Solo PRO

User guide



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About

This user guide describes the LiveU Solo PRO SDI and the LiveU Solo PRO HDMI, and provides basic information for the operation of these units in the field. The guide describes the different hardware configurations and how to use them to broadcast live streaming video.



Advanced operations intended for technical personnel and system administrators are outside of the scope of this user guide.

Intended audience

This user guide is intended to be used by operators of the LiveU Solo PRO unit. We assume that operators have basic computer knowledge and are familiar with any video equipment being used (cameras, microphones and so on) and the infrastructure to which the LiveU Solo PRO units are connected.

What's new in version 9.72

This user guide describes the first Solo PRO version.

Introducing the LiveU Solo PRO

The LiveU Solo PRO is a compact, lightweight unit that allows you to transmit high-quality HD/SD video from diverse locations while adapting to dynamic network conditions.

There are two LiveU Solo PRO models: Solo PRO SDI and Solo PRO HDMI.



Solo PRO units combine high-quality video performance with bandwidth efficiency, delivering video of up to 4K resolution and with full 5G support.

The Solo PRO supports two external modems, internal WiFi and one Ethernet port.



The option to connect up to four external modems will be available in the near future.

LiveU's Reliable Transport (LRT) technology ensures the transmission of video over the most unreliable networks.

With LiveU's HEVC technology at its core, the LiveU Solo PRO enables streaming for web distribution, point-to-point, and point-to-multipoint destinations. Content creators can provide the same video quality as H.264 using about half the bandwidth.

In cases where the original H.264 bitrate is maintained, the Solo PRO offers greatly improved video quality.

Solo PRO box contents

Solo PRO units are delivered with the following cables and accessories.

- Liveu Solo PRO portable video uplink unit: SDI or HDMI
- Protective sleeve
- Cables:
 - AC/DC power adapter (16V/4A) 2.1mm RA (1.5m) and power cord
 Power cables are provided for USA, Europe and UK plugs



- HDMI pigtail (2.5m)
- USB2/M Left-angle to USDB2/F (1/4m)
- USB2/m Right-angle to USDB2/F (1.4m)
- Solo PRO Getting Started card and Warranty
- Some SOLO stickers

Overview of the Solo PRO

Solo PRO data flow

The LiveU Solo PRO - HDMI and SDI/HDMI models - supports two USB ports that power two external modems. It also provides one Wi-Fi and one Ethernet interface, bringing the total number of bonded network interfaces to four.



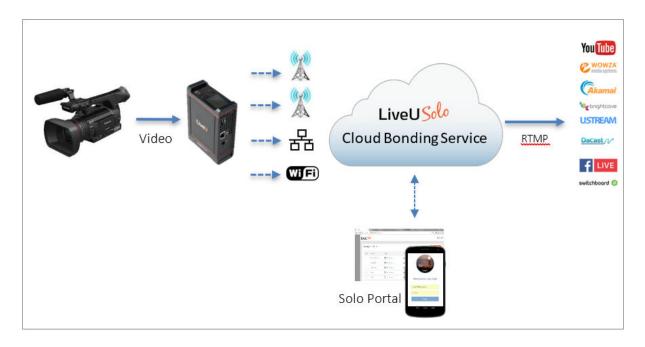
The Solo PRO currently supports up to two external modems. Support for four external modems, creating the potential for up to six bonded network interfaces, will be available in the near future.



On the right side of the Solo PRO, there is a flap under which there are slots for SIM cards. The SIM card slots are inactive in the Solo PRO, which supports only external modems.

When the LRT service is active, a total of four interfaces provides simultaneous bonding of more than one network and support increased bandwidth and resiliency when streaming from the field.

While the Solo PRO is powering on, it connects to its modems, Wi-Fi and Ethernet interfaces to various networks and combines their bandwidth into a single consolidated broadband uplink connection. The device then encodes incoming video into an H.264 stream and transmits it over the aggregated bandwidth to the cloud LRT service. LRT is converted to RTMP and streamed to the specified destination.



Solo PRO front panel

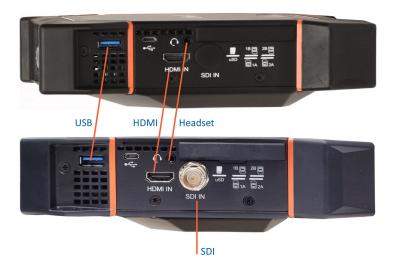
The following figure shows the Solo PRO's front panel.



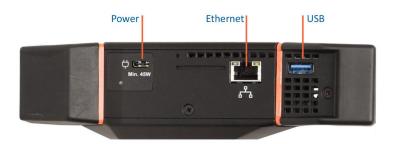
- **LCD screen**: Displays the streaming video
- **Power / Play**: Toggles between ON / OFF and starting / stopping transmission
- JOG: Navigates among the menu options.
- **Back**: Returns to the previous screen.

Solo PRO hardware connections

The following figure shows the right panel of the unit and the respective connections of the Solo PRO HDMI and the Solo PRO SDI.



The following figure shows the connections on the left panel of the Solo PRO.



Solo PRO workflow

The following flow chart gives an overview of the Solo PRO workflow.



Logging in to the Solo PRO portal

You use the Solo PRO portal to control and monitor the Solo PRO unit.

Using the portal, you can set destinations for your video stream, pause and restart streaming and view information about the stream.



We recommended that you always go live from the Solo PRO portal. Although you can start streaming by pressing the **Play** button on the unit's front panel, the portal supports additional functionality that might be required to activate related services, such as transcoding.

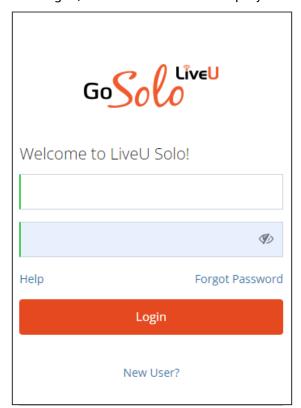
These services can be managed in the LiveU Solo portal only when the video stream is started in the Solo PRO portal.

To use the portal, you need to create an account and then register your Solo PRO unit.

Creating an account

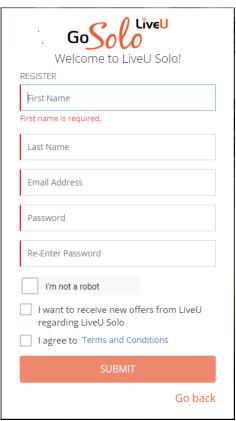
To create an account:

In your browser, go to https://solo.liveu.tv.
 The Login / New User screen is displayed.



Click New User?.

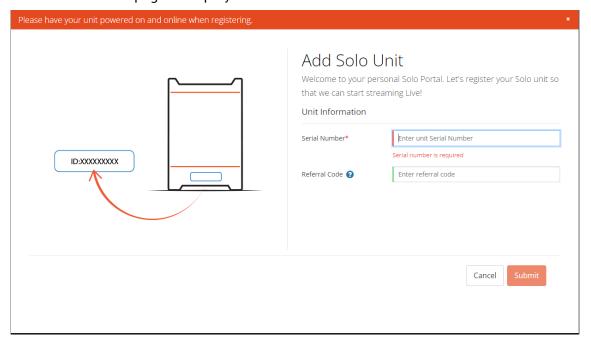
The Welcome to LiveU Solo! screen is displayed.



3. Fill in your personal details, and select I'm not a robot and I agree to Terms and Conditions, then click Submit.

An email is sent to the email address you provided, confirming that an account was opened in your name and asking you to click a link to verify that you created the account.

The Add Solo Unit page is displayed. .



Registering the Solo PRO

You need to repeat the registration process for each additional Solo PRO unit.

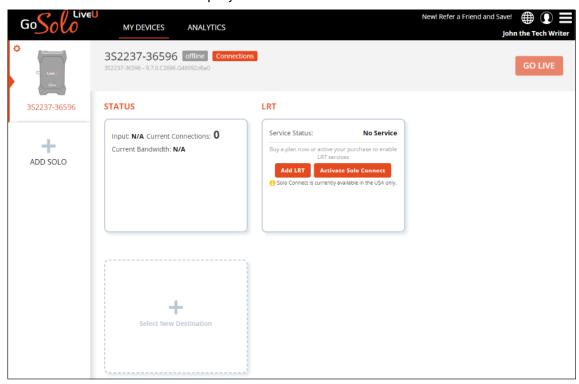
To register the Solo PRO:

1. In the Add Solo Unit area, type the unit's serial number in the **Serial Number** text box. The unit's serial number is on the back of the device.



- 2. If a friend has shared a referral code with you, type it into the **Referral Code** text box.
- 3. Click **Submit**.

The Solo PRO dashboard is displayed.



In this dashboard, you can:

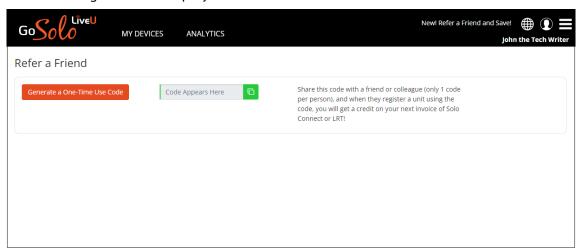
- Refer a friend
- Purchase LRT: LiveU Reliable Transport
- Register an additional Solo PRO device
- Select and manage your video streaming destinations
- Go Live: It is recommended that you begin streaming from the portal instead of directly from the Solo PRO unit
- Reboot the unit
- Rename the unit
- Remove the unit

Referring a friend

Sharing a code with a friend gives you credit on your next invoice of Solo PRO Connect (USA only) or LRT.

To refer a friend:

On the top right of the Solo PRO portal, click New! Refer a Friend and Save!
 The following screen is displayed.



2. Click Generate a One-Time Use Code.

The code appears in the green text box.

3. Click **Copy** and send the code to a friend or colleague.

The code can be used one time only.

A record of all your earlier refferrals is displayed in the screen.

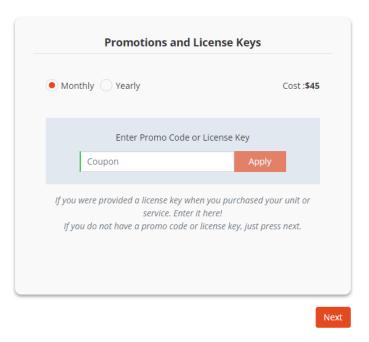
Purchasing LRT

An active LRT service enables simultaneous bonding of more than one network.

To purchase LRT:

1. Click Add LRT.

The following payment agreement screen is displayed.



- If you have a promo code or license key, type the characters into the text box and click Apply. Otherwise, click Next.
- 3. Select **Monthly** or **Yearly** and click the **+** sign.
- 4. Enter your details into the Payment Info screen and click **Next**.

 You are returned to the dashboard, where your purchase is confirmed. It can take up an one hour for LRT to be activated.

Registering an additional Solo PRO device



Clicking **+ ADD SOLO** returns you to the Add Solo Unit page where you repeat the registration process.

Selecting and managing video streaming destinations

You can set the destination for your video streams in the portal. If you're using LRT, the system determines in which zone your device is located.

To select and manage video streaming destinations:

Click + Select New Destination.

A list of all possible destinations is displayed.

- 2. Select a destination and sign in or register as required.
 - You can select multiple destinations.
- 3. To remove a destination, click the menu in the upper right corner to display the Manage Destinations page.
- 4. Select one or more destination and click **Delete**. The destination is removed from your list.

Rebooting the Solo PRO

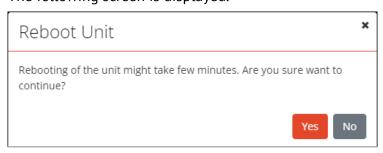
You can restart the unit from the portal.

To reboot the Solo PRO:

1. Click the **Power** button $\stackrel{\bullet}{\cup}$ on the left side of the screen.



The following screen is displayed.



2. Click **Yes** to confirm the reboot.

Renaming the unit

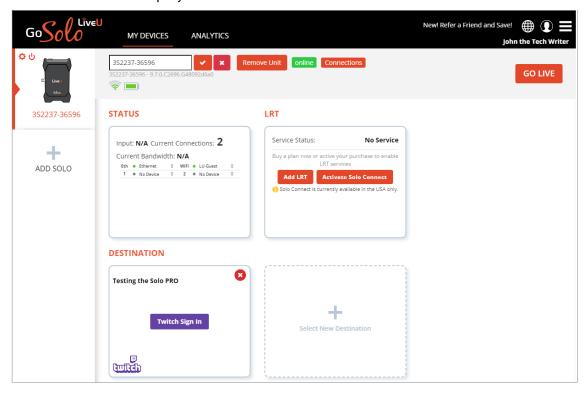
The unit's default name is its serial number. You can personalize the unit by assigning a new name to it.

To rename the unit:

1. Click the **Settings** Obutton on the left side of the screen.



The main screen is displayed.



- 2. In the text box where the serial number is displayed, type the unit's new name.
- Click the checkmark to confirm.

Removing a unit

When you remove a unit, you are cancelling your registration for that specific Solo PRO. The unit can then be registered by other users.

To remove a unit:

- 1. Click the **Settings** button on the left side of the screen.
- Click Remove Unit.
 A confirmation message appears.
- 3. Click Yes.

Powering on the Solo PRO



To power on the Solo PRO:

• Press the **Power** button with a short, sharp press.

The Home screen of the Solo PRO is displayed after about 20 seconds.

Ready is displayed at the bottom of the Home screen when the unit is connected to a network interface.

Shutting down the Solo PRO

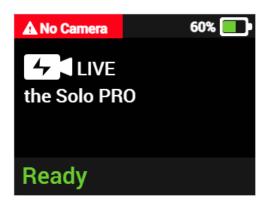


To shut down the Solo PRO:

- Press and hold the **Power** button.
 A **Hold to shut down** counter is displayed.
- 2. Continue pressing the **Power** button until the **Unit is shutting down** screen appears.

Around the Solo PRO Home screen

After powering on the Solo PRO, the Home screen is displayed.





The camera can be connected to the Solo PRO before or after powering on the unit. When connected, the video feed is automatically detected by the unit and is displayed in the preview screen.

- Alert: The cause of the alert is displayed next to
- Battery status:

Battery	Charge
	Battery is full
	The unit is connected to the power supply
	Battery is partially charged
	Battery is very low
	Battery is flashing red - charged less than 5%

- Bottom status bar: Indicates the status of the unit, as follows:
 - Offline: The unit is not connected to the network or is in the process of connecting to a network.
 - Ready: The unit is connected to the network and ready to stream.
- Streaming: The screen displays the following information:
 - Resolution and battery status
 - Video preview
 - Transmission rate

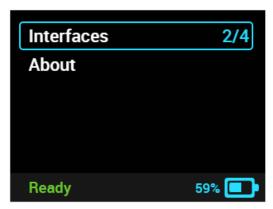


Using the Solo PRO interface

To use the Solo PRO interface:

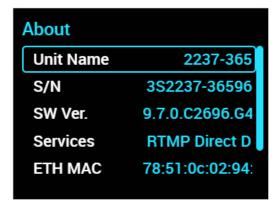
1. In the Home screen, press the JOG.

The Solo PRO main menu is displayed. Battery status is displayed at the bottom of the screen.



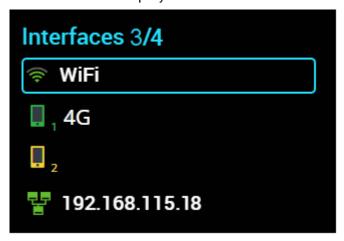
Turn the JOG clockwise to select **About** and then press the JOG.

The About screen displays information about the unit.



- 3. Do any of the following: .
 - Turn the JOG clockwise to move the selection bar down the screen, highlighting each item.
 - Turn the JOG anti-clockwise to move the selection bar up the screen or press Back
 to return to the main menu.

- 4. Turn the JOG anti-clockwise to select **Interfaces**.
- 5. Press the JOG to display the Interfaces screen.



See Configuring internet interfaces

Configuring internet interfaces

You can optionally connect to one or more of the Solo PRO's internet interfaces, which include up to two external cellular modems, and one Wi-Fi and Ethernet connection each. Each interface can be enabled or disabled separately.



The option to add two additional modems will become available in the near future.

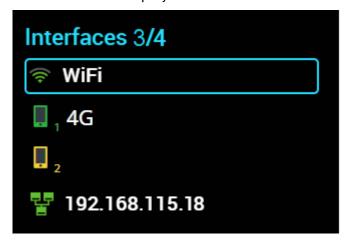
The following table describes the different network connections.

lcon	Description
	Wi-Fi
	Mobile network: The modem connected to the left panel is identified as 1. The modem connected to the right panel is identified as 2.
랼	Ethernet: Displays the IP address.

Accessing the Interfaces menu

To access the Interfaces menu:

- From the Solo PRO's Home screen, press the JOG.
 The Main menu is displayed. Interfaces is selected by default.
- 2. Press the JOG to display the Interfaces menu.



At the top of the Interfaces screen, the number indicates the number of active interfaces out of the total number of interfaces on the Solo PRO.

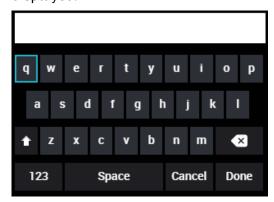
Configuring Wi-Fi

You navigate through the Wi-Fi options by turning the JOG clockwise / anti-clockwise to the required selection, then pressing the JOG joystick.

If you have previously connected to an available Wi-Fi network, you are now automatically reconnected.

To connect to Wi-Fi:

- 1. In the **Interfaces** menu, make sure that Wi-Fi is selected, then press the JOG.
- 2. Make sure that **Show list** is selected, then press the JOG.
- 3. Make sure **Select Network** is selected, then press the JOG. The unit scans for available networks.
- Select the required network, then press the JOG.
 If this is the first time you have connected to the selected network, the keypad is displayed.



- 5. In the keypad, turn the JOG to spell out your Wi-Fi password, pressing the button after each selected character.
- 6. Turn the JOG to **Done** and then press the JOG. You are now connected to Wi-Fi.

To disconnect from Wi-Fi:

• Press the JOG and then select **Forget**. Select a different network or select **Disable** to disconnect from the network.

Configuring a mobile network

You navigate through the mobile network options by turning the JOG clockwise / anticlockwise to the required selection, then pressing the JOG button.

The number of mobile network options depends on the number of modems connected to the Solo PRO.

You can connect up to two external modems to the USB ports on the right and left panels. The modems are connected with cables marked L/A to indicate that it is connected to the

USB port on the left panel, and R/A to indicate that it is connected to the USB port on the right panel.

The modem on the left panel is identified as 1. The modem on the right panel is identified as 2.

To connect to a mobile network:

- 1. In the **Interfaces** menu, turn the JOG to select one of the mobile network options, then press the JOG.
- 2. Make sure that **Mobile Networks** is selected, then press the JOG.
- 3. Do one of the following:
 - Press the JOG to scan the area for a network. Select a mobile operator from the list and press the JOG.
 - Turn the JOG to select Select Automatically, then press the JOG.

You are now connected to a mobile network.

To disable a mobile network:

• Turn the JOG to select **Disable Modem** and press the JOG. Turn the JOG to **Disable** and press the JOG to disconnect from the mobile network.

Configuring an Ethernet network

The LAN adapter included in Solo PRO is configured to use DHCP, a network protocol that automatically configures the Solo PRO to communicate on an IP network. If required, you can disable DHCP in the Solo PRO portal (see Managing network connections).

To connect to an Ethernet network:

Connect a LAN cable to the unit's Ethernet connector on the left side of the unit.
 You are now connected to a Local Area Network. The IP address is displayed immediately on the Interfaces screen.

You disconnect from the LAN when you remove the cable.

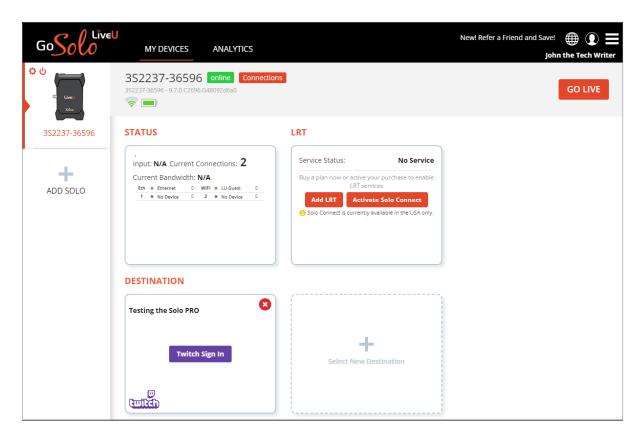
To disable an Ethernet network:

• Turn the JOG to select **Disable Ethernet** and press the JOG. Turn the JOG to **Disable** and press the JOG.

Managing network connections

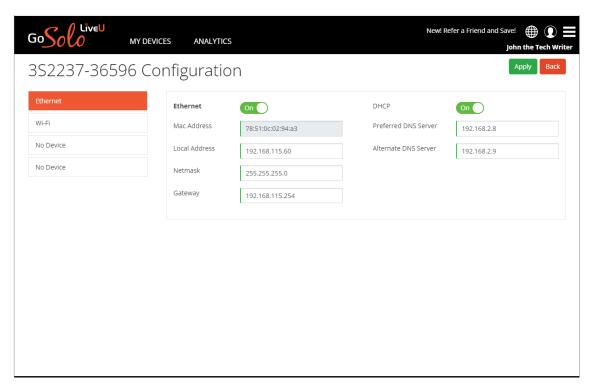
In the main screen of the Solo PRO portal, you can view and modify the status of your network connections.

At the top of the screen, the unit's battery status and the network interfaces to which you are connected are displayed.



To manage network connections:

At the top of the main screen, click **Connections**.
 The Configuration screen is displayed.



The screen displays information about your unit and your current network connections.

2. From the list on the left of the screen, select the network interface you want to view or modify.

Information about the selected network interface is displayed in the pane on the right.

3. Click **Apply** to confirm any changes.

Connecting modems to the Solo PRO

The Solo PRO unit is delivered with two USB cables used to connect up to two external modems to the unit.



The cables connect to the USB ports on the left and right panels of the unit. The cables are marked with L/A (left) and R/A (right) to indicate on which side of the unit to connect them.



The modem connected to the left panel of the unit is identified as 1. The modem connected to the right panel of the unit is identified as 2.



It is recommended to bind the modems into the elastic fasteners on the protective sleeve to keep them from moving around and potentially disconnecting from the unit during your live session.



Connecting the video camera

The camera can be connected either before or after powering on the Solo PRO.

Only one camera can be connected directly to the Solo PRO at one time. You cannot connect two cameras to both the SDI interface and to the HDMI interface at the same time.

You can remove the Solo PRO from the protective sleeve and mount the unit on the camera, using a camera mount.

To connect the video camera:

- 1. Connect one end of the camera cable to the Video Out port on the camera.
- 2. Connect the other end of the cable to either the HDMI or SDI interface on the Solo PRO.

You can connect a camera to only the HDMI interface or the SDI interface. Do not connect two cameras to each interface.

Charging the battery

The LiveU Solo contains an internal battery that enables up to three hours of standalone operation when fully charged. We recommend charging the battery for at least four hours before using the Solo PRO for the first time.

To charge the battery, plug the AC/DC power adapter into the Min. 45W power connector on the Solo PRO.



While charging, the LED next to the connector is red. When the battery is fully charged, this LED becomes green.

The battery charges even when the unit is turned on. It is good practice to keep the unit plugged into a power outlet when it is not in use to ensure it is charged and ready for operation at a moment's notice.

Safety information



- Do not disassemble this product.
- Do not remove its cover or its back. There are no user-serviceable parts inside.
- Refer servicing to qualified service personnel only.
- The use of controls, adjustments or procedures other than those specified in the guide may result in exposure to shock and/or electrical or mechanical hazards.
- The Solo PRO contains an internal battery that is not designed to be removed by users. Note the following guidelines:
 - Required operation rated temperatures:
 - Charging: -5 to +35 degrees C
 - Discharging mode operation: -5 to +45 degrees C
 - 10.5-17 VDC input powered operation: -5 to +45 degrees C
 - Avoid shorting the battery.
 - Do not immerse the unit in water.
 - Do not disassemble or deform the battery.
 - Do not expose the unit to fire and do not dispose of the unit and its internal battery in fire.
 - Avoid excessive physical shock or vibration of the unit.
 - Never use a unit that contains a battery that appears to have suffered abuse.
- Store the Solo PRO in an environment with low humidity that is free from corrosive gas, and in temperatures from -20°C to 60°C, < 80% RH.
- Use only the originally approved power supply adapter.
- Use only the supplied accessories. Accessories (including cables) must not be replaced.
- Do not use the product if there is any physical damage to the enclosure.
- Keep all air inlets and outlets free of any objects that may interfere with the air flow for at least 10 cm.
- It is normal for the product to become slightly hot during use. However, if the
 enclosure's temperature becomes unbearable to touch, turn the product off and contact
 support.
- Avoid leaving the product unprotected in direct sunlight for more than five minutes.
- Do not let the product come into contact with corrosive materials.
- Do not let the product come into contact with explosive or corrosive gas.

- Do not let the product come into contact with fire.
- To prevent fire or shock hazard, do not expose the product to rain, liquid or moisture. The product can be used in light rain while it is protected by the belt pouch. The product is not designed to be used under water.
- Only use the original LiveU pouch. Do not place the product in a non-LiveU bag.
- If the LCD screen breaks for any reason, do not touch the glass.

Potential Hazards

The Solo PRO uses external cellular devices that should be operated according to the same rules and limitations. Do not operate the unit in an environment that might be susceptible to radio interference resulting in danger, specifically:

Areas where prohibited by the law

Follow any special rules and regulations and obey all signs and notices. Always ensure that the enclosure is turned off (the power switch is not lit) when instructed to do so, or whenever it can cause interference or danger.

Where explosive atmospheres might be present

Do not operate the Solo PRO in any area where a potentially explosive atmosphere might exist. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death. Be aware and comply with all signs and instructions.

- It is not advisable to operate the Solo PRO at a refueling point or service station

 Observe restrictions on the use of radio equipment in fuel depots (fuel storage and distribution areas), chemical plants or where blasting operations are in progress.
- Areas with a potentially explosive atmosphere are often, but not always, clearly marked Potential locations can include gas stations, below deck on boats, chemical transfer or storage facilities, vehicles using liquefied petroleum gas (such as propane or butane), areas where the air contains chemicals or particles, such as grain, dust or metal powders, and any other area where it would normally be advisable to turn off a vehicle's engine.

Near medical and life support equipment

Do not operate the Solo PRO in any area where medical equipment or life support equipment exist, or near any equipment that may be susceptible to any form of radio interference. In such areas, the host communications device must be turned off. The Solo PRO could transmit signals that could interfere with this equipment.

On an aircraft, either on the ground or airborne

In addition to FAA requirements, many airline regulations state that wireless operations must be suspended before boarding an airplane. Ensure that the Solo PRO is turned off prior to boarding aircraft to comply with these regulations. The enclosure can transmit signals that could interfere with various onboard systems and controls.

While operating a vehicle

The driver or operator of any vehicle must not operate a wireless data device while in control of a vehicle. Doing so detracts the driver or operator's control and operation of that vehicle. In some countries, operating such communications devices while in control of a vehicle is an offense.

Regulatory Compliance

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:

- Reorient 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.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device must not cause harmful interference.
- This device must accept any interference received, including interference that might cause undesired operation.

FCC ID: Wifi Module - AW-CM389MA

Notice

English

This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) This device must not cause harmful interference, and
- (2) this device must accept any interference received, including interference that might cause undesired operation.

Additional testing and certification may be required for the end product with an embedded MC7455 module and are the responsibility of the OEM. LiveU offers professional services-based assistance to OEMs with the testing and certification process, if required.

Important

Because of 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 LiveU module are used in a normal manner with a well-constructed network, the LiveU module 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. LiveU and its affiliates accept no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the LiveU module, or for failure of the LiveU module to transmit or receive such data.

Device	Technology	Frequency (MHz)	EIRP Limit (dBm)
Collocated transmitters ¹	WLAN	2400-2500	25
		5150-5850	27
	WiMAX	2300-2400	25
		2500-2700	25
		3300–3800	25
	ВТ	2400-2500	15

Valid collocated transmitter combinations: WLAN+BT; WiMAX+BT. (WLAN+WiMAX+BT is not permitted.)



This device conforms to the EU harmonization legislation Radio Equipment Directive (RED): 2014/53/EU:

Standards Compliance

CE		
EMC	ETSI EN 301 489-1 V2.1.1	
	ETSI EN 301 489-7 V1.3.1	
	ETSI EN 301 489-17 V3.1.1	
Safety	IEC/EN 60950-1 A2:2013	
	CB Scheme	
Radio	EN 300 328 V2.1.1	
	EN 301893 V2.1.1	
	EN 301 908-2 V11.1.1	
	EN 301 908-13 V11.1.1	
FCC/Canada		
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	FCC rules part 22H//24E/27/90	

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