (FMEA), Sierra

*See Table 3-1 for kit specific –OL drawings.

Sierra ships with Aruba Instant firmware. The following table describes the applicable Aruba support documentation for this firmware version.

Table 1-2: Aruba Support Documentation

Document Name	Description
Aruba Instant User Guide	This User Guide describes the features supported by Aruba Instant and provides detailed instructions for setting up and configuring the Instant network.
Aruba Instant CLI Reference Guide	This document describes the Aruba Instant command syntax and provides information for each Command.

1.2 Industry Standards

Table 1-3: Industry Standards

Industry Standard	Description
ARINC 628	Cabin Equipment Interfaces, Part 1, Interfaces, Cabin Management and Entertainment Systems - Peripherals
IEE 802.11	A set of media access control (MAC) and physical layer (PHY) specifications for implementing wireless local area network (WLAN) computer communication in the 900 MHz and 2.4, 3.6, 5, and 60 GHz frequency bands.
IEE 802.3	A set of media access control (MAC) and physical layer (PHY) specifications for implementing wired local area network (LAN) computer communication.
RTCA/DO-160G	Environmental Conditions and Test Procedures for Airborne Equipment RTCA/DO-178B Software Considerations in Airborne Systems and Equipment
802.11h	Spectrum and Transmit Power Management Extensions (TPC) is supported to ensure that the average power is less than the regulatory maximum to reduce interference to satellites.

1.3 Warranty

The Sierra is warranted against defects in materials and workmanship for the warranty period from the date of shipment. The warranty does not apply to defects resulting from improper or inadequate maintenance of handling by the buyer, unauthorized modification or misuse, operation outside of the product's environmental specification of improper installation or maintenance. Astronics CSC will not be responsible for any defects or damages to other products not supplied by Astronics CSC that are caused by a faulty Astronics CSC product.

1.4 Exclusion of Liability Notice

Should the user disregard the instructions (specifically the safety instructions) in this manual and possibly on the device, Astronics CSC shall be exempt from legal liability for accidents.

In the event of damage to the device, which is caused by a failure to observe the instructions (specifically the safety instructions) in this manual and possibly on the device, Astronics CSC shall not be required to honor the warranty, including during the warranty period, and shall be exempt from legal liability of accidents.

2 Important Safety Instructions

2.1 Safety and Precautions

The following general instructions should always be followed in order to assure the proper operation of Sierra, the safety of operators and the preservation of warranty coverage.

1. The Sierra IFE System has been designed to operate in the pressurized passenger cabin on the aircraft. Never operate the Sierra IFE System in unpressurized areas of the aircraft. Avoid removing any identification plates, serial numbers or warning labels unless specifically authorized by the manufacturer.
2. To maximize battery life, the Sierra IFE System has been designed to operate with passive cooling in temperatures from 0°C to +50°C. To prevent overheating, be sure there is adequate air flow around the device, and that the heat dissipation holes are not blocked. A minimum airgap of 1" should be maintained during operation. Please observe all specified dimensions required for mounting, included in the kit specific Outline Drawing listed in Table 3-1.
3. Sierra has been designed to withstand the mechanical vibrations associated with aircraft transport, but care should still be taken to provide a stable location and avoid any unnecessary sliding, shifting, or damage from unsecured cargo.
4. Do not expose Sierra to rain or snow. Care should be taken when transporting to and from the aircraft.

2.2 Regulatory

Sierra contains the following Intentional Radiators:

Wi-Fi Transceiver

FCCID: 2AL4H-E71314

IC: 22737-E7131901

Aux Wi-Fi Transceiver

FCCID: PD98265NG

IC: 1000M-8265NG

Cellular Transceiver

FCCID: N7NEM75

IC:2417C-EM75S

2.2.1 USA – FCC Supplier Declaration of Conformity Product Identification and Responsible Party

Astronics CSC
804 S. Northpoint Blvd.
Waukegan, IL 60085
(847) 244-4500
www.astronics.com

We, Astronics CSC, 804 S. Northpoint Blvd. Waukegan, IL 60085, declare under our sole responsibility that the product E71-314 Sierra™ complies with Part 15 Subpart B of FCC CFR47 Rules.

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

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

2.2.1.1 Information to User

Class B Digital Device

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

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Do not operate the cellular transceiver module:

- Where explosive atmospheres may be present, including refueling points, fuel depots, and chemical plants.
- Near medical equipment, life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the cellular transceiver module **MUST BE POWERED OFF**. Otherwise, the cellular module can transmit signals that could interfere with this equipment.

In an aircraft, the cellular transceiver module **MUST BE POWERED OFF**. Otherwise, the transceiver module can transmit signals that could interfere with various onboard systems and may be dangerous to the operation of the aircraft or disrupt the cellular network. Use of a cellular phone in an aircraft is illegal in some jurisdictions. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action, or both.

Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. The cellular transceiver module may be used normally at this time.

2.2.1.2 RF Exposure Statement

The device shall be used in such a manner that the potential for human contact during normal operation is minimized. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

2.2.2 Canada – ISED Compliance Information

This device complies with the Class B limits for radio noise emissions as set out in the interference-causing equipment standard entitled “Digital Apparatus,” CAN ICES-3(B)/NMB-3(B).

This device complies with ISED license-exempt RSS-GEN and RSS-247. Operation is subject to the following two conditions: (1) this device may not cause interference and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme à la norme ISED RSS-GEN et RSS-247. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant entraîner un fonctionnement indésirable de l'appareil.

Under Industry Canada regulations, when operated in 5150 to 5250 MHz frequency range, this device is restricted to indoor use to reduce the potential for harmful interference with co-channel Mobile Satellite Systems. Users are advised that high power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Conformément aux réglementations d'Industrie Canada, en cas d'utilisation dans la plage de fréquences de 5150 à 5250 MHz, cet appareil doit uniquement être utilisé en intérieur afin de réduire les risques d'interférence avec les systèmes satellites mobiles partageant le même canal. Les utilisateurs êtes avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

2.2.2.1 RF Exposure Statement

The device shall be used in such a manner that the potential for human contact normal operation is minimized. This equipment complies with RSS-102 radiation exposure limits. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Le dispositif doit être utilisé de manière à minimiser le potentiel de fonctionnement normal par contact humain. Cet équipement est conforme aux limites d'exposition au rayonnement RSS-102. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps. Cet appareil et son (ses) antenne (s) ne doivent pas être co-localisés ou utilisés conjointement avec une autre antenne ou un autre émetteur.

2.2.3 European Union (EU) Compliance Information

2.2.3.1 Radio Equipment Directive

Hereby, Astronics CSC declares that this Sierra™ Portable Inflight Entertainment (IFE) System is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: <https://www.astronics.com/certificates?subsidiaryName=Astronics%20Connectivity%20Systems%20And%20Certification>.

This device operates on frequencies that are harmonized in the European Union in one or more member states in the frequency ranges:

- 2.400 to 2.4835 GHz
- 5.150 to 5.250 GHz
- 5.250 to 5.350 GHz
- 5.470 to 5.725 GHz
- 5.725 to 5.850 GHz

Cellular frequencies will be included in the Risk Assessment.

Users are advised that high power radars are allocated as primary users of the bands 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to Licensed Exempt WLAN devices.

When operated in the 5150 to 5350 MHz frequency range, this device is restricted to indoor use. Use inside an aircraft is also considered to be indoor use.

2.2.3.2 RF Exposure Statement

The device shall be used in such a manner that the potential for human contact under normal operation is minimized. This equipment complies with EN 62311:2008 and basic restrictions listed in 1999/519/EC. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

2.2.3.3 WEEE

This product is manufactured to ensure compliance with European Union regulations and policies that preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally. In compliance with the Waste Electrical and Electronic Equipment (WEEE) directive, return this product to a local recycling center, the original dealer, or supplier at the end of life. Otherwise, return the device to the following office:

Astronics CSC
804 S. Northpoint Blvd.
Waukegan, IL 60085
(847) 244-4500
www.astronics.com

2.2.3.4 RoHS

The E71-314 Sierra™ is in conformity with ROHS 2 (EU Directive 2011/65) and ROHS 3 (EU Directive 2015/863) on restriction of the use of certain hazardous substances in electrical and electronic equipment.

2.2.3.5 REACH

The E71-314 Sierra™ is in conformity with Regulation (EC) No 1907/2006 concerning Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) per the EU REACH level 201 Substances of Very High Concern (SVHC) list released 01/08/2020. The list of controlled substances is available at <https://echa.europa.eu/candidate-list-table>.

2.3 Battery Safety

The Sierra holds two rechargeable Lithium Ion battery modules, which are to be sourced directly from the battery manufacturer or their distribution centers. Each battery module is controlled individually by the Sierra unit's smart battery controller, allowing the unit to operate safely with one or two batteries installed.

It is important to charge your new batteries to ensure proper performance.

To ensure safety, the Sierra unit will only operate with RRC Power Solutions, P/N RRC2054-2, battery modules. Refer to the battery module user manual, found here:

https://www.rrc-ps.com/fileadmin/Dokumente/Manuals/Manual_RRC2054-2.pdf

Follow all of the following battery safety instructions:

- Do not dismantle, open, or shred the batteries.
- Do not expose the batteries to heat or fire. Avoid storage in direct sunlight.
- Do not short-circuit a battery. Do not store batteries where they may short-circuit each other or be short-circuited by other metal objects.
- Keep batteries in their original packaging when not in use.

- Do not subject batteries to mechanical shock.
- Do not use any charger other than that specifically provided for use with the equipment.
- Batteries need to be charged before use.
- Keep batteries clean and dry.
- Do not leave batteries on a prolonged charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the batteries several times to obtain maximum performance.
- Batteries give their best performance when they are operated at normal room temperature (+20°C ± 5°C).
- Retain the original product literature for future reference.
- There is a risk of explosion if the battery is replaced by an incorrect type.

3 Introduction

3.1 Product Description

Sierra is Astronics-CSC third generation streaming portable Inflight Entertainment (IFE) system designed to install in the overhead compartment of commercial aircraft. Sierra is primarily a battery-operated alternative to a fixed IFE installation.

Sierra is capable of multi-user media streaming of audio, video-on-demand, digital magazine content, and much more. Sierra offers a suite of features that are unmatched in today's portable IFE marketplace. In addition to its content streaming capabilities, the product also offers an onboard cellular radio and a dedicated third Wi-Fi radio that enables networking of multiple units.

The unit's compact size and light weight makes Sierra easily deployed in almost any cabin environment. With 12 hours of continuous battery operation, this solution is not only easy to operate, but is also easy to customize to meet your needs. Software APIs are available to quick-start your streaming and content management application. High capacity SSD storage ensures that you can provide ample content for streaming to passenger devices.

This unit is identified as Astronics CSC P/N: E71-314-XXX and is branded as *Sierra™*.

Note: *The –XXX is a generic placeholder representation of possible variants.*

3.1.2 Part Number Structure

A Sierra kit is comprised of the assembly of the following:

- 1) Sierra Base Unit Assembly P/N E71-319-01
The base unit represents the main body of the unit with all internals except for the removable SSD assembly.
- 2) Sierra Removable SSD Insert Assembly P/N E54-576-XX
The –XX is a generic placeholder representation of possible variants, which are based on SSD capacity. For example, P/N E54-567-01 represents the 1 TB Removable SSD Insert Assembly.

The assembly of the above parts is known collectively as the Sierra Portable IFE Kit, P/N E71-314-XXX, where –XXX is a variant placeholder depending on the Removable SSD included in the assembly.

For example, P/N E71-314-101 is the assembly of P/N E71-319-01 Base Unit + P/N E54-567-01 Removable SSD (1 TB). See Table 3-1 for all current kits.

Note: *A Sierra kit assembly will always be labeled with the –XXX placeholder filled in alphanumerically.*

Table 3-1: Sierra Kit Specific Drawing Information

Kit P/N	E71-314-101
Kit Description	Kit, Assembly Sierra Portable Server 1TB Removable SSD
Kit -OL Drawing	E71-314-101-OL
Kit Component: Assembly, Base Unit -OL Drawing	E71-319-01-OL
Kit Component: Assembly, Removable SSD -OL Drawing (capacity)	E54-576-01-OL (1 TB)

3.2 Hardware Architecture

The Sierra leverages a state-of-the-art, commercial enterprise-class Wireless Access Point (AP). The AP selected for this application is manufactured by Aruba Networks, a Hewlett Packard Enterprise company, The Aruba model AP-303 has been ruggedized and repackaged to meet the operational requirements of commercial aircraft environment.

The Sierra feature set includes:

- Utilizes a commercial dual band (2.4GHz/5GHz) 802.11ac, Wave 2 Access Point
- A dedicated 802.11ac/bgn radio (2.4 GHz /5 GHz) for networking between multiple Sierra units
- Dual hot swappable batteries for over 12-hours of video streaming content
- Up to 2 TB of storage possible with front removable solid-state drive
- Can be powered optionally from a 18V external power outlet with the appropriate STC.
- ADS-B Receiver for streaming moving map applications
- 4G/LTE cellular radio. Automatically disables cellular modem based on aircraft ADSB data.
- Audio/Video content can be paused remotely via detecting a PA announcement
- Disables itself automatically in the event of an emergency decompression

3.3 Key Hardware Components

The Sierra key hardware components include:

Component	Description
CPU	<ul style="list-style-type: none"> ▪ Dual Core 1.3 GHz (1.8 MHz burst), Intel® Atom™ x5-E3930 ▪ 2 MB L2 cache ▪ 4 GB DDR4 – 2133MT/s ▪ 16 GB eMMC onboard flash
Wi-Fi	<ul style="list-style-type: none"> ▪ Two (2) 2.4 GHz/5 GHz, 802.11ac/abgn radios (Wave 2) – simultaneous operation. ▪ One (1) dedicated 802.11ac/bgn (2.4 GHz/5 GHz) radio for networking multiple units together.
Cellular	4G/LTE supports diversity mode. Automatically enables and disables transmission based upon ADSB data. Front Panel Auto/Override switch
Bluetooth	Bluetooth v4.0 or Bluetooth Low Energy to be used for wireless discrete functions (requires a complimentary BLE device installed on the aircraft).
ADS-B	ADS-B receiver; used for moving map applications and automatic cellular modem control.
Decompression	Automatically disables IFE systems in the event of a cabin decompression
Security	TPM per TPM 2.0
PA Pause	<p>Optionally can automatically pause streaming content in the event of a PA announcement.</p> <p><i>Note: Requires a PA Pause Module, Astronics CSC P/N E71-500-01, installed in the aircraft.</i></p>
Mass Storage	<ul style="list-style-type: none"> ▪ Front Removable: Up to 2 TB SSD ▪ Internal: 16 GB eMMC flash memory on board
Control Interfaces	<ul style="list-style-type: none"> ▪ Power ON/OFF button ▪ USB 3.0 (Type A) ▪ SIM card slot (front panel) ▪ Serial console applications for both CPU and AP (USB-C) ▪ Gigabit Ethernet (RJ45 – rear panel) ▪ External power source (DIN and blade connector – rear panel)
Front Panel LED Indicators	<ul style="list-style-type: none"> ▪ Power ON ▪ Cellular Enabled ▪ Bat 1 / Bat 2 State-of-Charge Indicators ▪ Status ▪ External Power Source ▪ Bluetooth ▪ Wifi
Battery	Up to 2x 14.4 V, 6900 mA·h (99.4 W·h) Li-ion. Batteries are hot
Aircraft Power	<p>Optionally can be powered via the aircraft 28 VDC power bus with slide in tray-mounted connector.</p> <p><i>Note: Requires use of an aircraft specific STC.</i></p>
Dimensions	7.1" (W) x 10.4" (L) x 4.7" (H)

Component	Description
Thermal	Natural convection
Environment	Operating: 0°C to +50°C Storage w/o Batteries: -40°C to +85°C Storage w/ Batteries: -20°C to +50°C (+25°C recommended)
Operating System	Ubuntu 18.04 supported (support of other Linux systems available upon request).

Figure 3-1 shows the Sierra System Block Diagram.

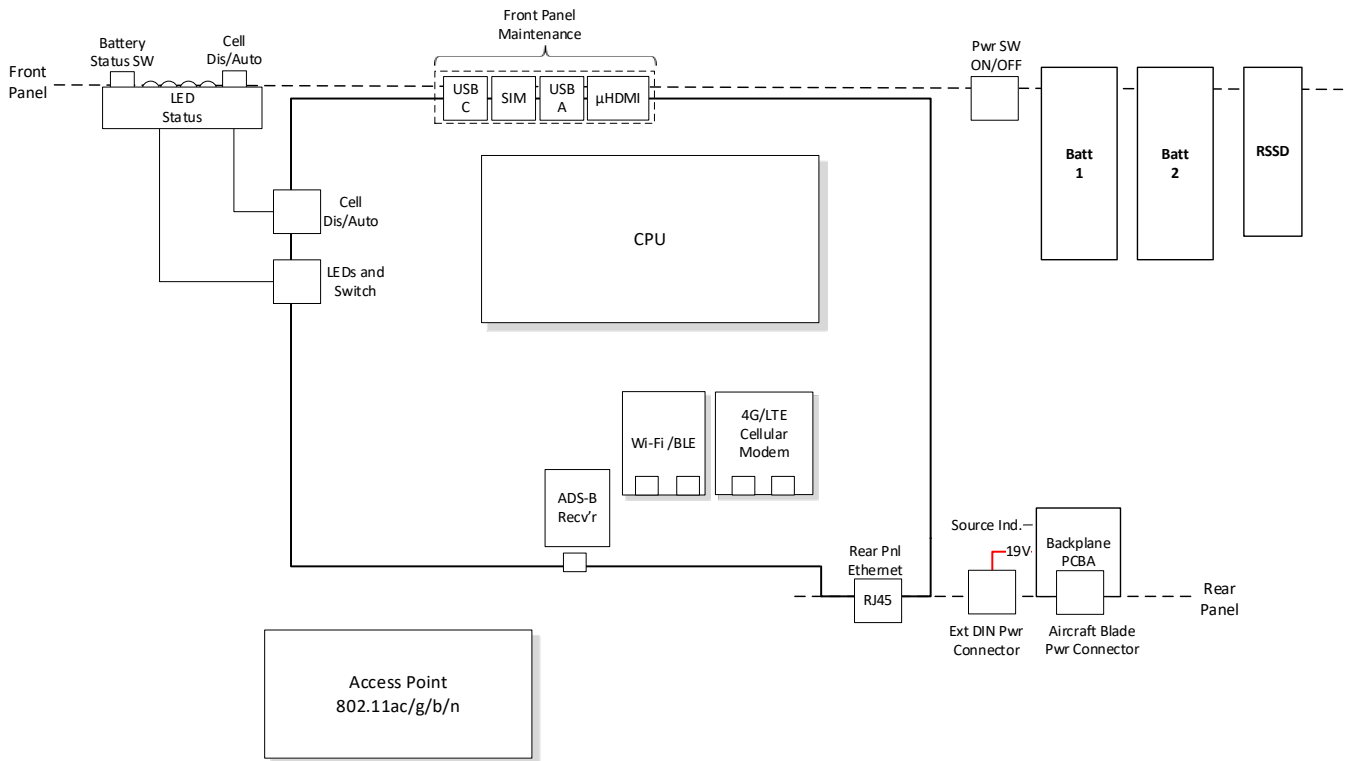


Figure 3-1: Sierra System Block Diagram

3.4 Orderable Part Numbers

Table 3-2: Sierra Orderable Part Numbers

ID	Astronics CSC P/N	Description
1	E71-314-XXX*	Kit, Sierra, Removable SSD
2	E71-319-01	Sierra Base Unit Assembly
3	E54-576-XX*	RSSD Module
4	AHM250PS19	External Power Module with Cable
5	E71-500-01	PA Pause Assembly
6	RRC2054-2	Li-Ion Battery (purchase directly from RRC Power Solutions)
7	E54-577	SSD Block Plate Kit

Notes:

- *See Table 3-1 for kit specific part numbers.
- Items 2, 3, and 4 are included in the Sierra Kit, Item 1, P/N E71-314-XXX.
- The wall plug interface cable is not included in Item 4.
- Installation kits are not listed above.



Figure 3-2: Sierra™ Equipment

4 Powering Up

Two (2) high-density Lithium-ion (Li-ion) battery modules, RRC Power Solutions P/N RRC2054-2, are required to power the Sierra. Alternatively, Sierra can be powered via the aircraft 28VDC power bus with the appropriate STC. Refer to Figure 4-1.

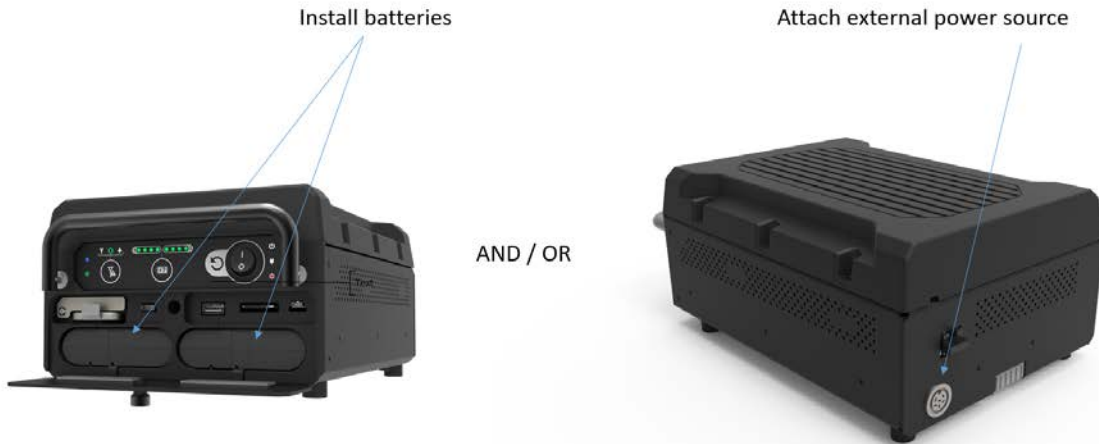


Figure 4-1: Power Source

Once power is connected via batteries or external power source, turn the POWER switch to 'ON' position as shown.

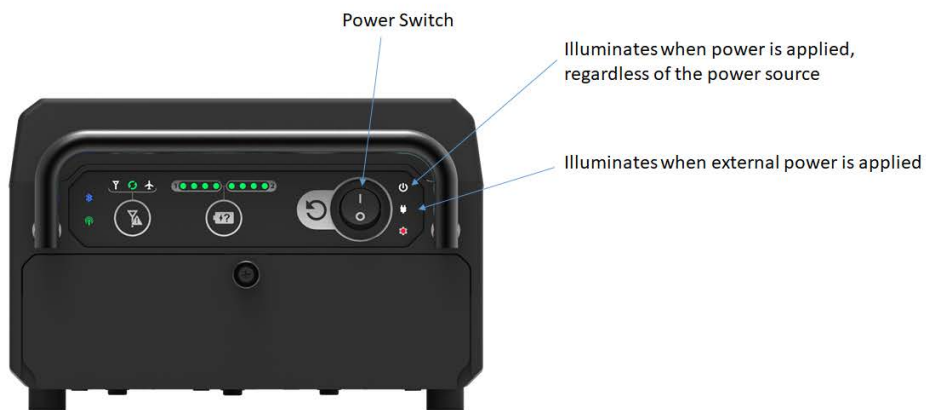


Figure 4-2: Power On/Off Switch and Power Indicator

5 Connecting to Sierra

5.1 Terminal Communication Settings

The integrated USB to UART provides console access via the USB-C port that is located behind the battery door as shown in Figure 5-1. There is also an internal console for the cell modem, when enabled. Use these settings to connect to the consoles:



Figure 5-1: USB-C connection

Use these settings to connect to the consoles:

Table 5-1: Com Port Settings

Port	Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
CPU	115200	8 bit	none	1 bit	none
WAP	9600	8 bit	none	1 bit	none
Cell Modem	9600	8 bit	none	1 bit	none

5.2 SSH

The rear Ethernet port comes configured as a dhcp client to allow access to the system from your development network. You can ssh into the unit using the Sierra username and password.

User: sierra

Password: sierra

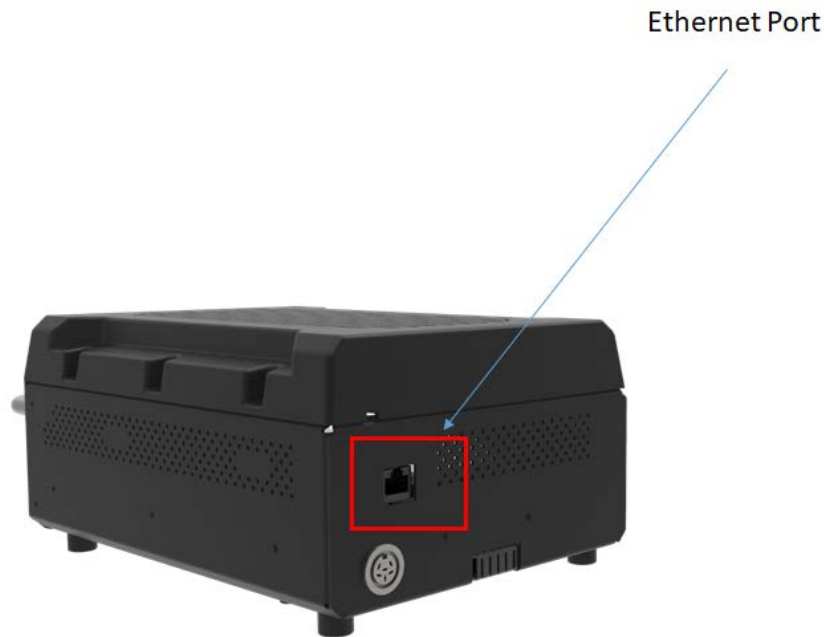


Figure 5-2: Ethernet Port

5.3 SSID

Sierra comes configured with the following ATP SSIDs, where xxxxxx is replaced with the unit's serial number. The password for both is: 12345678

- xxxxxxw2p4ghz
- xxxxxxw5ghz

5.4 WAP Configuration

Sierra leverages an Aruba enterprise class wireless access point that runs Aruba's Instant virtual controller software. The WAP can be configured through the Aruba web GUI, or through the console/ssh command line interface (CLI). The settings can be saved out to, and loaded from, a configuration file.

The following example copies a configuration file to the tftp server:

```
sierra# copy config tftp 192.168.1.1 filename.cfg
```

The following example copies a configuration file to the WAP:

```
sierra# copy tftp 192.168.1.1 filename.cfg system config  
reload (this command restarts the WAP)
```

To maximize video streaming performance, the following settings have been included in the default configuration file: `/var/lib/tftpboot/SierraBlackLabel.cfg`

- Wide channel bands are enabled, but channel width has been limited to 40MHz. This helps clients get on and off the air more quickly.
- Minimum transmit rates have been set to 12 Mbps. This prevents weaker clients from slowing down the network.
- Arp Broadcast filtering is enabled. This converts arp broadcasts to unicast.
- ARM Band Steering Mode is set to Balance Bands. This helps utilize both radios.
- The min/max power settings of the 5 GHz radio have been set 6dbm higher than the 2.4 GHz radio. This accounts for the additional free space path loss and smaller receiver aperture associated with the higher frequencies.

6 Connecting using Aruba's Web-based GUI

You can connect to the web-based GUI by entering the Aruba AP's IP address 192.168.1.20 in a web browser, and entering the Username and Password (admin / admin) when prompted as shown below in Figure 6-1.

Note: The following subsections refer to the [Aruba] IAP, or AP which shall be used interchangeably with the Sierra. The sections are summarized from Aruba Instant documentation and training materials. For additional information refer to the Aruba Instant User Guide.

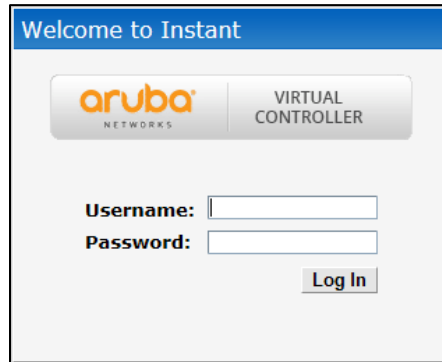


Figure 6-1: Aruba Instant GUI Login Prompt

You may see a Certificate Error message. This is because the certificates issued to the AP do not match the IP address used to connect to the GUI. It is recommended that you add a certificate issued by your network, to ensure secure administrative communication.

The web interface main GUI page is broken up into three vertical bands (A, B, C).

Vertical bands

- A. **Virtual Controller** - The top band contains the Virtual Controller settings, these are the global settings.
- B. **System Components** - This band contains the system components of the wireless network.
- C. **Information** – This band displays information for the currently selected system component.

The main GUI page is broken up into the following six sections. These sections are identified below in Figure 6-2.

- 1. **Networks** – Shows all the wireless networks associated with this cluster.
- 2. **Access Points** – Shows all the access points in the cluster, the * indicates the Virtual Controller.
- 3. **Clients** – Shows all the clients connected to access points in this cluster.
- 4. **Instant AP information** – Basic information on the Virtual Controller of this cluster.
- 5. **RF Dashboard** – Gives you a view of all clients RF signals and other issues.
- 6. **Usage Trends** – Shows all the clients and throughput generated by all the clients on this cluster.

Clicking on the + or – signs in the band or section title bar will expand or collapse that band or section.

Clicking on the one of the **Blue** text items or **Green** icons will display details of that item.

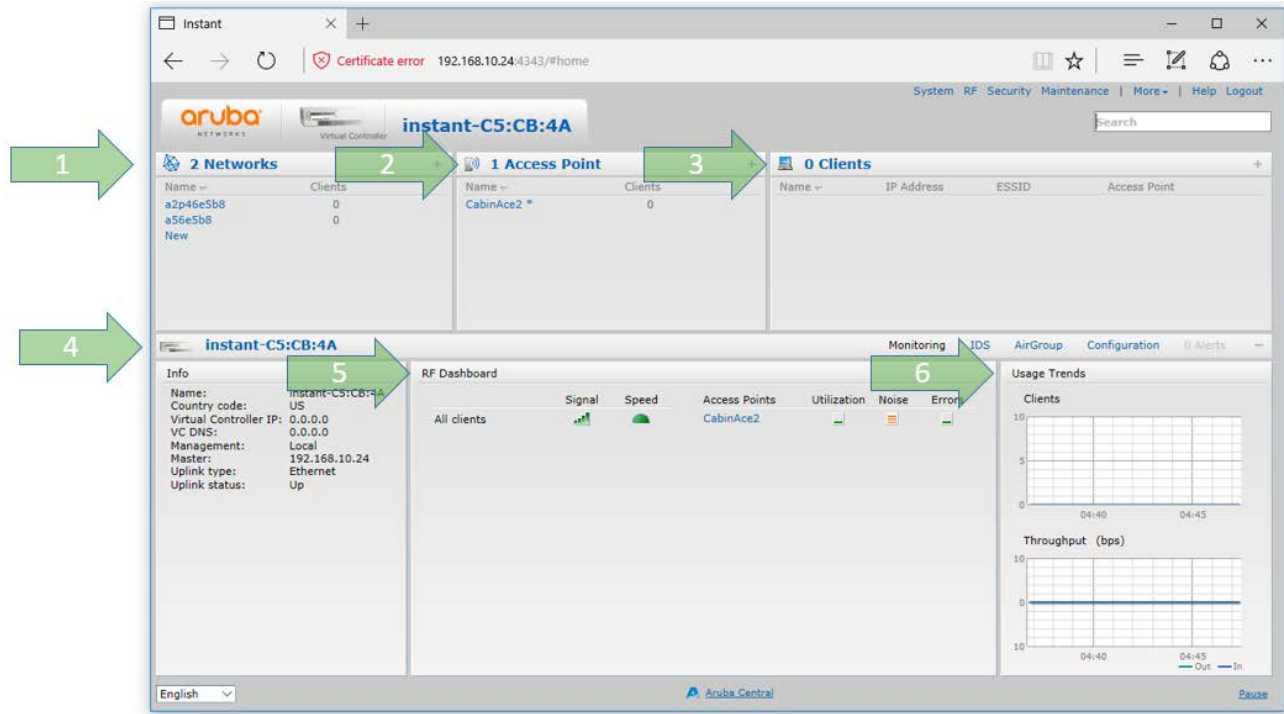


Figure 6-2: The Six Sections of the Aruba Instant Main GUI Page

6.1 Aruba Username and Password

The default system username and password are *admin / admin*. It is recommended that these be changed. The system username and password can be changed from the Admin tab of the System dialog box, as show in Figure 6-3.

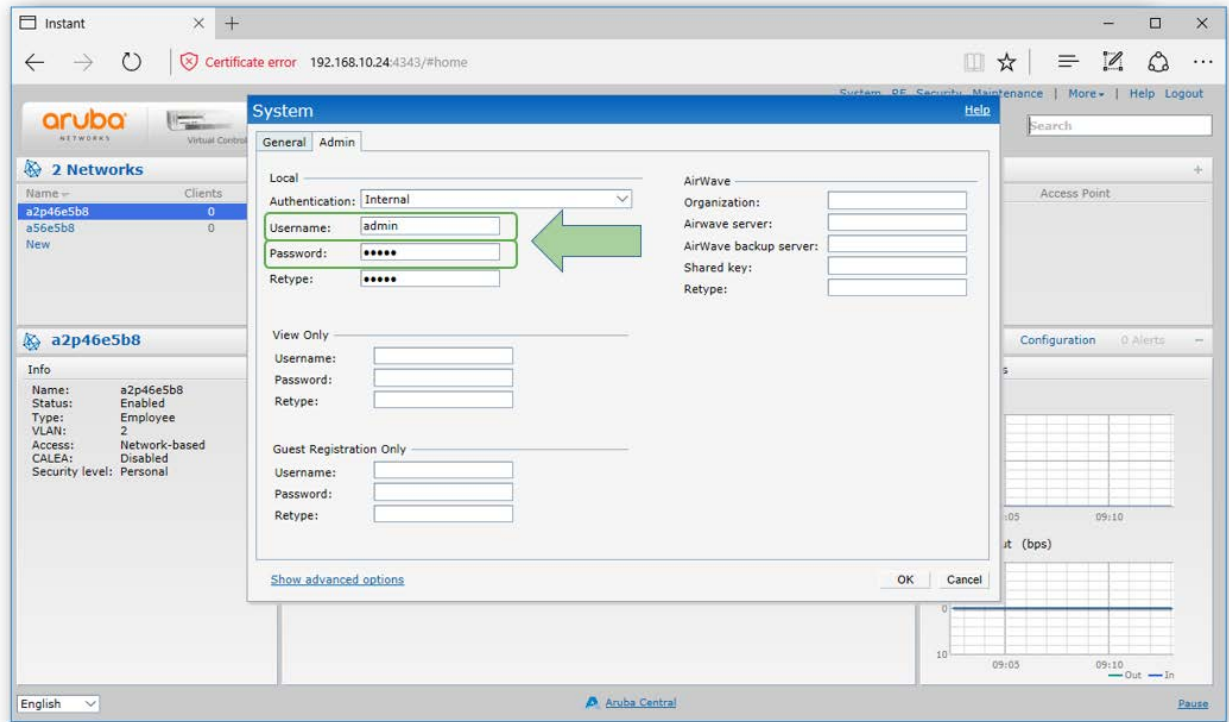


Figure 6-3: System Username and Password Dialog Box.

6.2 Network Selection

The Network section lists all the wireless networks (SSIDs) associated with the WAP, and displays the number of clients currently connected to each SSID. Clicking on the “+” sign on the Network sections title bar will display additional information about the wireless networks as show below in Figure 6-4.

Selecting one of the Blue SSID names will show additional details in the Information band.

The Info section on the left side displays the general settings for the selected network.

The RF Dashboard section displays a list of any clients experiencing signal or speed issues. Clicking on the speed icon brings up a popup window with further details as shown in Figure 6-5.

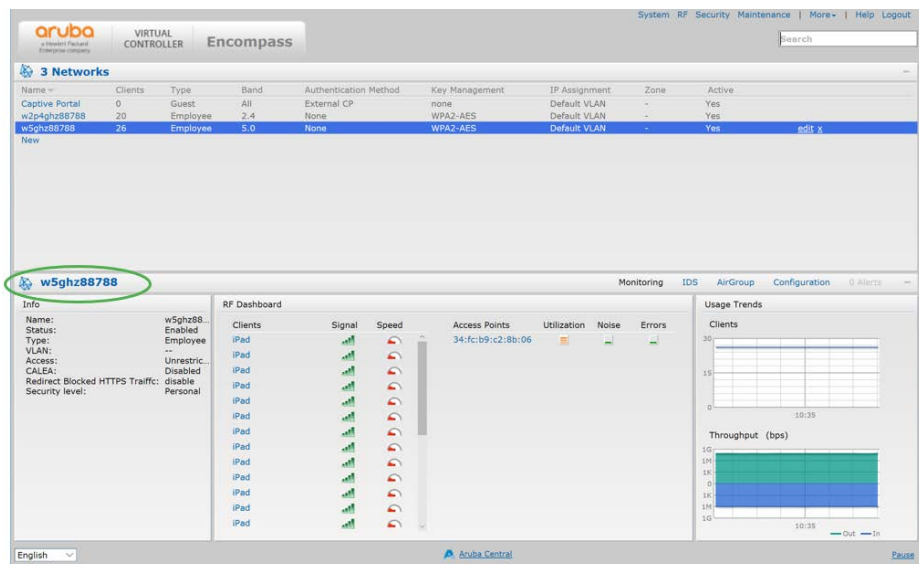


Figure 6-4: Additional Network Information

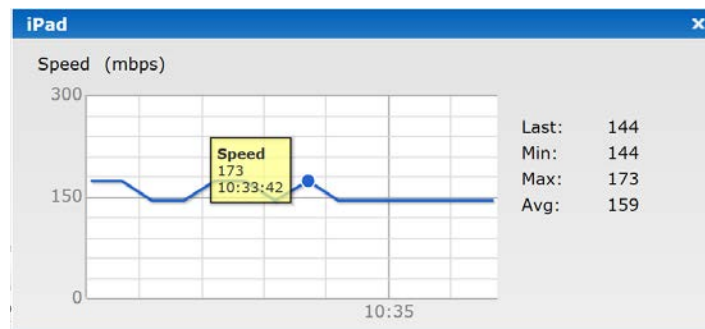


Figure 6-5: Signal Speed Popup Window

The Usage Trends section provides both client, and throughput information for the selected wireless network. in Figure 6-6, clicking on the throughput graph opens a popup window with a more detailed graph.

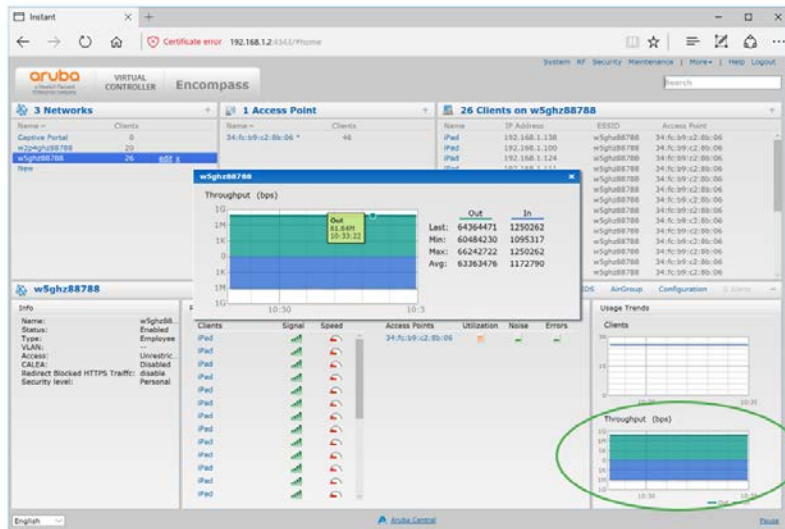


Figure 6-6: The Wireless network Usage Trends Section

6.3 Access Point Selection

The Access Points section lists all clients currently connected to Sierra. You can select Access Point to view its details in the Information band as shown on Figure 6-7. On the left side of the Information section are the operating details along with an RF Dashboard. On the right side of the Information band is the Overview section, with monitoring graphs. On the right side of the Overview title bar we see the **Blue** selectable text: **Radio 1: 2.4 GHz...** and **Radio 2: 5 GHz...**. Selecting one of these text items will display radio specific details as shown in Figure 6-8.

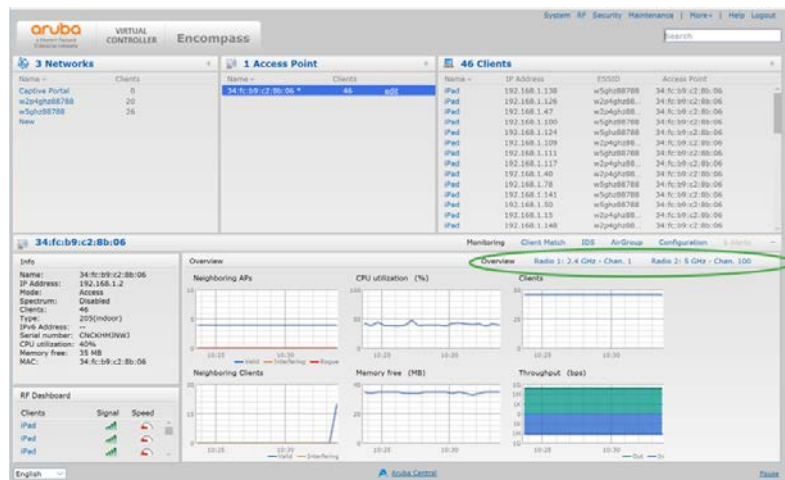


Figure 6-7: Information Band Display for Selected Access Point



Figure 6-8: Radio Specific Details

6.4 Client Selection

The Clients section lists all the clients associated with the wireless networks. In the Clients section, you can see the operating system and wireless capabilities of the devices, and also see which wireless network the clients are associated with.

Figure 6-9 shows the details of the Clients section. You can click on a client's name to display the details for that client in the Information band as shown in Figure 6-10.

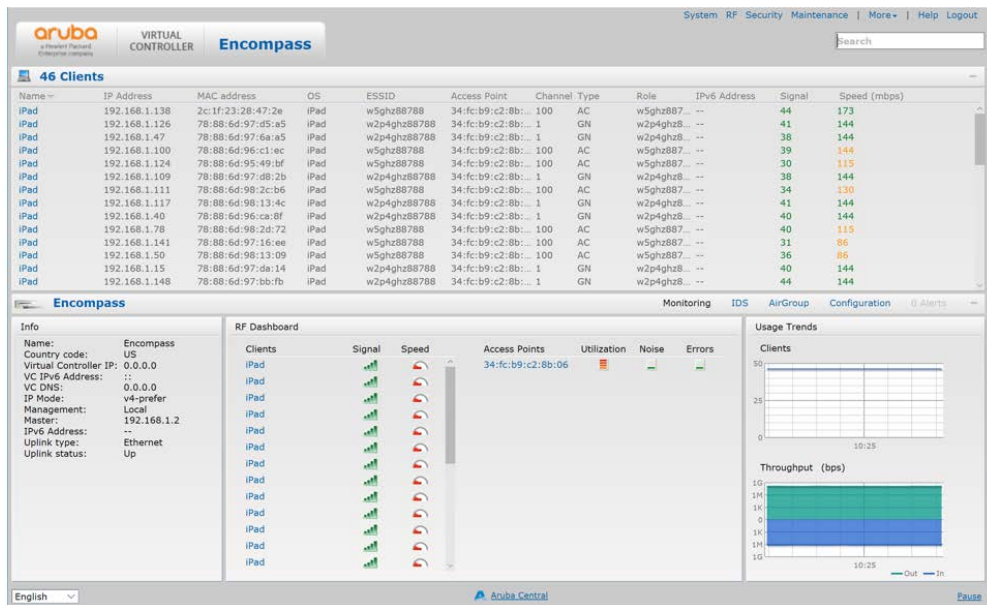


Figure 6-9: Clients Section

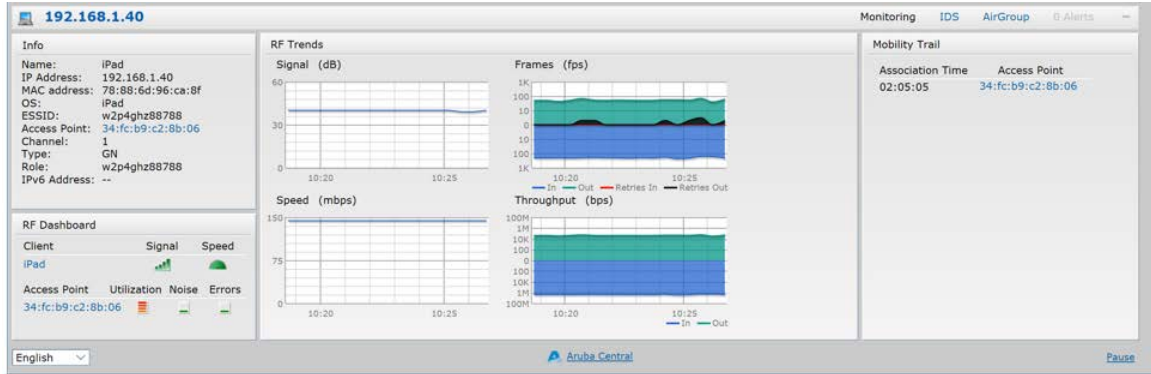


Figure 6-10: Client Details

7 WLAN Setup

There are four steps to creating an SSID:

1. Select the type of SSID you want to create. The Employee and Voice selections will lead you to 802.1X and PSK authentication. The Guest option will lead you to Captive Portal authentication.
2. Configure the Vlan and client IP assignment.
3. The security stage depends on your wireless LAN setting selections. Enterprise will give you 802.1x selections, personal will give you PSK or WEP selections. If you select guest you will receive captive portal options.
4. The last stage is the settings for the firewall with the user rights.

These stages are shown below in Figure 7-1.

WLAN Wizards SHARE

New WLAN Help

1	WLAN Settings	2	VLAN	3	Security	4	Access
---	---------------	---	------	---	----------	---	--------

<p>Employee Voice</p> <hr/> <p>Guest</p>	<p><u>Virtual Controller Assigned</u> Default Custom</p> <p><u>Network Assigned</u> Default Static Dynamic</p>	<p>Enterprise Personal Open</p> <hr/> <p>Captive Portal</p>	<p>Role Based Network Based Unrestricted</p>
--	--	---	--

Figure 7-1: The Four Stages to Creating an SSID

Step 1

You create SSIDs using the WLAN Wizard. You launch the WLAN Wizard by selecting **New** from the **Networks** section on the main GUI page. This will bring up the WLAN Settings tab of the New WLAN dialog box. The WLAN Settings tab is where you select the type of SSID you want to create and name the SSID, as shown below in Figure 7-2.

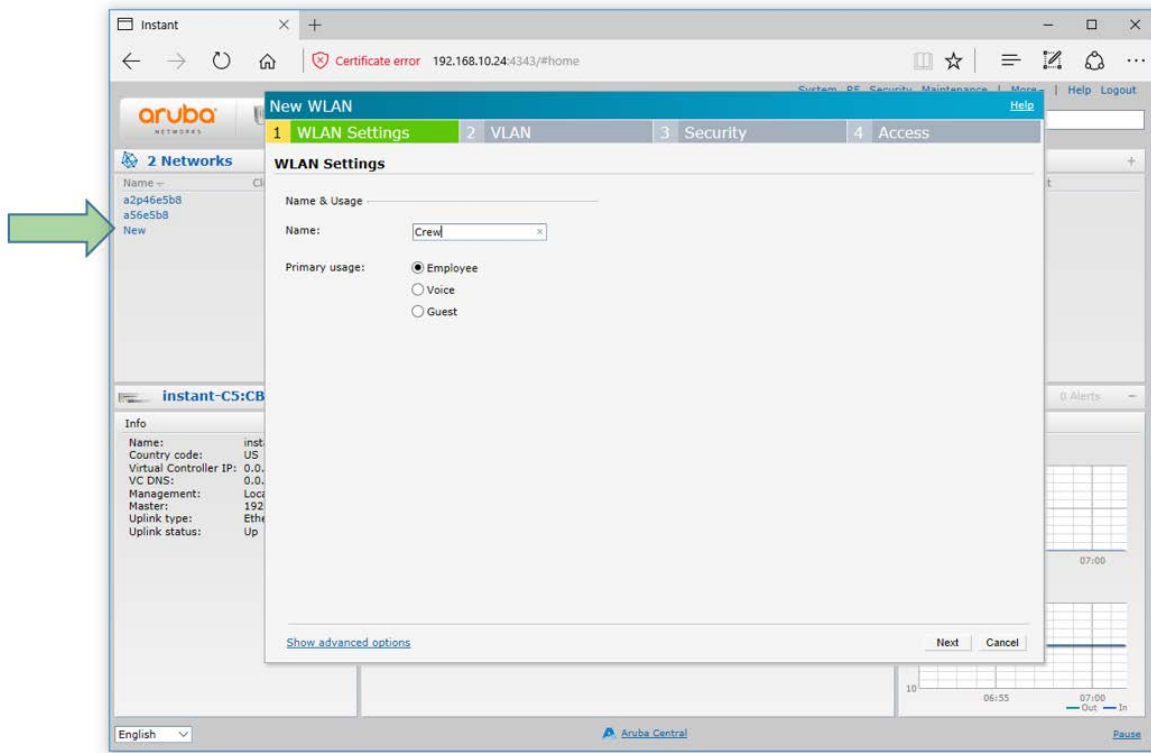


Figure 7-2: The WLAN Settings Tab of the New WLAN Dialog Box

Step 2

The VLAN Tab is where you configure the VLAN assignment and client IP assignment. The available VLAN and client IP assignment options are shown below in Figure 7-3.

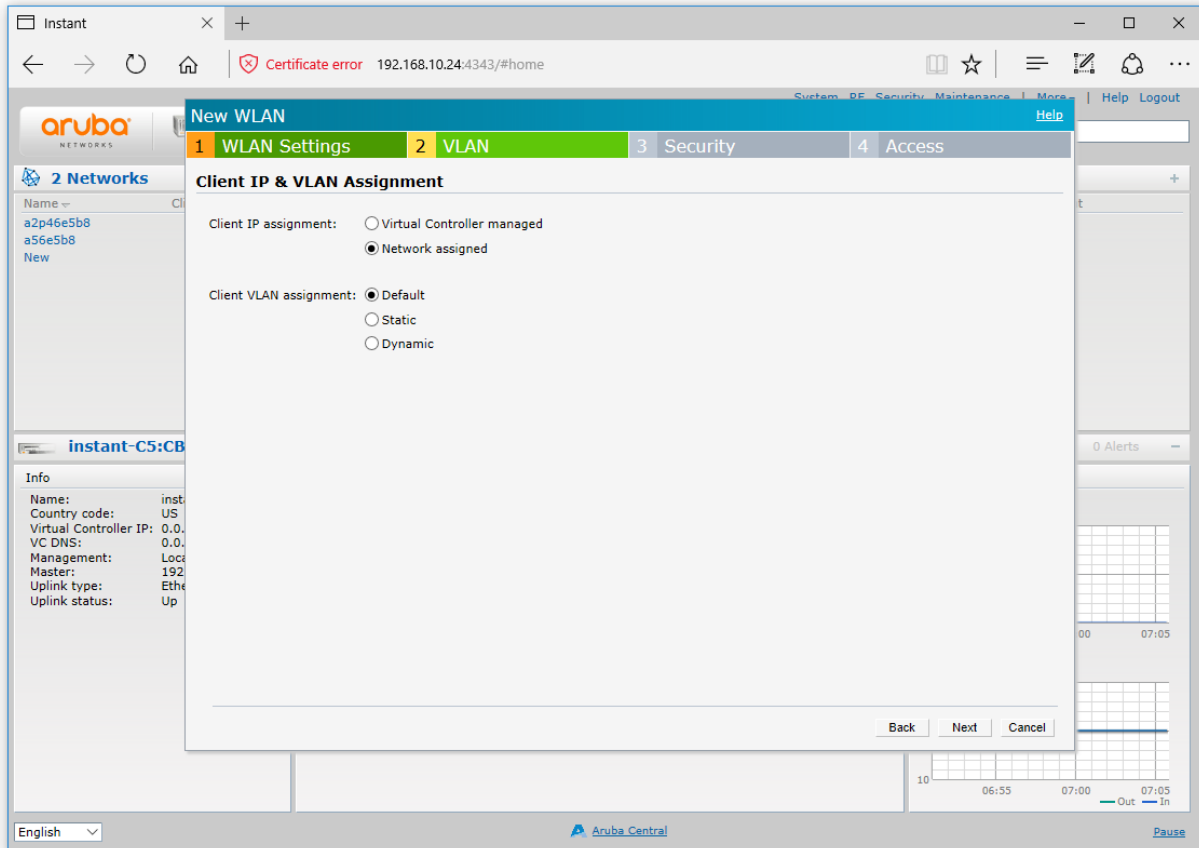


Figure 7-3: The VLAN Tab of the New WLAN Dialog Box

The two client IP assignment options are virtual controller Managed and Network assigned.

Virtual Controller Managed

The client will associate and authenticate to the access point. The access point will act as a relay agent to the virtual controller, and the virtual controller will provide and act as the DHCP server.

- The Access Points will be providing DHCP for any wireless clients that connect to this SSID.
- The SSID and IAPs will source NAT all client traffic onto the wire.

Network Assigned

The client will associate and authenticate to the access point. The access points will act as a bridge and pass the traffic without modifying the original payload. DHCP will be provided by the DHCP server on the LAN. The APs will bridge the client traffic onto the wire without manipulating or modifying the packets.

- The AP will bridge the client traffic onto the wire.
- The AP turns the wireless frame into an Ethernet frame.

Step 3

The Security tab is where you set the security level. There are three levels; Open, Personal, and Enterprise. Selecting the Enterprise level allows you to configure an external RADIUS authentication server, as shown below in Figure 7-4.

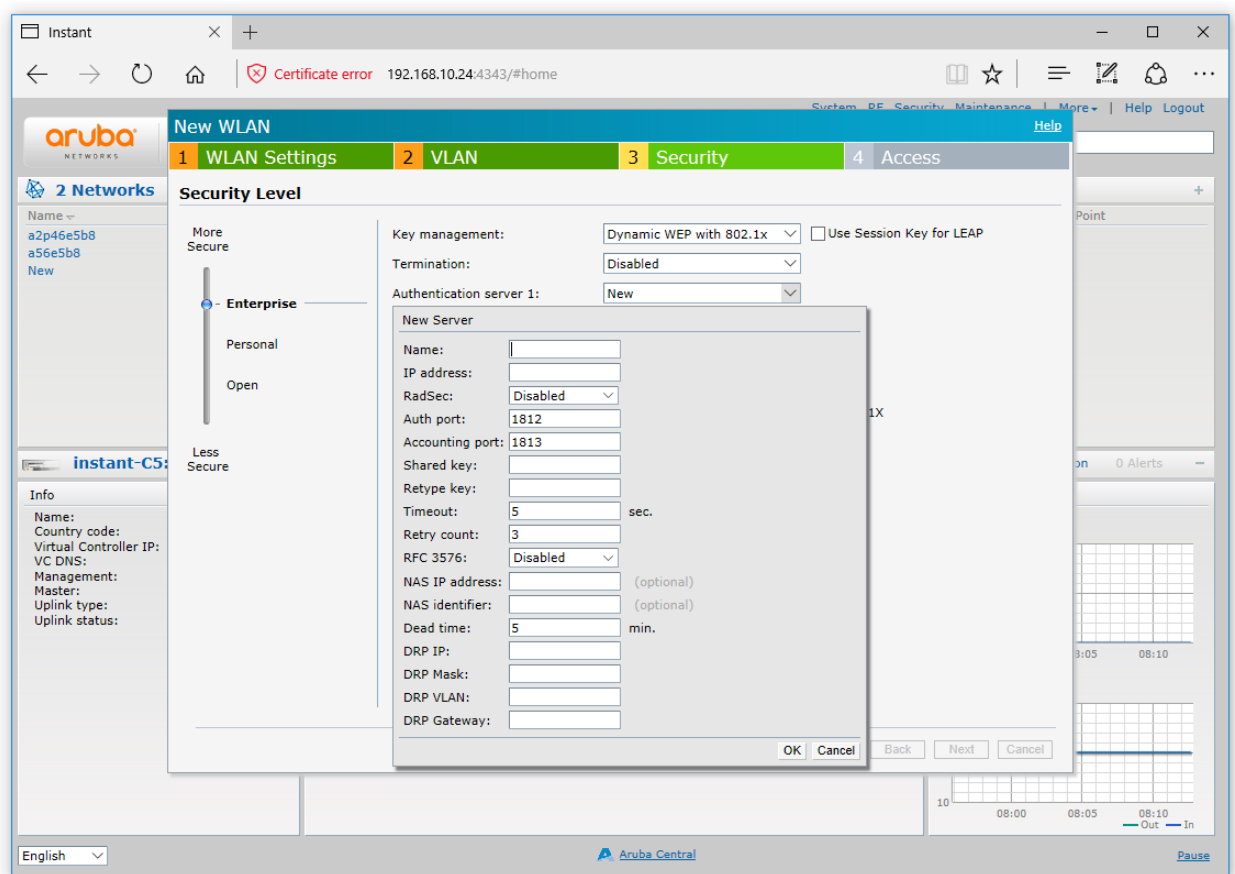


Figure 7-4: Configuring an External RADIUS Server

Step 4

The Access tab is where you configure the firewall rules and user rights. The Access tab allows you to create Network-Based rules and Role-Based rules. You also have the option to leave the SSID Unrestricted. Figure 7-5 shows an example of creating a rule that denies all DNS traffic except to the DNS server with the IP address of 192.168.10.1.

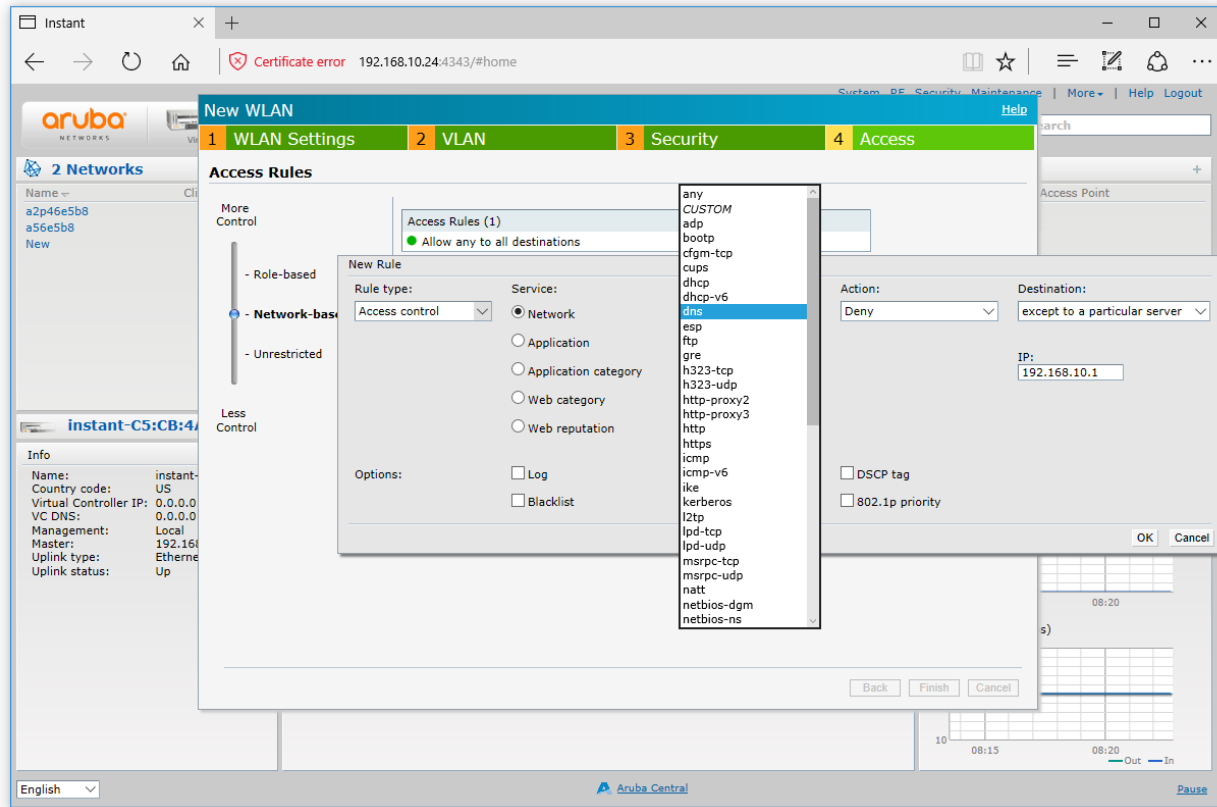


Figure 7-5: Configuring Firewall Rules

Refer to the *Aruba Instant Users Guide* for additional information on the IAP GUI.

Captive Portal SSID

The following is to create a Captive Portal SSID for your guests:

- In the **WLAN Settings** tab, select the **Guest** option.
- In the **VLAN** tab, select **Network Assigned** for *Client IP Assignment* and **Default** for *Client VLAN Assignment*.
- In the **Security** tab, select **External** for *Splash Page Type*, and then select the **Edit** button to edit the default *Captive Portal Profile* as shown below in Figure 7-6.

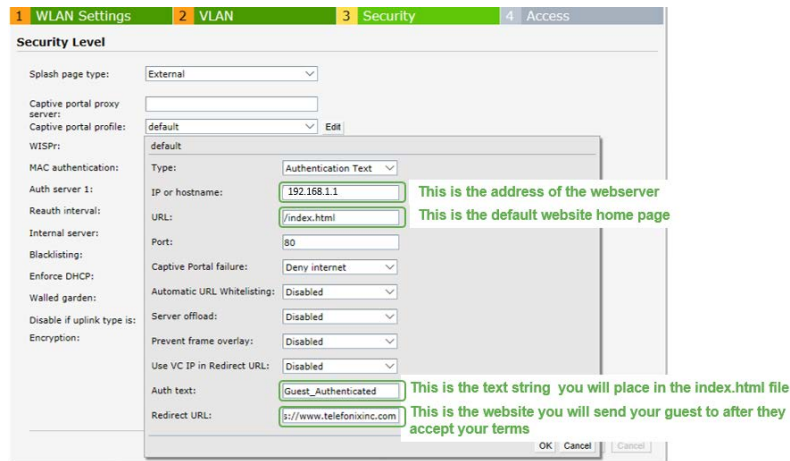


Figure 7-6: External Captive Portal Settings

- In the **Access** tab, configure the following *Network Based Access Rules*:
 - Allow HTTP to a specific server - 192.168.1.1
 - Allow HTTPS to a specific server - 192.168.1.1
 - Deny any to any

Place the following lines in the body of your index.html file which will automatically authenticate your guests.
<form>

<input type="hidden" id="authtext" value="Guest_Authenticated">

</form>

8 User Interface

8.1 Switch and Display Panel

Sierra includes a visual display and switch panel located on the front of the unit. This panel includes series of LEDs and switches designed to provide the users with an intuitive interface with the critical functions of Sierra. Figure 8-1 is an annotated illustration of the front panel Switch and Display Panel.

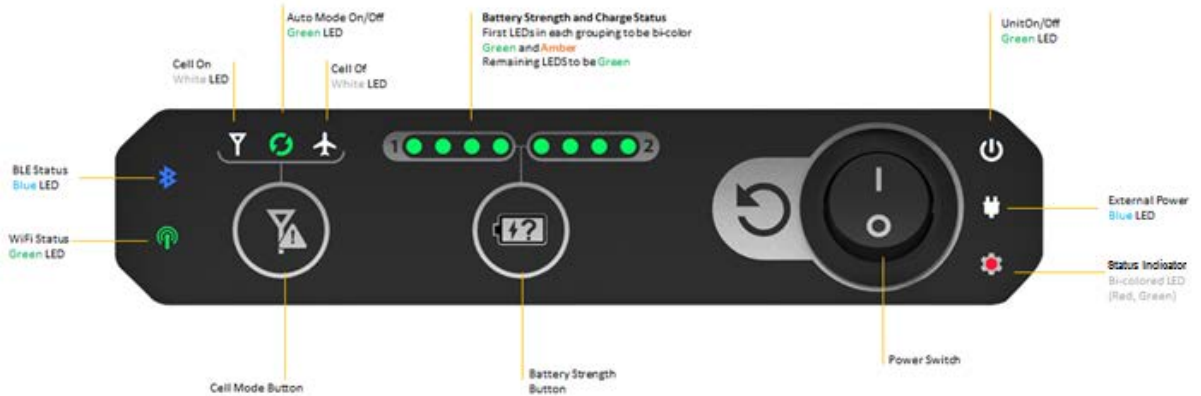














Figure 8-1: Switch and Display Panel

Table 8-1 lists the function of the front panel Switch and Display Panel.

Table 8-1: Switch and Display Panel Nomenclature and Function

Switch / LED	Function
Power Switch	 Power On/Off
Unit ON/Off LED	 Illuminates when power is applied. Blinks while system is booting-up.
External Power LED	 Illuminates whenever external power is applied.
Status LED	 Software programmable.
Battery Strength Button	 A momentary press displays the state-of-charge of each battery through an array of LEDs.

Switch / LED	Function
Battery Monitor LED Display	 <p>Monitors the state of charge of batteries 1 and 2. Each battery has its own set of LEDs. The display illuminates for 4-seconds when the Battery Strength button is pressed. See Section 6.1.6.4 for a description of the meaning and operation.</p>
Cellular Mode Button	 <p>A momentary press cycles through each cell modem mode of operation.</p>
Cellular Mode LED Icons	<p>Displays the cell modem mode of operation when the Cellular Mode button is pressed.</p> <p>  Illuminates when the cellular modem is ON. </p> <p>  Illuminates when the cellular modem is in "Auto" mode. </p> <p>  Illuminates when the cellular modem is "Off". </p>
Bluetooth Status LED	 <p>Illuminates when Bluetooth is enabled and paired to an external discrete I/O device, e.g. the PA Pause module.</p>
Wi-Fi Status LED	 <p>Illuminates when the Aruba Wi-Fi is enabled.</p>

8.2 Battery Status Indicator

Sierra includes a front panel display to provide real-time battery State-of-Charge (SOC), and charging status indications for Battery 1 and Battery 2. Figure 8-2 describes the behavior and meaning of the display. The SOC of the installed battery modules (or battery in the case of one installed battery module) is presented as four LEDs representing a “fuel gauge”. The display illuminates for 4 seconds when the “Battery Status” switch is pressed.



Figure 8-2: Battery State-of-Charge Indicator

8.3 Cellular Mode Button

Both the main and diversity antennas are integrated under the radome of the unit. The modem is typically turned off when the aircraft is airborne, both from an operational standpoint and to preserve battery power. Sierra is designed to accept aircraft position and/or acceleration data to determine if the aircraft is in motion, and automatically control the state of the modem. The cell modem mode button on the front panel can override this “Auto” feature and either turn the modem “OFF” or “ON”, regardless of the operation of the aircraft.

8.4 Battery Door

To access the battery bays, SIM card, SSD, and maintenance connectors behind the battery door, turn the knob (shown in Figure 8-3) counter-clockwise then open the battery door downward.

Battery Door



Figure 8-3: Battery Door

Sierra includes the following features behind the battery door:

- Removable Solid State Drive – 1TB m.2 SATA (default)
- Micro-HDMI port
- USB-C for serial console access to the CPU and access point
- USB 3.0 port
- SIM card slot
- Two battery bays



Figure 8-4: Hardware Interface behind the battery door

8.4.1 SSD Removal Instructions

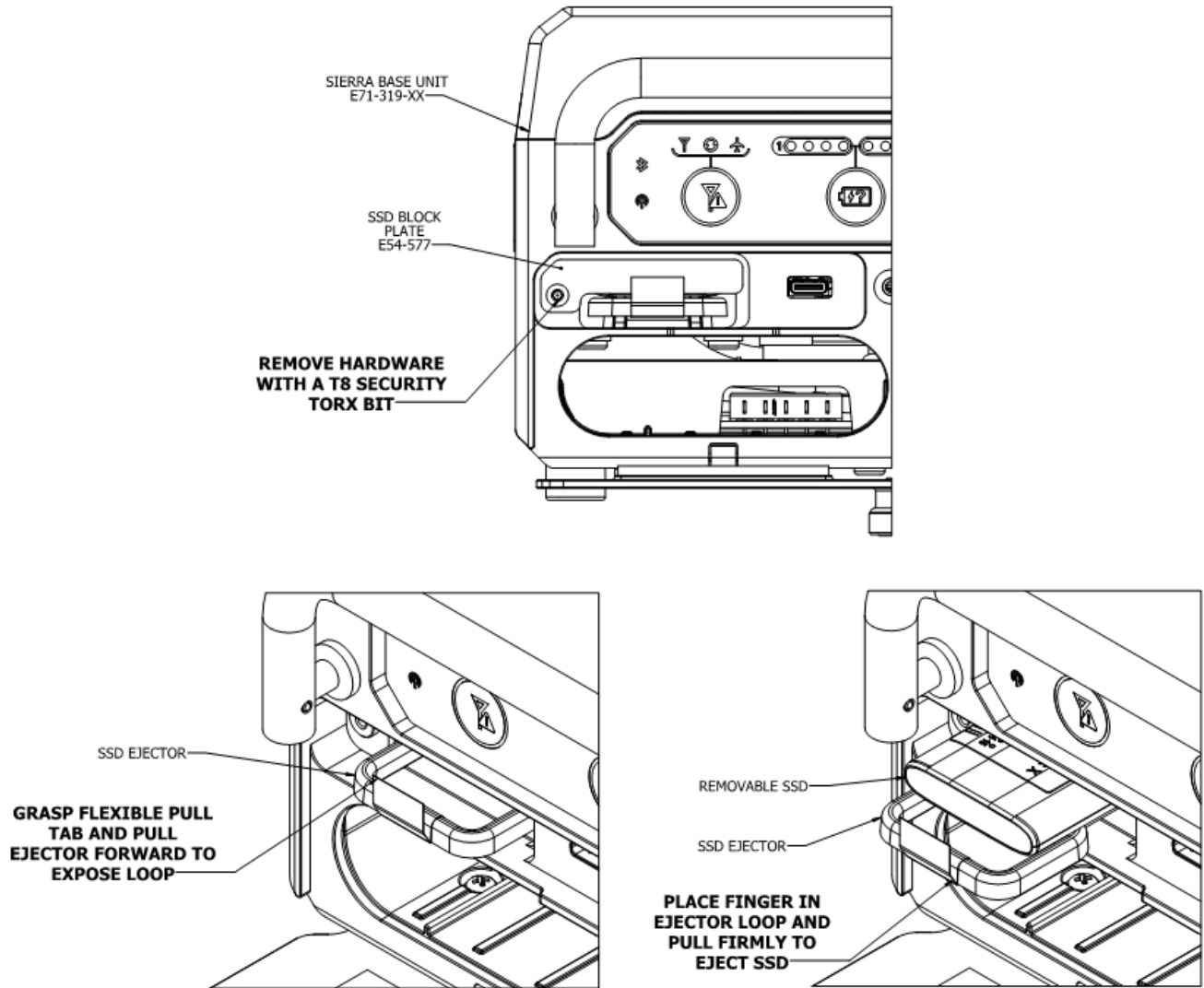
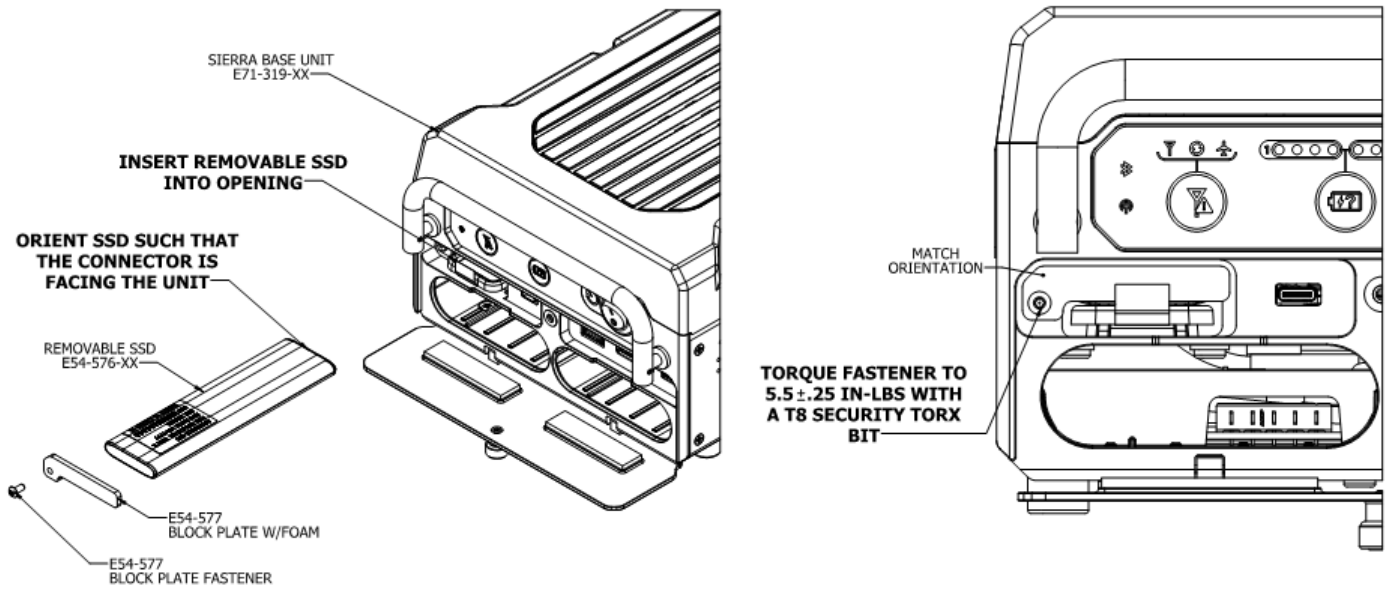


Figure 8-5: Removable SSD Ejection Instructions



Note: The SSD Block Plate is intended as a theft deterrent device. Usage is optional.

Figure 8-6: Removable SSD Installation Instructions

9 Performance Data

9.1 Aruba Wi-Fi Characteristics

Table 9-1: Radio Characteristics

Feature	Description
Supported Frequency Bands country-specific restrictions apply	-2.400 to 2.4835 GHz -5.150 to 5.250 GHz -5.250 to 5.350 GHz -5.470 to 5.725 GHz -5.725 to 5.850 GHz (Note: This band disabled for use in EU and cannot be enabled by the end user or installer.)
Operating Channels	Dependent on configured regulatory domain.
Supported radio technologies	-802.11b: Direct-sequence spread-spectrum (DSSS) -802.11a/g/n/ac: Orthogonal frequency-division multiplexing (OFDM)
Supported Modulation Types	-802.11b: BPSK, QPSK, CCK -802.11a/g/n/ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Transmit Power Adjustment	Software configurable in increments of 0.5 dBm.
Maximum Available Transmit Power**	Maximum (aggregate, conducted total) transmit power (limited by local regulatory requirements): -2.4GHz band: +21 dBm (18 dBm per chain) -5 GHz band: +21 dBm (18 dBm per chain) -Note: conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain + correlation gain.
Supported data rates (Mbps)	802.11b: 1, 2, 5.5, 11 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 802.11n: 6.5 to 300 (MCS0 to MCS15) 802.11ac: 6.5 to 867 (MCS0 to MCS9, NSS = 1 to 2) 802.11n high-throughput (HT) support: HT20/40 802.11ac very high throughput (VHT) support: VHT20/40/80 802.11n/ac packet aggregation: A-MPDU, A-MSDU
Wi-Fi Antennas	Two vertically polarized dual-band downtilt omni-directional antennas for 2x2 MIMO with peak antenna gain of 3.3dBi (2.4GHz) and 5.9dBi (5GHz) per antenna. Combining the patterns of both antennas per radio, the peak gain of the average (effective) pattern is 2.1dBi in 2.4GHz and 4.6dBi in 5GHz.

**The aggregate EIRP is limited to 20dBm (100mW).

Table 9-2: RF Performance Table

	Maximum transmit power (dBm) per transmit chain	Receiver sensitivity dBm per receive chain
802.11b 2.4GHz		
1 Mbps	18.0	-93.0
11 Mbps	18.0	-87.0
802.11g 2.4GHz		
6 Mbps	18.0	-90.0
54 Mbps	16.0	-73.0
802.11n HT20 2.4GHz		
MCS0/8	18.0	-90.0
MCS7/15	14.0	-71.0
802.11n HT40 2.4GHz		
MCS0/8	18.0	-87.0
MCS7/15	14.0	-68.0
802.11a 5GHz		
6 Mbps	18.0	-90.0
54 Mbps	16.0	-73.0
802.11n HT20 5GHz		
MCS0/8	18.0	-90.0
MCS7/15	14.0	-71.0
802.11n HT40 5GHz		
MCS0/8	18.0	-87.0
MCS7/15	14.0	-68.0
802.11ac VHT20 5GHz		
MCS0	18.0	-90.0
MCS9	12.0	-67.0
802.11ac VHT40 5GHz		
MCS0	18.0	-87.0
MCS9	12.0	-62.0
802.11ac VHT80 5GHz		
MCS0	18.0	-84.0
MCS9	12.0	-59.0

Note: Table shows the maximum hardware capabilities of the AP (excluding antenna and MIMO/MRC gain). Actual maximum transmit power may be limited below these numbers to ensure compliance with local regulatory requirements.

9.2 Country Codes

The IEEE 802.11/b/g/n Wi-Fi networks operate in the 2.4GHz spectrum and IEEE 802.11a/n operates in the 5.0GHz spectrum. The spectrum is divided into channels. The 2.4GHz spectrum is divided into 14 overlapping, staggered 20 MHz wireless carrier channels. These channels are spaced 5 MHz apart. The 5GHz spectrum is divided into more channels. The channels that can be used in a particular country differ based on the regulations of that country.

Table 9-3: Country Codes

Country	Code	Country	Code	Country	Code
Åland Islands	AX	Germany	DE	Nigeria	NG
Albania	AL	Ghana	GH	North Korea	KP
Algeria	DZ	Greece	GR	Northern Mariana Islands	MP
American Samoa	AS	Greenland	G	Norway	NO
Andorra	AD	Grenada	GD	Oman	OM
Angola	AO	Guam	GU	Panama	PA
Antigua and Barbuda	AG	Guatemala	GT	Papua New Guinea	PG
Argentina	AR	Guernsey	GG	Paraguay	PY
Armenia	AM	Haiti	HT	Peru	PE
Aruba	AW	Honduras	HN	Philippines	PH
Australia	AU	Hong Kong	HK	Poland	PL
Austria	AT	Hungary	HU	Portugal	PT
Azerbaijan	AZ	Iceland	IS	Puerto Rico	PR
Bahamas	BS	India	IN	Qatar	QA
Bahrain	BH	Indonesia	ID	Republic of Korea (South Korea)	KR
Bangladesh	BD	Iran	IR	Reunion	RE
Barbados	BB	Iraq	IQ	Romania	RO
Belarus	BY	Ireland	IE	Russia	RU
Belgium	BE	Islamic Republic of Pakistan	PK	Saint Barthelemy	BL
Belize	Z	Isle of Man	IM	Saint Helena	SH
Bermuda	BM	Israel	IL	Saint Kitts and Nevis	KN
Bolivia	BO	Italy	IT	Saint Lucia	LC
Bonaire, Sint Eustatius and Saba	BQ	Jamaica	JM	Saint Martin	MF
Bosnia and Herzegovina	BA	Japan	JP	Saint Pierre and Miquelon	PM
Botswana	BW	Jersey	JE	Saint Vincent and the Grenadines	VC
Brazil	BR	Jordan	JO	Samoa	WS
Brunei Darussalam	BN	Kazakhstan	KZ	San Marino	SM
Bulgaria	BG	Kenya	KE	Saudi Arabia	SA
Cambodia	KH	Kuwait	KW	Senegal	SN
Cameroon	CM	Laos People's Democratic Republic	LA	Serbia	RS
Canada	CA	Latvia	LV	Serbia and Montenegro	CS
Chad	TD	Lebanon	LB	Singapore	SG
Chile	CL	Liberia	LR	Slovak Republic	SK
Country	Code	Country	Code	Country	Code

China	CN	Liechtenstein	LI	Slovenia	SL
Colombia	CO	Lithuania	LT	Solomon Islands	SB
Comoros	KM	Luxembourg	LU	Somalia	SO
Congo	CD	Macau	MO	South Africa	ZA
Costa Rica	CR	Macedonia	MK	Spain	ES
Cote D'Ivoire	CI	Malaysia	MY	Sri Lanka	LK
Croatia	H	Maldives	MV	Svalbard and Jan Mayen	SJ
Cuba	CU	Mali	ML	Sweden	SE
Curacao	CW	Malta	MT	Switzerland	CH
Cyprus	CY	Maritime Forward Operating Base	MB	Syrian Arab Republic	SY
Czech Republic	CZ	Maritime Offshore	MMI	Taiwan	TW
Denmark	DK	Marshall Islands	MH	Thailand	TH
Dominican Republic	DO	Martinique	MQ	Trinidad and Tobago	TT
Ecuador	EC	Mauritania	MR	Tunisia	TN
Egypt	EG	Mauritius	MU	Turkey	TR
El Salvador	SV	Mayotte	YT	Uganda	UG
Estonia	EE	Mexico	MX	Ukraine	UA
Ethiopia	ET	Monaco	MX	United Arab Emirates	AE
Faroe Islands	FO	Mongolia	MC	United Kingdom	GB
Federated States of Micronesia	FM	Montenegro	ME	United States	US
Fiji	FJ	Montserrat	MS	Uruguay	UY
Finland	FI	Morocco	MA	US Virgin Islands	VI
France	FR	Nepal	NP	Uzbekistan	UZ
French Guiana	GF	Netherlands	NL	Vatican City	VA
French Polynesia	PF	New Caledonia	NC	Venezuela	VE
French Southern Territories	TF	New Zealand	NZ	Vietnam	VN
Gambia	GM	Nicaragua	NI	Yemen	YE
Georgia	GE	Niger	NE	Zimbabwe	ZW

10 Technical Data

10.1 Electrical and Environmental Specifications

The Sierra unit complies with all applicable FAA guidelines and regulations for a Portable Electronic Device (PED), and as such, is exempt from requiring formal RTCA/DO-160 airworthiness testing. Sierra meets the electrical and environmental test categories per Table 10-1.

Table 10-1: Engineering Test Matrix

Test Description	Specification	Section	Category	Required
Temperature ¹	DO-160G	4	-	-
Ground Survival Low Temperature Test (no Short Time Operating Low Temperature Test ²)	DO-160G	4.5.1	A1	Yes
Operating Low Temperature Test ³	DO-160G	4.5.2	A1	Yes
Ground Survival High Temperature Test (no Short Time Operating High Temperature Test ²)	DO-160G	4.5.3	A1	Yes
Operating High Temperature Test ⁴	DO-160G	4.5.4	A1	Yes
Altitude	DO-160G	4.6.1	A1	Yes
Decompression	DO-160G	4.6.2	A	Yes
Temperature Variation ^{1, 5}	DO-160G	5.3.1	B	Yes
Humidity	DO-160G	6.3.1	A	Yes
Operational Shock	DO-160G	7.2.1	A	Yes
Vibration - Random	DO-160G	8	S (Curve B2)	Yes
Electrostatic Discharge (ESD)	IEC 61000-4-2 Methods			Yes
Fire, Flammability	DO-160G	26	C	Yes

Notes:

¹ All temperature testing was performed with a shroud per ARINC 628 part 7.

² Not testing Short-Time Operating Low Temperature and Short-Time Operating High Temperature since temperature limits required are outside of the operating limit of the Sierra, as designed.

³ Modified the DO-160G, Section 4.5.2, Category A1, Operating Low Temperature, limit to -15°C to 0°C, as designed and described in the product specification, PS-E71-314.

⁴ Modified the DO-160G, Section 4.5.4, Category A1, Operating High Temperature, limit from +55°C to 50°C, as designed and described in the product specification, PS-E71-314.

⁵ Modified to perform only one cycle of the temperature profile.

10.2 Mechanical Design and Dimensions

The Sierra's metal components include a proper finish to offer maintenance-free service over the life of the Sierra. The Sierra's internal chassis, circuit cards, wiring and cabling, and other major components are mounted and secured to provide maximum protection against imposed shock and vibration.

10.2.1 Top View

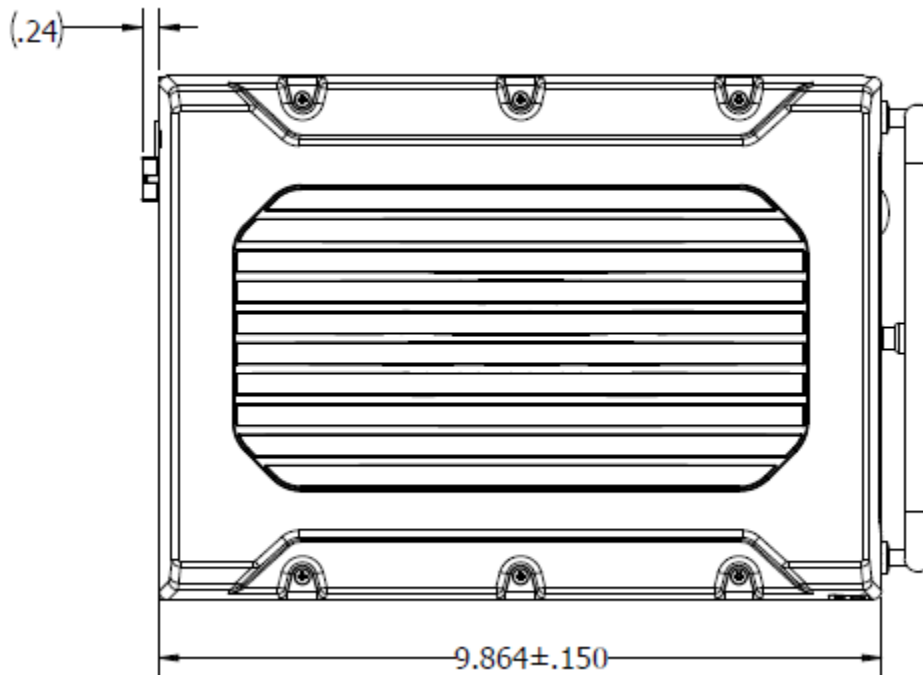


Figure 10-1: Sierra Top View

10.2.2 I/O Front View

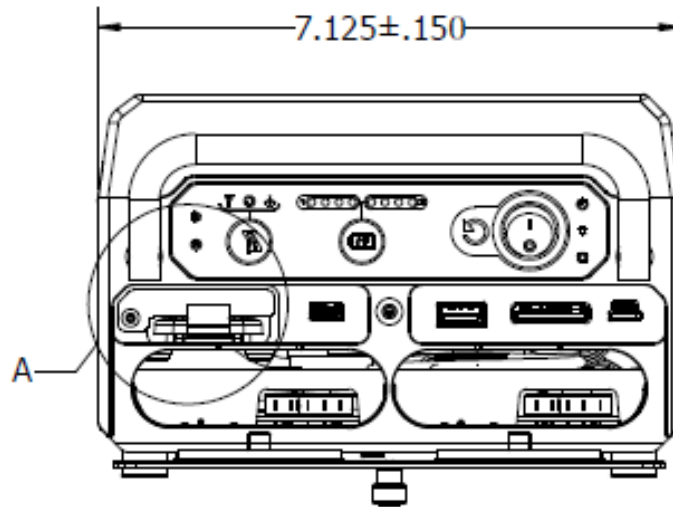


Figure 10-2: Sierra I/O Front View

10.2.3 Side View

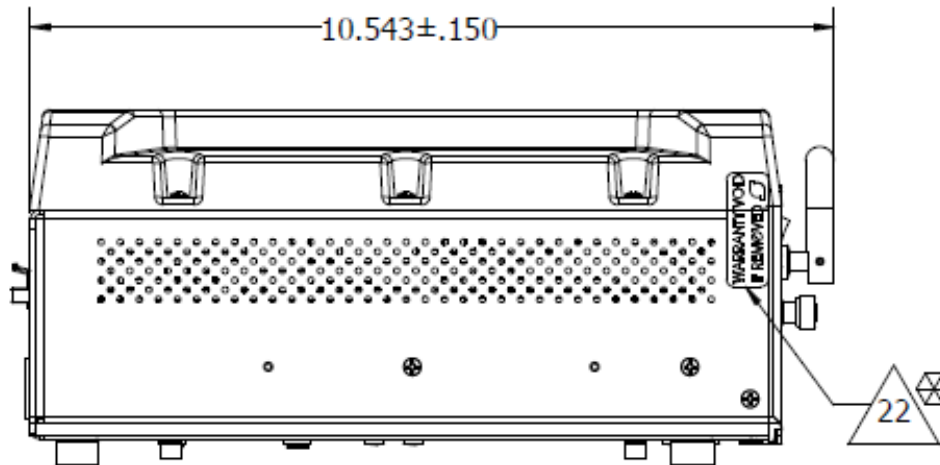


Figure 10-3: Sierra Side View

10.2.4 Rear View

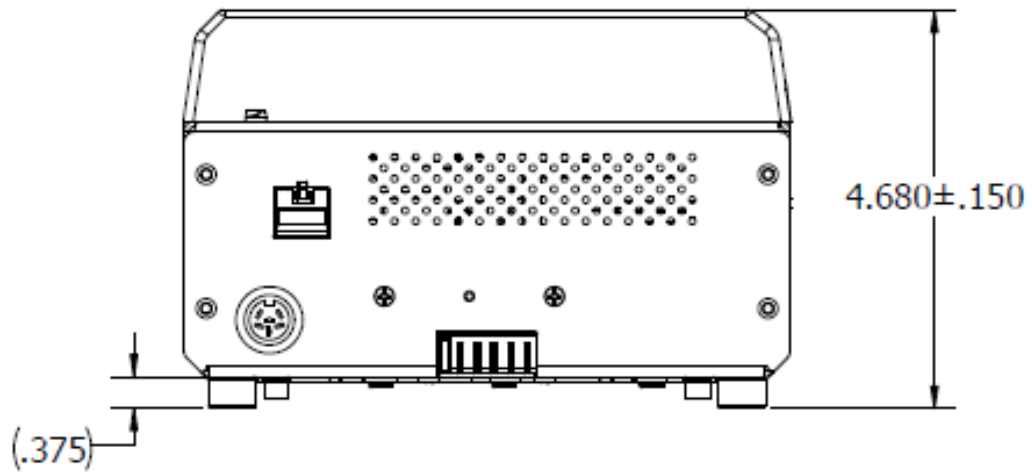


Figure 10-4: Sierra Rear View

10.2.5 Bottom View

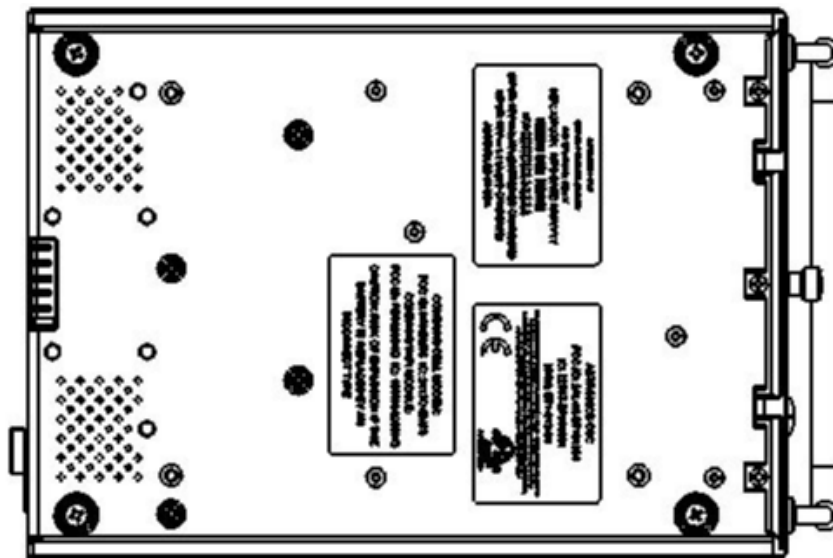


Figure 10-5: Sierra Bottom View

10.2.6 Product Identification

The Part Number Identification Label for each Sierra LRU is located on bottom panel and contains information as shown in Figure 10-5.

10.2.7 Finish and Color

The paint color of the Sierra is medium texture black.

10.2.8 Materials

All materials used in the construction of the Sierra are inherently non-nutrient to fungus and do not support combustion. The materials are of the best commercial quality and will not blister, corrode, crack, soften, or show other immediate latent defects that affect the storage, operation, or environmental capabilities of the unit after any or all of the tests specified.

Materials used in the Sierra have been selected in accordance with the appropriate flammability requirements of Code of Federal Regulations FAR-25.853a.

10.2.9 Weight

The Sierra weighs 7.3 lbs, which includes a full complement of two (2) Li-ion battery modules.

10.2.10 Cooling Characteristics

The Sierra is designed with passive cooling.

- Battery Powered:
Power Consumption: 15.76W nominal, 17.65W max
Current Draw: 1.09A nominal, 1.23A max
Input Voltage: 14.4V nominal
- Installation Powered (batteries not charging):
Power Consumption: 15.76W nominal, 17.65W max
Current Draw: 0.88A nominal, 0.98A max
Input Voltage: 18V nominal
- Installation Powered (with batteries charging):
Power Consumption: 178.0W nominal, 179.9W max
Current Draw: 9.89A nominal, 9.99A max
Input Voltage: 18V nominal
- AHM250PS19 Supply Powered (with batteries charging):
Power Consumption: 178.0W nominal, 179.9W max
Current Draw: 9.37A nominal, 9.47A max
Input Voltage: 19V nominal

10.2.11 Installation Limitations

The Sierra is intended to be installed in the bag bin of the cabin to provide adequate RF coverage of the Wi-Fi signal. The Sierra shall maintain a minimum air gap spacing as follows:

- Bottom (G1) = 0.00"
- Left (G2) = 1.00"
- Right (G3) = 1.00"
- Top (G4) = 1.00"
- Front (G5) = 1.00"
- Rear (G6) = 1.00"

Installations violating the above air gap spacing must be approved by Astronics CSC engineering.

There are no minimum installation distances between Sierras. The maximum distance shall be determined by aircraft type and configuration and content (e.g. throughput considerations).

Enclosures that fully encase the unit should be manufactured from materials that do not interfere with the operation of the unit's antennas. Transportable enclosures such as bags should include spacers to ensure these minimum air gaps are maintained at all times.

The air gaps listed above represent minimum required distances between the Sierra's surfaces and a hypothetical enclosure to ensure continued operation without overheating. Additional consideration should be given to the unit's front face to allow for access to the unit's battery bays, peripheral connections and the removable SSD if these elements are to be used while the unit is secured on the aircraft. The front door of the unit requires 1.75" of unobstructed area to open fully, and the batteries require a minimum of 6" of unobstructed area to be installed or removed. Allowance for these additional clearances may be satisfied by the addition of a door or a removable cover to the enclosure design.

10.3 Workmanship

Workmanship, including ANSI/IPC-A-620 soldering, is designed to meet ANSI/J-STD-002 and RTCA/DO-254.

10.4 Safety

The Sierra includes fuses on the system input power lines (Shurter Inc. P/N: 3413.0331.22, 63V, 20A), as well as additional fuses on the input power lines to the main system circuitry (Littelfuse P/N: RUEF300K-2, 30V, 3A), both to protect against over current conditions.

The Sierra is also be equipped with a temperature sensor (Texas Instruments P/N: LM75BIMM-3/NOPB) that can monitor the unit's internal temperature and be configured in software to inhibit operation in over-temperature and under-temperature conditions.

Furthermore, Sierra is equipped with two (2) (optional) Lithium Ion rechargeable Smart Battery Packs, which includes a management and safety unit to protect against under voltage, over voltage, overcurrent, over temperature, and short circuit conditions. The batteries comply with UL2054:2011 / UL1642:2009 and IEC62133:2012.

11 Reliability and Maintainability

11.1 Reliability

The Mean Time Between Failure (MTBF) for the Sierra is a minimum of 100,000 operating hours calculated using the RIAC 217+ (AIC, +30°C, 65% duty cycle, 2190 cycles per year).

11.2 Maintainability

The Sierra is considered an LRU and is repairable only by Astronics CSC or an authorized repair facility. Periodic maintenance of the Sierra is not required.

11.3 Mean Time to Repair (MTTR)

Repair time will not exceed 15 minutes, which entails replacement of the Sierra from its mounting points and disconnection of its electrical connectors..

11.4 Failure Detection and Fault Isolation

LED indicators located on the system enclosure provide functional status of the Sierra.

11.5 Production Testing

Production units are subjected to Environmental Stress Screening (ESS) and a production Acceptance Test Procedure (ATP) prior to shipment. These tests are intended to ensure that all elements of the product are functional and capable of performing at both high and low temperature extremes and that they are free of manufacturing defects. The Acceptance Test Procedure is run pre- and post-ESS to test the functional characteristics of the product.

12 Support and Service

12.1 Technical Support

For technical support, please contact support@Astronics.com.

12.2 Returning Defective Equipment

All equipment returned to Astronics CSC must have a Return Material Authorization (RMA) number assigned exclusively by Astronics CSC. Astronics CSC cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The Buyer accepts responsibility for all freight charges for the return of goods to the Astronics CSC designated facility. Astronics CSC will pay return freight charges back to the Buyer's location in the event that the equipment is repaired or replaced within the warranty period stipulated herewith.

Contact and Delivery Address

Astronics CSC
804 S. Northpoint Blvd.
Waukegan, IL 60085
Attn: RMA number

Revision History				
Date	Revision Level	Description of Change	Written By	Approved By
01-28-2020	A	Initial Release	Mike O'Connor	Chris Hinojosa
04-30-2020	B	Section 2.2: Updated Wi-Fi Transceiver FCC ID. Section 2.2.3.1: Updated the EU declaration of conformity URL. Added a statement regarding restriction to indoor use.	Volodya Vandakurov	Mike O'Connor