



# **Ripwave™ Base Station Installation & Commissioning Guide**

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Proprietary

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## About This Document

### *Purpose*

This document provides a Navini-certified Installation & Commissioning Technician or Field Engineer with instructions to properly install the Base Transceiver Station (BTS), Radio Frequency Subsystem (RFS), and cabling; and to test and commission the Base Station after installation.

### *Revision History*

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## Safety

To optimize safety and expedite installation and service, read this document thoroughly. Follow all warnings, cautions, and instructions marked on the equipment and included in this document.

To aid in the prevention of injury and damage to property, cautionary symbols have been placed in this document to alert the reader to known potentially hazardous situations, or hazards to equipment or procedures. The symbols are placed before the information to which they apply. However, any situation that involves heavy equipment and electricity can become hazardous, and caution and safety should be practiced at all times when installing, servicing, or operating the equipment.



Caution Symbol - possible equipment or property damage



Warning Symbol - could cause personal injury or otherwise be hazardous to your health

Navini Networks, Inc., expressly requires that when using Navini electronic equipment always follow the basic safety precautions to reduce the risk of electrical shock, fire, and injury to people and/or property.

1. Follow all warnings and instructions that come with the equipment.
2. Do not use the equipment while you are in a bathtub, shower, pool, or spa. Exposure of the equipment to water could cause severe electrical shock or serious damage to the equipment.
3. Do not allow any type of liquid to come in contact with the equipment. Unplug the equipment from the power source before cleaning. Use a damp cloth for cleaning. Do not use any soaps or liquid cleaners.
4. Follow all airport and FAA regulations when using the equipment on or near aircraft.
5. Only operate the equipment from the type of power source(s) indicated in this manual (110/220 VAC, 60/50 Hz or Navini supplied battery). Any other type of input power source may cause damage to the equipment.
6. Power the equipment using only the battery or the AC adapter cable provided, and in accordance with the instructions specified in the User Guide.
7. Do not use a frayed or damaged power cord. Do not place the power cord where it can be stepped on or tripped over.
8. Do not touch wires where the insulation is frayed or worn unless the equipment has been disconnected from its power source.
9. Do not overload wall outlets, power strips, or extension cords. This can cause serious electrical shock or fire.
10. Do not place the equipment on an unstable surface. It can fall and cause injury or damage to

the equipment.

11. Do not disassemble the equipment. Removing covers exposes dangerous voltages or other risks and also voids the warranty. Incorrect reassembly can cause equipment damage or electrical shock. Only an authorized repair technician should service this product.
12. Do not expose the equipment to extreme hot or cold temperatures.
13. Do not use the equipment under the following conditions:
  - When the equipment has been exposed to water or moisture.
  - When the equipment has been damaged.
  - When the power cord is damaged or frayed.
  - When the equipment does not operate properly or shows a distinct change in performance.

## Regulatory & Safety Information

### *Safety Notice*



**WARNING!** This device is a Radio Frequency transmitter. A minimum separation distance of 2 meters or more must be maintained between the antenna and all persons during device operations to ensure safe operation. If this minimum distance cannot be maintained, exposure to RF levels that exceed safety limits may result.

### *FCC Notice*



**WARNING!** This device is a Radio Frequency transmitter. It is required to comply with FCC RF exposure requirements for transmitting devices. A minimum separation distance of 2 meters or more must be maintained between the antenna and all persons during device operations to ensure compliance with the FCC's rules for Radio Frequency Exposure. If this minimum distance cannot be maintained, exposure to RF levels that exceed the FCC's limits may result.

### **INFORMATION TO USER**

This device has been authorized as a radio frequency transmitter under the appropriate rules of the Federal Communications Commission. Any changes or modifications not expressly approved by Navini Networks could void the user's authority to operate the equipment.

### *UL & NEC/CEC Regulations*

1. The Ripwave BTS must be installed in accordance with NEC/CEC Articles 800/810/830.
2. As a minimum, all DC power leads and bonding/grounding straps shall be 6 AWG copper conductors.
3. GPS, RF, and power/data cables in excess of 140 feet in length must have protective devices installed that are UL listed to UL 492, UL497A or UL497B, UL497C, and UL1449.
4. Lightning protection is recommended. If used, the lightning protection devices must comply with UL497.
5. Power supplies should be UL listed to UL60950 or UL60950-1 and have earthed SELV output.
6. Ethernet connections require a UL497B listed protection device to be installed between the BTS and the first network device. T1 connections must be routed from the BTS through a UL497 listed protection device at the demarcation point.
7. T1/E1 interconnect cables between the BTS and demarcation point must be a minimum of #26 AWG wire, in accordance with NEC/CEC standards.
8. All power and ground conductors must be mechanically supported to avoid strain of the

- wires and connection points.
9. A UL listed disconnect device, such as a circuit breaker or fuse, must be installed between the power supply and BTS chassis connections.
  10. Power-interconnect wires between the power supply/recitifier and the BTS Digital chassis must have heat shrink tubing applied over the barrel of the terminal lugs after crimping the wire. A picture is provided in the “Installation” section of this manual.
  11. If it is necessary to replace a fuse on a CHP, CC or PA board, a fuse of the same type and with the same rating must be used to insure continued protection against risk of fire.

## ***EU Alert Mark***



Danish	Undertegnede Navini Networks erklærer herved, at følgende udstyr 2.4 GHz BTS overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Dutch	Hierbij verklaart Navini Networks dat het toestel 2.4 GHz BTS in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
English	Hereby, Navini Networks declares that the 2.4 GHz BTS is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
German	Hiermit erkläre Navini Networks dass sich dieser/diese/dieses 2.4 GHz BTS in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet.
Greek	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Navini Networks ΔΗΛΩΝΕΙ 2.4 GHz BTS ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Finnish	Navini Networks vakuuttaa täten että 2.4 GHz BTS tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
French	Par la présente, Navini Networks déclare que ce 2.4 GHz BTS est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables.
Italian	Con la presente Navini Networks dichiara che questa 2.4 GHz BTS è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Portuguese	Navini Networks declara que la 2.4 GHz BTS está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Spanish	Por medio de la presente Navini Networks declara que la 2.4 GHz BTS cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Swedish	Härmed intygar Navini Networks att denna 2.4 GHz BTS står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

## ***EU Restrictions***

### ***(English)***

**Austria:** Plug-in radio devices should be used only with the host equipment and external antennas specified by the manufacturer.



**France:** Use of this equipment is limited to the 2446.5-2483.5 MHz band, with some geographical constraints and the EIRP limited to -20dBW/MHz. Indoor: EIRP limited to 10 mW in the 2400-2446 MHz band. Inside a private area: EIRP limited to 100 mW in the 2446-2483.5 MHz band, with authorization. Outside a private area: the band is not opened.

**Belgium:** EIRP limited to 10 mW.

**Hungary:** Processing gain: 10 dB minimum. Antenna type: integral or external with maximum gain of 6 dBi.

**Italy:** No restrictions if used outside own premises; a general authorization is required.

**Luxembourg:** No restrictions. System provider for third party traffic may require a Telecommunications Act License

**The Netherlands:** No license required indoor or outdoor for EIRP up to 10 mW. No license required indoor only for EIRP up to 100 mW. License required outdoor for EIRP up to 100 mW within 2451–2471 MHz. Current use of this band by the Government should be protected.

**United Kingdom:** A system provider for third party traffic may require a Wireless Telegraphy and/or Telecommunications Act License

### *(Español)*

**Austria:** Los dispositivos de radio enchufables deben ser conectados únicamente con el equipo y las antenas externas declarados por el fabricante.

**Francia:** Limitado a la banda de 2446,5-2483,5 MHz, con EIRP no mayor que -20 dBW/MHz, y con algunas restricciones geográficas. En interiores el EIRP debe limitarse a 10 mW en la banda de 2400-2446 MHz. Dentro de áreas privadas el EIRP debe limitarse a 100 mW en la banda de 2446-2483,5 MHz, con autorización. Fuera de las áreas privadas la banda no esta abierta.

**Bélgica:** El EIRP está limitado a 10 mW.

**Hungría:** Se requiere una ganancia de procesamiento de al menos 10 dB y una antena de tipo integral o exterior con una ganancia máxima de 6 dBi.

**Italia:** No existe ninguna restricción si se utiliza fuera de propias premisas, pero se requiere una autorización general.

**Luxemburgo:** No existe ninguna restricción, pero un proveedor de servicios de sistema para tráfico de terceros puede requerir una licencia en conformidad con el Acta de Telecomunicaciones

**Países Bajos:** No se requiere licencia para operar a 10 mW en interior o exterior. No se requiere licencia para operar a 100 mW en interiores solamente. Se requiere una licencia para operar a 100 mW en la banda de 2451-2471 MHz en el exterior. . Debe protegerse el uso actual de esta banda por parte del gobierno.

**Reino Unido:** Un proveedor de servicios de sistema para tráfico de terceros podría requerir una Licencia de Telegrafía Inalámbrica y/o un permiso en conformidad con el Acta de Telecomunicaciones.

### *(Français)*

**Autriche:** Les dispositifs de radio doivent être branchés uniquement sur l'équipement et les antennes externes spécifiés par le fabricant.

**France:** Limité à la bande des 2446,5-2483,5 MHz avec certaines restrictions géographiques et le EIRP limité à -20dBW/MHz. À l'intérieur: EIRP limité à 10 mW dans la bande des 2400-2446 MHz. À l'intérieur, d'une zone privée: EIRP limité à 100 mW dans la bande des 2446-2483,5 MHz, avec autorisation. À l'extérieur d'une zone privée: la bande n'est pas ouverte.

**Belgique:** Le EIRP est limité à 10 mW.

**Hongrie:** Le gain de traitement doit être d'au moins 10 dB, et l'antenne doit être de type intégral ou extérieure avec un gain maximum de 6 dBi.

**Italie:** Il n'y a aucune restriction s'il est utilisé en dehors de propres locaux, mais une autorisation générale est exigée.

**Luxembourg:** Il n'y a aucune restriction, mais un fournisseur de services de système pour le trafic de tiers peut être demandé d'avoir un permis en conformité avec la Loi des Télécommunications.

**Pays-Bas:** Aucun permis n'est pas nécessaire pour opérer à 10 mW à l'intérieur ou à l'extérieur. Aucun permis n'est pas nécessaire pour opérer à 100 mW à l'intérieur seulement. Il faut avoir un permis pour opérer à 100 mW dans la bande des 2451-2471MHz à l'extérieur. Il faut protéger l'utilisation actuelle de la bande par le gouvernement.

**Royaume Uni:** Un fournisseur de services de système pour le trafic de tiers peut être demandé d'avoir un permis de Télégraphie sans fil et/ou un permis en conformité avec la Loi des Télécommunications.

## Battery Caution & Procedures



**WARNING!** To reduce risk of injury or fire, follow these instructions when handling the battery.

1. Risk of explosion is possible if the battery is replaced with one not supplied by Navini Networks.
2. Do not dispose of the battery in a fire. It may explode. Check with the local codes for battery disposal guidelines.
3. Do not open or mutilate the battery. The battery contains substances that are toxic, corrosive, or harmful to humans. If battery substances come in contact with the skin, seek medical help immediately.
4. Do not attempt to recharge the battery by any means except per the instructions in this manual.
5. Remove the battery from the equipment if the equipment is not going to be used for a long period of time. The battery could leak and cause damage to the equipment.
6. Exercise care when handling the battery to prevent shorting the battery with conducting materials such as bracelets, rings, and keys.
7. Store the battery pack in a dry place, 0 to +40 degrees Celsius.
8. Dispose of used batteries according to environmental guidelines.