



AirStrand 1300 Installation Guide

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Document Information

Abstract

This document details procedures for installing the Airspan's AirStrand 1300 Pico-class LTE eNodeB variant.

Revision History

Revision Details	Date	Summary of Changes
0.1 – 0.2	November 2017	<ul style="list-style-type: none">Initial document & comments
A & A1	November 2017	<ul style="list-style-type: none">PublishComments
A2 + A3	December 2017	<ul style="list-style-type: none">Tx Power updateUpdates from Comments
A4	January 2018	<ul style="list-style-type: none">Modifications and Updates

Warnings and Cautions

Human Exposure to Radio Frequencies

The AirStrand 1300 when operational should be operated from a minimum safe distance of 2m.

Avertissement et Precautions d'Utilisation

Exposition des personnes aux fréquences radioélectriques

Les antennes d'AirStrand 1300 quand opérationnel doivent être installée et utilisée de façon à garantir la distance minimale de sécurité de 2m.

Radio Interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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 general 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 AirStrand 1300 radio and antenna 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.
- Power provided by PoE output cannot be considered limited power source (LPS) per IEC/UL 60950-1 clause 2.5.
- Connection to the PoE port is permitted only by certified electrician according to NEC requirements.
- Connect PoE terminal only to equipment which does NOT require "LPS only" feeding.

Général

- Seul le personnel qualifié peut être autorisé pour installer ou remplacer l'équipement ainsi qu'effectuer les opérations de maintenance pour cet équipement.

- L'équipement ne peut pas être vendu en grande distribution ou par commande via email à destination du public. Il doit être vendu aux opérateurs de télécommunications.
- Son installation doit être contrôlée
- Son Installation doit être effectuée par des professionnels autorisés.
- Son installation requiert une formation spécifique du personnel. L'AirStrand 1300, radio et antenne doit être installée UNIQUEMENT par des installateurs professionnels expérimentés et ayant une connaissance des constructions locales et règles de sécurité, ainsi que, dès que nécessaire, disposant d'un agrément des autorités gouvernementales de régulation. Toute enfreinte à ces obligations peut annuler la garantie délivrée par Airspan pour ces produits et peut exposer l'utilisateur final ou le fournisseur de services à des dommages légaux et financiers.
- Airspan et ses revendeurs ou ses distributeurs ne sont pas responsables des blessures, dommages ou violations de la régulation en vigueur liées à l'installation du système extérieur ou des antennes.
- L'Équipement doit être installé dans une zone à accès réduit et contrôlé.
- L'alimentation fournie par la sortie PoE ne peut pas être considérée comme une Source d'Alimentation Limitée (ou LPS – limited power source) selon le standard IEC/UL 60950-1 clause 2.5
- La connexion au port PoE est autorisée par un électricien certifié selon les standards NEC.
- Connecter le port PoE uniquement aux équipements NE demandant PAS un source de type " LPS only

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. Supply cord is not shipped with the unit and is to be provided by user. Installation is to be performed by a qualified electrician according to local codes. Installation to be done in accordance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part I, CAN/CSA C22.1, and when applicable, the National Electrical Safety Code, IEEE C2.
3. Static sensitive components inside - do not remove the lid or base: No user serviceable parts inside.
4. The ground connection should be made before connecting to supply connections.
5. Position the power cord to avoid possible damage; do not overload circuits.
6. Do not place this product on or near a direct heat source, and avoid placing objects on the terminal.
7. To avoid electrical shock do not install this device during adverse conditions such as rain or inclement weather.
8. The units should not be located too near power lines or other electrical power circuits, where it can come into contact with such power lines or circuits.
9. 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.
10. Installation of the AirStrand 1300 must be contracted to a professional installer.

11. The circuit breaker should be easily accessible in case you have to disconnect the device.
12. 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.

Securete

1. Lire attentivement ce guide et suivre les instructions d'utilisation et de sécurité.
2. Le cordon d'alimentation n'est pas livré avec l'appareil et doit être fourni par l'utilisateur. L'installation doit être effectuée par un électricien qualifié conformément aux règles et standards locaux. L'installation doit être effectuée en conformité avec le Code national de l'électricité (NEC), ANSI / NFPA 70, le Code canadien de l'électricité (CCE), Partie I, CAN / CSA C22.1, et le cas échéant, le Code national de sécurité électrique, IEEE C2.
3. Des composants sensibles à l'électricité statique sont utilisés à l'intérieur. Ne pas retirer le coffre ou la base. Aucune pièce à l'intérieur est d'utilité pour l'utilisateur.
4. La connexion "terre" doit être effectuée en priorité et avant d'effectuer les connexions à la source d'alimentation (phase et neutre).
5. Positionner le cordon d'alimentation de façon à éviter des dommages potentiels. Ne pas surcharger les circuits.
6. Ne pas placer ce produit sur ou à proximité d'une source directe de chaleur et éviter de placer des objets sur le terminal.
7. Afin d'éviter des problèmes électriques, ne pas installer cet équipement au cours d'événements climatiques difficiles comme averses ou météo non clémente.
8. L'unité ne doit pas être située trop près de lignes électriques ou autres circuits de puissance, avec lesquels il pourrait entrer en contact.
9. L'émetteur radio doit être correctement relié à la terre afin de le protéger contre les surtensions ou accumulation d'électricité statique. L'utilisateur est tenu responsable de l'installation du produit conformément aux règles électriques en vigueur localement.
10. L'installation de AirStrand 1300 doit être contractualisée avec un installateur professionnel.
11. L'interrupteur de circuit électrique doit être facilement accessible afin de pouvoir déconnecter l'équipement.
12. Lors de l'installation de la configuration finale, le produit doit être conforme aux Standards de Sécurité en vigueur ainsi qu'aux exigences réglementaires du pays dans lequel il est installé. Si nécessaire, consulter les agences réglementaires appropriées, ainsi que les autorités chargées de l'inspection afin de garantir la conformité.

Warning of Hazardous Voltages

On AC installations, hazardous voltages exist. Use caution when verifying or working with AC power. Remove metal jewellery 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.

Note: 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.

Attention aux Voltages Hasardeux

Sur les installations de réseau électrique de type courant alternatif (CA), des voltages hasardeux peuvent survenir. Garder une Attention particulière lors d'une vérification ou de travaux sur réseau électrique CA. Retirer tous bijoux en métal qui pourraient entrer en contact avec l'alimentation ou le réseau CA.

Sur les portions de réseau électrique de type courant continu (CC), un circuit basse impédance peut causer de sérieux arcs électriques qui pourraient bruler ou endommager les yeux. Retirer bagues, anneaux, montres etc... afin d'éviter les court-circuit sur le réseau CC.

Adherence to European Directive 1999/5/EC

European Council Recommendation 1999/5/EC 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.



Airspan equipment is compliant with CE and R&TTE regulations and can be operated in all EU (European Union) locations listed below:

Country Code			
BE	EL	LT	PT
BG	ES	LU	RO
CZ	FR	HU	SI
DK	HR	MT	SK
DE	IT	NL	FI
EE	CY	AT	SE
IE	LV	PL	UK

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

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:

- The terminal does not function after following the operating instructions outlined in this manual.

- b. 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.

UL Information

- The equipment must be properly grounded according with NEC and other local safety code requirements.
- Reminder to all the BWA system installers: Attention to Section 820-40 of the NEC which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as is practical.

Power Rating

40-90 VAC 47/63Hz 1.4A

Lightning Protection

WARNING: The following notes are general recommendations for the system. The wireless equipment should be installed by a qualified professional installer and must follow local and national codes for electrical grounding and safety. Failure to meet safety requirements and/or use of non-standard practices and procedures could result in personal injury and damage to equipment. A direct lightning strike may cause serious damage even if these guidelines are followed.

All outdoor wireless equipment is susceptible to lightning damage from a direct hit or induced current from a near strike. Lightning protection and grounding practices in local and national electrical codes serve to minimize equipment damage, service outages, and serious injury. The antennas are to be DC grounded, so surge protection is not required. Reasons for lightning damage are summarized as:

- Poorly grounded tower/antenna sites that can conduct high lightning strike energy into equipment.
- Lack of properly installed lightning protection equipment that can cause equipment failures from lightning induced currents.

A lightning protection system provides a means by which the energy may enter earth without passing through and damaging parts of a structure. A lightning protection system does not prevent lightning from striking; it provides a means for controlling it and preventing damage by providing a low resistance path for the discharge of energy to travel safely to ground. Improperly grounded connections are also a source of noise that can cause sensitive equipment to malfunction.

A good tower grounding system disperses most of the surge energy from a tower strike away from the building and equipment.

To limit the equipment damage due to a lightning strike, the following practices are recommended for the wireless system:

- Provide direct grounding from the antenna mounting bracket, the radio and antenna and the lightning/surge protectors to the same ground point at the base of the tower or a ground bus on the building. Use the grounding screws on the antenna bracket and the radio and antenna for terminating the ground wires.
- The circuit ground must be connected to the same grounding system as the eNodeB.

DECLARATION OF CONFORMITY

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC

English:

This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Deutsch:

Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.

Dansk:

Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 1999/5/EF.

Español:

Este equipo cumple con los requisitos esenciales así como con otras disposiciones de la Directiva 1999/5/EC.

Greek:

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Airspan ΔΗΛΩΝΕΙ ΟΤΙ Ο ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.

Français:

Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/EC.

Íslenska:

Þessi búnaður samrýmist lögboðnum kröfum og öðrum ákvæðum tilskipunar 1999/5/ESB.

Italiano:

Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/EC.

Nederlands:

Deze apparatuur voldoet aan de belangrijkste eisen en andere voorzieningen van richtlijn 1999/5/EC.

Norsk:

Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 1999/5/EC.

Português:

Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 1999/5/EC.

Suomalainen:

Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muidenkin ehtojen mukainen.

Svenska:

Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

Român:

Acest echipament este în conformitate cu cerințele esențiale și alte prevederi relevante ale Directivei 1999/5/CE.

The Declaration of Conformity related to this product can be obtained from PLM@Airspan.com.

GPS Compliance

The GPS is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC."

The GPS complies with the following EMC Common Regulatory Testing standards:

- EN55022: Radiated and Conducted Emissions
- CISPR 22: Class B
- EN 50081-1: Generic Emissions Class B
- EN 50082-1: Generic Immunity Class B
- EN 61000-4-2: Electrostatic Discharge Immunity
- EN 61000-4-3: Radiated RF EM Field Immunity Test
- EN 61000-4-4: Electrical Fast Transient/Burst Test
- EN 61000-4-6: Conducted Immunity
- EN 61000-4-8: Magnetic Field Immunity

Note: A GPS is recommended for synchronizing between LTE sectors.

Note: An optional GPS Lightning/Surge protector is available from Airspan when installing the GPS antenna in a remote location for lightning prone deployments.

Maximum Output TX Total Power

Table 1: AirStrand 1300 B41 FCC Maximum Output TX Total Power

Frequency Band	FCC TX	EIRP	Antenna Gain
2496 – 2690 MHz	30.4 dBm	40.9 dBm	10.5dBi

Table 2: AirStrand 1300 B41 ETSI Maximum Output TX Total Power

Frequency Band	ETSI TX	EIRP	Antenna Gain
2496 – 2690 MHz	30 dBm	40.5 dBm	10.5dBi

Caution: Do not set maximum output TX power to higher than local regulations.

Power Consumption

AirStrand 1300 has a nominal power consumption of 40W. AirStrand 1300 power consumption is described in the following table:

Table 3: Power Consumption

Duplex	Tx Power at RF Port (dBm)	Nominal Power Consumption (W)
TDD	Sec1: 26 Sec2: 26	45

Antenna System

The eNB solution is based on a dual sector model that can be operated as a dual sector / dual carrier mode of operation. There are 2x directional 2x2 antennas which are positioned perpendicular to the strand (back to back).

Figure 1: AirStrand 1300



About This Document

Purpose

This guide provides the workflow and step-by-step procedures for Installing the AirStrand 1300. These procedures include:

- Verify prerequisites
- Assemble Strand Brackets on Unit
- Install the AirStrand 1300
- Connect and manage cables

Intended Audience

This guide is intended for persons who are responsible for installing the AirStrand 1300 equipment.

These persons should have a working knowledge of the equipment.

Document Conventions

This document uses the following typographic conventions.

Table 4: Typographic Conventions

Convention	Element
Blue underlined text	Cross-reference links.
Bold text	Keyboard buttons and GUI elements.
<i>Command</i>	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.
Important	Provides necessary information to explain a task.
Note	Provides additional information.
Tip	Provides helpful hints.

Related Reading

The following documents contain related information:

- AirStrand 1300 Hardware Product Specification *Pending*
- Airspan LTE Commissioning Manual *Pending*

Customer Care Help Desk

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

Note: To avail 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.

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Airspan Encourages Comments

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1 Introduction

This section provides a descriptive overview of the Airspan's AirStrand 1300 Pico-class eNodeB variant and its place in the Airspan product suite.

1.1 AirStrand 1300

AirStrand 1300 is part of Airspan's carrier-class LTE advanced outdoor small cell eNodeB family. AirStrand 1300 is a Pico-class LTE eNodeB product, providing high-speed data, mobility, Voice over LTE, and broadcast/multicast services.

AirStrand 1300 is a super compact, easy to install Pico-class Outdoor Small Cell Strand mounted eNodeB with an integrated DOCSIS (Alpha DSM33) backhaul solution. Allowing an operator to deploy LTE broadband services on a cable strand without the need for backhaul connectivity or infrastructure – It uses the already existing Macro layer for backhauling.

AirStrand 1300 is a dual sector product which is operated as a single 2x2 MIMO cell of 20MHz channel using the advanced Lite-CoMP technology.

AirStrand 1300 fully supports the standard LTE (Uu/S1/X2) interfaces.

All Airspan eNodeB products, including AirStrand 1300, are interoperable with a rich portfolio of 3rd party end user devices, including many handsets, indoor UEs, outdoor UEs and USB dongles from several ODMs, using various chipsets. For an updated of interoperability list, please contact your nearest Airspan Sales Representative.

Note: For management please refer to the AirStrand 1300 LTE Commissioning Manual as well as the Netspan User Manual.

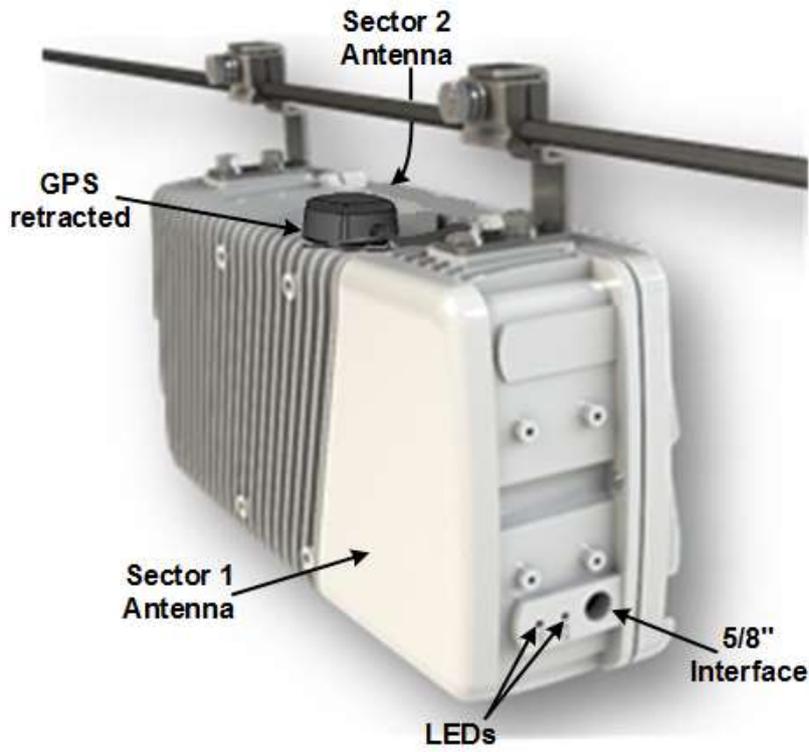
1.1.1 Deployment

AirStrand 1300 perfectly fits the requirements of the hard zoning outdoor locations such as hotels, city centers, parks and universities all due to its super compact one box form factor.

AirStrand 1300 creates a single install process for LTE Access and Backhaul, and enables “Just add Power” plug and play deployment method and along with the easy zoning of the product saving deployment related costs and time.

Note: The following is for illustration only; actual layout may differ as infrastructure is installation-specific.

Figure 2: AirStrand 1300

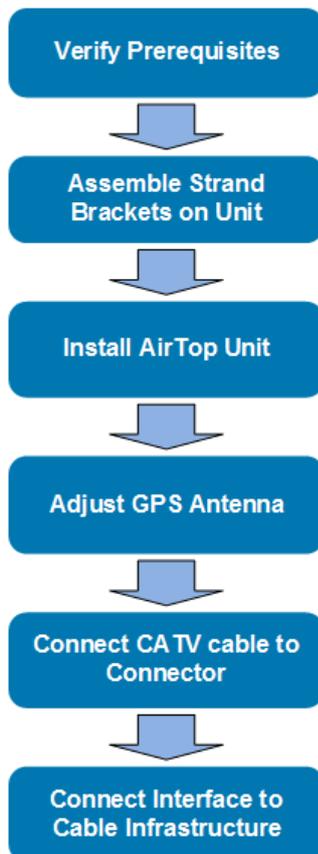


2 Getting Started

2.1 Workflow of Installation

The Workflow to install the AirStrand 1300 is shown in the following diagram:

Figure 3: Workflow



2.2 AirStrand 1300 Installation Checklist

Plan the installation of the AirStrand 1300 by using the Installation Checklist, which you can find as a removable job aid in [Appendix A](#) for this guide.

3 Verifying Prerequisites

Prior to installing the AirStrand 1300, 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 AirStrand 1300, an IP connection to a Netspan server is required.

3.2 Verify Installation Requirements

3.2.1 Verify the Tools

Table 5. Minimum Hardware Requirements

Tool	Use
9/16 inch wrench	Tightening hanger 3/8-16 bracket nuts
1/2 inch wrench	Tightening hanger 5/16-18 bracket screws and nuts
#10 (5/32) Allen wrench	For adjusting the GPS slide screws
Philips screw driver	Good to have
Torque screwdriver	Tightening screws
Adjustable Wrench	For CATV 5/8" connector (if needed)
Small flat blade screw driver (insulated shaft recommended)	Good to have

3.2.2 Verify the Parts and Kits

The following figures display various AirStrand 1300 components and accessory kits.

Note: Verify order and requirements to ensure the correct unit type is being installed.

Table 6: AirStrand 1300 Components

Installation Kit / Part	Product Code	Airspan No.	Consisting of	Images
AirStrand 1300	AT13-U41-B03S	998-73-419 SP	AirStrand 1300 2.496 - 2.690 / 2.496 - 2.690 MHz (B41), DOCSIS Backhaul, DOCSIS Power	
AirStrand Strand Mounting Kit	AS12-SMK-1 Included in the main unit packaging	903-03-040	Strand bracket x 2 with Hanger clamps x 2 Hardware (bolts, threaded stud and nuts)	

3.2.3 Power

AirStrand 1300 supports direct connection to AC Quasi-sine power source. To be fed from the HFC network.

Operational Voltage Range: 44V~90V

Table 7: Power

Power Source	Nominal Power Consumption (W)	Nominal Power Consumption (W)
AC Quasi Sine 44V~90V	45	70

3.2.4 Physical Dimensions

AirStrand 1300 is in an all outdoor enclosure.

Table 8. AirStrand 1300 Physical Dimensions

Variant	Dimensions (L x W x H)	Comment
Total size	16.5 x 5.5 x 8.5 in. / 420 x 140 x 203 mm	The physical dimensions exclude connectors
Volume	11.5L	
Weight		
Complete Unit (including hangers)	24 Lbs. / 11 Kg.	

4 Installation of AirStrand 1300

AirStrand 1300 is installed on the strand (the steel cable) that runs from pole to pole supporting other cables, such as telephone and cable company cables that run from pole to pole.

When mounting the AirStrand 1300 on a cable strand, you must use the Strand mount accessory kit. The kit contains several parts that you should assemble before mounting on a cable strand. The Strand Accessory kit contains the strand bracket(s) and the hanger bracket(s) (clamps) with the required hardware (included) required for installation.

To install AirStrand 1300 to a cable strand, you need to perform these operations:

- Assemble strand hanger brackets.
- Attach the strand hanger brackets to the AirStrand 1300 unit.
- Attach the hanger bracket clamps to the cable strand.
- Connect interface (5/8" Interface connector type) to the cable infrastructure.

4.1 Strand Mounting of AirStrand 1300

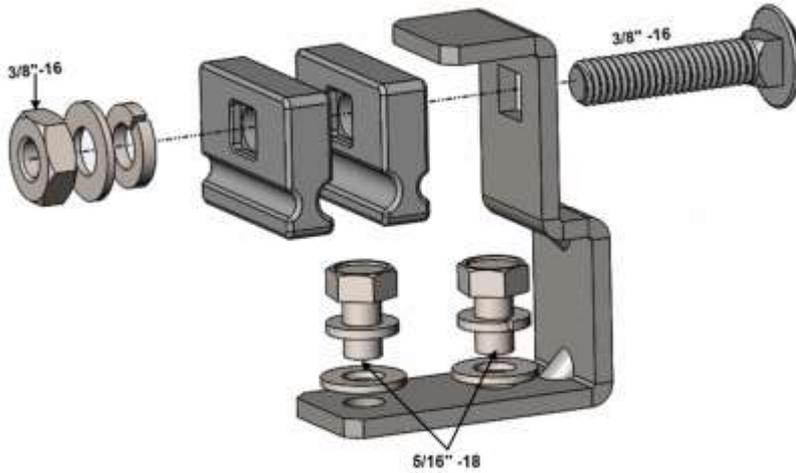
Caution: Proper local rigging and hoisting practices should be followed when installing the AirStrand 1300.

Caution: The AirStrand 1300 is intended to be strand mounted in the telecommunications space between poles, not in the electrical space.

4.1.1 Bracket Assembly on the AirStrand 1300

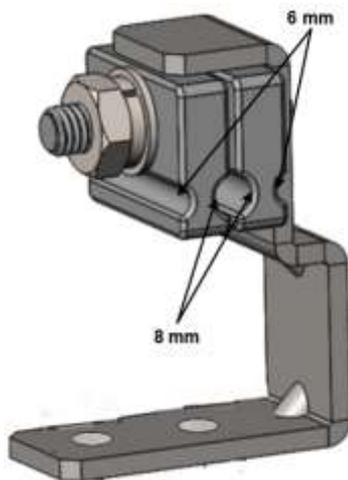
1. Assemble the hanger clamp bracket (first verify the cable diameter, and select either the 6 mm or 8 mm hole configuration).

Figure 4: Hanger and Clamp Assembly



Note: Different sized strand(s) may be accommodated when securing hanger bracket by rotating the notched clamp to the suitable hole size, as displayed below.

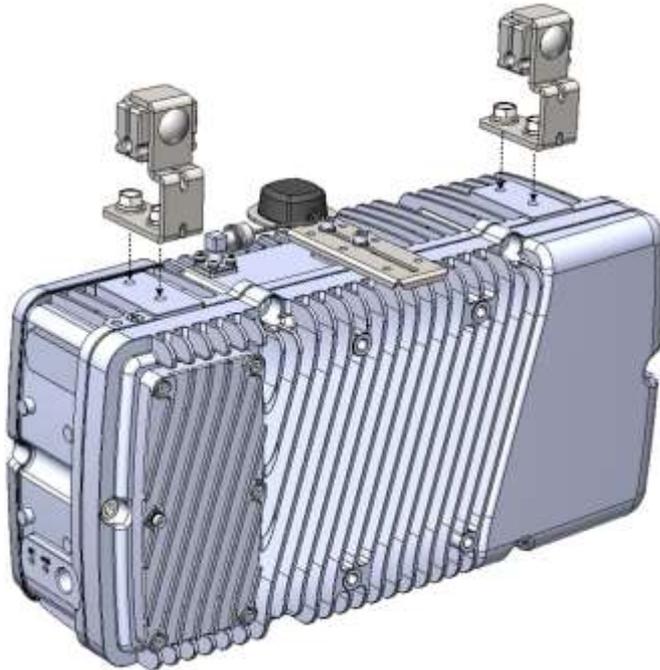
Figure 5: Mounting Hanger Assembled



2. Assemble both strand brackets to the top of the unit. Inserting the 5/16"-18 bolts (provided) into the threaded holes.

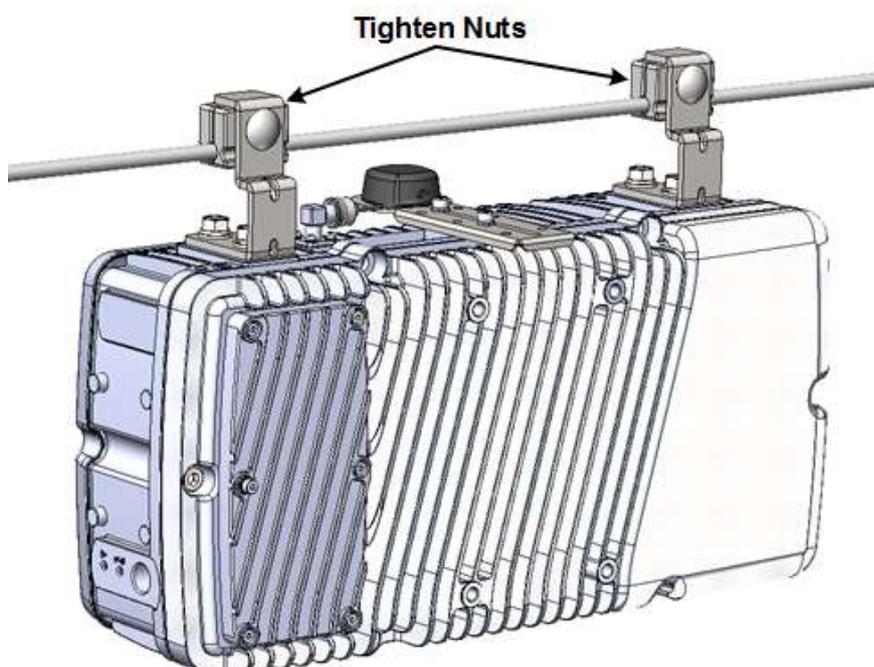
Note: Assemble the brackets in the direction as shown in Figure 6 below.

Figure 6: Hanger Bracket Assembly on Unit



3. After assembly tighten down the bolts.
4. Orient the AirStrand 1300 to enable optimal positioning prior to placing on strand cable.
5. Lift assembled unit into place on the cable strand.

Figure 7: Unit on Cable Strand



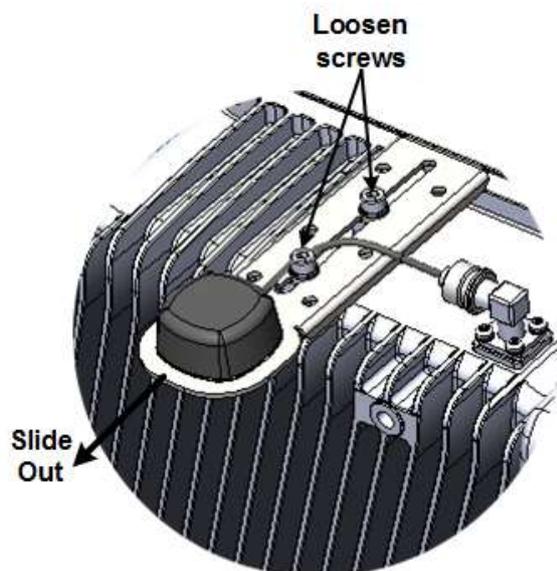
6. Secure the hanger bracket on the strand.

4.1.2 GPS Bracket Adjustment

After the AirStrand 1300 is securely fastened on the strand cable, the GPS and its bracket should be extended for maximum efficiency.

1. Loosen the two (2) Hex Head Allen screws on the GPS slide, which is attached on the top of the slide bracket.

Figure 8: GPS Bracket Adjustment



2. Extend the slide bracket.
3. Re-tighten the two (2) Hex Head Allen screws.

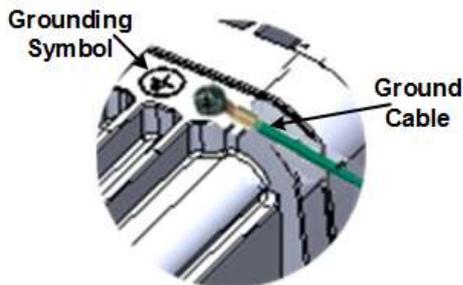
5 Connecting and Managing Cables

5.1 Connecting the Ground Cable

Once the AirStrand 1300 is securely attached on the strand it is advisable to connect an approved ground cable.

Connect the ground cable after attaching a grounding lug to the ¼-20 threaded hole on the top of the AirStrand 1300 body, as shown below:

Figure 9: Ground Cable Connection



Note: Cutting the Ground cable to the required length and crimping the grounding lug is performed by the Installer.

Note: The threaded ¼-20 ground hole is bare metal and needs no preparation.

Note: The minimum cable gauge to be used for the ground wire is 9 AWG.

5.2 1300 Interface Connection

Danger: Hazardous voltage! Before working, ensure that the power is off prior to performing any connections.

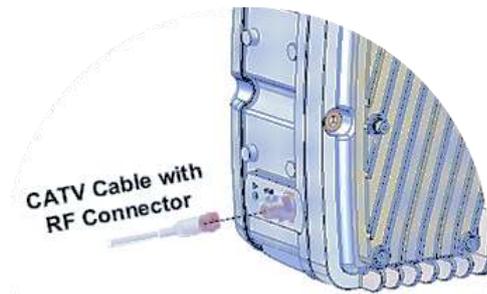
5.2.1 Connecting the CATV Cable

Once the AirStrand 1300 is securely attached on the strand the installer should connect the CATV cable terminated with an RF connector to the F-type connector (factory installed) connected to the unit's connecting outlet.

1. Connect the CATV cable terminated with an RF connector to the F-type connector connected (factory installed) to the unit's connecting outlet.

Note: Supplied with F-type connector adapter but other connectors (i.e. stinger) are available if required.

Figure 10: Connect CATV Cable



Note: When securing the cable make sure there is no tension on the connector so that it is easy to disconnect and re-connect for future maintenance actions.

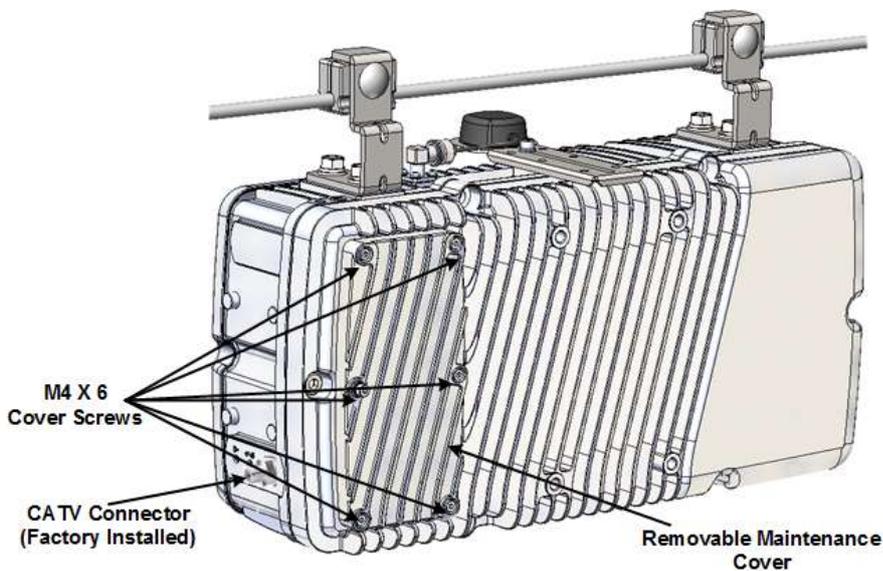
5.2.2 Accessing the Attenuator(s) and Test Port

Note: Opening of the maintenance cover is done in order to change the attenuators or for connecting to a stinger connector (instead of the supplied connector).

1. Loosen the six (6) M4 screws that hold the maintenance cover in place.

Note: The screws are secured to the cover and will not fall off.

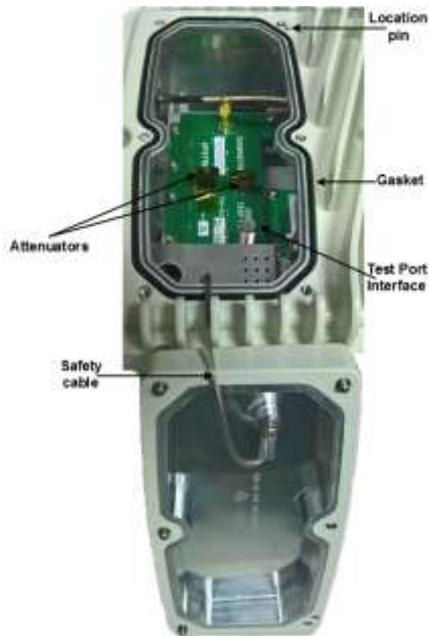
Figure 11: Removable Maintenance Cover



2. Open the removable maintenance cover and let it hang on the attached safety cable.

Note: Access to Attenuator(s) and test port are available via the Maintenance cover, see Figure 12.

Figure 12: Maintenance Cover Open



Note: The “test port” is available for use to test required attenuation as needed.

5.2.3 Replacing the Maintenance Cover

The following is the recommended procedure to set the maintenance cover in place and the correct pattern for tightening the screws to maintain proper weather proofing.

Note: Verify that the gasket is “seated” fully within the groove encircling the opening before setting the cover in place.

1. Carefully place the maintenance cover (utilize the location pin) over the opening and hand tighten the six (6) M4 screws in place.
2. Tighten the screws in the following pattern in order to achieve proper pressure for optimal weather proofing.

Figure 13: Screw Tightening Pattern

Tightening the screw in this pattern reduces the likelihood of the cover shifting and flexing, which could nullify the weather proofing.

When you've tightened all the screws, go back through the pattern again with the torque screwdriver to ensure that every screw is tightened appropriately.

Caution: Initially hand-tighten the six (6) M4 screws. Torque the screws to no more than a maximum of 17.70 in-lbs or 2 N.m using a Torque screwdriver.

A Job Sheet

This job sheet enables the users to keep track of their installation. It covers all the prerequisites required for accomplishing the AirStrand 1300 installation.

Site Requirements
<ul style="list-style-type: none">○ Cable Strand for installation identified○ Position on Strand identified○ Access restrictions (highway regulations, other services on pole, power pole)○ Method of reaching Strand positions (Bucket truck, Elevated work platform)○ Configuration programming details known○ All equipment items available at the installation site<ul style="list-style-type: none">○ AirStrand 1300 unit○ Strand Mounting Kit
Tool Requirements (For further information, see Verify the Tools.)
<ul style="list-style-type: none">○ 9/16 inch wrench○ 1/2 inch wrench○ #10 (5/32) Allen wrench○ Torque screwdriver○ Philips screw driver○ Adjustable Wrench

B Installation Checklist

During installation, review and perform all the steps on this checklist (in the given order). This checklist is meant for the person who performs the AirStrand 1300 installation. It includes the high-level steps involved in the installation process.

Tip: To make sure you complete all the tasks, detach or print this checklist and use it as a job aid. After performing, check off each task.

Procedure	Action	Check If Performed
Verify the prerequisites	Verify site requirements.	<input type="checkbox"/>
	Verify safety requirements.	<input type="checkbox"/>
	Verify installation requirements.	<input type="checkbox"/>
Assemble the strand bracket onto the unit	Assemble the strand bracket on the AirStrand 1300 unit.	<input type="checkbox"/>
Install AirStrand 1300 on the cable strand	Fit and secure the AirStrand 1300 unit to the strand cable.	<input type="checkbox"/>
Adjust the GPS bracket	Extend the GPS bracket as required	<input type="checkbox"/>
Connect to Infrastructure	Connect the CATV cable to the factory installed Connector	<input type="checkbox"/>

C Abbreviations

Term	Definition
3GPP	3rd Generation Partnership Project, responsible for LTE
ABS	Almost Blank Subframe
ACS	Adjacent Channel Selectivity is a measurement of a receiver's ability to process a desired signal while rejecting a strong signal in an adjacent frequency channel. ACS is defined as the ratio of the receiver filter attenuation on the assigned channel frequency to the receiver filter attenuation on the adjacent channel frequency.
AWGN	Additive White Gaussian Noise is a channel model in which the only impairment to communication is a linear addition of white noise with a constant spectral density and a Gaussian distribution of amplitude.
BER	Bit Error Rate
CN	Core Network
CP	Cyclic Prefix
CTC	Convolution Turbo Code is a high-performance forward error correction (FEC) code
dB	Decibel. A logarithmic unit used to describe a ratio (such as power ratio in radio telecommunications)
dBm	An abbreviation for the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW). It is used as a convenient measure of absolute power because of its capability to express both very large and very small values in a short form
eNodeB	Evolved Node B, is the element in E-UTRAN of LTE
ESP	Encapsulating Security Payloads (ESP) provide confidentiality, data-origin authentication, connectionless integrity, an anti-replay service (a form of partial sequence integrity), and limited traffic-flow confidentiality
E-UTRAN	Evolved UMTS Terrestrial Radio Access Network, is the air interface of 3GPP's Long Term Evolution
EVM/RCE	The Error Vector Magnitude or EVM (sometimes also called Receive Constellation Error or RCE) is a measure used to quantify the performance of a digital radio transmitter or receiver. It is measured in dB or percentage (%) – the lower the better
FDD	Frequency-Division Duplexing. A transceiver mode where the transmitter and receiver operate at different carrier frequencies
GNSS	Global Navigation Satellite System is a term used to describe a satellite navigation system with global coverage. There are currently two fully operational GNSSs – the US GPS and the Russian GLONASS.
GTP-U	GPRS Tunneling Protocol for User data is a relatively simple IP based tunneling protocol which permits many tunnels between each set of end points
HPBW	Half Power BandWidth is the angular separation in an antenna, in which the magnitude of the radiation pattern decreases by 50% (or -3 dB) from the peak of the main beam
ICS	In-channel selectivity is a measure of the receiver's ability to receive a wanted signal at its assigned Resource Block locations in the presence of an interfering signal
IPSec	Internet Protocol Security is a protocol suite for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet of a communication session

Term	Definition
LED	Light Emitting Diode
LTE	Long Term Evolution
MAC	Medium Access Controller – responsible for several functions such Error Correction, Packet (De)Multiplexing, etc...
MBSFN	Multicast-Broadcast Single Frequency Network is an LTE feature designed to deliver services such as Mobile TV using the LTE infrastructure, and is expected to be a competitor to DVB-H-based TV broadcast
MCS	Modulation and Coding Scheme
MME	Mobility Management Entity is the key control-node for the LTE access-network. It is responsible, among other things for idle mode UE tracking and paging procedure including retransmissions
MTBF	Mean Time Between Failures
OFDMA	Orthogonal Frequency-Division Multiple Access (OFDMA) is a multi-user version of OFDM digital modulation scheme, used for eNodeB transmissions to UEs
PDPC	Packet Data Convergence Protocol. A Sub-Layer in LTE responsible for IP Header (De) Compression, etc...
PDU	Protocol Data Unit
PTP	Precision Time Protocol is used to synchronize clocks throughout a network. In this document, PTP is referring to IEEE1588-2008 protocol
RB	Resource Block
RLC	Radio Link Control. A Sub-Layer in LTE responsible for Ack/Nack, error correction, packet reordering, etc...
ROHS	Restriction Of Hazardous Substances
RRM	Radio Resource Management is used to cover all functions that are related to the assignment and sharing of radio resources among UEs
S-GW	Serving Gateway. A Core entity in the LTE EPC architecture responsible for routing and forwarding user data packets, while also acting as the mobility anchor for the user plane during inter-eNodeB handovers and as the anchor for mobility between LTE and other 3GPP technologies
SC-FDMA	Single-Carrier FDMA is a frequency-division multiple access scheme, dealing with the assignment of multiple users to a shared communication resource. Used in LTE for UE
SCTP	Stream Control Transmission Protocol is a reliable transport layer protocol, ensuring in-sequence transport of messages with congestion control like TCP
SDR	Software Defined Radio
WEEE	Waste Electrical and Electronic Equipment