

TSS Gateway User Manual

TSS Gateway 500

TSS Gateway 500-W



Contents

TSS Gateway User Manual	1
Introduction	3
Planning.....	4
Coverage	4
Connections	4
Placement	4
Gateway Hardware.....	5
Specifications.....	5
Interfaces	7
Ethernet with Power over Ethernet support	7
Reset Button	7
USB 7	
Barrel Jack.....	8
Front Button	8
Multi-color LED.....	8
Cable Cover	8
SIM Card Slot	9
Antenna Connector.....	9
Mechanical Information	10
TSS 500 Dimensions	10
TSS 500-W Dimensions.....	10
Installation.....	11
Equipment.....	11
Mounting Tools	11
Mounting Instructions.....	12
Gateway Setup	14
Initial Boot	14
Troubleshooting	15

Introduction

TSS Gateway collects, process and delivers real-time data from all BLE loggers and facilitates a secure connectivity to TSS Cloud. A powerful and cost-effective edge network for large-scale, low-power wireless set-up. Off the shelf product but with customized software to meet the specific need.

Models included in this document	
TSS Gateway 500	Edge Gateway with Bluetooth, WiFi, and Ethernet connectivity
TSS Gateway 500-W	Edge Gateway with Bluetooth, WiFi, Ethernet and LTE Cat1/3G/2G cellular connectivity

Planning

Planning is key to the success of any hardware installation. There are many things to consider when installing a wireless system into a space. Key elements for consideration are listed in the sections below.

Coverage

In a typical commercial space expected coverage area of about 4,000 sq. ft. per Gateway. However, the area of coverage for each Gateway is dependent on the layout and construction of the facility where it is installed. A Gateway in an open floor plan will have a larger coverage area than a closed floor plan with many walls. Building construction materials also affect coverage – drywall and glass permit more coverage than brick and concrete. Note that brick or concrete walls should be planned around, as signals have poor penetration through these types of walls. If coverage is required on both sides of a brick or concrete wall, plan for a Gateway on each side. If a higher level of coverage planning precision is required, TSS suggests using a Wi-Fi site planning tool to simulate coverage. There are multiple planning tools available online, both free and professional. For use in this application it should allow for changing the Access Points transmit power and characteristics for the TSS Gateway.

Connections

The types of connections required should be taken into consideration when planning a new install. In order to function, the Gateway needs both a power and internet connection. For power, the options are Power over Ethernet (PoE) or AC wall power (adapters available upon request). For internet connection, the two options are Wi-Fi, Ethernet, or LTE (500-W only). TSS suggests using PoE-enabled Ethernet for Gateway connection. PoE connections allow for both data and power to be provided to the Gateway, requiring only one cable for installation. Special consideration needs to be given when choosing to use Wi-Fi, as the Gateway is an always connected device without a physical user interface.

Placement

Correct placement of Gateways is important for getting the desired coverage. Generally, mounting Gateways up high and out of reach is recommended, as this improves line of sight while making the units more difficult to tamper with. Special consideration should be given to any metal near the mounting area, such as in support beams or HVAC ducts, as it is not recommended to mount the Gateway directly to any large metal surface. Gateways do not need to be visible for operation. It is common to mount Gateways above drop ceilings, to either the wall or a drop from the ceiling. When mounting above drop ceilings or in open office style spaces, it is recommended to mount the Gateway below the level of any ceiling HVAC ducts to avoid dead spots.

Gateway Hardware

Specifications

Processor	
i.MX6ULL (Y2)	800MHz, 32bit ARM® Cortex™-A7
Memory	
Memory (Volatile)	512 MB DDR3L SDRAM @ 400MHz, x16
Memory (Bulk Storage)	8GB eMMC
Wi-Fi (802.11a/b/g/n/ac)	
Frequency	2.412GHz - 2.472GHz; 5.180GHz – 5.700 GHz (region dependent)
Modulations	DSSS, FHSS OFDM
Transmit Power	19dBm for 2.4GHz band, 18dBm for 5GHz band, depending on modulation
Receiver Sensitivity	-98 to -72dBm for 2.4GHz band, -92 to -68dBm for 5GHz band, depending on modulation
Antenna	Integrated Dual-band Antenna
Bluetooth	
Bluetooth Version	5 (Bluetooth Low Energy)
LE Connections	Up to 6 connections supported
Frequency	2.402 to 2.480 GHz
Modulations	GFSK at 1Mbps, 2Mbps data rates
Transmit Power	12dBm
Receiver Sensitivity	-108 to -98dBm, depending on modulation
Cellular LTE Cat1 with 3G/2G fallback (Cascade 500-W only)	
LTE Frequencies	700, 800, 850, 900, 1700/2100 (AWS), 1800, 1900, 2100, 2600 MHz (bands 1, 2, 3, 4, 5, 7, 8, 12, 18, 19,20, 28) (region dependent)
UMTS/HSPA+ Frequencies	800, 850, 900, 1700/2100 (AWS), 1800, 1900 and 2100 MHz (bands I, II, IV, V, VIII, IX, XIX) (region dependent)
GSM/GPRS/EDGE Frequencies	GSM 850, 900, 1800, 1900 MHz
Modulations	GMSK/QPSK/16QAM
Power Class (per listed 3GPP release)	EGSM850/900: Class 4, GSM1800/1900: Class 1, according to release 99 GSM 850/900/1800/1900 8-PSK: Class E2, according to release 99 UMTS 800/850/900/AWS/1800/1900/2100: Class 3, according to release 99 LTE 700/800/850/900/AWS/1800/1900/2100/2600: Class 3 according to release 8
Antenna	Dual external dipole antennas, 5.0dBi
GPRS/EGPRS Multislot Class	12
Ethernet	
10/100 Base-T RJ-45 connector with PoE Support	
USB	
USB 2.0, A-type Host connector	
Dimensions	
TSS 500 Enclosure	L: 127 mm W: 127 mm H: 30 mm
TSS 500-W Cell antennas	L: 196mm W: 38mm H: 13mm
Hardware	

Power supply	4.5 to 5.5VDC, 2A max via Barrel Jack (5.5mm x 2.1mm) 36-57V (IEEE 802.3af) via Ethernet connector (RJ-45)
Temperature Range	0 to +60°C
Certifications	
TSS 500	FCC / ISED / CE-RED / RCM / UL / MIC
TSS 500-W	FCC / ISED / CE-RED / RCM / GCF / PTCRB / AT&T

Interfaces

Interface features are described throughout this section, including power and data connectivity, and button and LED location and behavior.

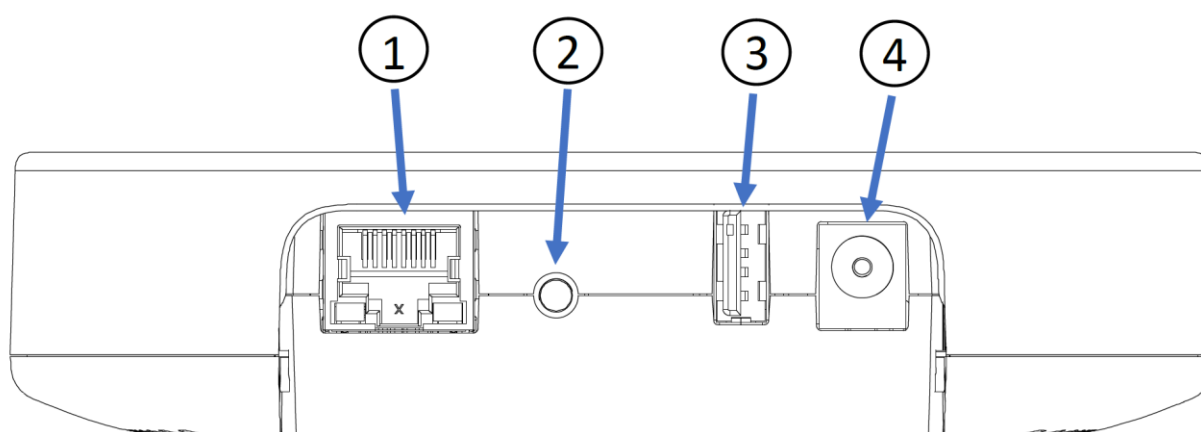


Figure 1: Gateway – Back View

Ethernet with Power over Ethernet support

The Gateway is equipped with a single 10/100 Base-T Ethernet connector. For configurations supporting PoE (802.3af), the Gateway will operate when powered by either a PoE switch (end-span) or injector (mid-span).

Reset Button

The reset button provides both soft and hard reset capabilities, depending on the length of the press. The timing is described in the following table:

Reset Action	Time	Behavior
Quick Press	< 2 seconds	Soft Reboot
Short Press	2-4 seconds	Network Reset
Long Press	10-15 seconds	Hard Reset
Very Long Press	> 30 seconds	Factory Reset

USB

A USB 2.0 Type-A connector on the Gateway board provides access to a High Speed (up to 480Mbps) USB host.

Barrel Jack

The Gateway provides a 5.5mm x 2.1mm barrel jack for 5V DC input. Any AC/DC wall adapter used to power the gateway needs to be rated up to 2A. Please note that actual current consumption is dependent upon programmed snaps deployed on the Gateway.

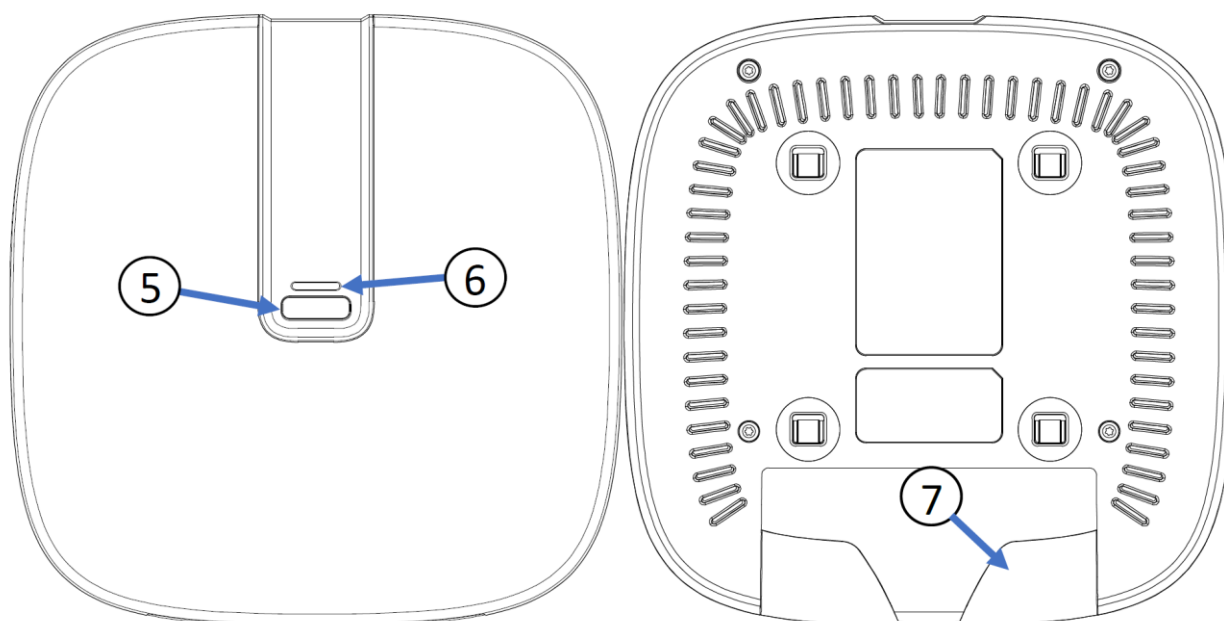


Figure 2: TSS Gateway – Top and Bottom View

Front Button

A front facing button is located on the face of the Gateway. This button is not enabled on the default Gateway configuration.

Multi-color LED

A multi-color (red/green/blue) LED located near the user button provides a means of visual indication for the user.

Cable Cover

The back of the unit has a snap-in cover for improved cable management. This allows for hidden cable routing when the unit is installed on a wall or ceiling. The cable cover is removable.

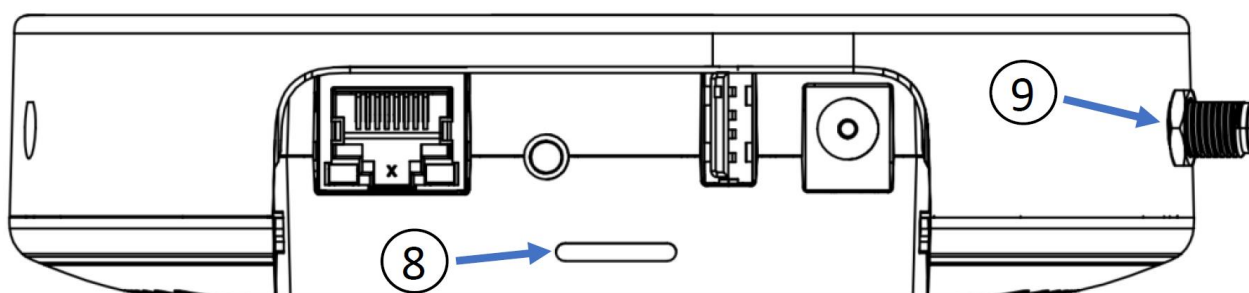


Figure 3: Gateway – Back View

SIM Card Slot

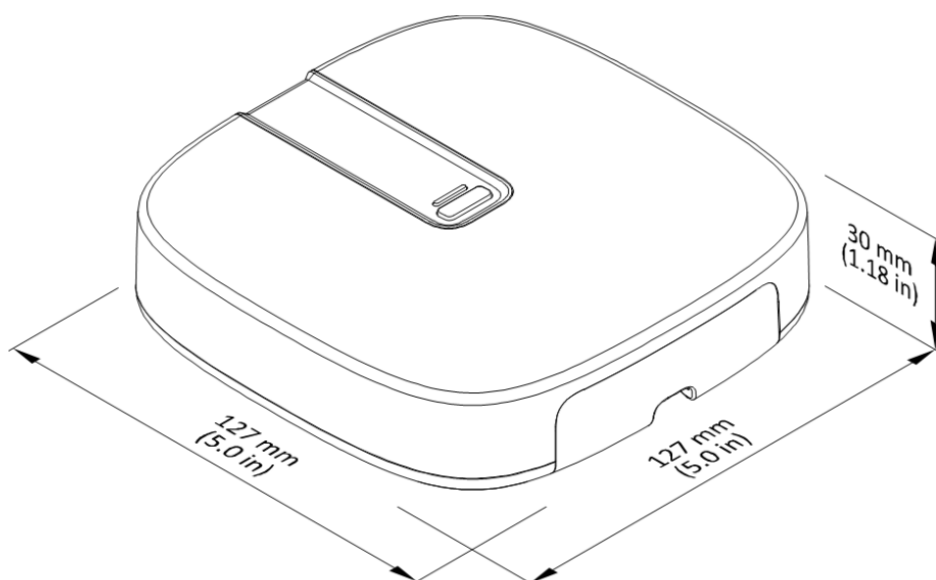
TSS 500-W units also have a small slot on the back of the enclosure near the USB connector and reset button. This is a push-push type slot that fits a micro SIM (3FF).

Antenna Connector

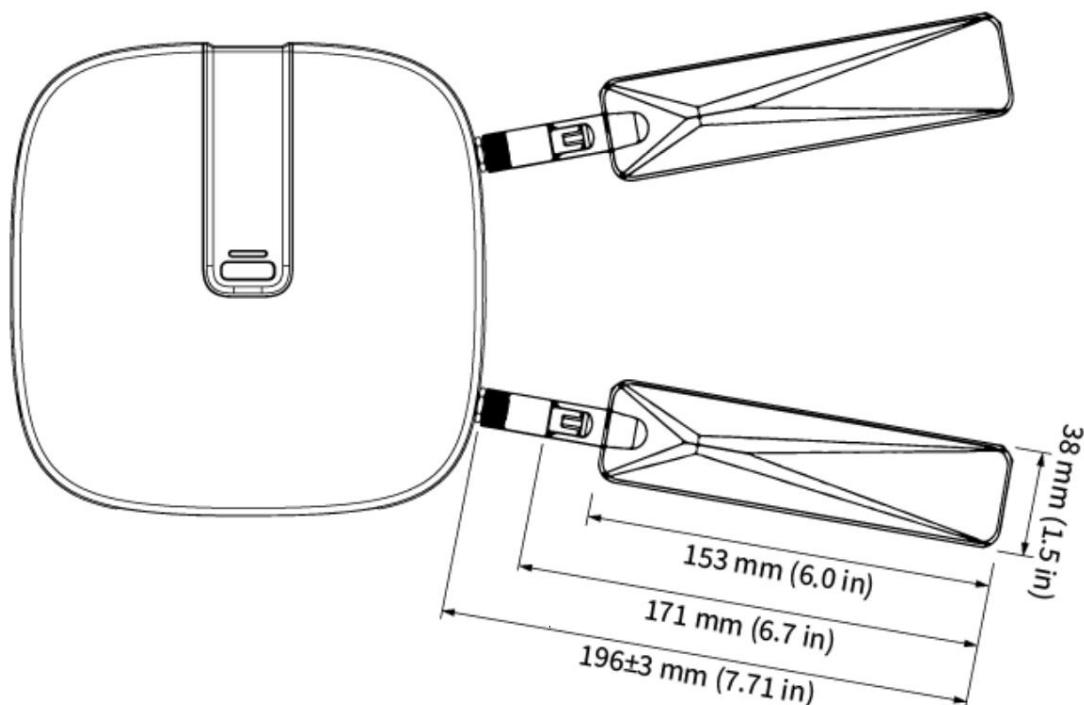
Two SMA type connectors are visible on one side of the unit where the provided cellular antennas attach. Only the antennas provided with the TSS 500-W unit are certified for use on cellular networks.

Mechanical Information

TSS 500 Dimensions



TSS 500-W Dimensions

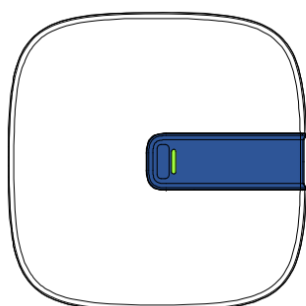


Installation

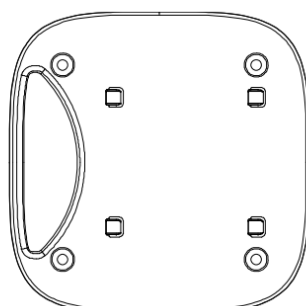
Equipment

Each TSS Gateway comes with following equipment in the box:

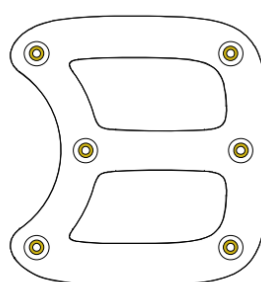
- 1 x TSS Gateway
- 2 x Cellular Antennas (500-W only)
- 1 x Power supply with international adapters (optional)
- 1 x Wall/Ceiling Mount Kit:
 - o 1 x TSS mounting bracket
 - o 1 x TSS ceiling backer plate
 - o 4 x M3 x 50 mm Length, Pan Head, Phillips #1, Machine Screw
 - o 4 x Screw, Pan Head Phillips Sheet Metal #6/18x1.25"
 - o 4 x Drywall Anchor, #6-#8 Screw, 1-1/4" Length



Cascade Gateway



Mounting Bracket



Ceiling Backer Plate



Ceiling Mount Screws
M3 x 50 mm Phillips (x4)



Wall Mount Screws
#6 x 1-1/4" Phillips (x4)



Drywall Anchors (x4)

Mounting Tools

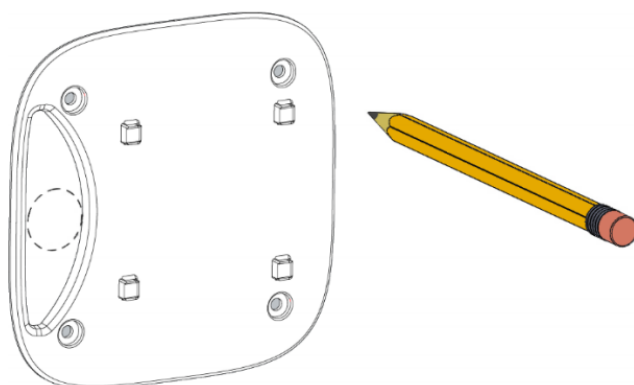
To use the Wall/Ceiling Mount kit provided, the following tools are required (not included):

- Screwdriver
- Drill and drill bit - 3/16" for wall, or 1/8" (3-4 mm) for ceiling mounting
- Drywall saw or keyhole saw for 1" cable pass-through hole

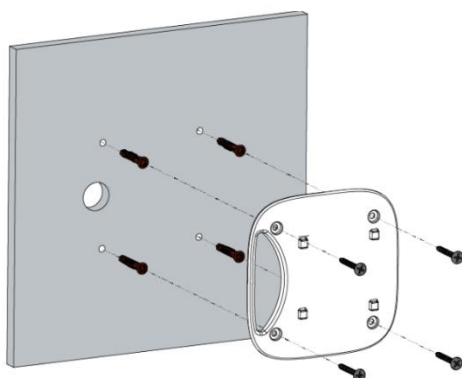
Mounting Instructions

TSS recommends mounting the Gateway with the tab pointing to the side (mounting bracket installed as shown below). This correctly orients the antennas and maximizes Gateway coverage.

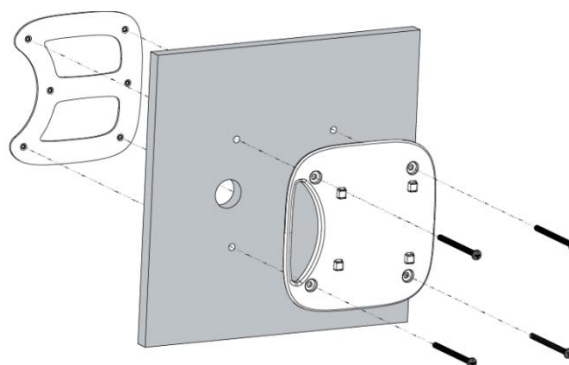
1. Use the mounting bracket as a template to mark the hole locations on the wall or ceiling. If mounting to the wall, use a 3/16" (5 mm) drill bit. If mounting to a ceiling tile, use a 1/8" (3-4 mm) drill bit. If a hole is needed for any cables, also mark this in the appropriate cable opening space in the mounting bracket.



2. Attach the mounting bracket to the surface using the appropriate method:
Wall Mounting
Ceiling Mounting

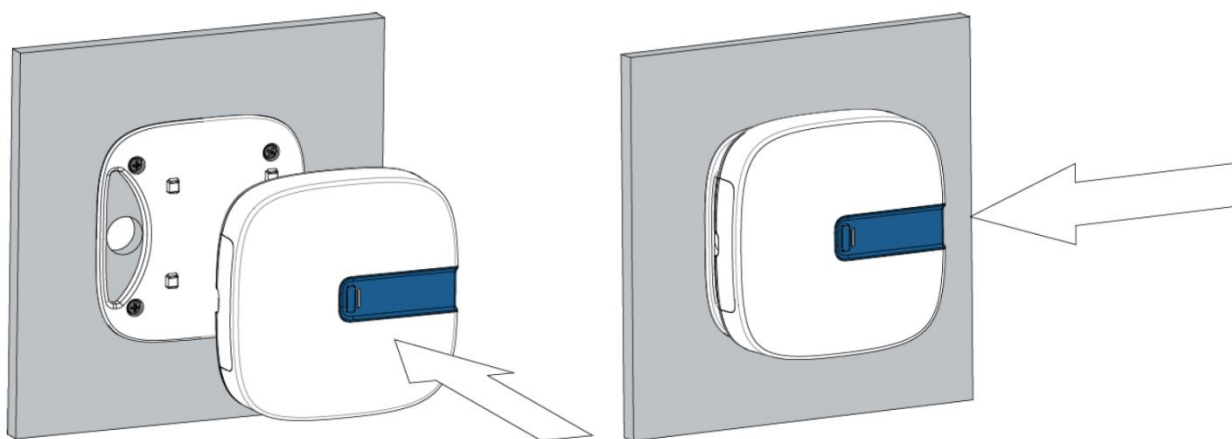


Push the provided drywall anchors into the drilled holes, then place the mounting bracket snugly against the wall. Using a screwdriver, screw the wall mount screws into the drywall anchors.



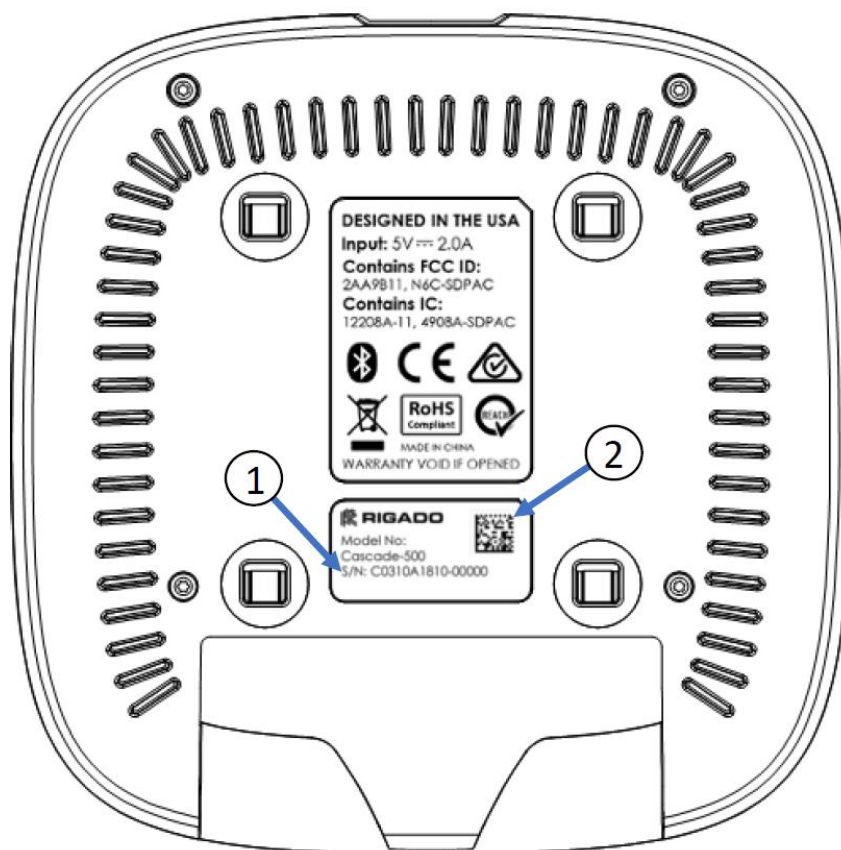
Place one ceiling mount screw through one of the mounting bracket screw holes, and push through the corresponding drilled ceiling hole. Use this screw to guide placement of the ceiling backer plate to the opposite side, then use the screwdriver to screw in this and the remaining ceiling mount screws.

3. Once the mounting bracket is installed, line up the four hooks of the mounting bracket with the corresponding holes on the back of the Gateway and press the two together. To lock in place, slide the Gateway over towards the cabling hole until it clicks into place.



Gateway Setup

Before the Gateway is permanently installed, look at the bottom (mount side) and record the unit Serial Number (1) or scan the 2D barcode (2), as shown below.



Initial Boot

At first power on, the Gateway's LED indicator will display the boot status. The status of the Gateway can be determined using the following table:

LED color	LED activity	Status
Yellow/Amber	Solid	Appliance is booting
Yellow/Amber	Slow-blink (1 blink every 2 seconds)	Appliance is in provisioning sequence
Yellow/Amber	Fast-blink (2 blinks per second)	Provisioning is complete, appliance is authenticating
Green	Solid	Appliance is provisioned and authenticated with TSS Cloud

Troubleshooting

Should you experience issues with any of the above steps, or with the TSS-500 / TSS-500-W Gateway in general, please reach out to us at customer.service@tss.se.