Tarana G1 BN Manual

DRAFT

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NOTE For the most up-to-date instructions, please download the latest version of this document on our customer portal: www.taranawireless.com/private

Safety and Warnings

Tarana G1 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.

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 VDC of input to the device.
- 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.
- When the SPF+ port is used, 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 7.87 in or 20 cm away from the radome cover of the system.

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 G1 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.

Health and Safety Warning

All personnel must comply with the relevant health and safety practices when working on or around the G1 radio equipment.

The G1 system has been designed to meet relevant US and European health and safety standards as outlined in IEC Publication 62368-1, 2nd edition.

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

进行调整和/或修改本设备**是不符合本用户指南的**规**定，安装手册或其他**补**充文件可能**导**致**人身**伤**害或**设备损**坏，并可能会使**设备**保修。**

General Hazards

Topic	Explanation
Chassis Earthing	The G1 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 G1 chassis must be maintained.
Mains Power Supply Routing	G1 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 G1 product is 55 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. G1 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 G1 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	G1 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	G1 is designed to operate in an outdoor environment with no significant obstructions in front of the radome. Do not install G1 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 G1 product.

Operational Description

Tarana's Gigabit 1 (G1) product line delivers gigabit fixed wireless speeds in outdoor non-line of sight environments in a cellular-like network topology. Tarana's G1 product is an OFDM Time Division Duplex (TDD) based system which utilizes the same frequency channel in both downlink and uplink transmissions. The 4 network profiles can cover downlink heavy deployments (4.5:1 DL/UL ratio) on one extreme, and more symmetric data demand between uplink and downlink with a 1.1:1 DL/UL ratio at the other extreme. The G1 network profiles can cover a cell radius of 15, 30 and 60 kilometers.

Our unique interference cancellation technology allows operators to deploy our gear with a universal frequency reuse factor across all sectors and cells in a given geographical area. The G1 product is capable of operating in the 3 GHz band (3.3 GHz - 3.8 GHz) or in the 5 GHz band (UNII-1 and UNII-3) under two different SKUs. This device supports UNII-1 and UNII-3 in the FCC (USA); supports UNII-3 only in ISED (Canada).

The base node (BN) is typically mounted on a tower and can serve up-to 512 residential nodes (RN) in any given sector. The current SW release supports 128 users per sector. Our system supports two different carriers, each having a configurable bandwidth of 10, 20, or 40 MHz for a maximum sector bandwidth of 80 MHz. The current FPGA-based implementation of the RN, referred to as RNF, is only capable of communicating over a single carrier, the bandwidth of which is configurable. The BN accepts user-specific Layer 2 Ethernet packets, encodes the information bits, and modulates an RF waveform which is transmitted by the BN in the DL. One of the RNs to which the transmission is intended receives the downlink RF signal, demodulates it, decodes the information bits, and reconstructs the Ethernet packet which is then put on the Ethernet data port. A similar data transmission mechanism applies in the uplink.

Geo-location capabilities will be implemented in a future software release. The initial release will have the country code set manually. In a future software release, TCS will automatically assign country code to the BN based on GPS coordinates. This country code will automatically adjust transmit power and operating channels to comply with local regulatory standards.

Regulatory Information

Compliance	
Safety	• IEC 60529, 2013-08 • IP X7 • EN 62368-1:2014 (2nd Edition) • IEC/EN 60950-22
Immunity	• 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
Radio Approvals	• FCC Part 15.407 • FCC Rules Part 15 Subpart E, section 15.203, 15.205, 15.209 • 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 20 cm (7.9 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: 20cm.

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: 20cm.

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

This Product carries CE Mark:

CE

Declaration of Conformity for radio equipment under the scope of Directive 2014/53/EU (RED) statement

The Radio Equipment Directive 2014/53/EU (RED) establishes a regulatory framework for placing radio equipment on the market. It ensures a Single Market for radio equipment by setting essential requirements for safety and health, electromagnetic compatibility, and the efficient use of the radio spectrum

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 2014/53/EU (RED).

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 G1 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 could face some restrictions to operate in the following Countries:

AT	BE	BG	HR	CY	CZ	EE
FI	EL	FR	IT	LV	LT	LU
NL	PL	RO	SK	ES	SW	UK
DE	CH	LI	NO	IC	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. To meet radiation exposure requirements, these devices should be installed at a minimum distance of 0.7083 from people or animals.

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

G1 product complies with RF Exposure Requirements: EN 62311

Eco-Environmental Statements

Electronic products and batteries bearing or referencing the symbols shown above 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.

WEEE, REACH and RoHS Compliance

Tarana Wireless products have been reviewed, analyzed and found to be following the European Union (EU) directive for Waste Electrical and Electronic Equipment (WEEE) WEEE Directive 2012/19/EU, with the EU directive for the Restriction of Hazardous Substances (RoHS) RoHS Directive 2011/65/EU and REACH Regulation (EC) No 1907/2006.

WEEE Collection Programs in the U.S. and EU at end of product life (EOL), customers are requested to contact Tarana Wireless to plan for WEEE collection/disposal of their products. The Tarana collection center in the U.S. is at the following address: Tarana Wireless Inc. 590 Alder Drive, Milpitas, CA 95035 Telephone: 408-351-4085 Contact: compliance@taranawireless.com

English	This equipment is in compliance with essential requirements and other relevant provisions of Directive 2014/53/EU
Български *Bulgarian*	Това оборудване е в съответствие с основните изисквания и съответващите разпоредби на Директива 2014/53/EU
Cesky *Czech*	Toto zařízení je v souladu se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU
Dansk *Danish*	Dette udstyr er i overensstemmelse med væsentlige krav og øvrige relevante bestemmelser i direktiv 2014/53/EU
Deuch *German*	Dieses Gerät ist in Übereinstimmung mit den grundlegenden Anforderungen und anderen Bestimmungen der Richtlinie 2014/53/EU
Esti *Estonian*	See seade on vastavuses põhinõuetele ja muudele direktiivi 2014/53/EU
Español *Spanish*	Este equipo cumple con los requisitos esenciales y otras disposiciones pertinentes de la Directiva 2014/53/EU
Ελληνική *Greek*	Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και τις λοιπές σχετικές διατάξεις της οδηγίας 2014/53/EU
Français *French*	Cet équipement est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 2014/53/EU
Islenska *Islandic*	Þessi búnaður er í samræmi við grunnkröfur og aðrar kröfur sem gerðar eru í tilskipun 2014/53/EU
Italiano *Italian*	Questa apparecchiatura è conforme ai requisiti essenziali e altre disposizioni contenute nella Direttiva 2014/53/EU
Latviešu *Latvian*	Šī iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 2014/53/EU
Lietuvių *Lithuanian*	Ši įranga atitinka esminius reikalavimus ir kitas susijusias nuostatas Direktyvos 2014/53/EU
Nederlands *Dutch*	De apparatuur is in overeenstemming met de essentiële eisen en andere relevante bepalingen van Richtlijn 2014/53/EU
Malti *Malteese*	Dan it-tagħmir huwa konformi mar-rekwiżiti essenzjali u dispożizzjonijiet rilevanti oħra tad-Direttiva 2014/53/EU
Magyar *Hungarian*	Ez a berendezés megfelel az alapvető követelményeknek és más vonatkozó rendelkezéseinek a 2014/53/EU
Norsk *Norwegian*	Dette utstyret er i samsvar med grunnleggende krav og øvrige relevante krav i direktiv 2014/53/EU
Polski *Polish*	Ten sprzęt jest zgodny z zasadniczymi wymaganiami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/EU
Portugues *Portuguese*	Este equipamento está em conformidade com os requisitos essenciais e outras disposições relevantes da Directiva 2014/53/EU
Română *Romanian*	Acest echipament este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 2014/53/EU
Slovensko *Slovenian*	Ta oprema je v skladu z bistvenimi zahtevami in drugimi ustreznimi določbami Direktive 2014/53/EU
Slovenski *Slovak*	Toto zariadenie je v súlade so základnými požiadavkami a ďalšími príslušnými ustanoveniami smernice 2014/53/EU
Suomi *Finish*	Tämä laite on olennaisten vaatimusten ja muiden määräysten mukainen direktiivin 2014/53/EU
Swenska Swedish	Denna utrustning är i överensstämmelse med väsentliga krav och andra relevanta bestämmelser i direktivet 2014/53/EU
Hrvatski *Croatian*	Ova oprema je u skladu s osnovnim zahtjevima i drugim relevantnim odredbama Direktive 2014/53/EU

Preparation

Tools

- ☐ 13mm combination wrench
- ☐ Torque wrench
- ☐ T30 Torx driver
- ☐ Crimping tool (6 AWG)
- ☐ Anti-Seize compound - must be applied to all fasteners at the installation location (per manufacturer's instructions)
    - LOCTITE LB771 Nickel Anti-Seize, Permatex Aluminum Anti-Seize, or equivalent

Tarana Hardware and Peripherals

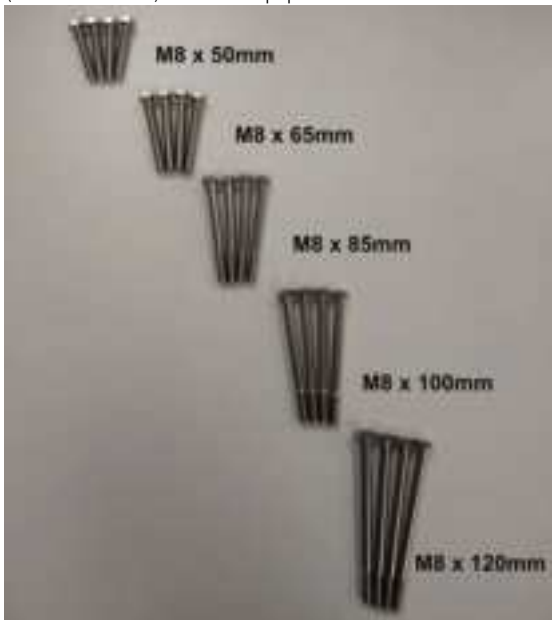
- ☐ BN radio unit
- ☐ BN mount (32-0051-300 REV 2.0, as shipped)
- ☐ Harting DC pigtail
- ☐ Harting optical cable
- ☐ Harting RJ45 cable
- ☐ Lightning and surge protection devices

Customer Supplied Equipment

- ☐ Power cable - Belden 5240F1 or equivalent
- ☐ Ethernet cable - shielded CAT5e/CAT6
- ☐ Grounding wire (6 AWG)
- ☐ (4) M8 flanged nut (used on all bolts)

- ☐ (4) M8 bolts
    - Measure Pole Diameter (95mm in this example)

    - Choose appropriate length bolt
        - (M8 x 50mm) used for pipe diameter 60mm - 75mm
        - (M8 x 65mm) used for pipe diameter 75mm - 95mm
        - (M8 x 85mm) used for pipe diameter 95mm - 111mm
        - (M8 x 100mm) used for pipe diameter 111mm - 127mm
        - (M8 x 120mm) used for pipe diameter 127mm



Physical Installation

The BN mount is a saddle clamp that is adjustable in azimuth and tilt. The tilt should be set to zero degrees and the azimuth to the required direction. In typical installation, the BN is installed on an outrigger which gets mounted to the tower.

Note: The GPS antenna mounted on the top of the BN must have a clear view of the sky to establish synchronization.

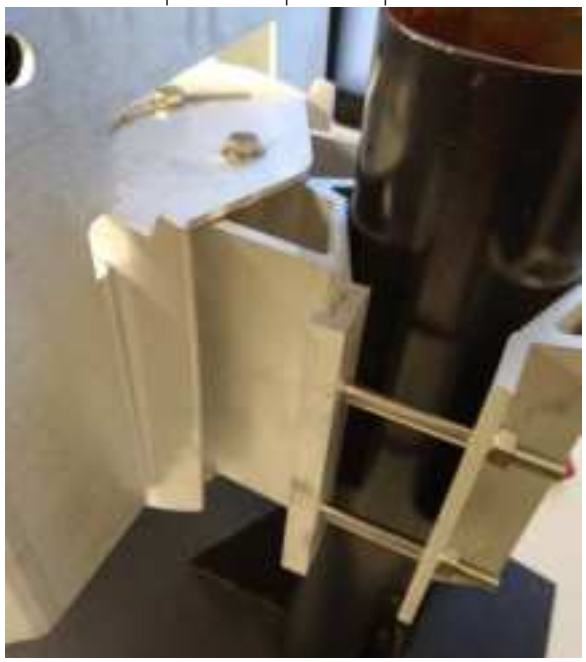
BN Mount

BN Installed on Tower

Outrigger installed with BN Mount

Step 1. Place mounting bracket clamp halves around pole.
NOTE: Head of bolt captured in the slot of the clamp assembly

Be sure to keep the clamp halves parallel to each other.



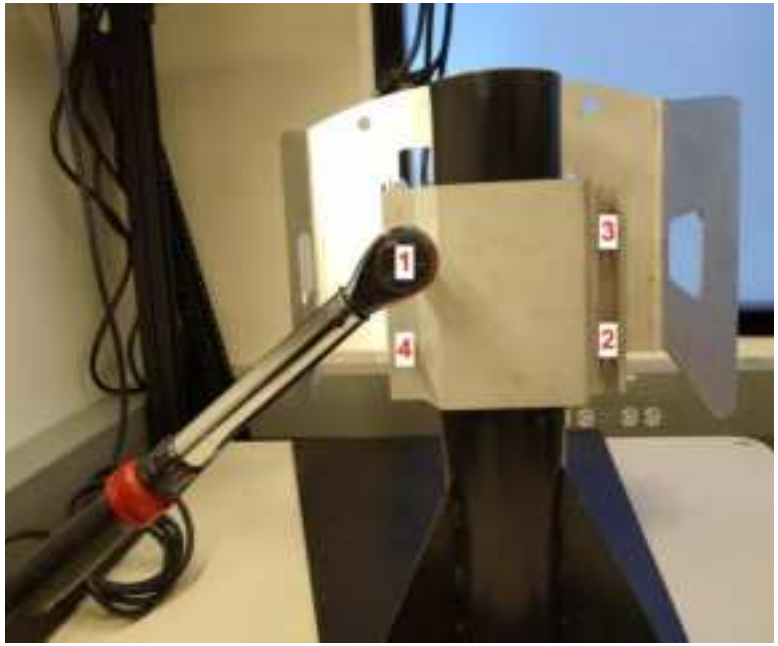
Step 2. Torque all fasteners to 19 N-M (14 ft-lbs). Torque sequence as shown.

3 times around bolt pattern

- Round 1= 30%
- Round 2 = 60%
- Round 3 = 100%

Use of combination wrench for locations 2 and 3 may be needed due to clearances.

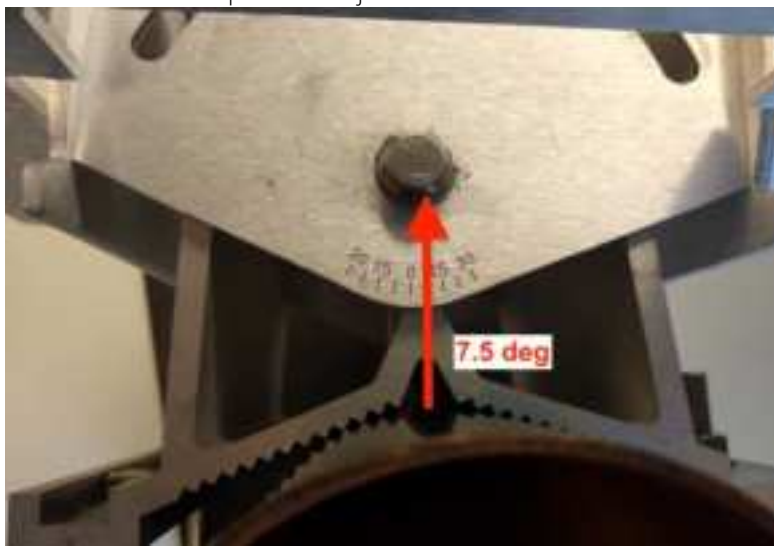
Universal joint socket wrench may also be used.



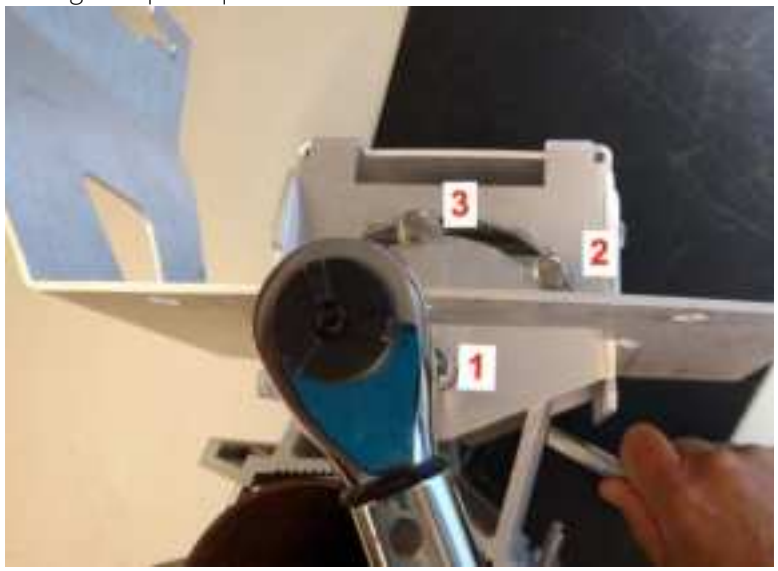
Final torque reading can be applied to bolt #1 and #4, as it will be difficult to access #2 and #3 with the torque wrench (opposite facing view).

Step 3. Perform azimuth adjustment

Azimuth scale on top side of adjustment bracket



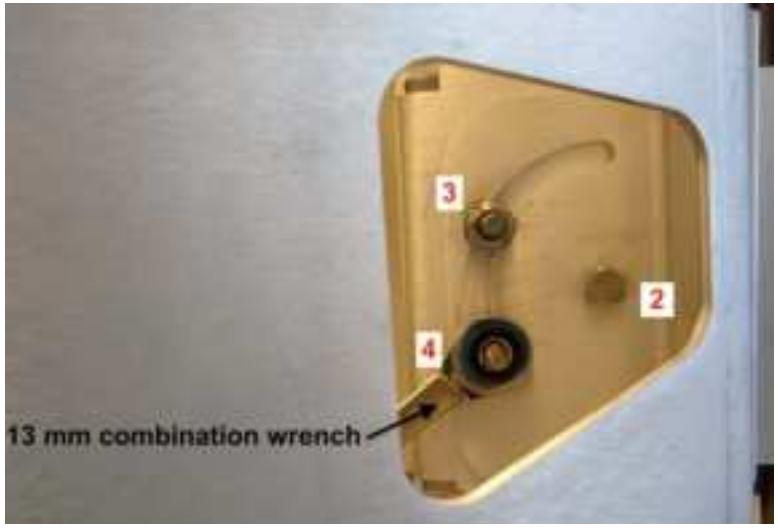
13mm combination wrench being used to hold the fastener for torque setting. Torque sequence as shown.



Step 4. Perform elevation adjustment

Right-side access to fasteners

Left-side access to fasteners



Torque sequence numbered above.

Note: #1 and #2 are short fasteners that do not pass all the way through the bracket like fasteners #3 and #4

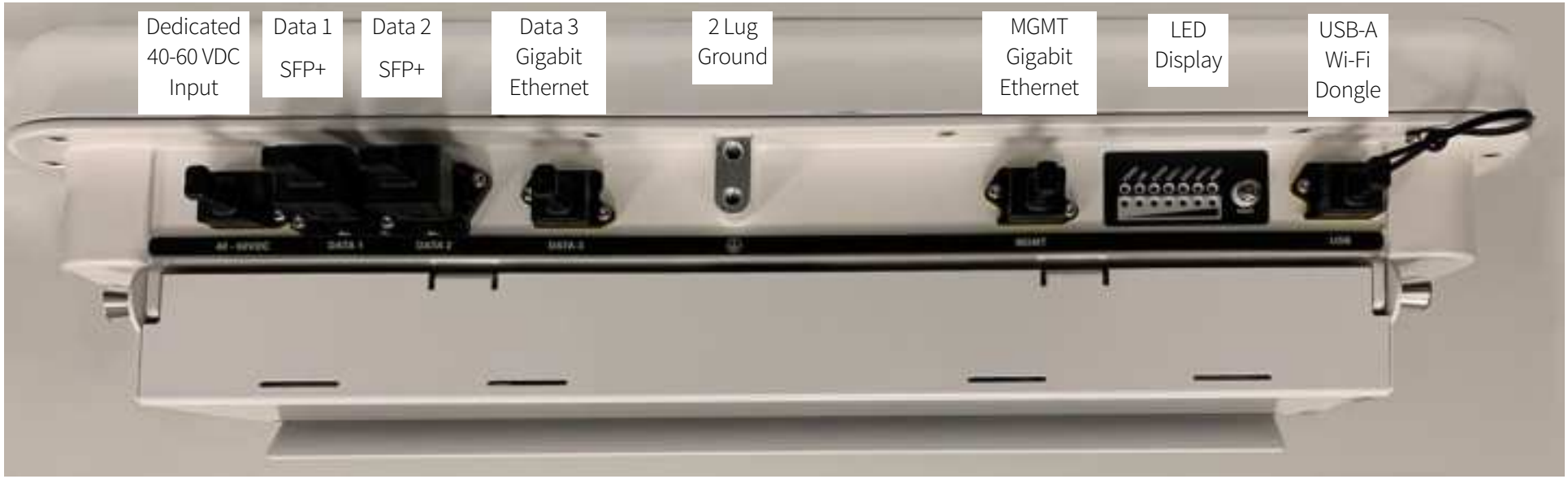
Step 5. Lower BN into the slots as shown

Power and Connectivity

Supply 40VDC-60VDC (300W) to the unit through its power port. Ethernet connectivity can be established for data and management traffic using the fiber and Ethernet ports. All power and signal cables must be terminated with Harting weatherproof connectors. Proper lightning or surge suppression devices (available on our accessories list) and associated grounding are required for all connections.

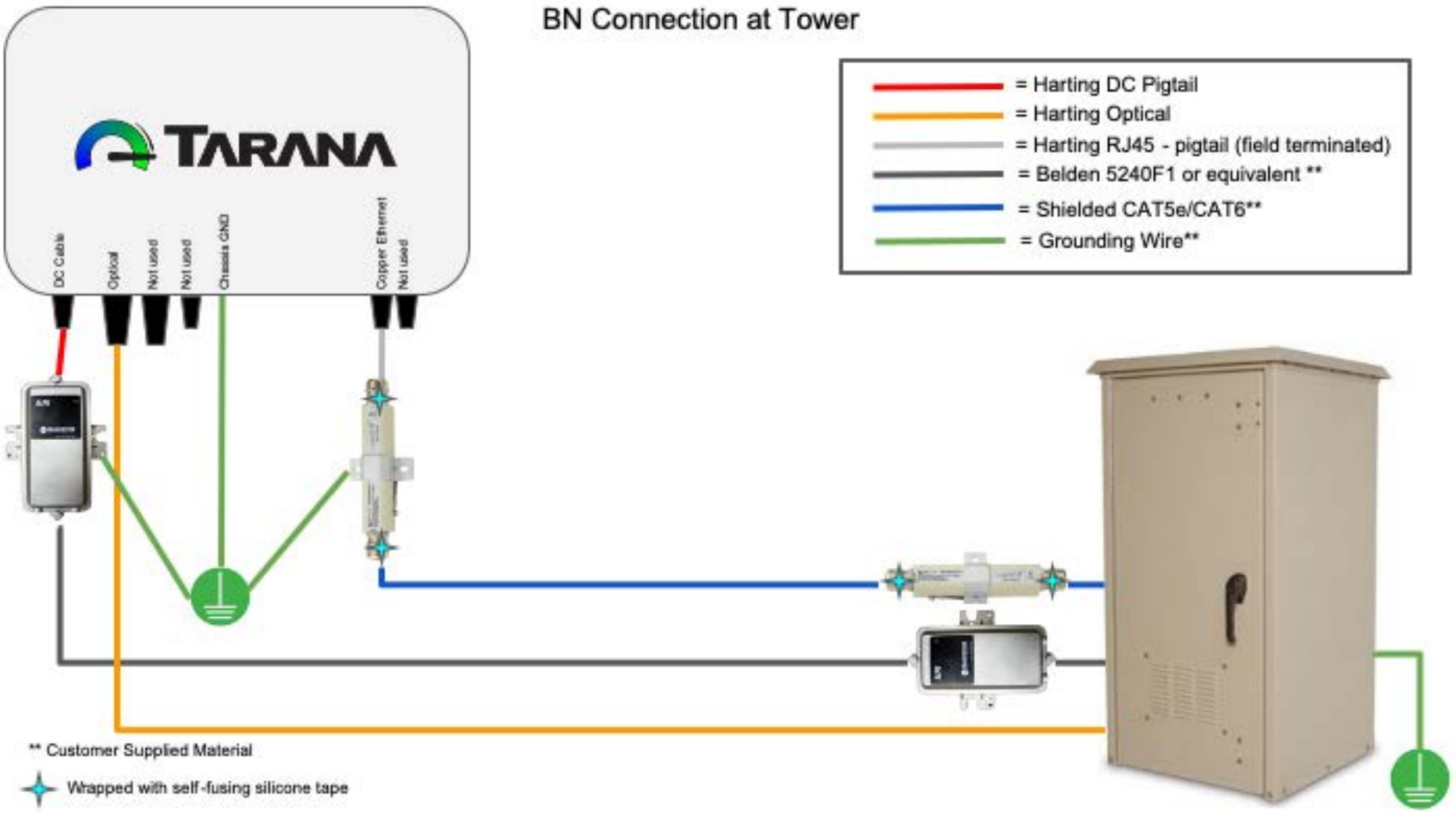
To turn on the unit, simply apply power. For security, there is not a power switch. Connect the radio end of the power cable before applying power in all power configurations.

Interfaces



Note: The management interface is for out-of-band local management.

Typical Deployment



Configuration & System Bring-up

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

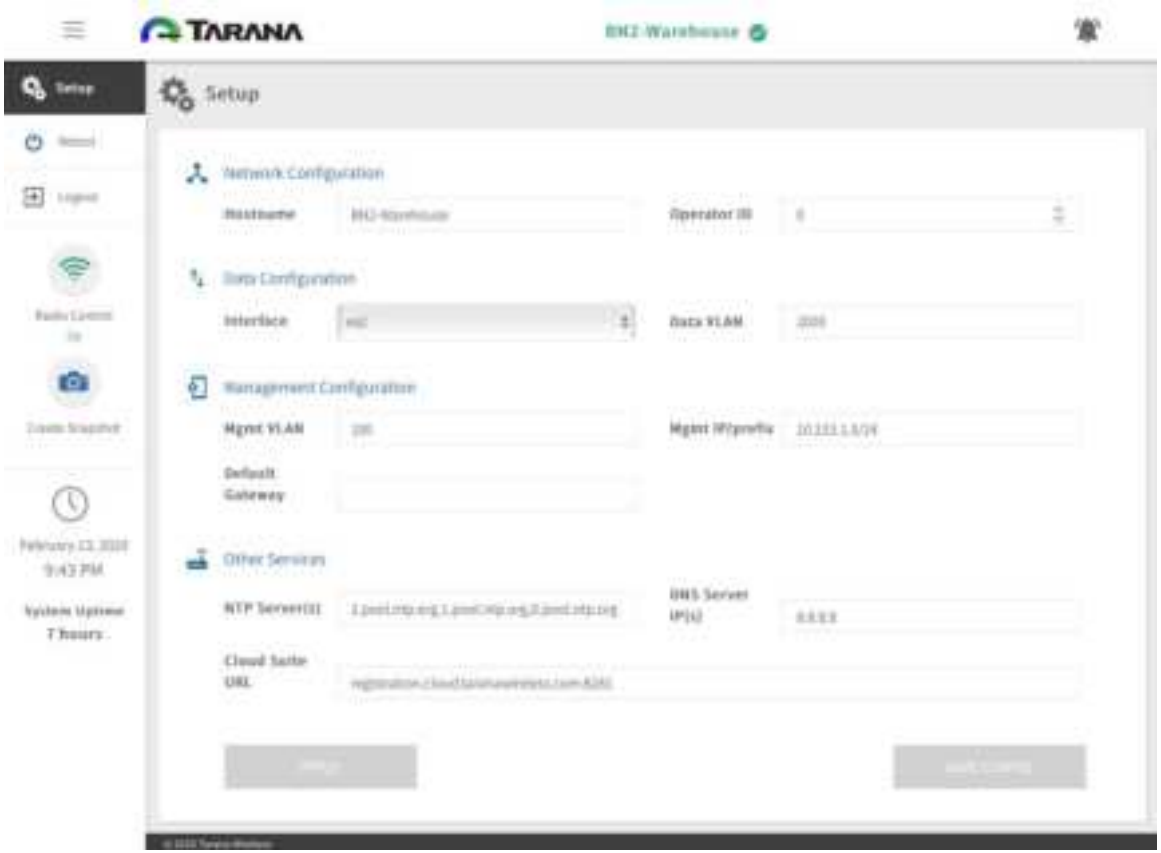
Basic outdoor setup requires the following steps. For safety, the radio is muted by default.

Note: The GPS antenna mounted on the top of the BN must have a clear view of the sky to establish synchronization.

Connect your device to the unit's Management port. Note: this port is DHCP enabled. Point your device's browser at the unit's management IP address to access the BN's webUI. Login using the credentials provided by your network administrator.

Once logged in, enter the values provided by your network administrator.

Section		Description
Network Configuration	Hostname	Determined by your organization
	Operator ID	Value provided by your network administrator
Data Configuration	Interface	Interface to use for data transmission ex1 = data1 SFP+, ex2 = data2 SFP+ gi1 = data3 GbE
	Data VLAN	VLAN tag to use for data traffic
Management Configuration (in-band for TCS connection)	Mgmt VLAN	VLAN tag to use for management traffic
	Mgmt IP/ prefix	Management IP address for this device
	Default Gateway	Gateway address provided by your network administrator
Other Services	NTP Server(s)	NTP Server(s) address provided by your network administrator
	DNS Server IP(s)	DNS Server(s) IP address provided by your network administrator
	Cloud Suite URL	Address of your organization's Tarana Cloud Suite (TCS) instance



Warranty

We warrant that commencing from the date of shipment to you (and in case of resale to you by a Tarana partner, commencing not more than 90 days after our original shipment), and continuing for a period of twelve (12) months, the hardware will be free from defects in material and workmanship under normal use. This limited warranty is not transferrable. Your sole and exclusive remedy and our entire liability under this limited warranty will be, at our option, shipment of a replacement or a refund of the purchase price, if you notify us of the defect within the warranty period and return the hardware to us freight and insurance prepaid. Parts used in replacement may be new or reconditioned. Our obligations are conditioned upon the return of affected hardware in accordance with our then-current standard Return Material Authorization (RMA) procedures. This limited warranty does not cover (a) damage resulting from (i) use in other than the wireless transport applications defined in our product documentation; (ii) use not in accord with applicable spectrum regulations; (iii) handling, testing, installation, operation, maintenance, service, repair, alteration, modification, or adjustment outside of practices and conditions defined in our product documentation; (iv) other general misuse, accident, liquid intrusion, or neglect; (v) unauthorized radio connection to equipment not supplied by us; (vi) illegal or unauthorized alteration of software or firmware; (vii) acts of nature (such as lightning) or performance failure of other equipment (including electrical transients and over/under voltage); (b) scratches, discoloration, or other cosmetic damage to surfaces that do not affect operation; (c) normal and customary wear and tear; and (d) any product where serial number, revision level, part number, date code, warranty data, tamper-proof seals, or quality assurance decals have been removed or altered.

DISCLAIMER: Except as specified above, all express or implied conditions, representations, and warranties including, without limitation, any implied warranty or condition of merchantability, fitness for a particular purpose, non-infringement, satisfactory quality, non-interference, accuracy of informational content, or arising from a course of dealing, law, usage, or trade practice, are hereby excluded to the extent allowed by applicable law and are expressly disclaimed by us. To the extent an implied warranty cannot be excluded, such warranty is limited in duration to the express warranty period. This disclaimer and exclusion will apply even if the express warranty set forth above fails of its essential purpose.

Tarana products are not designed, intended, or certified for use in communication systems for, or relating to (a) weapons or weapons systems, (b) nuclear facilities, (c) air traffic control or other mass transportation systems, (d) life support systems or other medical devices, (e) applications where electrical sparks could trigger explosions or fires, or (f) any other systems, devices or applications in which the failure of the product to operate as intended may lead to death, bodily injury, or catastrophic property damage (each an “Unauthorized Use”). Many of such Unauthorized Uses would require specific industry certification which has not been sought or obtained for the Tarana products.

LIABILITY. We will not be liable for any special, incidental, indirect, or consequential damages (including lost profits or property damage) arising out of or relating to the sale of the goods to you or your possession, installation, use, operation or repair of the goods, even if the goods are nonconforming, defective, infringing, delayed, or not delivered, and even if we have been advised of the possibility of such damages. You agree to indemnify and hold us harmless from any claims, suits, demands and causes of action arising out of or relating to your possession, installation, use, operation or repair of the goods. Notwithstanding any other provisions of this document, in no event will our total liability in connection with or relating to the goods exceed the amount you have paid us for the goods.