AIRVELOCITY 1901 5G SUB-6 GHZ NR GNB 2T2R INDOOR GNB UNIT

Installation Guide

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Document Information

This document details the procedure for installing the Airspan's AirVelocity 1901 5G Sub-6 GHz, RU aimed as part of the 5G NR standard and its place in the Airspan product suite. This document is intended for qualified personnel with a working knowledge of 5G.

Revision History

Revision	Date	Summary of Changes	Created by
Rev 0.1	April 2022	• Initial document – draft	MSF + YS
Rev 0.2 – 0.3	June 2022	• draft	MSF
Rev 0.4	July 2022	Added: • Remote GPS • PoE	MSF / MS
Rev A	August 2022	Published	MSF + MS
Rev A1	December 2022	Added FCC notice	MSF + ZL

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Warnings and Cautions

Human Exposure to Radio Frequencies

The AirVelocity 1901 5G Sub-6 gHz should be operated from a minimum safe distance of 20 cm (7.87 in.) during normal operation.

Radio Interference

The AirVelocity 1901 5G Sub-6 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 on and off, the technician is encouraged to try to correct the interference by performing one or more of the following measures:

- Re-orientate or relocate the unit
- Increase separation between the units and/or End Devices
- Connect the equipment to a circuit different from that to which the power source is connected

Modifications

Any changes and modifications to this device that are not expressly approved by Airspan Networks may void the user's authority to operate the equipment.

General

- Only qualified personnel should be allowed to install, replace, and service the equipment.
- The device cannot be sold retail, to the public or by mail order. It must be sold to operators.
- Installation must be controlled.
- Installation must be performed by licensed professionals.
- Installation requires special training. The AirVelocity 1901 5G Sub-6 should be installed ONLY by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void Airspan's product warranty and may expose the end user or the service provider to legal and financial liabilities. Airspan and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.
- The device is to be installed in a Restricted Access Location not easily accessible.

FCC Notice

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

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

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⚠ Important Safety Instructions

- Read and Save these instructions
- This Installation Guide contains instructions and warnings that should be followed during installation, and operation.
- Failure to follow these instructions could cause bodily injury and/or product failure

Safety

1. Read this guide and follow all operating and safety instructions.
2. Static sensitive components inside - do not remove the lid or base: No user serviceable parts inside.
3. Position the power cord to avoid possible damage; do not overload circuits.
4. Do not place this product on or near a direct heat source, and avoid placing objects on the terminal.
5. Use only a damp cloth for cleaning. Do not use liquid or aerosol cleaners. Disconnect the power before cleaning.
6. The units should not be located too near power lines or other electrical power circuits, where it can come into contact with power lines or circuits.
7. The radio transceiver must be properly grounded to protect against power surges and accumulated static electricity. It is the user's responsibility to install this device in accordance with the local electrical codes.
8. Installation of the AirVelocity 1901 5G Sub-6 must be contracted to a professional installer.
9. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

> 🚫 The onsite source circuit breaker (10A) should be gang operated, **double pole** (single phase type).

Warning of Hazardous Voltages

On AC installations, hazardous voltages exist. Use caution when verifying or working with AC power. Remove metal jewelry that could come into contact with AC power.

On DC sections, short-circuiting the low voltage, low impedance circuits can cause severe arcing that may result in burns or eye damage. Remove rings, watches etc. to avoid shorting DC circuits.

> ⓘ Airspan products do not contain hazardous substances (as defined in UK Control of Substances Hazardous to Health Regulations 1989 and the Dangerous Substances Regulations 1990). At the end of any Airspan products life cycle, the customer should consult with Airspan to ensure that the product is disposed of in conformance with the relevant regulatory requirements.

Adherence to European Directive 2014/53/EU

European Council Recommendation 2014/53/EU details basic restrictions and reference levels on human exposure to electromagnetic fields as advised by the ICNIRP. Adherence to these recommended restrictions and reference levels should provide a high level of protection as regards the established health effects that may result from exposure to electromagnetic fields.

Warning Symbols

The following symbols may be encountered during installation or troubleshooting. These warning symbols mean danger. Bodily injury may result if you are not aware of the safety hazards involved in working with electrical equipment and radio transmitters. Familiarize yourself with standard safety practices before continuing.

| Caution, hot surface | Caution | Electro-Magnetic Radiation | High Voltage | DC |

Service Information

Refer all repairs to qualified service personnel. Do not modify any part of this device, as this will void the warranty.

Disconnect the power to this product and return it for service if the following conditions apply:

1. The terminal does not function after following the operating instructions outlined in this manual.
2. The product has been dropped or the housing is damaged.

Locate the serial number of the terminal and record this on your registration card for future reference. Also, record the MAC address, located on the product sticker.

The unit can be powered by either PoE++ or AC power (using an AC/DC converter).

AirVelocity 1901 can be installed on a ceiling, suspended ceiling or wall.

About This Document

Purpose

This guide provides the workflow and step-by-step procedures for installing the Airspan's AirVelocity 1901a high performing RU variant. These procedures include:

- Verify prerequisites
- Install Mounting bracket Wall or Ceiling (Suspended or Solid)
- Install the AirVelocity 1901
- Connect and manage cables
- Connect power

Intended Audience

This guide is intended for persons who are responsible for installing the AirVelocity 1901 5G Sub-6.

These persons should have a working knowledge of the equipment.

Document Conventions

This document uses the following typographic conventions.

Table 1: Typographic Conventions

Convention	Element
Blue underlined text	Cross-reference links.
Bold text	Keyboard buttons and GUI elements.
Command	Command names or phrases.
Computer output	Text displayed by the computer.
Hyperlinks	Website and e-mail addresses.
Danger	Signifies a hazardous situation—if not avoided—will cause death or serious injury. Describes how to avoid it.
Warning	Signifies a hazardous situation—if not avoided—can cause death or serious personal injury. Describes how to avoid it.
Caution	Signifies a hazardous situation—if not avoided—can void the product warranty, and cause property damage. Describes how to avoid it.
Information/Note	Provides necessary information to explain a task.
Tip	Provides helpful hints.

Related Reading

The following documents contain related information:

- AirVelocity 1901 5G Sub-6 Product Specification

1 Introduction

This section provides a descriptive overview of the installation of Airspan's AirVelocity 1901 and its place in the Airspan product suite.

This document is intended for readers with 5G working knowledge.

All information in this document is for general information only, and is subject for change without notice.

1.1 AirVelocity 1901 5G Sub-6Hz

The AirVelocity 1901 is 5G-NR, sub-6 GHz indoor solution that's part of the OpenRANGE product line. It consists of both a radio unit (RU), distributed unit (DU) and in a compact unit (CU). It either can operate as a full gNB solution, or can be based on 3GPP split 2 architecture (SW Roadmap) - thus, allowing network adaptability for operators. The AirVelocity 1901 delivers indoor network coverage and capacity.

> ⓘ For management please refer to the system Commissioning Manual.

Figure 1: AirVelocity 1901 5G Sub-6Hz

2 Getting Started

2.1 AirVelocity 1901 5G Sub-6 Job Sheet

Plan the installation of the AirVelocity 1901 5G Sub-6 by using the Job Sheet, which you can find as a removable job aid in Appendix A for this guide.

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3 Verifying Prerequisites

Prior to installing the AirVelocity 1901 5G Sub-6Hz, verify the required safety, power, tools, parts and components. This chapter includes the hardware, software, and client requirements for installation.

> ⓘ **Important:** Set up requirements for the installation is detailed in the Job Sheet, see Appendix_A.

3.1 Verifying Site Requirements

To set up the AirVelocity 1901 5G Sub-6Hz, an IP connection to a Network Management System (NMS) is required.

3.2 Verify Installation Requirements

3.2.1 Verify the Tools

Table 2. Minimum Hardware Requirements

Tool	Use
Philips screwdriver (PH2)	For securing the 10-24 x 3/8" Sems screws.

3.2.2 Verify the Parts and Kits

Table 3. Parts & Kits

Installation Kit / Part	Part No.	Consisting of:	Image
AirVelocity 1901 5G n48 Sub-6 unit	AV191-N48-DP4C1S	• AirVelocity 1901 5G Sub-6 • Ceiling, Suspended Ceiling and wall mounting kit with hardware	

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Installation Kit / Part	Part No.	Consisting of:	Image
Optional – to be ordered separately			
AV-GPS-EXT-1	903-20-016	• GPS Antenna with Interference Rejection (SMA-M connector) • 10m GPS extension cable (SMA-F to SMA-M connections)	N/A
PoE	903-20-017	Power Over Ethernet (POE),1 Port Midspan Injector,56V 60W 1.07A POE-60-AC-GL-1	N/A

> ⓘ The AirVelocity 1901 requires operation using an Airspan FCC-specific version of ACP acting as a CBRS Domain Proxy.

3.2.3 Product Variants

Table 4: AirVelocity Variants – Supported Frequency Bands

Product Code	Frequency/Band	TX Power	Antenna Gain	EiRP	AZ/EL
AV191-F380-DP4C1S	3.7-4GHz/n77p	2x 320mW (2x25dBm)	9dBi	dbm	60°/60°
AV191-N48-DP4C1S	3.55-3.7GHz/n48	2x 320mW (2x25dBm)	9dBi	dbm	60°/60°

3.2.4 Power Supply and Current

AirVelocity 1901 5G Sub-6 supports a direct connection to DC power source or Standard 802.3bt Type4 class 8 90w adaptor.

Operational Range: 40.5-57vDC

Safety approved (certified) according to IEC/EN/TUV 60950-1
The use of other power sources may impair safety and will void the warranty.

3.2.5 Connections

The following diagram displays the port connections on the AirVelocity 1901.

Figure 2: Connection Ports
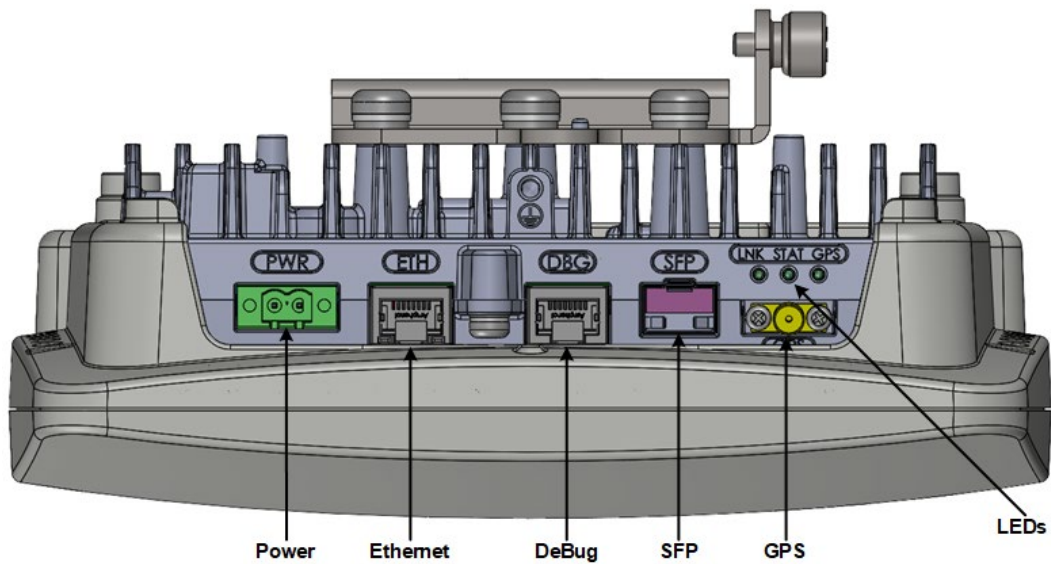
3.2.6 Physical Dimensions

AirVelocity 1901 5G Sub-6 is in an indoor enclosure.

Table 5: AirVelocity 1901 5G Sub-6 Physical Dimensions

Dimensions (H x W x D)	Weight
260 x 210 x 75.4 mm / 10.24 x 8.3 x 3.0 in.	3.5Kg / 7.7lb.

Figure 3: AirVelocity 1901 5G Sub-6 Dimensions

3.2.7 Environmental

> ℹ️ AirVelocity 1901 5G Sub-6RU is not for external/outdoor use.

Table 6: AirVelocity 1901 5G Sub-6 Operational Tolerances

Type	Details
Operating temperature	0°C to 40°C / 32°F to 104°F
Operating humidity	5% - 85% non-condensing
Storage temperature	-25°C to 70°C / -13°F to 158°F
Storage humidity	5% - 95% non-condensing
IP rating	IP30
Operational altitude	70-106 kPa as well as: From -60m to 1800m @ 40°C From 1800m to 4000m @ 30°C

4 AirVelocity 1901 5G Sub-6 Installation

AirVelocity 1901 5G Sub-6 supports mounting on a wall or ceiling (both suspended and conventional) by using these elements.

AirVelocity 1901 Mounting Kit:

- Mounting bracket – used for mounting on either a wall, a conventional ceiling or a suspended ceiling (with Hanger clip & adapter bracket).
- Hanger clip & adapter bracket – for hanging on a suspended ceiling
- Locking screwOK if you find one who has it ask
- Security Cable

4.1 Wall Mount

The following describes the Wall mounting procedure:

1. Select the optimal location where the AirVelocity 1901 unit is to be installed, in close proximity to a window.

2. Take the Wall/Ceiling mounting bracket and position it against the wall where the unit is to be mounted. Position the Wall mount bracket with the arrow pointed up. Be sure to position the wall mount plate straight and level to ensure the unit sits level.

3. Mark the holes carefully through the wall mounting bracket onto the wall.

4. Drill the four (4) holes. After drilling insert wall plugs, (x4) (not included).

> (i) Wall plugs (x4) and necessary hardware are **not** supplied by Airspan and are the responsibility of the installer. Use appropriate wall plugs according to field conditions. The holes in the Wall bracket are 5.5 mm.

5. Position the Wall mount on the wall and drive the screws into the inserted plugs through the holes on the Wall mount bracket base plate, as shown below:

Figure 4: Fix Wall Mount on Wall
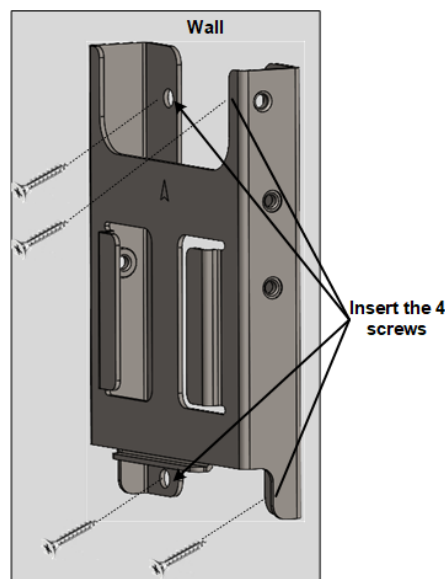
6. Slide the AirVelocity 1901 onto the Wall mount.

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Figure 5: Slide Unit on the Wall Mount
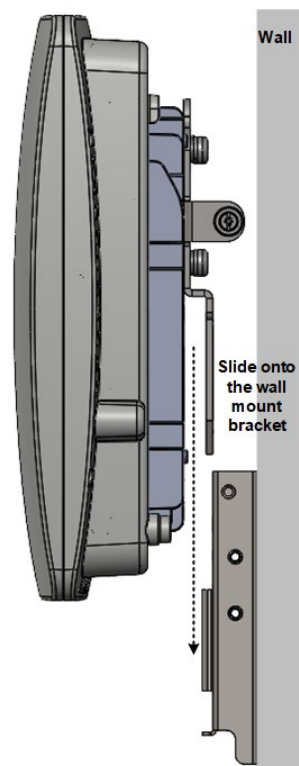
7. Align the locking screw with the threaded hole on the bracket and tighten. Tighten to a torque of no more than 17.5lb*in (1.98 Nm) max.

Figure 6: Insert Locking Screw and Tighten
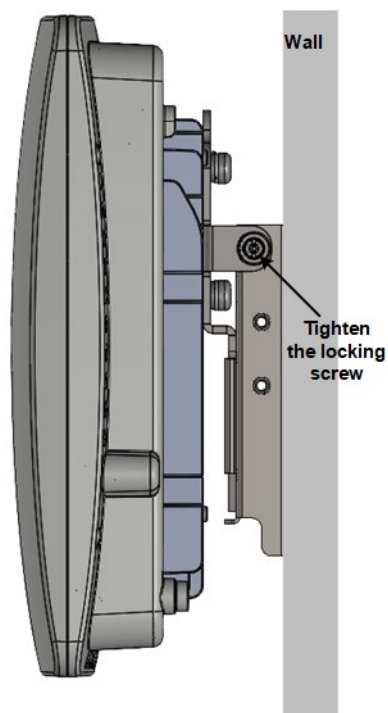
8. Connect the necessary cables to the relevant ports.

4.2 Ceiling Mount

The following defines the AirVelocity 1901 ceiling-mount assembly procedure for conventional ceiling or suspended ceilings.

> ⓘ   Prior to assembly, in any mounting scenario, determine where the unit it to be installed.

4.2.1 Conventional Ceiling Assembly

The following are instructions for assembly to a conventional ceiling.

1. Select the required location where the AirVelocity 1901unit is to be installed, on the ceiling in close proximity to a window.
2. Position the Ceiling adaptor bracket on the ceiling.
3. Mark the screw positions carefully through the holes in the Ceiling adaptor bracket onto the ceiling.
4. After drilling holes and inserting approved ceiling anchors (plugs) fasten the Ceiling adaptor bracket to the ceiling with screws and washers (not included).

> ⓘ   Screws and washers (x4) and any necessary hardware are not supplied by Airspan and are the responsibility of the installer. Use appropriate ceiling hardware according to field conditions. The holes in the Ceiling bracket are 5/16 (8mm).

Figure 7: Fasten the Wall/Ceiling Bracket to the Ceiling
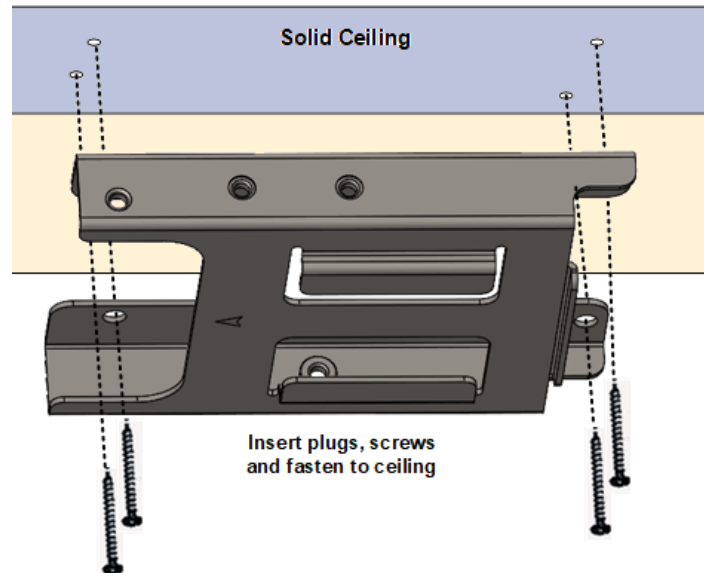
5. Carefully lift and slide the AirVelocity unit onto the bracket, till the stopper.

Figure 8: Slide Unit onto the Bracket
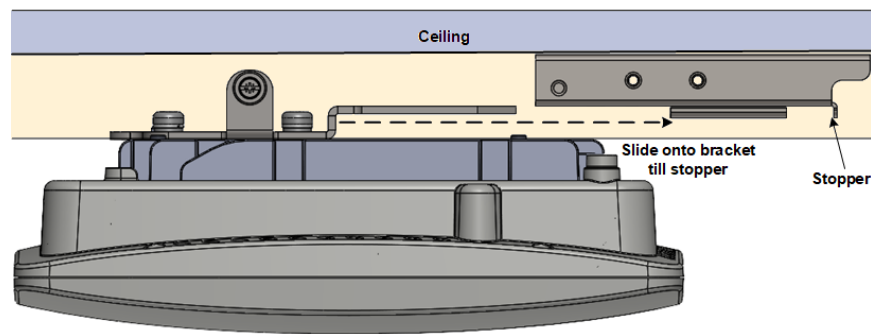
6. Attach the Security cable and fasten the other end of the Security cable to a secure point somewhere in the ceiling cavity, this is used for anti-drop purposes.
7. Align the locking screw with threaded hole on the bracket and tighten. Tighten to a torque of no more than 17.5lb*in (1.98 Nm) max.

Figure 9: Conventional Ceiling Mounted

8. Connect the necessary cables to the relevant ports.

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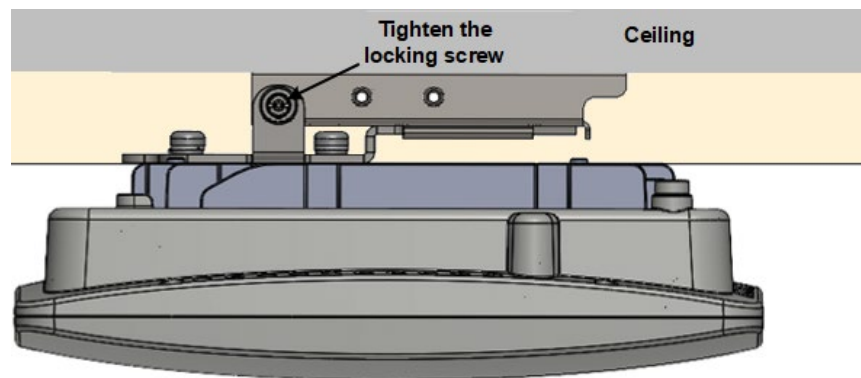
4.2.2 Suspended Ceiling Assembly

The following are instructions for assembly to a Suspended (acoustical) ceiling.

1. Determine the optimal position where the AirVelocity unit is to be installed at an intersection between the suspended ceiling keel/T-bar supports.
2. Assemble the Hanger clip on the T-bar supports.
3. Swivel the Hanger clip so that it clinches on the T-bar supports, as shown below:

Figure 10: Mount Hanger on T-bar
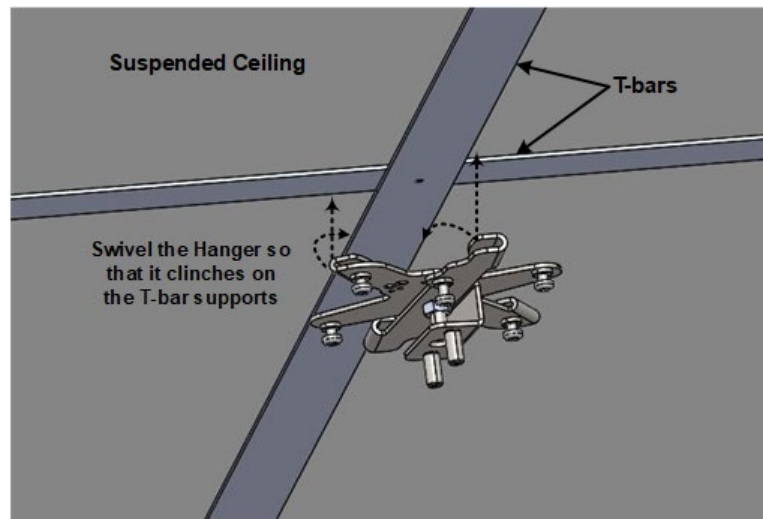
4. Select one of the 3 available threaded holes (corresponding to the width of the T-Bar) and tighten the set screw.

Figure 11: Secure Hanger to T-bar
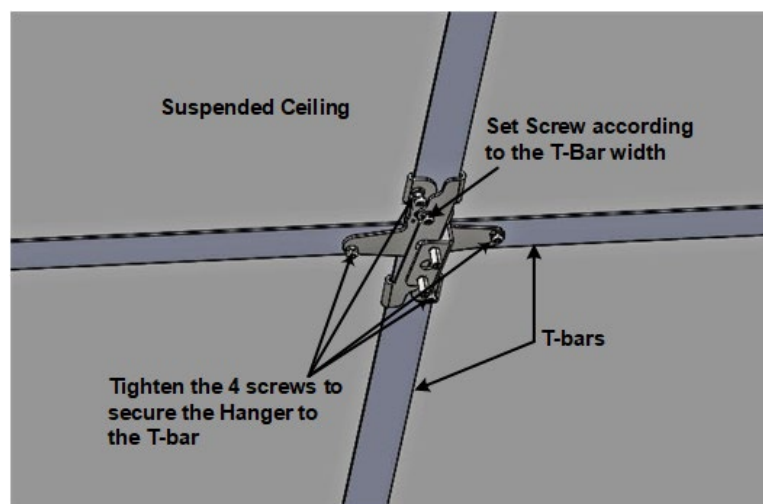
5. Once clinched, tighten the 4 set screws to secure the Hanger to the T-bar.
6. Lift the mounting bracket onto the Hanger clip by passing the protruding screws through the holes in the bracket.

Figure 12: Assemble the Mounting Bracket onto the Hanging Clip
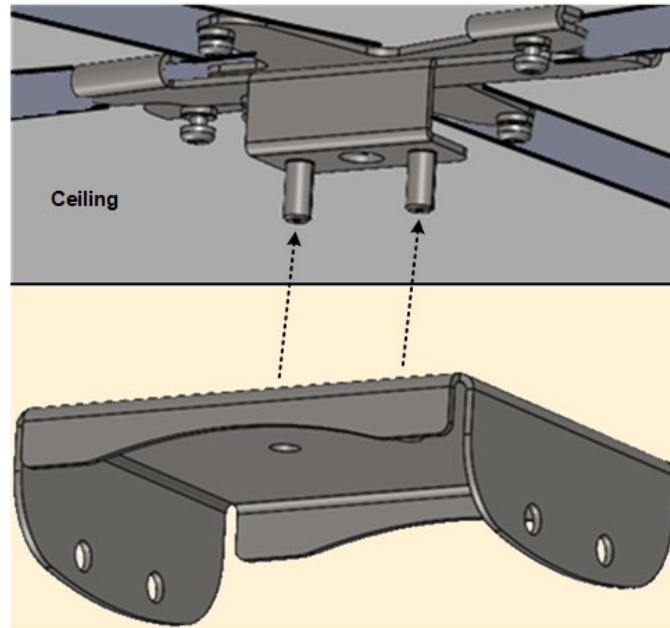
7. Put on a washer, split washer and wing nut on each screw, as shown below:

Figure 13: Mounting Bracket on Hanging Clip
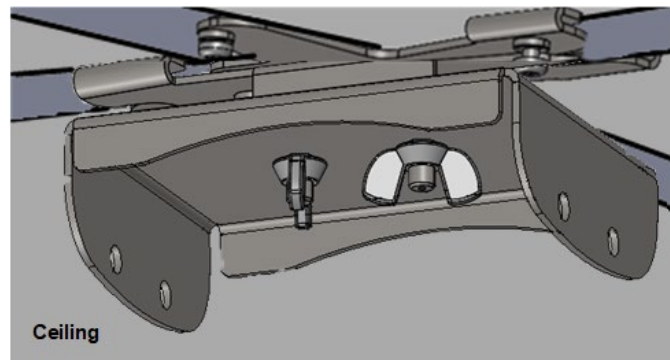
8. Lift the mounting bracket onto the ceiling adaptor bracket. Align the threaded holes of the mounting bracket with the holes and the ceiling adaptor bracket.

Figure 14: Bracket to Bracket Assembly
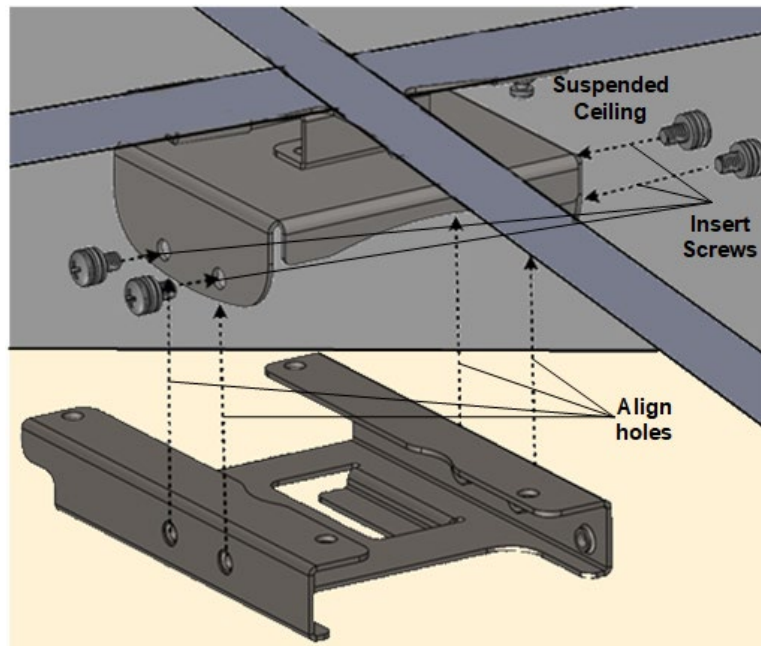
9. Insert the four (4) #10-24 screws, washers and tighten. Tighten to a torque of no more than 17.5lb*in (1.98 Nm) max.
10. Attach the Security cable and fasten the other end of the Security cable to a secure point somewhere in the ceiling cavity, this is used for anti-drop purposes.
11. Carefully lift and slide the AirVelocity unit onto the bracket, till the stopper.

Figure 15: Slide Unit onto Bracket
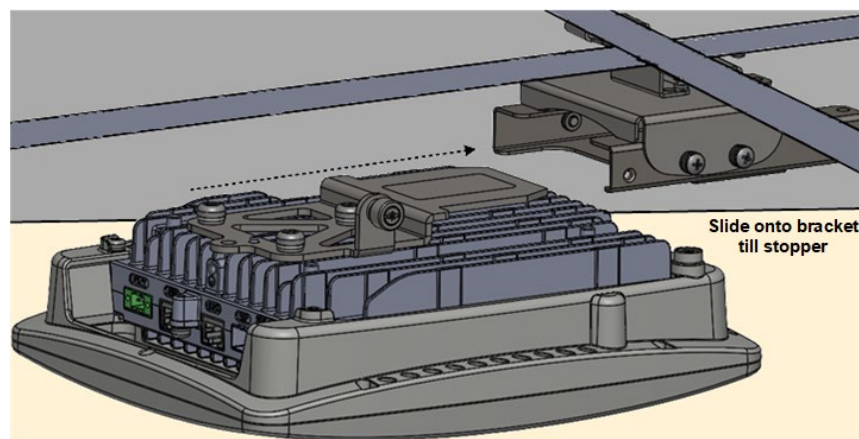
12. Align the locking screw with threaded hole on the bracket and tighten. Tighten to a torque of no more than 17.5lb*in (1.98 Nm) max.

Figure 16: On Suspended Ceiling
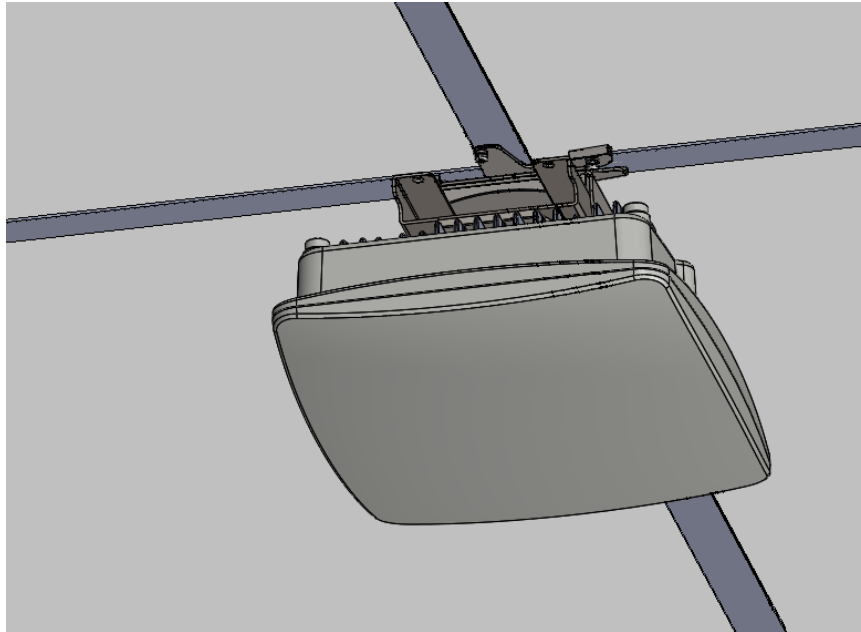
13. Connect the necessary cables to the relevant ports.

4.3 LED Display

Two (2) LEDs appear on the upper part of the unit, providing unit status indication: System/Access, Backhaul.

When powering up refer to the following table for indication of the current status:

Table 7: Status LED Display

State Name	Color	Status	Description
Powering Up	White	On Continuously	Until running from operational SW image
Software loading	Green	Blinking (4Hz)	Till SW startup is finished
Unit up with RF off	Blue	On Continuously	When Unit is up and configured by the operators to RF off on all cells
Normal Operation	Green	On Continuously	Normal operation (Radiating on at least one of the cells)
	In the event ACP configuration for LED switched off, will be initiated after 10 minutes.		
Major Alarm*	Orange	On Continuously	Service not affected
Critical alarm*	Red	On Continuously	Service affected.

Table 8: BH LED Display

State Name	Color	Status	Description
Powering Up	White	On Continuously	Until running from operational SW image
Software loading	Green	Blinking (4Hz)	Until SW startup is finished and the Physical link in OK (like a router/switch)
			A timer of 60 sec will be triggered and in case that link not established the led will turn to red.
			Can take a few seconds.
Normal Operation	Green	On Continuously	Normal operation (physical link is OK)
			If at least 1 backhaul port link is OK.
	In the event ACP configuration for LED switched off, will be initiated after 10 minutes.		
Critical alarm*	Red	On Continuously	Service affected

4.4 GPS LED Display

A LED appears on the upper part of the unit, providing unit the GPS status indication:

When powering up refer to the following table for status indication:

Table 9: GPS LED Display

State Name	Color	Status	Description
Powering Up/Reboot	White	On Continuously	Until running from operational SW image
Initial	Red or Blue or Green	Blink Continuously	• No sufficient GPS Reception – Red • Good GPS Reception – Blue • Excellent GPS Reception – Green
Steady	Blue or Green	On Continuously	Good GPS Reception – Blue Excellent GPS Reception – Green
Switched off	Off		In the event ACP configuration for LED switched off, will be initiated 300sec post steady state reached.

5   Connect and Manage Cables

Before connecting any of the cables to the appropriate port, you can manage and store any excess cable by winding it and tying it off. This takes up any excess slack and presents a more thorough and orderly installation.

5.1 Physical Interfaces

5.1.1 Fiber SFP 1GbE Cable

1 x SFP socket - SFP module and connector (when applicable), **not** supplied by Airspan.

Either SFP or copper.

5.1.2 Ethernet Cable Copper 1GbE Cable

1x RJ45 Socket - Typical RJ45 connection (when applicable).

Either SFP or copper.

5.1.3 Power Connection DC

Connector Type	Voltage Range
Phoenix Type Connector 2-Pole 5mm Pitch	40.5:-57vDC

5.1.4 Power Connection PoE

Connector Type	RJ45
Standard	Standard 802.3bt Type3 60w

5.2 AC to PoE++/DC Power Supply

The AC/DC PSU power supply should be mounted on a wall in close proximity to the AirVelocity unit. The power supply should be mounted close to an available electrical outlet.

The POE++/DC power supply can be mounted remotely from to the AirVelocity unit, according to the 802.11bt standard allowable distance.

Appendix A. Job Sheet

This job sheet enables the users to keep track of their installation. It covers all the prerequisites required for accomplishing the AirVelocity 1901 5G installation.

Table 10: Job Sheet

Site Requirements
- Area for installation identified   - Position on ceiling or wall identified   - Method of reaching ceiling / wall positions (ladders, elevated work platform)   - All equipment items available at the installation site: - AirVelocity 1901 5G Sub-6 unit   - Mounting bracket, and required hardware   - Required cables
Tool Requirements (For further information, see Verify the Tools.)
- Philips screwdriver - securing the Ground and opening the back covers   - Screw driver (for Wall mounting if required)
Required Ancillary Equipment
- Laptop PC for initial configuration   - Cable for temporary connection of the laptop
Other installed materials
- Cable ties (good to have)   - Labels (good to have)

Acronyms, Abbreviations, and Definitions

Table 11: Acronyms, Abbreviations, and Definitions

Term	Description
AC /DC	Alternating/Direct Current
RU	Radio Unit
CU	Control Unit
5GC	5G Core Network
5G NR	5G New Radio
PoE	Power over Ethernet
3GPP	3rd Generation Partnership Project
ETSI	European Telecommunication Standards Institute
TCP	Transmission Control Protocol
SFP	Small Form-factor Pluggable
CE	Conformitè Europëenne
EMC	Electromagnetic Compatibility
FCC	Federal Communications Commission
IEC	International Electrotechnical Commission
ROHS	Restriction of Hazardous Substances

Customer Service Help Desk

Airspan's *Customer Care Help Desk* offers prompt and efficient customer support services.

> To take advantage of Airspan's *Customer Care Help Desk* support, you must be a registered user and must have a valid support contract. To register, click here and fill the Registration form.

To create and update issue logs, send e-mails to Customer Care Help Desk. Once you submit your issue, the system generates a new issue and sends an issue number for your reference. The system uses this issue number to categorize and store e-mails under the appropriate issue.

To help *Customer Care Help Desk* identify your issue, include the issue number and your *Customer Care Helpdesk* account details in all further communications.

Main Operations	Worldwide Headquarters
Airspan Communications Ltd. Capital Point 33 Bath Road Slough, Berkshire SL1 3UF, United Kingdom Tel: +44-1895-467-100	Airspan Networks Inc. 777, Yamato Road, Suite 310 Boca Raton, FL 33431, USA Tel: +1-561-893-8670

Airspan Encourages Comments

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