

DCIM in a box with LoRa™ radio (L-DCIM)

The L-DCIM is a “DCIM in a box” solution for data center infrastructure monitoring and management. Many DCIM solutions require annual license fees and are complex to use, as well as needing a dedicated PC. With L-DCIM it’s easy to implement a complete DCIM monitoring solution.

AKCPro Server is embedded on every L-DCIM allowing you to monitor all your data center infrastructure, manage access control, sync video with sensor events track assets, graph sensors and generate alerts.

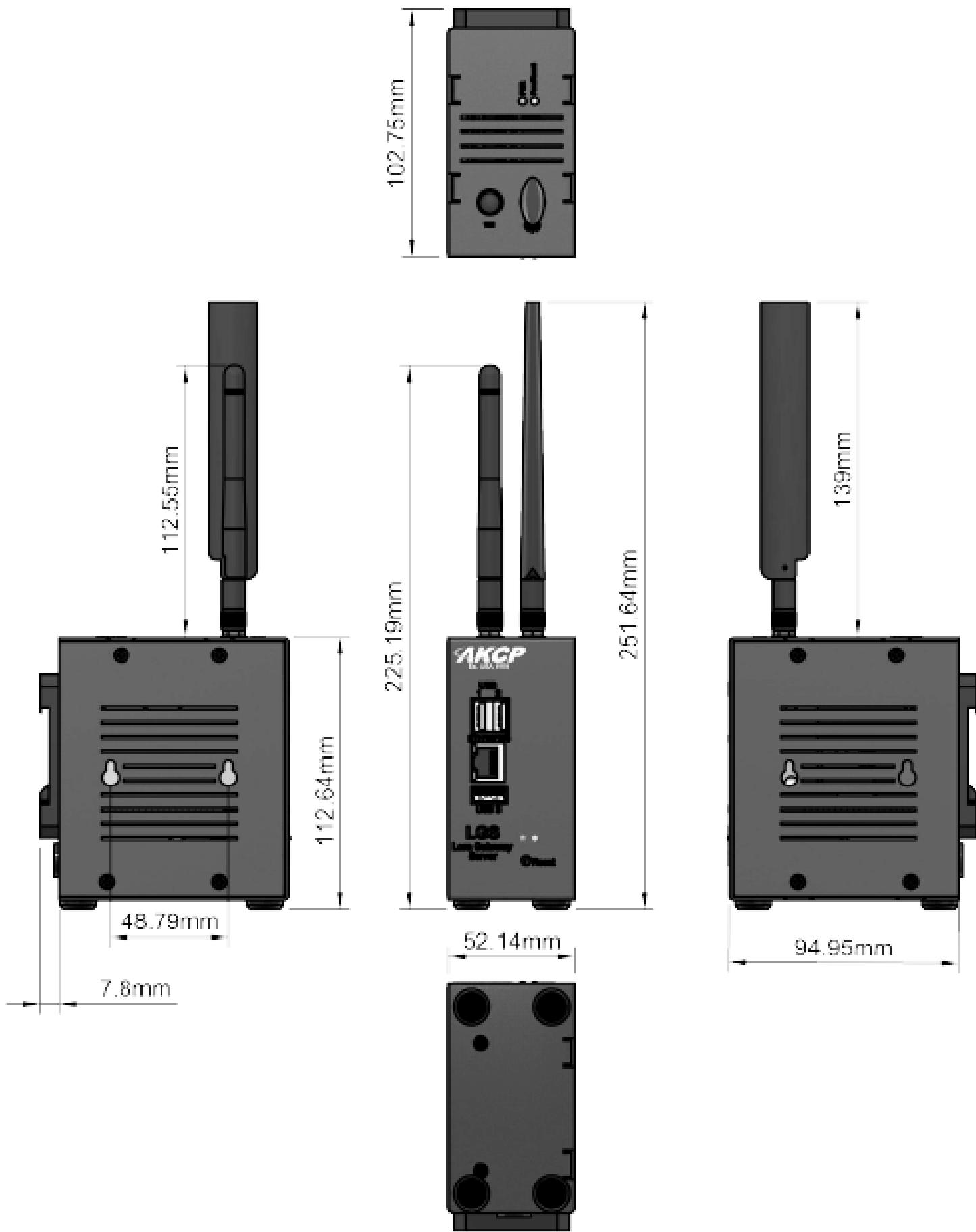
Equipped with a LoRa™ radio and high quality Di-Pole antenna, monitoring of AKCP wireless sensors means you can rapidly deploy your environmental monitoring system without needing to run cables, tap power, use network ports and IP addresses.



Sensor	Host	Value	Status
Door (front)	Demo Host		Opened
Door (rear)	Demo Host		Opened
Temperature front (bottom)	Demo Host	21 °C	Normal
Temperature front (middle)	Demo Host	23 °C	Normal
Temperature front (top)	Demo Host	23 °C	Normal
Temperature rear (bottom)	Demo Host	34 °C	High Warning
Temperature rear (middle)	Demo Host	31 °C	High Warning
Temperature rear (top)	Demo Host	25 °C	Normal

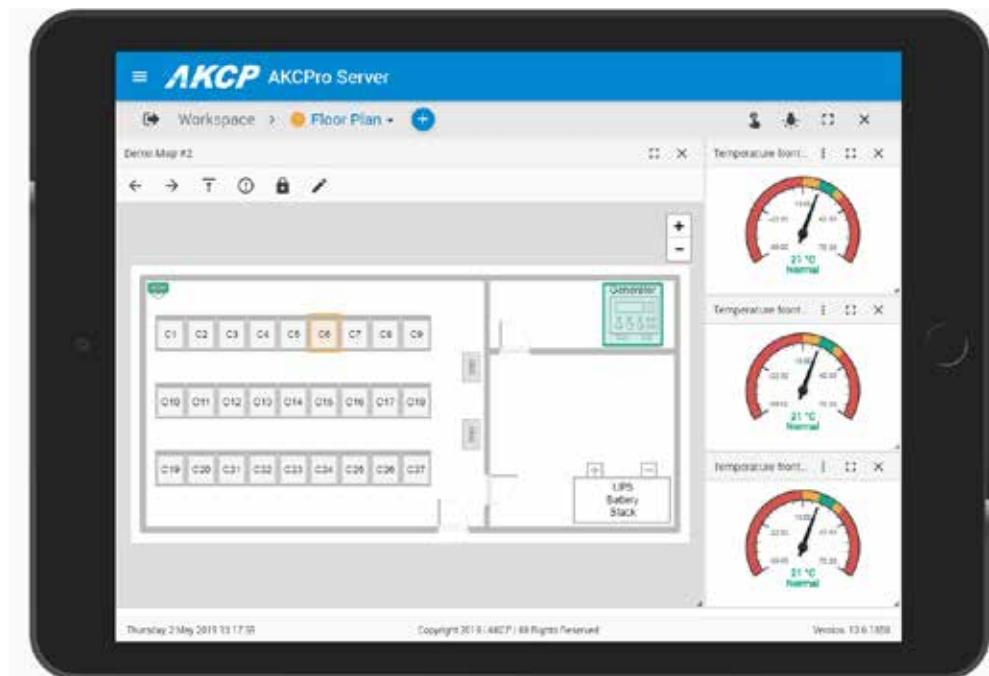
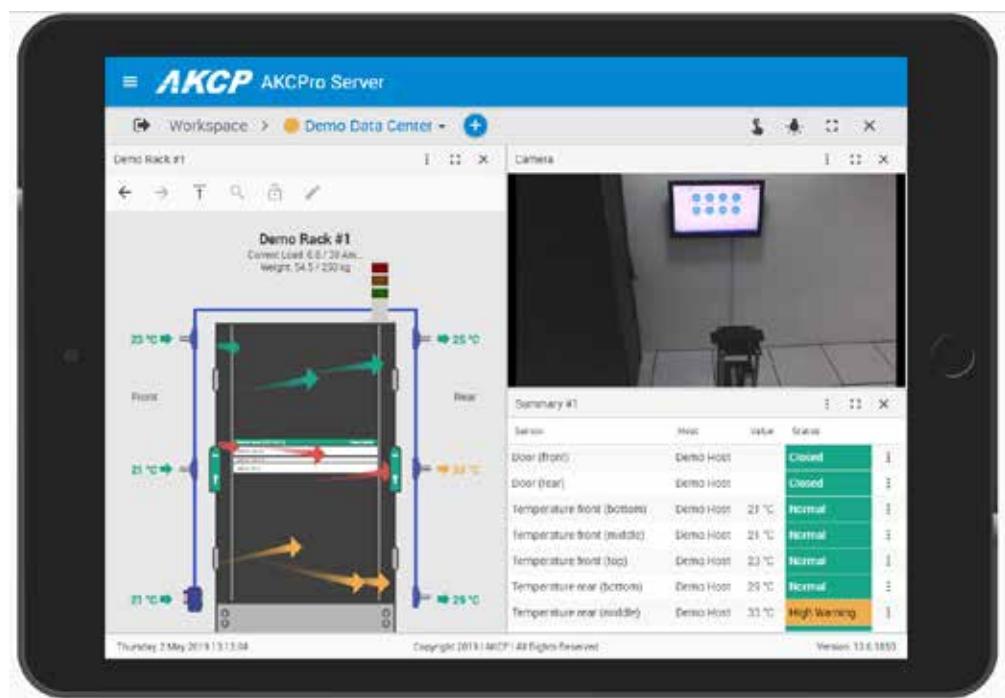
Screenshot of AKCPro Server central monitoring software embedded in every L-DCIM

L-DCIM - Technical Drawing



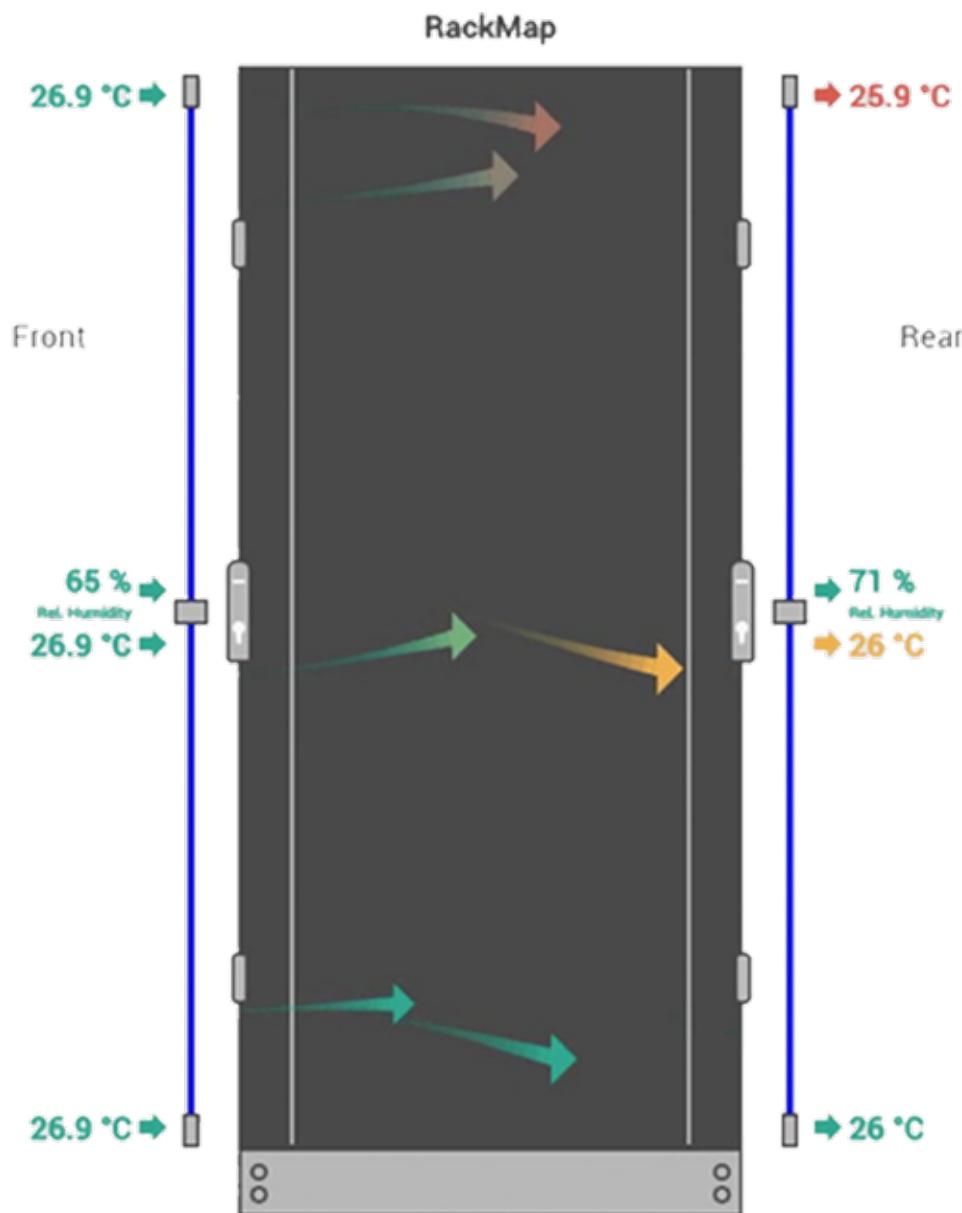
L-DCIM - Tablet View

Use any Android or IOS tablet or cellphone to monitor your data center at ground level. The L-DCIM acts as a WiFi hotspot for mobile devices to connect directly with and display sensor data in a dedicated tablet user interface. No apps to install, just access using your google Chrome web browser. Now your technicians on the data center floor can be kept up to date and be alerted instantly to critical situations as they arise.



L-DCIM - Data Center Design and Analysis Tool

Every L-DCIM comes with a free wireless dual temperature and humidity sensor. You can upgrade to a wireless cabinet thermal map sensor that is battery powered and can be easily moved from rack to rack. This is an ideal engineering design tool that can be left on a rack for several days to profile the thermal properties, detect cabinet hotspots and see the effect of changes that are made. Due to it being a self contained wireless unit moving it from rack to rack is easy.



Example of AKCP Pro Server rack map view, with thermal map sensor and front to rear temperature differentials

LoRa™ Wireless Solutions

The world's most complete end to end LoRa solution

The AKCP Wireless solution uses LoRa™ technology which provides superior penetration through buildings. A wide range of AKCP's intelligent sensors are available with a LoRa wireless module that transmits sensor data to the nearest AKCP LoRa™ gateway.

LoRa Advantages

- Battery operated sensors
- Rapid deployment
- Save on cabling and installation costs
- Fewer base units and IP addresses
- L-DCIM Gateway with integrated AKCPro Server
- Individually tested to ensure correct broadcast frequency and strength



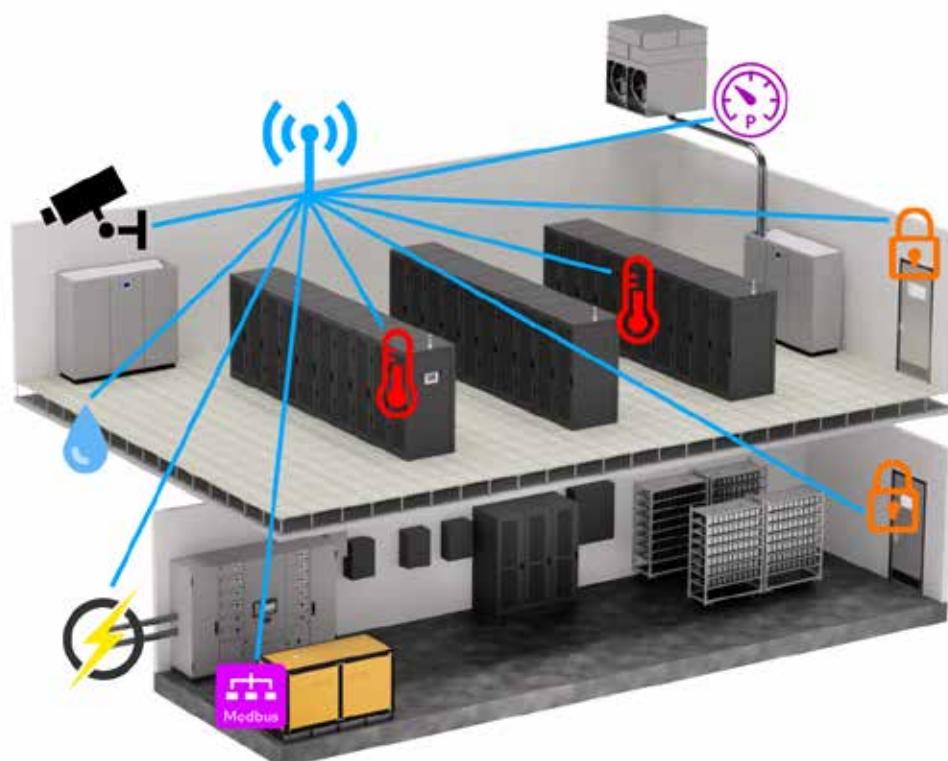
LoRa™ Technology

AKCP Application of LoRa™ Technology

LoRa™ radio is an energy efficient, long range and low cost bi-directional communications technology. Running on unlicensed frequencies it is specifically tailored towards IoT use cases. LoRa™ radio modulation provides deep indoor penetration through walls, elevator shafts and basements.

Data center critical infrastructure requires constant monitoring and instantaneous alerts. AKCP is the first company to bring a LoRa™ wireless monitoring solution tailored for the data center. Below are some of the specific features we have implemented :-

- Immediate broadcast upon sensor status change
- Periodic broadcasting of graph data as frequently as every 10 seconds
- “Listen before talk” to minimize packet collisions
- Queuing and Re-Broadcast of undelivered messages
- Utilizes the shortest spreading factor, giving several benefits
- Increased battery life by using less airtime
- Shorter airtime means more frequent broadcasts are possible
- Individually tuned antennas, maximum range with shortest spreading factor

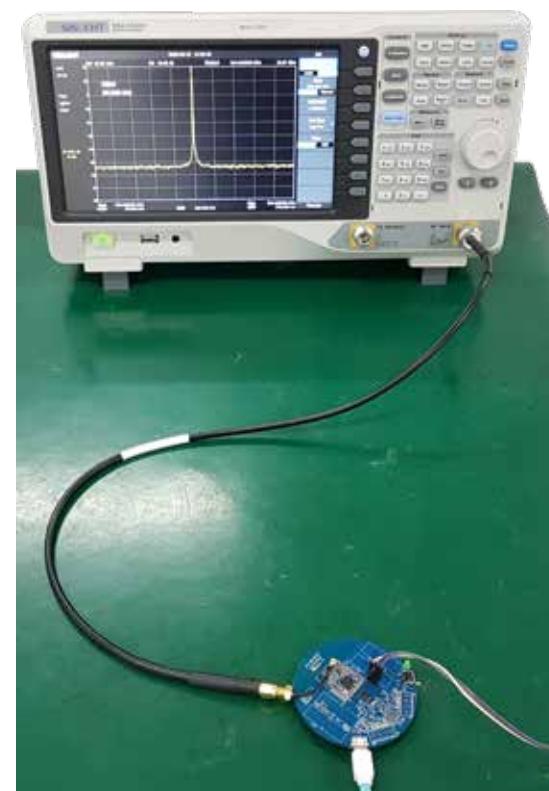


AKCP and LoRa™

AKCP Tests and Tunes every LoRa™ Radio

AKCP uses professional spectrum analyzers to hand tune every antenna to ensure proper broadcast strength and frequency. We only use high quality external Di-Pole antennas for maximum signal strength. Our thorough testing procedures enabled us to identify counterfeit components in our supply chain which allowed us to pro-actively remove them from production and change suppliers

Testing broadcast frequency and strength of AKCP LoRa™ sensor device



Testing of Di-Pole antenna frequency



L-DCIM- Technical Specification

Dimension	52 (W) x 112 (H) x 94 (D) compact design
Mounting	Desktop, wall mount, DIN rail
Power	External 5V 3A Power Adapter Input Voltage and Current ratings : 100V~240V - 0.22A
Status Indication	LED indication for power LED for network connectivity
Components	Manufactured using highly integrated, low power surface mount technology to ensure long term reliability. ARM Coretex-A7 Quad Core 1GHz CPU, 1GB DDR3 8GB Embedded memory
Operating Environment	Temperature : Min. -15° C – Max.50° C Humidity: Min. 20% – Max. 80% (Non-Condensing)
MTBF	1,400,000 Hours
Connectivity	Ethernet 10/100 2.4GHz IEEE 802.11 b/g/n/ac wireless LAN Optional Integrated cellular modem with external antenna
Video	Supports 2x AKCP HD-DC Cameras via USB input Supports ONVIF IP Cameras (h.264, MJPEG)
Inputs	1x 10/100 Ethernet Port 3x USB 2.0 Ports
LoRa ® Radio	863-870 MHz (EU) Max TX Power +14dBm Duty cycle 1% 902-915 MHz (US) Max TX Power +20dBm
Certification	FCC Part 15C, CE EN300220-2