



Milesight-Troubleshooting

AloT Camera

Version	1.0	Update	2022.9.22
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1. Introduction of AIoT Camera

Milesight AIoT Pro Bullet Plus Network Camera is our newest member of the 5G Series. Offering IoT technology, AI deep learning, compact structure and more, Milesight AIoT Pro Bullet Plus Network Camera builds a whole new world by combining high-tech with high-performance. IoT is an advanced function which allows to get information of any things need to be monitored, connected and interacted in real-time via various technologies and devices, like sensor and RFID to smartly realize perceiving, recognizing and managing things.

This article will introduce the basic configuration of AIoT Camera, so that you can quickly learn to use our AIoT Camera.

Note: For more information about how to configure 5G, please refer to *Milesight-Troubleshooting-5G AI Camera*

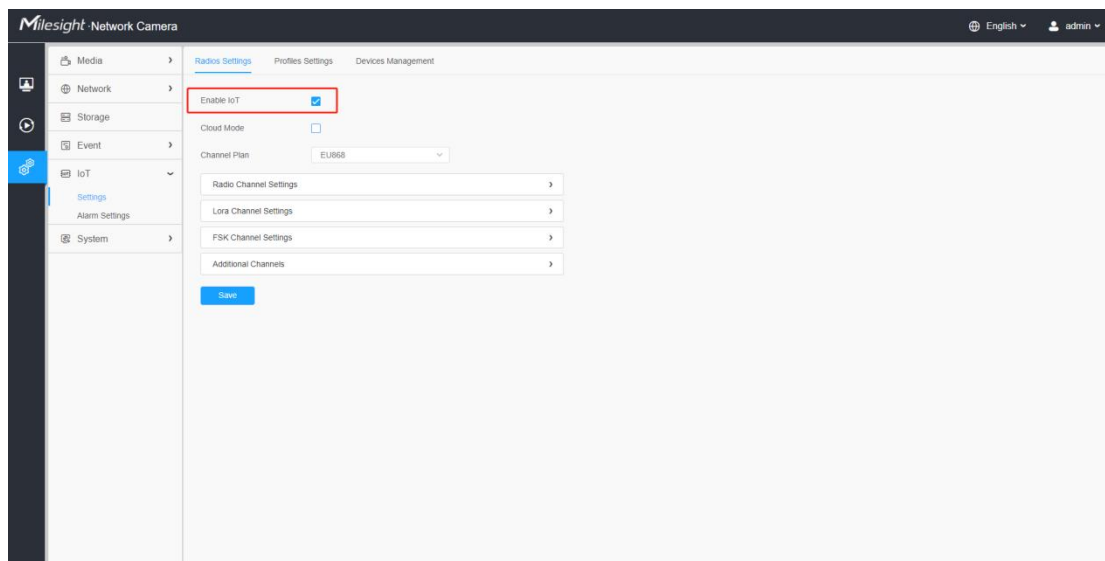
Released Model	
	Milesight 5G AIoT 4X/12X Pro Bullet Plus Network Camera
	Milesight AIoT 12X Pro Bullet Plus Network Camera

2. How to Set IoT

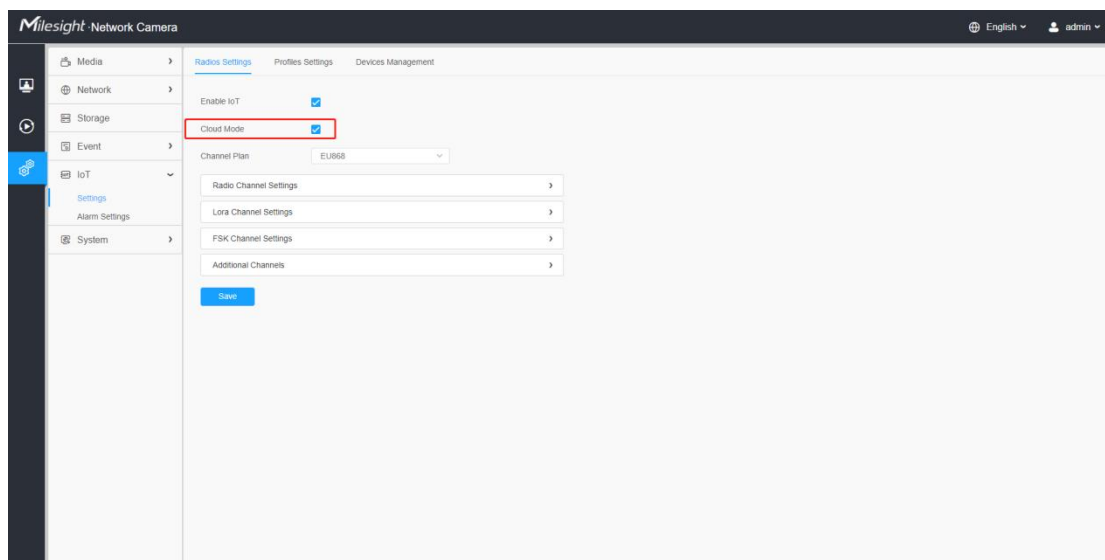
1) Device Settings

① Radios Settings

Step 1: After logging into the web, go to **"Settings"**→ **"IoT"**→ **"Settings"**. Check the checkbox "Enable IoT", and IoT function will be enabled.



Step 2: Check the checkbox to enable Milesight IoT Cloud management so that you can have a central management for devices.

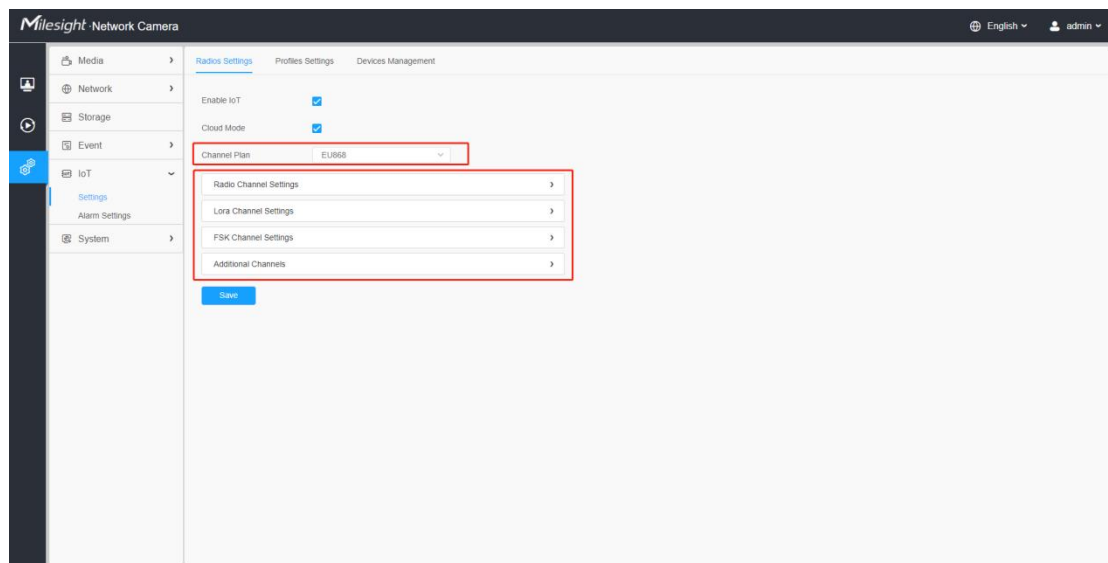


Step 3: Configure Radios Settings.

Currently our IoT camera supports **three IoT frequency bands of 915M** (The corresponding channel plan is **US915/AU915/KR920/AS923/AS923-2**), **868M** (The corresponding channel plan is **IN865/EU868/RU864**) and **470M** (The corresponding channel plan is **CN470**). Before buying the camera, you need to contact our sales to choose the frequency band that is supported in your country.

For example, here I choose the IoT camera with the frequency bands of **868M** or reference document regional parameters for LoRaWAN, and it will show that the current channel plan is **EU868** on the camera's web.

Note: Usually you can directly use the default settings without configuring Radio Settings. If you need to customize some radio settings, you can make further settings as shown below.



Please refer to the meaning of the options as follows:

Parameters		Function Introduction
Channel Plan		The required Channel Plan can be selected according to the country region. For example, here I choose the IoT camera with the IoT frequency band of 915M, then it will list all the channel plans supported by this frequency band, including US915, AU915, AS923, AS923-2 and KR920, then I need to select the corresponding channel plan.
Channel Mask		<p>Enabled frequencies are controlled using channel mask. Leave it blank means using all the default standard usable channels specified in the LoRaWAN® regional parameters document. A bit in the ChMask field set to 1 means that the corresponding channel can be used for uplink transmissions if this channel allows the data rate currently used by the end-device. A bit set to 0 means the corresponding channels should be avoided.</p> <p>Note: This option is optional for CN470, US915 and AU915.</p>
Radio Channel Settings	Center Frequency of Radio 0	<p>Supports transmitting and receiving packet;</p> <p>Note: For details of default value and configuration ranges in different regions, please refer to Appendix 1 at the end of this document.</p>
	Center Frequency of Radio 1	<p>Only supports receiving packet from nodes;</p> <p>Note: For details of default value and configuration ranges in different regions, please refer to Appendix 2 at the end of this document.</p>
	Multi-channel list	The radio and frequency corresponding to all channels will be listed here. All channels are enabled by default. You can also check the box to enable the corresponding channel.

		<table><tr><th><input checked="" type="checkbox"/></th><th>Channel</th><th>Radio</th><th>Frequency/MHz</th></tr><tr><td><input checked="" type="checkbox"/></td><td>1</td><td>Radio 0 ▾</td><td>868.9</td></tr><tr><td><input checked="" type="checkbox"/></td><td>2</td><td>Radio 0 ▾</td><td>869.1</td></tr><tr><td><input checked="" type="checkbox"/></td><td>3</td><td>Radio 0 ▾</td><td>869.3</td></tr><tr><td><input checked="" type="checkbox"/></td><td>4</td><td>Radio 1 ▾</td><td>867.3</td></tr><tr><td><input checked="" type="checkbox"/></td><td>5</td><td>Radio 1 ▾</td><td>867.5</td></tr><tr><td><input checked="" type="checkbox"/></td><td>6</td><td>Radio 1 ▾</td><td>867.7</td></tr><tr><td><input checked="" type="checkbox"/></td><td>7</td><td>Radio 1 ▾</td><td>867.9</td></tr><tr><td><input checked="" type="checkbox"/></td><td>8</td><td>Radio 1 ▾</td><td>868.1</td></tr></table>	<input checked="" type="checkbox"/>	Channel	Radio	Frequency/MHz	<input checked="" type="checkbox"/>	1	Radio 0 ▾	868.9	<input checked="" type="checkbox"/>	2	Radio 0 ▾	869.1	<input checked="" type="checkbox"/>	3	Radio 0 ▾	869.3	<input checked="" type="checkbox"/>	4	Radio 1 ▾	867.3	<input checked="" type="checkbox"/>	5	Radio 1 ▾	867.5	<input checked="" type="checkbox"/>	6	Radio 1 ▾	867.7	<input checked="" type="checkbox"/>	7	Radio 1 ▾	867.9	<input checked="" type="checkbox"/>	8	Radio 1 ▾	868.1
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<input checked="" type="checkbox"/>	8	Radio 1 ▾	868.1																																			
LoRa Channel Settings	Enable	Enable/Disable the LoRa Channel.																																				
	Radio	Choose Radio 0 or Radio 1 as center frequency.																																				
	Frequency	Enter the frequency of this channel. For example: 1. The frequency range formula of US915 and AU915: Center frequency ± 0.55 ; 2. The frequency range formula of other regions (except US915 and AU915): Center frequency ± 0.4625 ; For example, the center frequency is configured with 867.5, then the frequency range corresponding to each channel: 867.5-0.4625~867.5+0.4625.																																				
	Bandwidth	Enter the bandwidth of this channel. 125KHz, 250KHz and 500KHz are available. The default option is 250KHz; Note: The default option is 500KHz for AU915 and US915.																																				
	Data Rate	From SF7 to SF12, the transmission rate decreases and the transmission distance increases. In general, the range of Data Rate is SF7 ~ SF12, the default value would be SF7. Only the default value of the Channel Plan AU915 and US915 is SF8.																																				
FSK Channel Settings	Enable	Enable/Disable the FSK Channel.																																				
	Radio	Choose Radio 0 or Radio 1 as center frequency.																																				
	Frequency	Enter the frequency of this channel.																																				
	Bandwidth	Enter the bandwidth of this channel. 125KHz, 250KHz and 500KHz are available. The default option is 125KHz. Note: The default option is 250KHz for AU915 and US915.																																				
	Data Rate	Enter the data rate. The Date Rate must be between 500~250000.																																				
Additional Channels	<div>Add</div>	For some regional variants, if allowed by your LoRaWAN® region, you can use Additional Plan to configure additional channels undefined by the LoRaWAN® Regional Parameters, like EU868 and KR920; Note: If you choose the channel plan as CN470, AU915 and US915, additional channels are not supported.																																				

Note: The configurations here should be the same with those in End Device.

② Devices Management

Step 4: Add and manage End Devices.

Please refer to the meaning of the options as follows:

Parameters	Function Introduction
Device Name	Customize the device name.
Device EUI	Fill in Device EUI which can be obtained from the device label. You can also get Device EUI from Milesight Tool Box if you use Milesight Lora Sensor.
Device-profile	<p>Usually you can use the default settings without configuring Profiles Settings. If you need to customize some profiles settings, you can click the Edit button to make further settings and click save button, it will list the Device-profiles you created.</p> <p>Please refer to the meaning of the options as follows:</p> <p>[Name]: Customize the profile name.</p> <p>[Max TXPower]: Enter the maximum transmit power. The TXPower indicates power levels relative to the Max EIRP level of the end-device. 0 means using the max EIRP. EIRP refers to the Equivalent Isotropically Radiated Power. The Max TXPower must</p>

	<p>be between 0~16.</p> <p>[Join Type]: OTAA and ABP are optional, the default option is OTAA.</p> <p>➤ OTAA: Over-the-Air Activation.</p> <p>For over-the-air activation, end-devices must follow a join procedure prior to participating in data exchanges with the network server. An end-device has to go through a new join procedure every time as it has lost the session context information.</p> <p>➤ ABP: Activation by Personalization.</p> <p>Under certain circumstances, end-devices can be activated by personalization. Activation by personalization directly ties an end-device to a specific network bypassing the join request - join accept procedure.</p> <p>[Class Type]: Device type is Class A by default. Users can check the box of Class B or Class C to add the class type.</p> <p>[MAC Version]: Choose the version of the LoRaWAN® supported by the end-device. 1.0.0/1.0.1/1.0.2/1.1.0 are optional, the default option is 1.0.2.</p> <p>[Regional Parameters Revision]: Revision of the Regional Parameters document is supported by the end-device. A and B are optional, the default option is B.</p> <p>[RX1 Data Rate Offset]: The offset used for calculating the RX1 data-rate is based on the uplink data-rate.</p> <p>[RX2 Data Rate]: Enter the RX2 datarate which is used for the RX2 receive-window.</p> <p>[RX2 Channel Frequency]: RX2 channel frequency is used for the RX2 Frequency receive-window.</p> <p>[Frequency List]: List of factory-preset frequencies. The range is based on what is specified in the LoRaWAN® regional parameters document.</p>
Application Key	<p>Whenever an end-device joins a network via over-the-air activation, the application key is used to derive the Application Session key. It is mainly used to generate corresponding Device Address/Network Session Key/Application Session Key.</p> <p>Note:</p> <ol style="list-style-type: none"> 1. The default key can be obtained from the end-device; 2. Milesight Sensors' default key is 5572404c696e6b4c6f52613230313823.
Device Address/Network Session Key/Application Session Key	<p>Information needed to access the network. If you choose ABP network access mode, you need to fill in these items. And you can obtain them from End Device. For example, you can get such information from Milesight Tool Box when you use Milesight Lora Sensor.</p> <p>Device Address: The device address identifies the end-device within the current network.</p> <p>Network Session Key: The network session key is specific for the end-device. It is used by the end-device to calculate the MIC or part of the MIC (message integrity code) of all uplink data messages to ensure data integrity.</p> <p>The default key of Milesight Sensor is 5572404c696e6b4c6f52613230313823.</p> <p>Application Session Key: The AppSKey is an application session key specific for the end-device. It is used by both the application server and the end-device to encrypt and decrypt the payload field of application-specific data messages.</p>

	The default key of Milesight Sensor is 5572404c696e6b4c6f52613230313823.
Uplink Frame-counter	Calculate the number of uplink frames sent from End Device to network server. This count is increased and received by the End Device. The default value is 0.
Downlink Frame-counter	The number of data frames which sent uplink to the network server. It will be incremented by the end-device and received by the end-device. Users can reset the personalized end-device manually, then the frame counters on the end-device and the frame counters on the network server for that end-device will be reset to 0. The default value is 0.
Device Type	Select the device type according to the actual situation. Lora Sensor and Lora Sensor Node are optional. Lora Sensor is a kind of sensor that supports LoraWAN protocol, while Lora Sensor Node is a kind of device which receives data from interfaces of RS485, AI and GPIO.
Font Color	Configure the OSD font color.
Font Size	Configure the OSD font size.

Note:

1. Device Name and Device EUI cannot be repeated.
2. Device EUI, Application Key, Device Address, Network Session Key and Application Session Key should be consistent with the configuration of End Device.
3. Uplink Frame-counter and Downlink Frame-counter can be reset only in ABP mode.

Step 4: Sensor Settings. You can enter sensor configuration page by clicking [Sensor](#). After the configuration is finished, you can click [Save](#) to save your configuration or click [Cancel](#) to cancel your configuration.

LoRa Sensor Sensor Settings

Sensor ID: 1

Sensor Type: Temperature Sensor

Sign: ☐

Decimal Point Forward: 0

Unit: °C

Show OSD: ☐

[Save](#) [Cancel](#)

LoRa Node **Sensor Settings** ✕

RS485

Port Type: RS485

Channel ID: 1

Sensor Type: Temperature Sensor

Sign: ☐

Decimal Point Forward:

Unit: °C

Show OSD: ☐

Save **Cancel**

Port Type	Channel ID	Sensor Type	Operation
RS485	5	Temperature Sensor	

LoRa Node **Sensor Settings** ✕

GPIO

Port Type: RS485

Channel ID: 1

Sensor Type: Temperature Sensor

Sign: ☐

Decimal Point Forward:

Unit: °C

Show OSD: ☐

Save **Cancel**

Port Type	Channel ID	Sensor Type	Operation
RS485	5	Temperature Sensor	
GPIO	GPIO 2	Temperature Sensor	

Only AI of LoRa Node **Sensor Settings** ✕

Port Type: RS485

Channel ID: 1

Sensor Type: Temperature Sensor

Sign: ☐

Decimal Point Forward:

Unit: °C

Show OSD: ☐

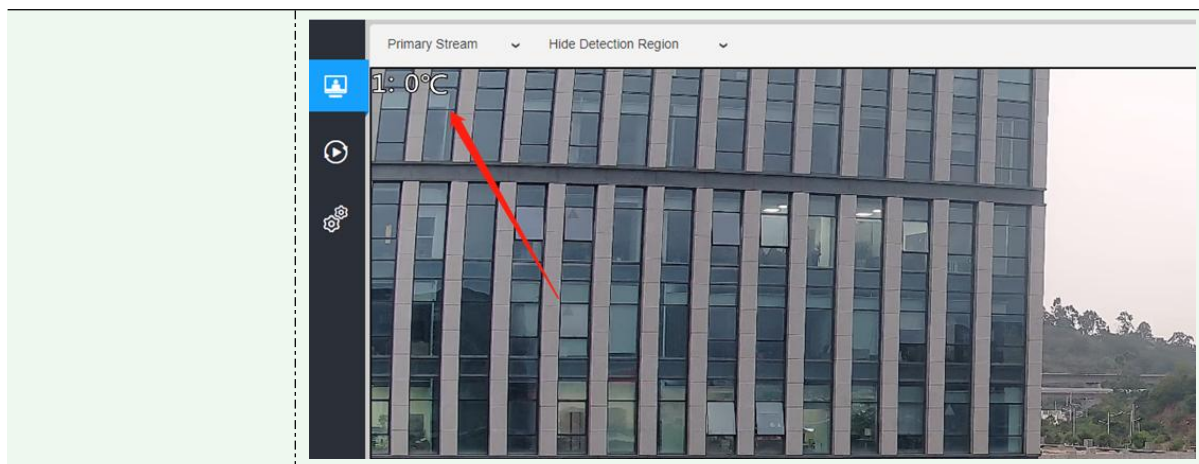
Save **Cancel**

Port Type	Channel ID	Sensor Type	Operation
RS485	5	Temperature Sensor	
GPIO	GPIO 2	Temperature Sensor	
AI	AI 1	Temperature Sensor	


Please refer to the meaning of the options as follows:

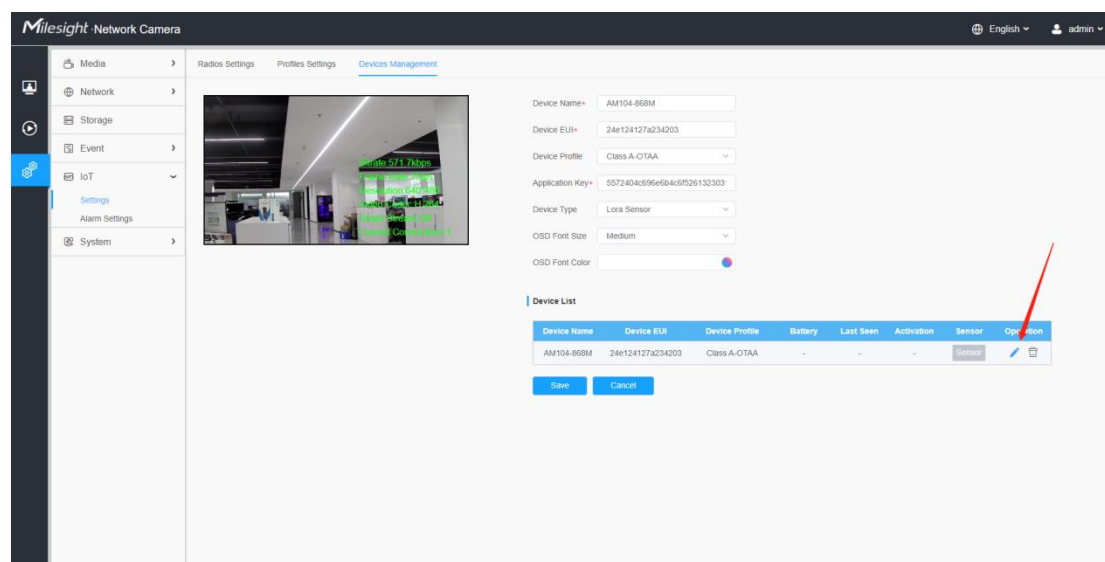
Parameters	Function Introduction
Sensor ID	Select the Sensor ID that you want to configure. The number of sensor IDs depends on how many kinds of data the sensor has and there is a one-to-one relationship between ID and data.
Port Type	Select the correct port type according to the actual situation. RS485, GPIO and AI are available. Note: Only for LoRa Node;
Channel ID	Select the Channel ID that you want to configure. There are eight Channel IDs for each kind of interface.
Osh	The high value of the device range. Note: Only AI of LoRa Node;
Osl	The low value of the device range.


Sensor Type	<p>Note: Only AI of LoRa Node;</p> <p>Sensor Type configuration. We have several common used sensor types as shown below:</p> <div data-bbox="496 327 821 844"><p>Temperature Sensor</p><p>Humidity Sensor</p><p>Dust Sensor(PM2.5)</p><p>Dust Sensor(PM10)</p><p>Water Level Sensor</p><p>Speed Sensor</p><p>Weight Sensor</p><p>Photoelectric Sensor</p><p>Vibration Sensor</p><p>Pressure Sensor</p><p>Other</p></div> <p>Or you can also customize it:</p> <div data-bbox="496 911 1021 1467"><p>Sensor Settings</p><p>Sensor ID: 1</p><p>Sensor Type: CO2</p><p>Sign: <input type="checkbox"/></p><p>Decimal Point Forward: 0</p><p>Unit: °C</p><p>Show OSD: <input checked="" type="checkbox"/></p><p>Save Cancel</p></div>
Sign	The tick indicates that the value has a plus or minus sign.
Decimal Place	Decimal configuration. For example, when you fill in 1, you are moving the decimal point one to left, and you get a decimal.
Unit	Data unit configuration. We have some common units here and users can also customize it.
Show OSD	As the picture shown below, once you enable this function, you can see the detected data on the screen.

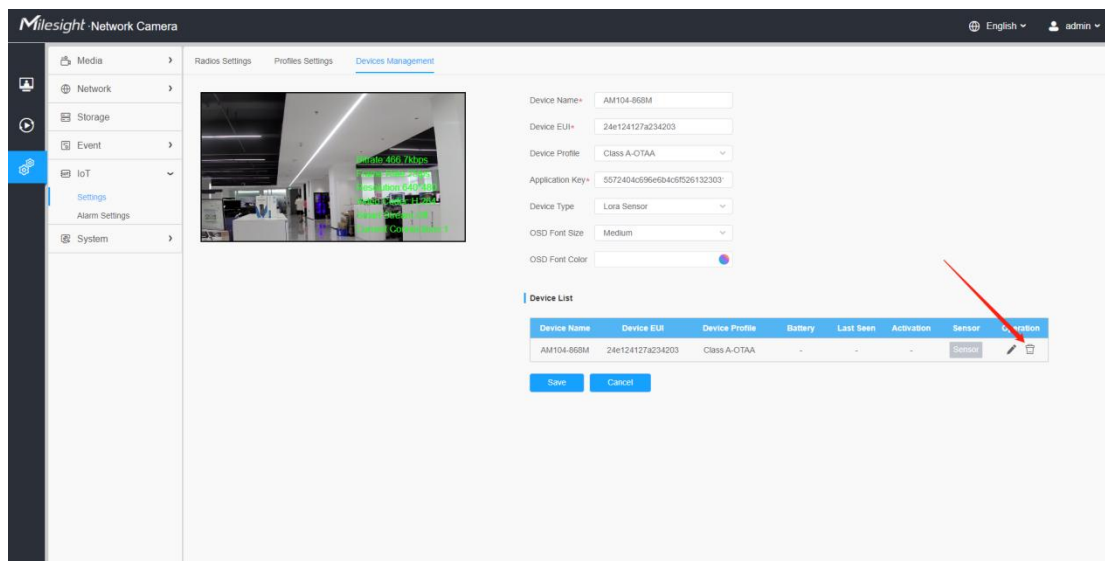
**Note:**

1. The channel ID and Sign should be consistent with those in End Device.
2. Decimal Place is set according to the properties of the sensor. For example, you need to set this value to 1 to get the correct temperature when using the Milesight temperature sensor.

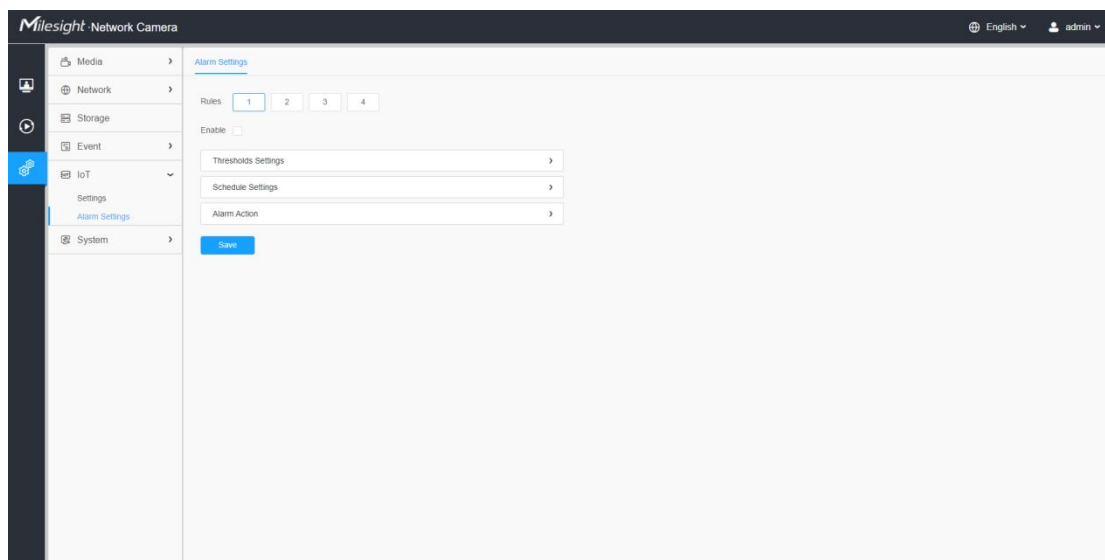
Step 5: You can click  to modify the configuration in End Device Management.



Step 6: You can click  to delete the device you added.

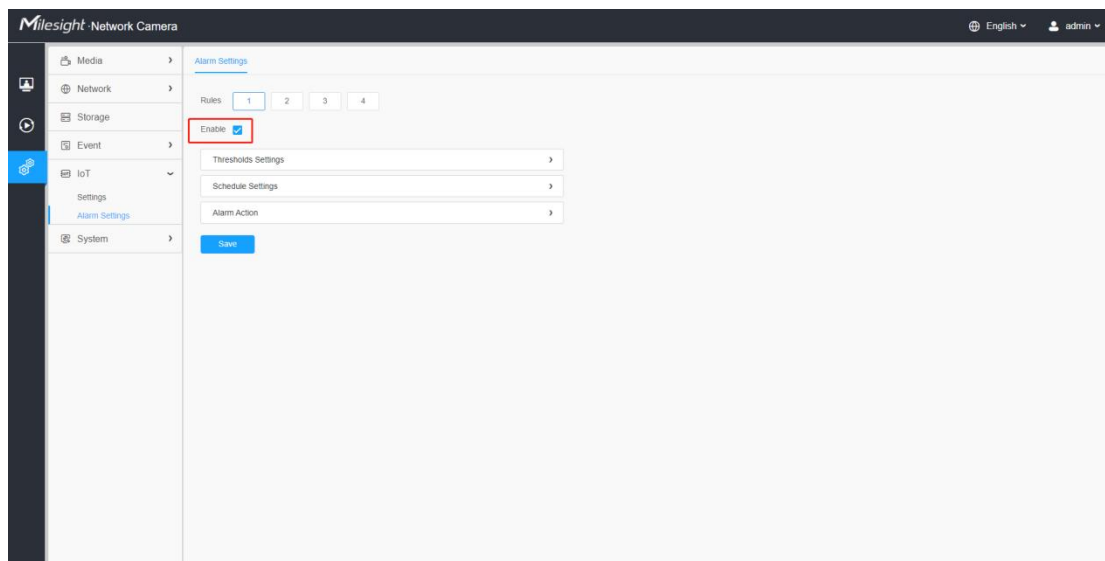


2) Alarm Setting



Step 1: Select the alarm rule that you want to set and you can configure four kinds of rules.

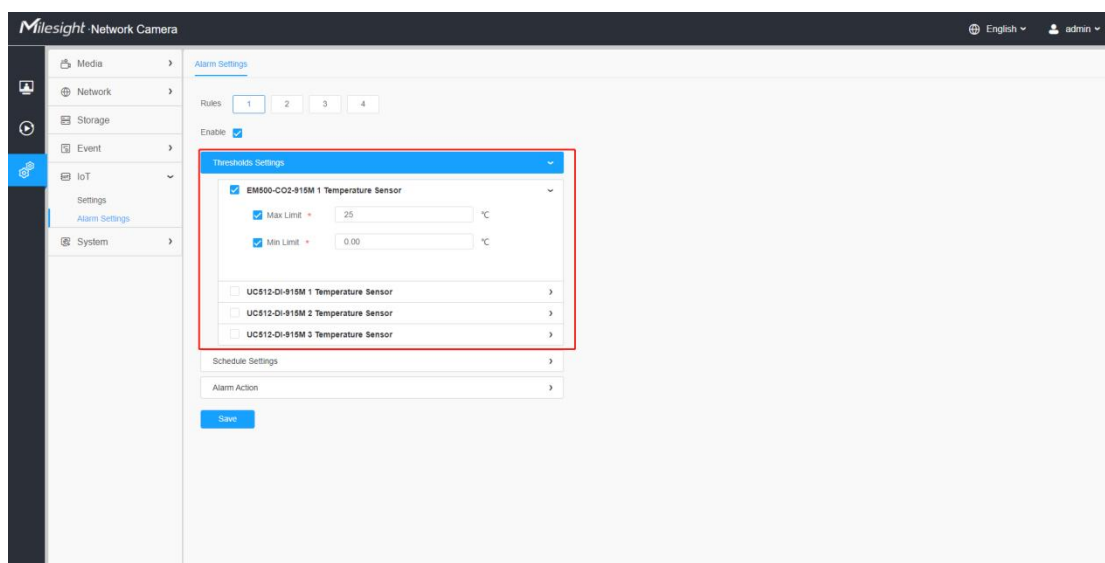
Step 2: Check the checkbox to enable Alarm Rules.



① Thresholds Settings

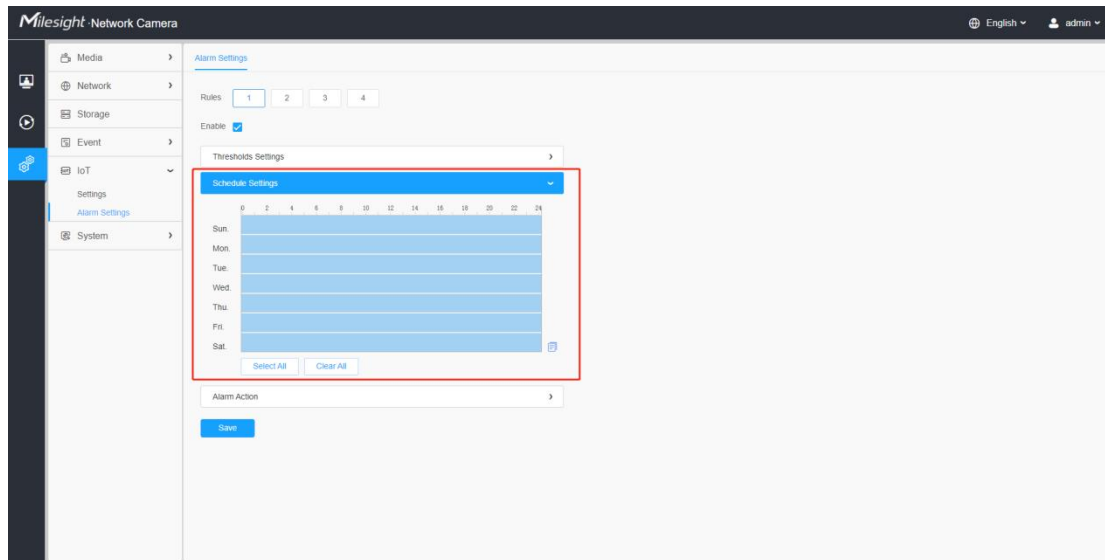
Step 3: Click to select the sensor to alarm and set threshold for the selected sensor.

When the data reaches the critical value, the alarms will be triggered. Both upper and lower thresholds are configurable. You can also only configure upper or lower threshold.

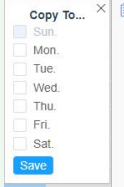

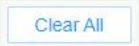


② Schedule Settings

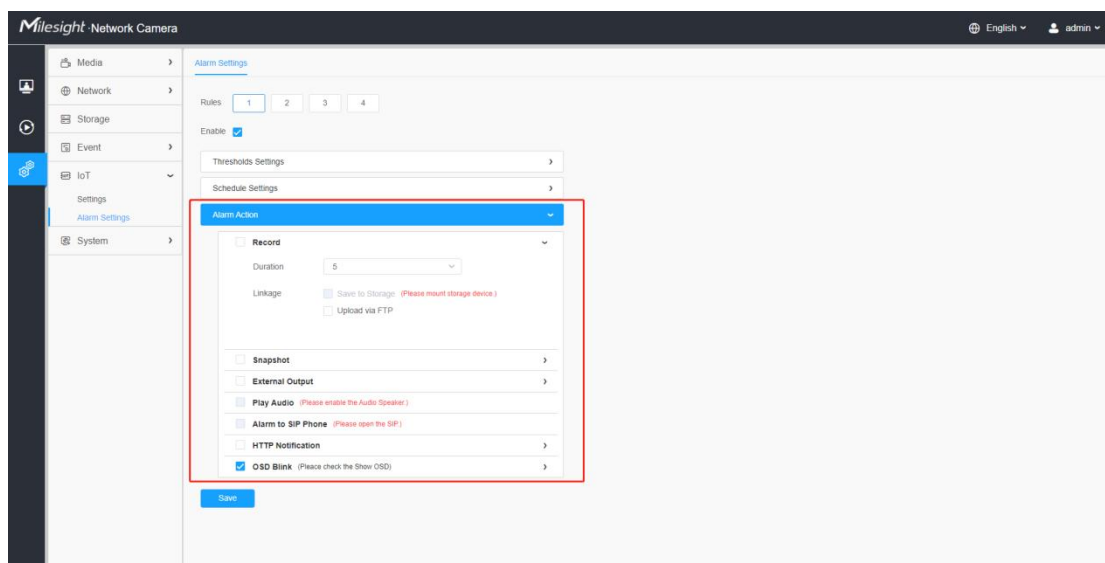
Step 5: Set the alarm schedule for IoT.



Please refer to the meaning of the options as follows:

Parameters	Function Introduction
	Copy the schedule area to another date.
	Select all schedule.
	Clear all schedule.

Step 6: Set Alarm Action.



Please refer to the meaning of the options as follows:

Parameters	Function Introduction
Record	<p>Duration: Selected the duration time of alarm. 5s/10s/15s/20s/25s/30s are available.</p> <p>Linkage: Save alarm recording files into SD Card or NAS or Upload the recording files via FTP.</p>
Snapshot	<p>Number: The number of snapshot, 1~5 are available.</p> <p>Interval: This cannot be edited unless you choose more than 1 to Snapshot.</p> <p>Linkage: Save alarm recording files into SD Card or NAS, Upload the recording files via FTP and send alarm email.</p>
Play Audio	<p>Auto/10 seconds/30 seconds/1 minute/5 minutes/10 minutes are available.</p> <p>Note: Please enable the Audio Speaker.</p>
Alarm to SIP Phone	<p>Support to call the SIP phone after enabling the SIP function.</p> <p>Note: Please open the SIP.</p>
HTTP Notification	Support to pop up the alarm news to specified HTTP URL.
OSD Blink	<p>If the Show OSD in the page of sensor configuration is checked, the OSD will blink when alarm is triggered.</p> <p>OSD Blink Time: Support to set the blinking duration of the OSD, 1~10 are Available.</p> <p>For example, the alarm action is set to OSD blinking at an interval of 3 seconds, when the data reaches the critical value, the alarms will be triggered and the OSD blinking on the live view interface.</p> 

3. Compatibility with Milesight back-end

After completing the basic settings of AIoT camera, you can access the camera through the Milesight back-end.

- For Milesight CMS, it supports adding AIoT camera via P2P, and then the parameter of IoT can be configured.

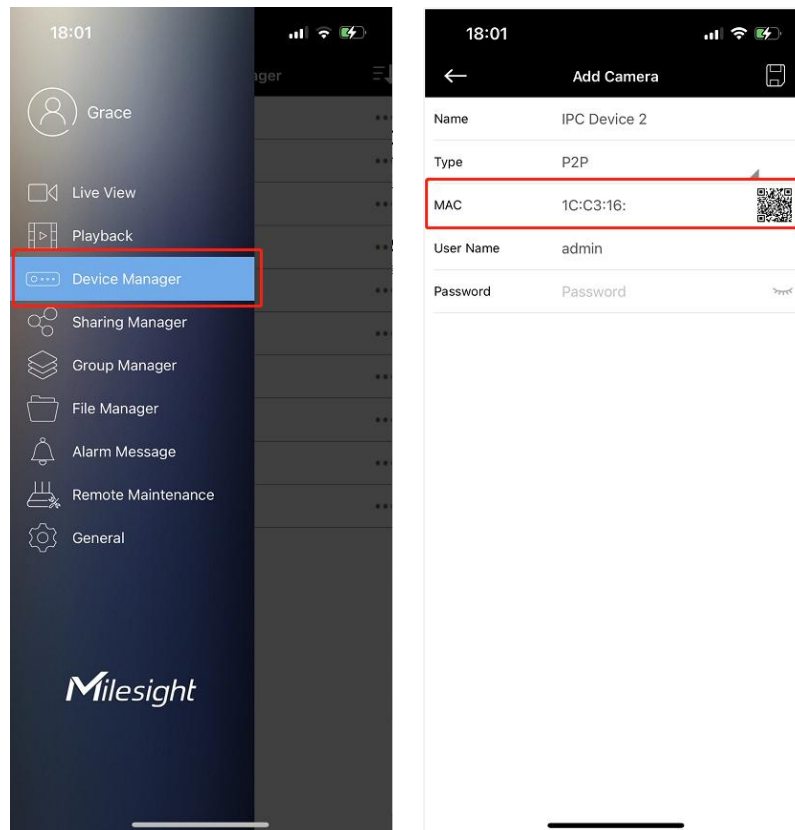
Step 1: After logging into the Milesight CMS, go to **"Management" → "Devices" → "Add Device Manually"**, and you can add AIoT Camera by Mac Address when selecting P2P connection type.

Step 2: Go to **"Devices Config" → "AIoT Camera" → "IoT"**, You can set the IoT settings on CMS as shown below.

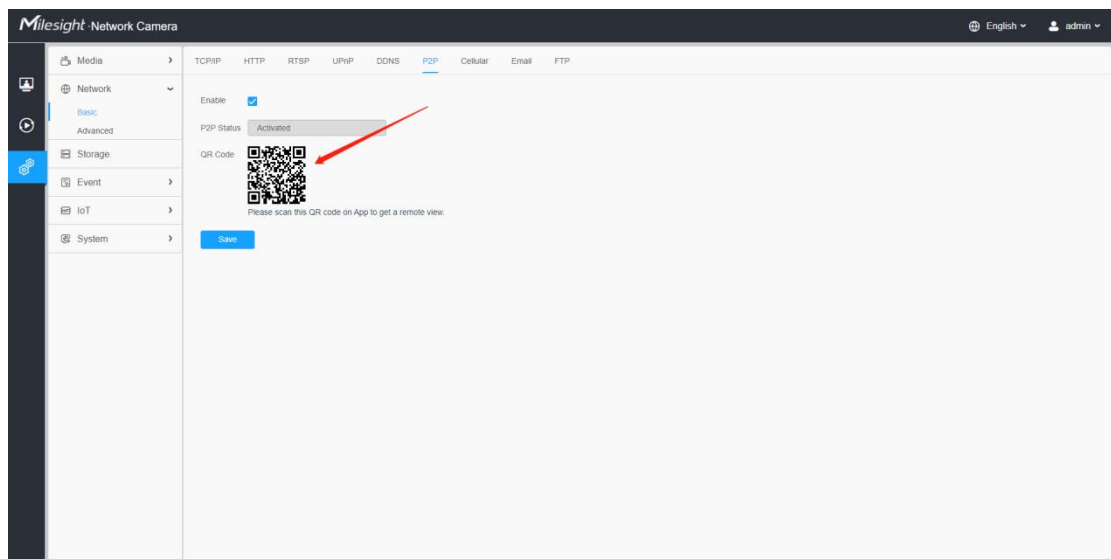
Device Name	Device EUI	Device Profile	Battery	Last Seen	Activation	Sensor	Operation
BM50-C02...	2443A12B842...	OTAA	91%	Just now	✓	Sensor	✎
BM50-S04...	2443A12B842...	ABP	91%	3 minutes ago	✓	Sensor	✎

- For M-sight Pro APP, it supports adding AIoT camera via P2P.

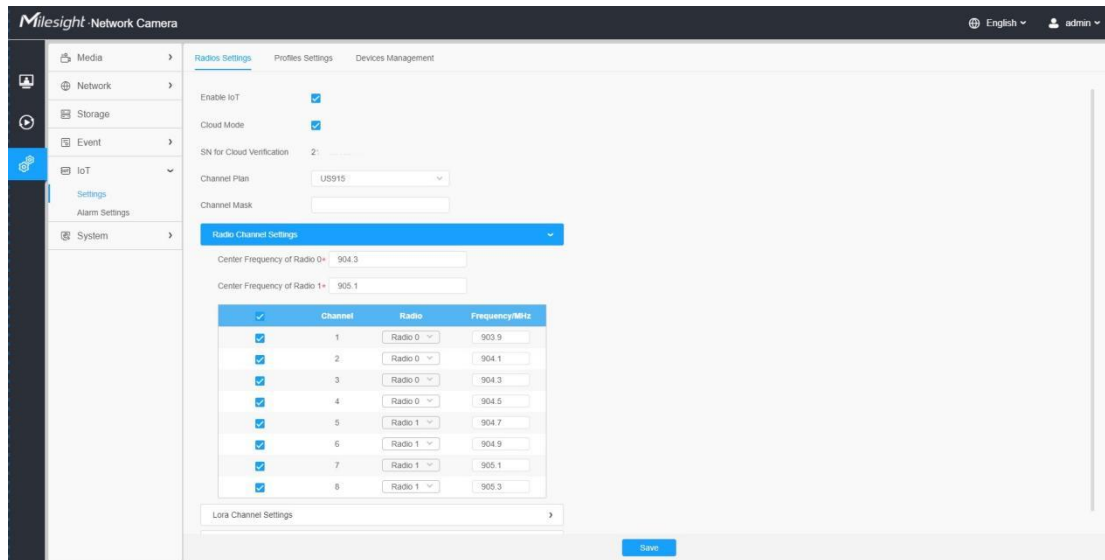
Step 1: After logging into the M-Sight Pro, go to **"Device Manager"→ "Add Camera"**, and you can add AIoT Camera by Mac Address when selecting P2P protocol. Or you can connect the AIoT Camera by P2P QR Code.



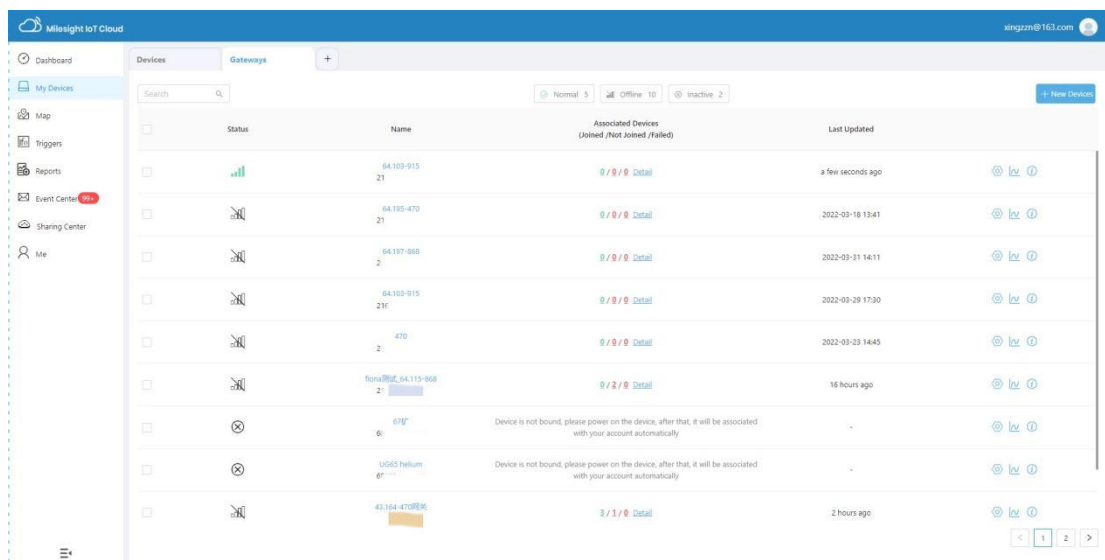
Note: The P2P QR Code of AIoT Camera is activated by default on camera Web.



- For Milesight IoT Cloud, it supports adding AIoT Camera to Milesight IoT Cloud as a gateway, and then manages the sensor data on the cloud centrally.



Interface of AIoT Camera



Interface of Milesight IoT Cloud

Appendix 1

According to different regions, the default value and configurable range of the **Center Frequency of Radio 0** are different, as follows:

Channel Plan	Default Value	Configurable Range
EU868	867.5	863-870
IN865	865.3	865~867

RU864	868.9	864~870
US915	904.3	902~928
AU915	917	915~928
AS923	923	915~928
AS923-2	921.5	915~928
KR920	922.3	920.9~923.3
CN470	472.3	470~510

Appendix 2

According to different regions, the default value and configurable range of the **Center Frequency of Radio 1** are different, as follows:

Channel Plan	Default Value	Configurable Range
EU868	868.5	863~870
IN865	866.385	865~867
RU864	867.7	864~870
US915	905.1	902~928
AU915	917.8	915~928
AS923	922.2	915~928
AS923-2	922.3	915~928
KR920	923.1	920.9~923.3
CN470	472.9	470~510

----- **END** -----