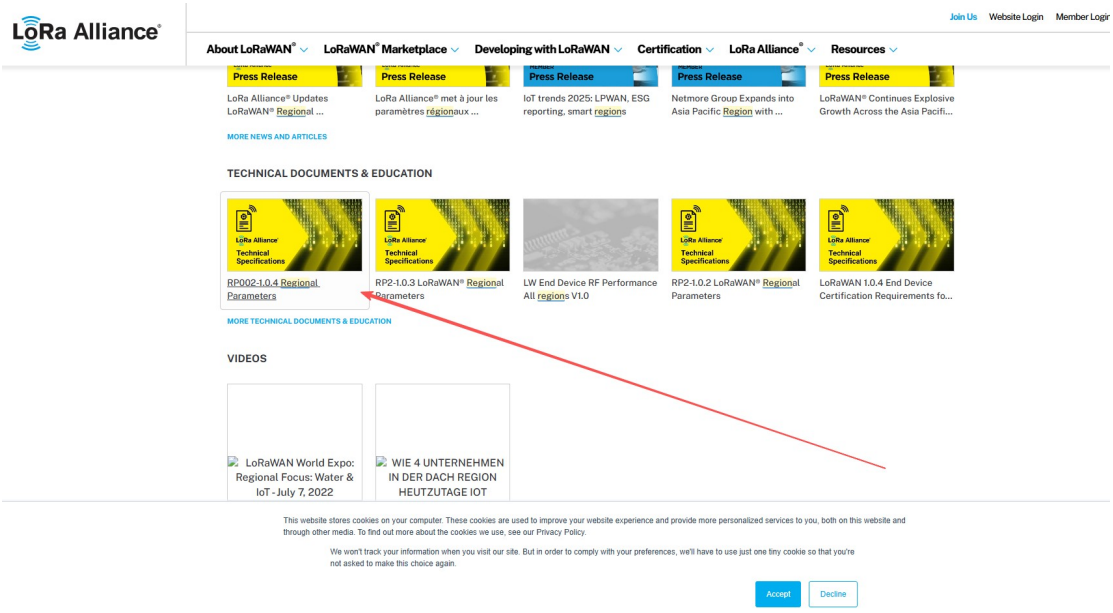
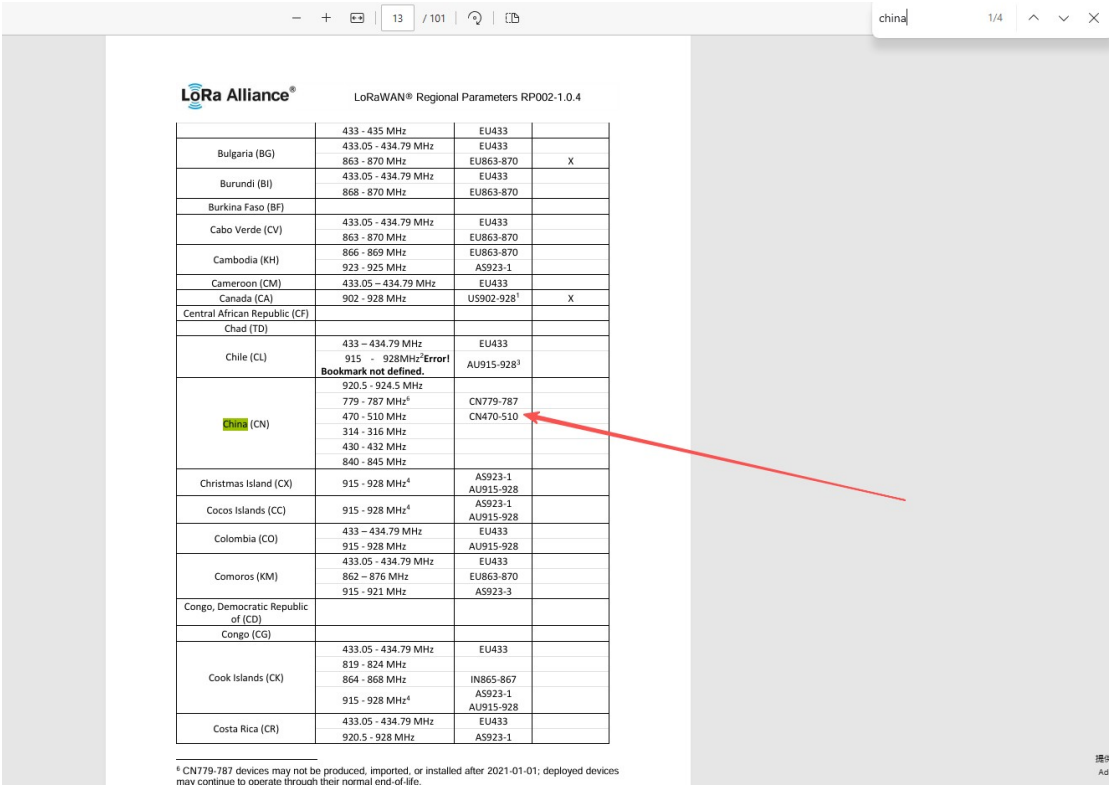
Application Frequently Asked Questions (FAQ)

1. Basic Knowledge

Q1: How to determine the operating frequency bands for different regions?

A: Go to the official website of the LoRa Alliance®, and search for the REGION documentation (You searched for region - LoRa Alliance®). Select the latest version of the document and download it. Then, enter the country or region where the device will be used to find the corresponding frequency band, as shown below.





LoRa Alliance® LoRaWAN® Regional Parameters RP002-1.0.4

	433 - 435 MHz	EU433	
Bulgaria (BG)	433.05 - 434.79 MHz	EU433	
	863 - 870 MHz	EU863-870	X
Burundi (BI)	433.05 - 434.79 MHz	EU433	
	868 - 870 MHz	EU863-870	
Burkina Faso (BF)			
Cabo Verde (CV)	433.05 - 434.79 MHz	EU433	
	863 - 870 MHz	EU863-870	
Cambodia (KH)	866 - 869 MHz	EU863-870	
	923 - 925 MHz	AS923-1	
Cameroon (CM)	433.05 – 434.79 MHz	EU433	
Canada (CA)	902 - 928 MHz	US902-928[3]	X
Central African Republic (CF)			
Chad (TD)			
Chile (CL)	433 – 434.79 MHz	EU433	
	915 - 928MHz[2]Error! Bookmark not defined.	AU915-928[3]	
China (CN)	920.5 - 924.5 MHz		
	779 - 787 MHz[6]	CN779-787	
	470 - 510 MHz	CN470-510	
	314 - 316 MHz		
	430 - 432 MHz		
	840 - 845 MHz		
Christmas Island (CX)	915 - 928 MHz[4]	AS923-1 AU915-928	
Cocos Islands (CC)	915 - 928 MHz[4]	AS923-1 AU915-928	
Colombia (CO)	433 – 434.79 MHz	EU433	
	915 - 928 MHz	AU915-928	
Comoros (KM)	433.05 - 434.79 MHz	EU433	
	862 – 876 MHz	EU863-870	
	915 - 921 MHz	AS923-3	
Congo, Democratic Republic of (CD)			
Congo (CG)			
Cook Islands (CK)	433.05 - 434.79 MHz	EU433	
	819 - 824 MHz		
	864 - 868 MHz	IN865-867	
	915 - 928 MHz[4]	AS923-1 AU915-928	
Costa Rica (CR)	433.05 - 434.79 MHz	EU433	
	920.5 - 928 MHz	AS923-1	

[6] CN779-787 devices may not be produced, imported, or installed after 2021-01-01; deployed devices may continue to operate through their normal end-of-life.

Q2: What to do if the frequency band of the purchased kit does not match the supported frequency band of the actual application area?

A: Contact Ai-Thinker technical support directly to obtain the specified firmware version, and follow the firmware flashing instructions to complete the firmware replacement and switch the operating frequency band.

Q3: How to perform the network join operation for the kit?

A: Contact Ai-Thinker technical support directly to obtain the application instructions.

2. Deployment and Implementation

Q1: How many terminal nodes can the RG-03H gateway support?

A: The number of nodes that the gateway can support has no fixed value; it is mainly influenced by three factors: the reporting interval of terminal data, the data packet length, and the spreading factor (SF). In addition, since the gateway is a single-channel device, the actual number of supported terminal nodes will be further reduced. Theoretically, when the terminal reporting interval is 20 minutes, a single gateway can stably support 30 nodes; if the reporting interval is extended to 1 hour, the theoretical capacity can reach 700 nodes. It is recommended to reserve redundancy during deployment to avoid excessive load on a single gateway, and ensure that each terminal is covered by at least two gateways to improve communication reliability.

Q2: What are the precautions for the deployment of the RG-03H gateway?

A: Focus on three key points for gateway deployment: ① Location selection: Prioritize installation at elevated locations (such as rooftops and signal towers) to minimize obstructions

from walls, trees, and especially billboards, thereby improving signal coverage; ② Interference avoidance: Stay away from high-voltage lines, large metal equipment, and strong electromagnetic radiation sources to prevent signal attenuation.

Q3: What factors affect the coverage range of the RG-03H gateway?

A: The coverage range is mainly affected by four types of factors: ① Environmental factors: Open areas (such as grasslands and deserts) offer the farthest coverage, while dense urban buildings and indoor environments reduce coverage range due to signal blocking and multipath effects; ② Deployment height: The higher the gateway installation position, the fewer signal propagation obstacles and the wider the coverage range; ③ Co-channel interference, obstruction by metal objects, and adverse weather conditions such as rain and snow will reduce communication quality and coverage range. It is recommended to conduct on-site tests before deployment to verify the actual coverage effect; ④ In multi-gateway deployment scenarios, the channels between gateways should be separated to avoid co-channel interference.

3. Device and Technology

Q1: What network join methods does the Ai-LoRaWS-1001 temperature and humidity sensor support?

A: The Ai-LoRaWS-1001 temperature and humidity sensor supports the OTAA (Over-the-Air Activation) network join method by default. Each time the node joins the network, it sends a join request. After verification by the Network Server (NS), it obtains credentials such as Device Addr, AppSKey, and NwkKey to complete the network join. Keys are refreshed for each network join, ensuring higher security. If the customer requires the ABP (Activation by Personalization) join method, please contact Ai-Thinker technical support for assistance.

Q2: What operating modes does the Ai-LoRaWS-1001 temperature and humidity sensor support?

A: It supports Class A operating mode by default: In this mode, the node controls the communication rhythm. After the node reports data, it briefly opens two receive windows to obtain downlink data from the gateway. This mode has the lowest power consumption and is suitable for scenarios with low real-time requirements and battery-powered operation. If the customer requires other operating modes, please contact Ai-Thinker technical support for assistance.

Q3: Does the device support adaptive data rate (ADR)?

A: No, it does not support ADR. The data rate must be manually adjusted.

4. Troubleshooting

Q1: What could be the reasons for a terminal node failing to join the network?

A: Common reasons and solutions are as follows. ① Incorrect join parameters: For example, DevEUI, AppKey, or JoinEUI input errors. Please check these parameters and reconfigure

them; ② Mismatched frequency bands: Check whether the frequency bands of the sensor and the gateway are inconsistent. If inconsistent, replace the firmware or device of the corresponding frequency band; ③ Signal obstruction: Obstacles may exist between the node and the gateway, or the communication distance is excessive. Adjust the node position, increase the number of gateways, or optimize the gateway deployment height; ④ Gateway not properly connected to the network: Check the gateway's network connection (e.g., Ethernet, 4G/Wi-Fi) to ensure it is correctly connected to the server.

Q2: What to do if packet loss occurs when multiple devices report data at the same time?

A: In a single-gateway setup with multiple devices, simultaneous data reporting from multiple devices is not supported, and the reporting time must be staggered.

Q3: What could be the reasons for the short communication distance of the terminal node?

A: There are four main reasons: ① The spreading factor (SF) is set too low. Increase the SF value appropriately to extend the communication distance (this sacrifices some data rate); ② Antenna issues: Poor antenna contact, insufficient gain, or using an antenna not matched to the frequency band. Replace with a high-gain antenna and ensure secure installation; ③ Interference or obstruction: The node may be near metal objects or strong electromagnetic interference sources, or obstructed by walls and trees. Adjust the node installation location to avoid interference sources.