The Manual | TARANA

Quick-Start Guide

The essentials of getting a link up and running

Preparation

Setting up a Tarana Wireless® link requires gathering, at a minimum, the following:

Tools

- ☐ 13 mm combination or socket wrench
- ☐ 5 mm hex driver or wrench
- ☐ T30 Torx driver
- ☐ Wi-Fi USB dongle and short USB extension cable
- ☐ mobile device for setup and alignment (smartphone, tablet, or laptop) with terminal app and current browser

Hardware

- ☐ 1 CN and 1 EN radio unit
- ☐ 2 elevation-adjust mounting bracket kits
- ☐ 2 pole/wall mounting kits
- ☐ 2 power sources and cables
- ☐ 2 Ethernet cables (+ SFPs, if fiber)
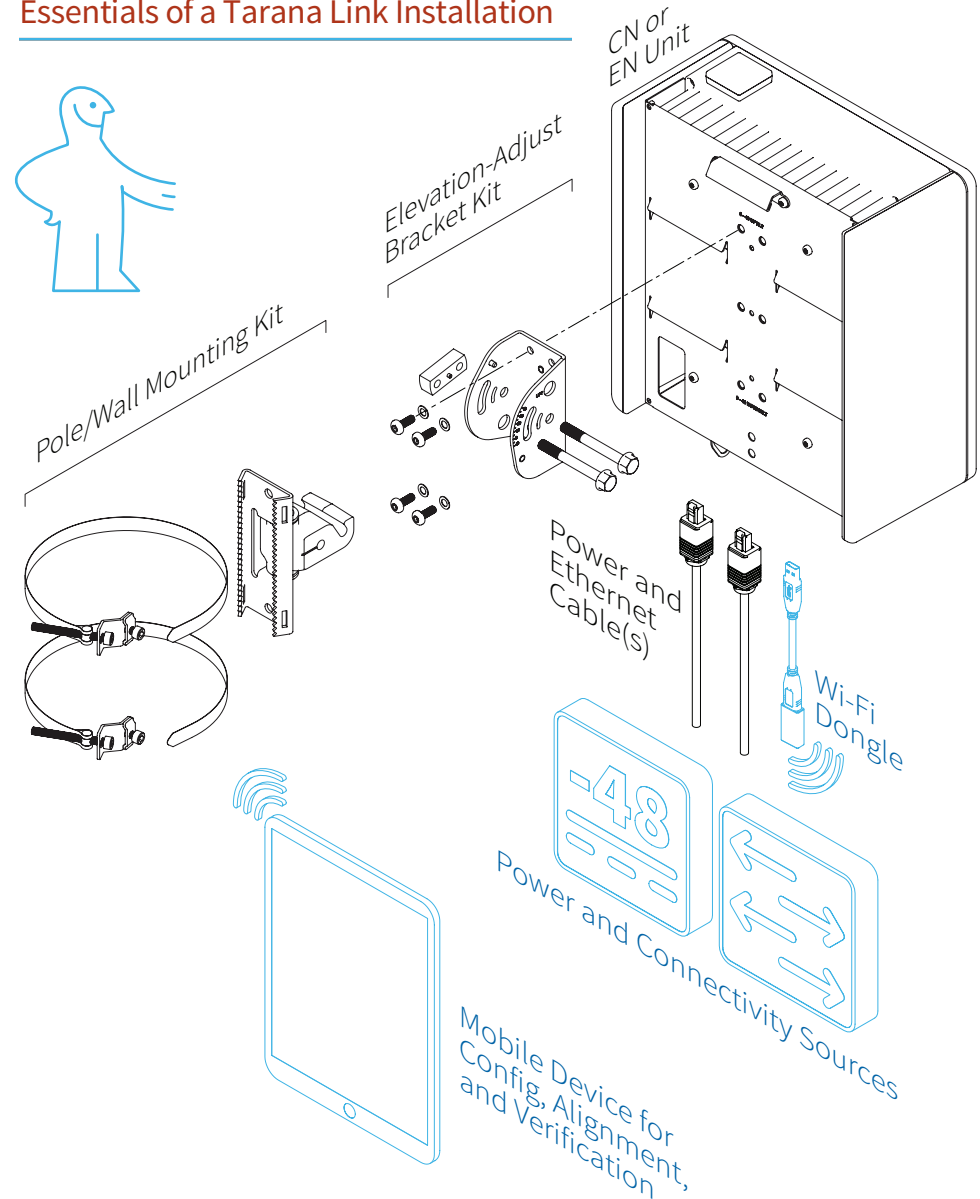- ☐ 2 target mounting locations (wall or pole)

Information

- ☐ frequency of operation
- ☐ Transmit (Tx) power limit
- ☐ link code
- ☐ 2 IP addresses (if not DHCP)

Regulatory, Safety, and Best Practices ⚠️

Tarana AbsoluteAir® equipment is designed for installation and use by trained professionals and requires adherence to all relevant regulatory, safety, and telecom industry best practice guidelines for outdoor radios. See our Safety, Warnings, and Regulatory section for details.

Essentials of a Tarana Link Installation

- CN or EN Unit
- Elevation-Adjust Bracket Kit
- Pole/Wall Mounting Kit
- Power and Ethernet Cable(s)
- Wi-Fi Dongle
- -48 / Power and Connectivity Sources
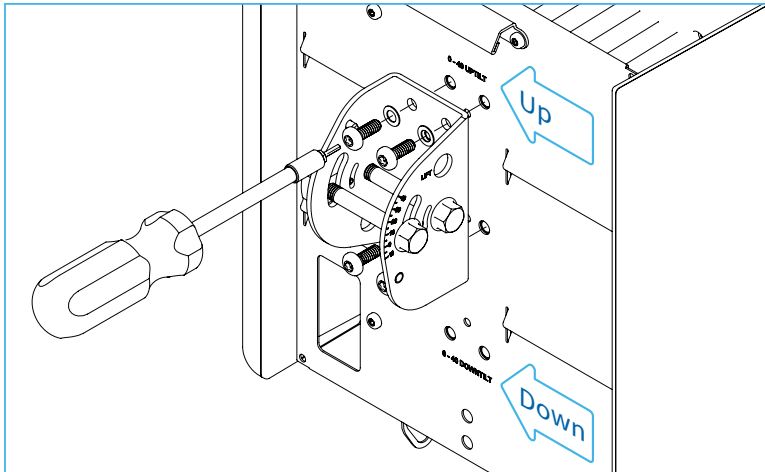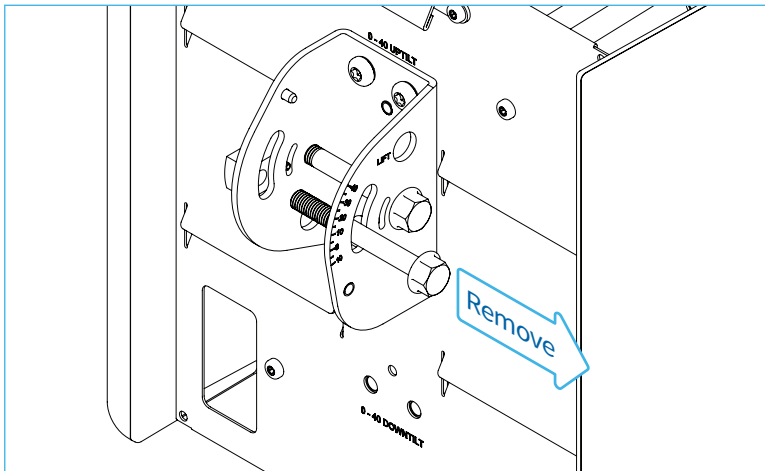- Mobile Device for Config, Alignment, and Verification

Sequence

For a single point-to-point link, the EN and CN can be installed in whichever order is most convenient. Otherwise, CNs should be installed before ENs, as the latter have more alignment flexibility when multiple links are involved that can be leveraged to maximize link headroom and resilience.
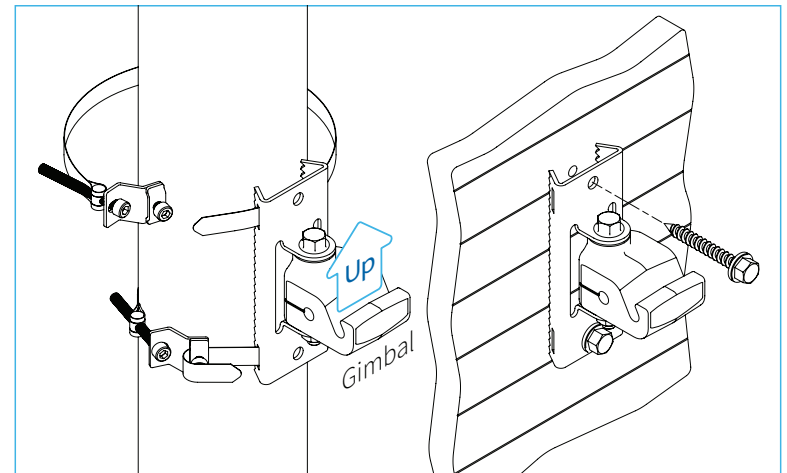
Physical Installation

Step 1. Attach elevation-adjust bracket to rear of unit. Torque these screws to 42-60 in-lb (5-7 Nm). Note uptilt v. downtilt position options, used typically for ENs and CNs, respectively.
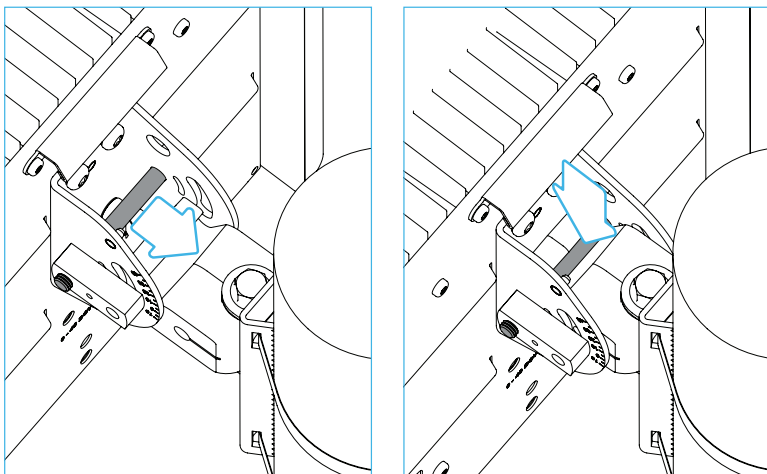

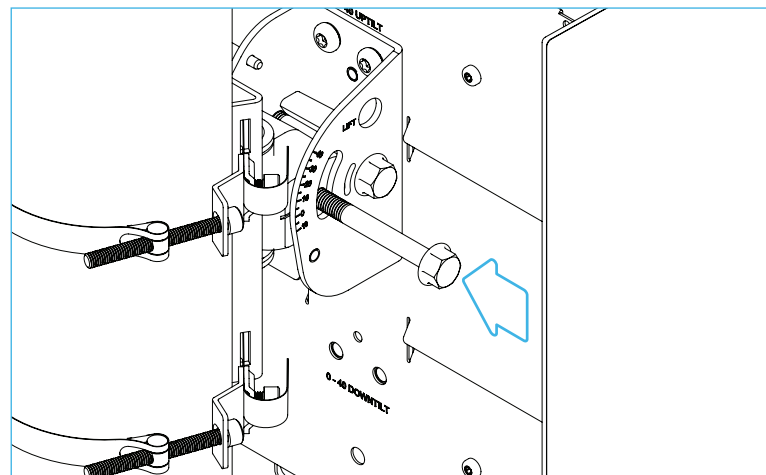**Step 2.** Remove outer M8x70 hex/flange bolt from elevation-adjust bracket.

Step 3. Attach assembled gimbal and mounting bracket with groove opening in gimbal facing up. Do not torque the azimuth adjustment bolt at this time, as you may want to adjust the angle as part of link alignment. After alignment is complete, torque to 25 ft-lb (33 Nm).
For wall mounting, use fasteners appropriate to wall material. A load rating of 220 lbs. is recommended per fastener.
For pole mounting, insert the band through the slot under the hex-head locking bolt. Pull the band through the slot until nearly tight, then fold over the band at the edge of the locking bolt/slot. Torque the locking bolt to 42-44 in-lb (4.75-5 Nm). Clip off excess band if required. Partially tighten the tension bolt to secure to the pole. Do not torque the bolt at this time, as you may want to adjust the position as part of link alignment. After alignment is complete, torque the tension bolt to 70-75 in-lb (8-8.5 Nm).

Step 4. Hang unit on gimbal, hooking inner hex/flange bolt into groove.

Step 5. Return outer hex/flange bolt to bracket, orient unit, and tighten. Do not torque the bolt at this time, as you may want to adjust the angle as part of link alignment. After alignment is complete, torque to 25 ft-lb (33 Nm).
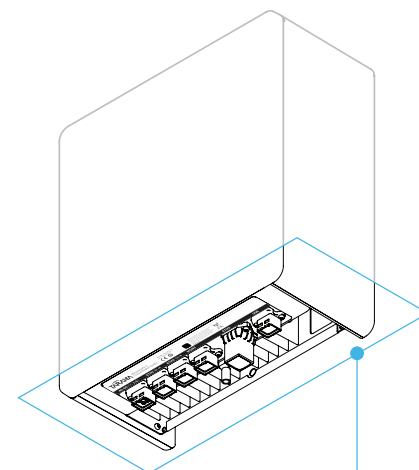
Power and Connectivity

Supply -48 VDC to the unit through either its power port (1) or PoE-in enabled Ethernet port (2). Ethernet connectivity can be established for link and management traffic in a variety of configurations using the three or four Ethernet ports — see our Configuration section for more details. Absent other network design constraints or goals, a single ETH<n> port can be used for both, separating traffic with VLANs.   In any configuration, all power and signal cables must be terminated with Harting weatherproof connectors. Proper lightning or surge suppression devices and associated grounding are required for all connections.
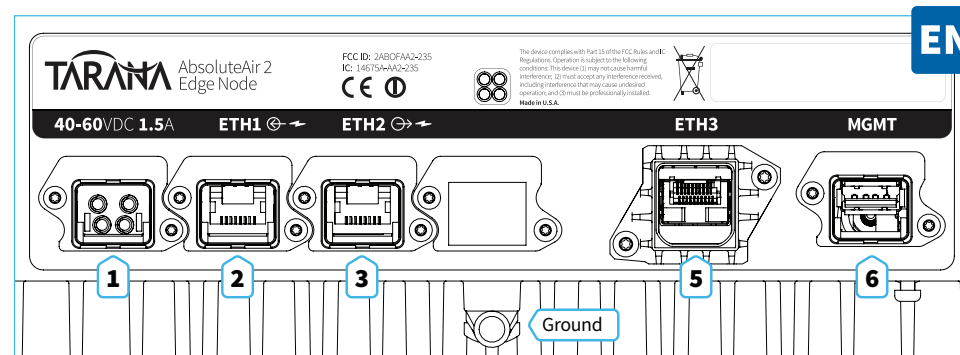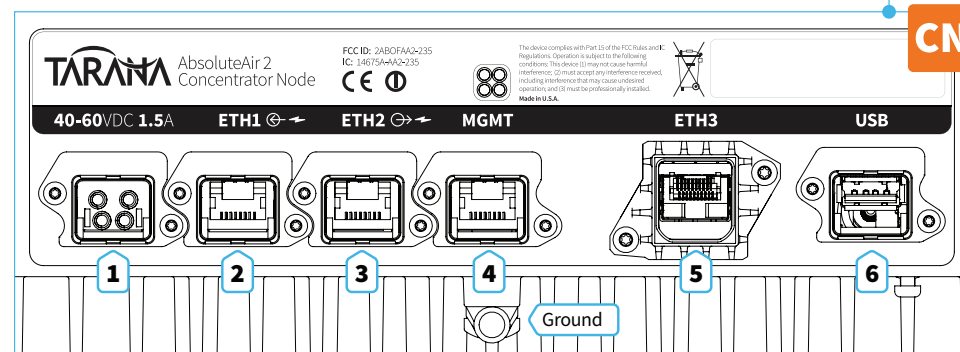
Grounding

Install the ground wire prior to hanging the unit on the gimbal, as the pole or wall may block access to the ground port. Ground the unit by attaching the grounding wire via a standard barrel copper lug (PN#48-0061-001). Use an M8-1 X 10MM pan-head screw and appropriate locking hardware (lock washers or thread-locker adhesive) to secure the lug to the unit. Ensure the grounding wire is attached to earth ground in accordance with local electrical code requirements.

Interfaces

Port	Description
1	Dedicated -48 VDC input, from AC adapter or other site power source
2	1000BASE-T, RJ45, with PoE-in option for powering unit
3	1000BASE-T, RJ45
4	(CN only) 1000BASE-T, RJ45, dedicated management interface
5	SFP socket (1000BASE-X fiber or 1000BASE-T copper)
6	USB-A for direct management access during installation or maintenance via Wi-Fi or Ethernet dongle

CN and EN Power, Data, and Management Interfaces

Setup

Connecting the unit to DC power initiates its boot-up process. When that is complete (in typically 3–4 minutes), the rear panel Power LED shows steady green.

Basic setup requires the following steps:

☐ Plug the Wi-Fi dongle into the unit's USB port, and watch for SSID "Absolute-Air-<9 digit unit serial number> on your mobile device. Authenticate with password **192.168.123.1**

☐ Use your terminal app to SSH into the unit at its static Wi-Fi address:

```
$ ssh admin@192.168.123.1
admin@192.168.123.1's password:  admin123
```

This will drop you directly into the unit's command-line interface.

☐ Enter these commands to configure the radio link, using an example of 3.5 GHz, link code 1.0.0.1, and max Tx power of 33 dBm:

```
<unit name># configure terminal
<unit name>(config)# radio frequency 3500.0
<unit name>(config)# radio link-code 1.0.0.1
<unit name>(config)# radio max-permitted-pa-power 33.0
```

Note that unique link codes for a small number of links can be simple serial assignations in the format 0.0.m.n, where n ranges from 0 to 5 for each m from 0 to 23. For proper network deployments, see our Network Planning section for details on setting up and maintaining non-interfering link codes at scale.

The final step with the radio is to turn its transmit power on:

```
<unit name>(config)# radio tx-opmode on
```

☐ For remote management access, configure your unit with its assigned static IP address x.x.x.x, subnet mask y.y.y.y, and gateway z.z.z.z:

```
<unit name>(config)# interface vlan 1
<unit name>(config-if)# ip address x.x.x.x y.y.y.y; exit; ip
route 0.0.0.0 0.0.0.0 z.z.z.z
```

(You may loose connection at this point. Open a new SSH session to the new IP address. See our Configuration section for details on networking configuration.)

Access unit via Wi-Fi for config and alignment

Advanced alternative: Upload prepared config file to unit

See our Configuration section for more details on template-based config using the Node Manager web app (introduced on the next page).

☐ For reference, give the unit a meaningful name and location entry:

```
<unit name>(config)# system name "unit name here"
<unit name>(config)# system location "unit location here"
```
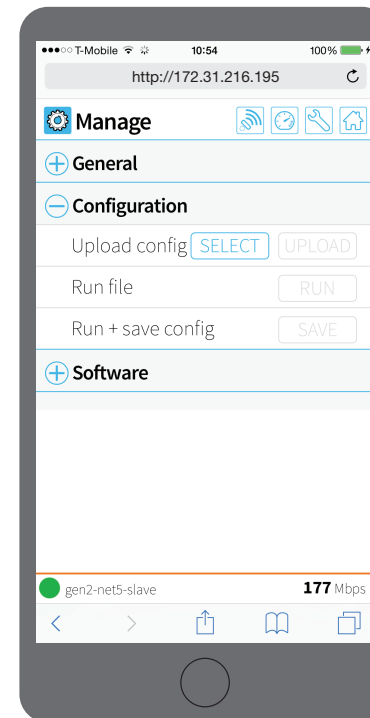
☐ Finally, save configuration:

```
<unit name>(config)# configure save
Configuration saved
```

To confirm:

```
<unit name>(config)# exit
<unit name># show radio config  <content follows...>
<unit name># show system information  <content follows...>
```
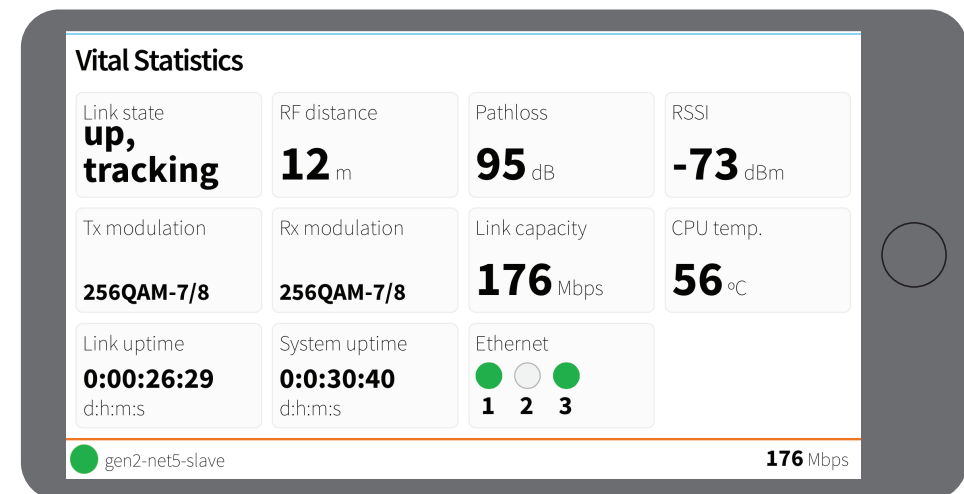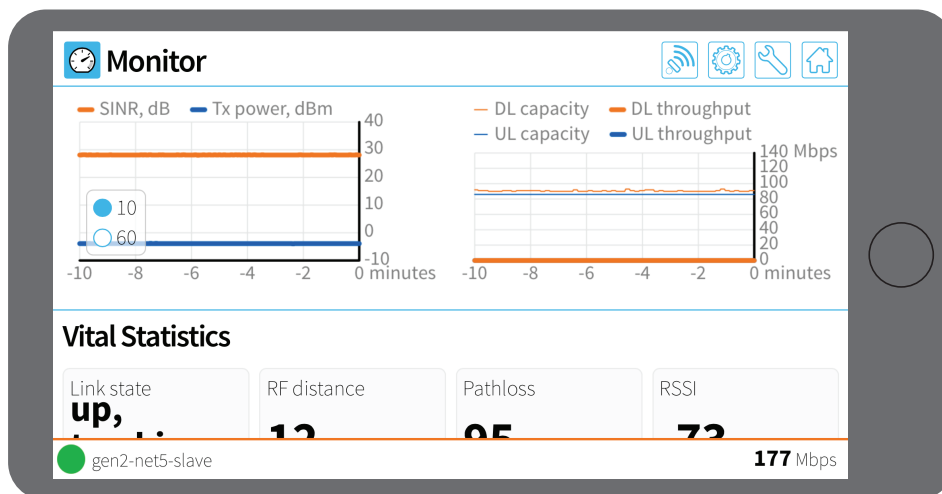
Note: It is recommended to configure the units one at a time. If you connect both CN and EN to the same physical network prior to configuration, you will create a loop.

Alignment and Validation

Point your mobile device's browser at the unit's IP address (either 192.168.123.1 over Wi-Fi or the static public IP address you've assigned it) to launch the Tarana Node Manager, the unit's web-based user interface. The UI uses the same authentication credentials as the CLI.

Use the UI to optimize and validate link and system performance.

Use the unit's webUI for visual feedback on link performance

Check range of orientations for best performance

Align

Link Quality(dB)

34.0 dB

27

Best

■ SINR ■ Headroom

dsprf3-master   **19** m   **178** Mbps

Vital Statistics

Link state	RF distance	Pathloss	RSSI
up, tracking	**12** m	**95** dB	**-73** dBm

Tx modulation	Rx modulation	Link capacity	CPU temp.
256QAM-7/8	**256QAM-7/8**	**176** Mbps	**56** ºC

Link uptime	System uptime	Ethernet	
0:00:26:29 d:h:m:s	**0:0:30:40** d:h:m:s	● ○ ● 1 2 3	

● gen2-net5-slave   **176** Mbps

Safety, Warnings, and Regulatory Information

Safety and Warnings

General Warnings

Failure to observe these safety precautions may result in personal injury or damage to equipment.

- Follow all warnings and instructions marked on this product.

- Use standard safety guidelines when mounting. Installation and maintenance procedures must be followed and performed by trained personnel only.

- Before unmounting the product, disconnect power input to reduce the risk of hazards.

- Do not exceed 60 V of input.

- Do not open the device. Opening the device voids the warranty.

- Do not stack anything on the radome.

- Dust covers must be installed on all connectors when not in use.

- Cable ends must be protected from weather if not connected to the device.

- This is a Class 1 laser product. Invisible laser radiation can be emitted from the aperture of the port when no fiber is connected; therefore, avoid exposure to laser radiation and do not stare into open apertures.

FCC Information

The FCC occupational controlled limit for maximum permissible exposure (MPE) is 5 mW/cm2. It is estimated that the maximum power density at the radome is 1.25 mW/cm2, which is below the FCC MPE limit. Since the power density for an occupational controlled environment is less than the FCC limit, no additional precautions are necessary. The occupational uncontrolled environment limit for maximum permissible exposure (MPE) is 1 mW/cm2. To meet this MPE requirement, the operator must be at a distance of 5.41 in or 29 cm away from the radome cover of the system. However, an installer can reduce exposure further by turning off the power to the device or by issuing a CLI command to the device to mute its power.

General Health and Safety Information

Topic	Explanation
Flammability	The equipment is designed and constructed to minimize the risk of smoke and fumes during a fire.
Hazardous Materials	No hazardous materials are used in the construction of this equipment.
Hazardous Voltage	The AbsoluteAir® system meets global product safety requirements for safety extra-low voltage (SELV) rated equipment.
Safety Signs	External warning signs or other indicators on the equipment are not required.
Surface Temperatures	The external equipment surfaces become warm during operation, due to heat dissipation. However, the temperatures reached are not considered hazardous.

Operator Health and Safety Information

Topic	Explanation
Equipment Protrusions	The equipment is designed and constructed to minimize the risk of smoke and fumes during a fire.
Lifting Equipment	No hazardous materials are used in the construction of this equipment.
Protection from RF Exposure	The AbsoluteAir system meets global product safety requirements for safety extra-low voltage (SELV) rated equipment.
Safety Warnings	External warning signs or other indicators on the equipment are not required.

Health and Safety Warning

All personnel must comply with the relevant health and safety practices when working on or around the AbsoluteAir radio equipment.

The AbsoluteAir system has been designed to meet relevant US and European health and safety standards as outlined in IEC Publication 60950-1.

AbsoluteAir is a Class B product. It is intended to be used exclusively in telecommunications centers.

Local safety regulations must be used if required. Safety instructions in this section should be used in addition to the local safety regulations. In the case of conflict between safety instructions stated herein and those indicated in local regulations, mandatory local norms will prevail. Should local regulations not be mandatory, then safety norms herein will prevail.

Warning Labels

WARRANTY VOID

DO NOT BREAK THE TAMPER SEALS ON HARDWARE. DOING SO WILL VOID THE WARRANTY.

WARNING

Making adjustments and/or modifications to this equipment that are not in accordance with the provisions of this User Guide, the Installation Guide or other supplementary documentation may result in personal injury or damage to the equipment, and may void the equipment warranty.

AVERTISSEMENT

Tout réglage ou modification faits à cet équipement hors du cadre édicté par ce guide d'utilisation ou par toute autre documentation supplémentaire pourraient causer des blessures ou endommager l'équipement et peut entraîner l'annulation de sa garantie.

WARNUNG

Die an diesen Geräten gemachte Einstellungen und/oder Änderungen, welche nicht gemäß dieser Bedienungsanleitung, oder gemäß anderen zusätzlichen Anleitungen, ausgeführt werden, können Verletzungen oder Materialschäden zur Folge haben und eventuell die Garantie ungültig machen.

ATENCIÓN

Llevar a cabo ajustamientos y/o modificaciones a este equipo, sin seguir las instrucciones provistas por este manual u otro documento adicional, podría resultar en lesiones a su persona o daños al equipo, y anular la garantía de este último.

警告

□行□整和/或修改本□□是不符合本用□指南的□定，安装手册或其他□充文件可能□致人身□害或□□□坏，并可能会使□□保修。

General Hazards

Topic	Explanation
Chassis Earthing	The AbsoluteAir chassis earth must be connected directly to the DC supply system earthing conductor, or to a bonding jumper from an earthing terminal bar, or bus to which the DC supply system earthing is connected.
Protection from RF Exposure	When installing, servicing or inspecting an antenna always comply with the following: • Locate the antenna such that it does not infringe the RF Exposure Limit Distance, relating to the Compliance Boundary General Public. • Stay aware of the potential risk of RF exposure and take appropriate precautions. • Do not stand in front of or look into an antenna without first ensuring the associated transmitter or transmitters are switched off. • At a multi-antenna site ask the site owner or operator for details of other radio services active at the site and for their requirements/recommendations for protection against potentially harmful exposure to RF radiation. • When it is not possible to switch transmitters off at a multi-antenna site and there is potential for exposure to harmful levels of RF radiation, wear a protective suit.
Fiber Optic Cables	• Handle optical fibers with care. Keep them in a safe and secure location during installation. • Do not attempt to bend them beyond their minimum bending radius. • Protect/cover unconnected optical fiber connectors with dust caps.
Grounding Connections	Reliable grounding of the AbsoluteAir chassis must be maintained.
Mains Power Supply Routing	AbsoluteAir DC power is not to be routed with any AC mains power lines. They are also to be kept away from any power lines which cross them.
Maximum Ambient Temperature	The maximum ambient temperature for the AbsoluteAir product is 60 degrees C. To ensure correct operation and to maximize long term component reliability, ambient temperatures must not be exceeded. Operational specification compliance is not guaranteed for higher ambients. AbsoluteAir should be mounted in such a way as to permit the vertical free flow of air through its cooling fins.
Mechanical Loading	When installing the AbsoluteAir on a tower, ensure that the tower is securely anchored. Ensure that the additional loading of devices will not cause any reduction in the mechanical stability of the tower.
Power Supply Connection	AbsoluteAir operates from a nominal -48 VDC power supply.
Power Supply Disconnect	An appropriate power supply disconnect device should be provided as part of the installation.
Rack Mount Temperature Considerations	AbsoluteAir is designed to operate in an outdoor environment with no significant obstructions in front of the radome. Do not install AbsoluteAir in a closed or multi-unit rack assembly, because such a closed rack would impede the propagation of the RF signals. The maximum ambient temperature applies to the immediate operating environment of the AbsoluteAir product.

Regulatory Information

Compliance	
Safety	• UL 60950, 2nd Edition Amendment 2
	• CAN/CSA-C22.2 No. 60950-1-07
	• IEC 60950-1:2005, 2nd Edition + Am1:2009 + Am2:2013
	• EN 60950-1:2006 +A11:2009+A12010+A12:2011+A2:2013
	• IEC 60950-22:2005,
	• EN 60950-22:2006+A11
Immunity	• <= 5 mJ for 6kV/3kA @ 8/20 ms waveform
	• ANSI/IEEE C62.41
	• EN61000-4-5 Level 4 AC Surge Immunity
	• EN61000-4-4 Level 4 Electrical Fast Transient Burst Immunity
	• EN61000-4-3 Level 4 EMC Field Immunity
	• EN61000-4-2 Level 2 ESD Immunity
	• EN60950-1 Overvoltage Category II
Radio Approvals	• FCC Part 2
	• FCC Part 15
	• FCC Part 27
	• FCC Part 90
	• RSS-192,
	• RSS-197
	• RSS-199
	• EN 302 326-2
	• EN 302 502
EMI and susceptibility	• FCC part 15.207, 15.209
	• ICES-003; RSS-Gen
	• EN 301 489-1, -4, -17 Class B

Deployment in the US – FCC Statement

This product must be professionally installed.

This device complies with FCC Rules for Class B limits. 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.

Modifications not expressly approved by Tarana Wireless Inc. could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment 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 off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC RF exposure limits. This equipment should be installed and operated with a minimum distance of 29 cm (11.4 in.) between the radiator and user. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Deployment in Canada - Industry Canada Statements

This product must be professionally installed.

This Class B Digital apparatus meets all the requirements of ICES-003.

To satisfy IC RF exposure requirements for RF transmit ting devices, the following distances should be maintained between the antenna of this device and persons during device operation: 58cm.

This device has been designed to ensure that radio frequency emissions are maintained within the band of operation under all normal operating conditions listed in this manual.

This device complies with Industry Canada RSS standard(s). Operation is subject to the following two conditions:

This device may not cause interference, and

This device must accept any interference, including interference that may cause undesired operation of the device.

Le produit final doit être installé par un professionnel

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

IC avertissements d'exposition RF Pour satisfaire les exigencies d'IC en ce qui a trait aux expositions aux RF pour RF dispositifs de transmission, les distances suivantes doit être maintenue entre l'antenne de ce dispositive et des personnes pendant le fonctionnement du dispositif: 58cm.

Ce dispositif a été conçu pour veiller à ce que les émissions de radiofréquences sont maintenus dans la bande de fonctionnement dans toutes les conditions normales de fonctionnement figurant dans ce manuel.

Cet appareil est conforme la norme d'Industrie Canada RSS (s). Son fonctionnement est soumis aux deux conditions suivantes:

Cet appareil ne peut pas causer d'interférences, et.

Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

Deployment in the European Union – CE Mark Statements

This Product carries CE Mark:

Declaration of Conformity for radio and telecommunication terminal equipment under the scope of Directive 1999/5/EC statement

Hereby, Tarana Wireless Inc. declares that the equipment documented in this publication is in Compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The technical documentation as required by the Conformity Assessment procedure is kept at Tarana Wireless Inc. location which is responsible for this product. For more information please contact your local Tarana Wireless Inc. Customer Service or Sales representative.

This declaration is only valid for AbsoluteAir 2 systems (hardware, software, and firmware) that are provided for use within the EU. If this equipment is used in a manner not specified by Tarana Wireless Inc. (including use of unsupported software or firmware), it may result in the equipment no longer being compliant with the regulatory requirements.

Tarana Products described above are intended to be used in the following Countries:

BE	DE	ES	LV	MT	PT	FI	NO
BG	EE	FR	LT	NL	RO	SE	CH
CZ	IE	IT	LU	AT	SI	GB	LI
DK	GR	CY	HU	PL	SK	IS	TR

This Product meets International guidelines for human exposure to RF fields

Tarana Wireless systems are designed to be operated as to avoid contact with the antennas by the end user. It is recommended to install the system in a location where the antennas can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines which are designed to reduce the overall exposure of the user or operator.

E-Field Limit (V/m)	Distance (m)
61	0.7083

Eco-Environmental Statements

Electronic products and batteries bearing or referencing the symbols shown below shall be collected and treated at the end of their useful life, in compliance with applicable European Union and other local legislation. They shall not be disposed of as part of unsorted municipal waste. Due to materials that may be contained in the product and batteries, such as heavy metals, the environment and human health may be negatively impacted as a result of inappropriate disposal.

Language	Statement
English	This equipment is in compliance with essential requirements and other relevant provisions of Directive 1999/5/EC
Български *Bulgarian*	Това оборудване е в съответствие с основните изисквания и съответващите разпоредби на Директива 1999/5/ЕО
Cesky *Czech*	Toto zařízení je v souladu se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/EC
Dansk *Danish*	Dette udstyr er i overensstemmelse med væsentlige krav og øvrige relevante bestemmelser i direktiv 1999/5/EF
Deuch *German*	Dieses Gerät ist in Übereinstimmung mit den grundlegenden Anforderungen und anderen Bestimmungen der Richtlinie 1999/5/EU
Esti *Estonian*	See seade on vastavuses põhinõuetele ja muudele direktiivi 1999/5/EC
Español *Spanish*	Este equipo cumple con los requisitos esenciales y otras disposiciones pertinentes de la Directiva 1999/5/CE
Ελληνική *Greek*	Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και τις λοιπές σχετικές διατάξεις της οδηγίας 1999/5/εκ
Français *French*	Cet équipement est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/CE
Islenska *Islandic*	Þessi búnaður er í samræmi við grunnkröfur og aðrar kröfur sem gerðar eru í tilskipun 1999/5 / EC
Italiano *Italian*	Questa apparecchiatura è conforme ai requisiti essenziali e altre disposizioni contenute nella Direttiva 1999/5/CE
Latviešu *Latvian*	Šī iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 1999/5/EK
Lietuvių *Lithuanian*	Ši įranga atitinka esminius reikalavimus ir kitas susijusias nuostatas Direktyvos 1999/5 / EB
Nederlands *Dutch*	De apparatuur is in overeenstemming met de essentiële eisen en andere relevante bepalingen van Richtlijn 1999/5 / EG
Malti *Malteese*	Dan it-tagħmir huwa konformi mar-rekwiżiti essenzjali u dispożizzjonijiet rilevanti oħra tad-Direttiva 1999/5 / KE
Magyar *Hungarian*	Ez a berendezés megfelel az alapvető követelményeknek és más vonatkozó rendelkezéseinek a 1999/5/ EK
Norsk *Norwegian*	Dette utstyret er i samsvar med grunnleggende krav og øvrige relevante krav i direktiv 1999/5/ EC
Polski *Polish*	Ten sprzęt jest zgodny z zasadniczymi wymaganiami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5 / WE
Portugues *Portuguese*	Este equipamento está em conformidade com os requisitos essenciais e outras disposições relevantes da Directiva 1999/5 / CE
Română *Romanian*	Acest echipament este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 1999/5/CE
Slovensko *Slovenian*	Ta oprema je v skladu z bistvenimi zahtevami in drugimi ustreznimi določbami Direktive 1999/5 / ES
Slovenski *Slovak*	Toto zariadenie je v súlade so základnými požiadavkami a ďalšími príslušnými ustanoveniami smernice 1999/5 / EC
Suomi *Finish*	Tämä laite on olennaisten vaatimusten ja muiden määräysten mukainen direktiivin 1999/5 / EY
Swenska Swedish	Denna utrustning är i överensstämmelse med väsentliga krav och andra relevanta bestämmelser i direktivet 1999/5/EG
Hrvatski *Croatian*	Ova oprema je u skladu s osnovnim zahtjevima i drugim relevantnim odredbama Direktive 1999/5 / EC