

## Installation Instruction













**The Remote Unit, Extension Unit or Master Unit must be mounted by professional / specially trained fitter**

### 1.1. MECHANICAL INSTALLATION

#### 1.1.1. Health and Safety for Mechanical Installation

### General Mounting Cautions

The following cautions apply to all CAP M2 installations; there may be other mounting cautions applicable to a specific mounting option, which will be defined in the applicable mounting procedure.

-  **Note:**  Attach all CAP M2 securely to a stationary object as described in this installation guide.
-  **Note:**  To maintain proper ventilation, keep at least 76 mm (3-inch) clearance around the CAP M2.
-  **Note:**  The installation site must be able to bear the weight of the CAP M2; see [Maximum CAP M2 Installation Weights](#).
-  **Note:**  Do not paint the CAP M2 or antenna.
-  **Note:**  Do not mount the antenna on conductive surface as it may change RF propagation properties.
-  **Note:**  If mounted outdoors, all open/unused ports must be covered using IP rated caps for outdoor use. All connectors must be sealed.

## 1.2. ELECTRICAL INSTALLATION


### 1.2.1. Health and Safety for Electrical Installation

## Safely Working with ERA Hardware

The following sections provide important information that you should read and know before working with any ERA hardware. Observe all cautions and warnings listed in this section.

### Health and Safety Precautions




**Note:**  A high leakage current ground (earth) connection to the Power Supply Unit (PSU) is essential before making any other connections to the PSU.




**Note:**  Laser radiation. Risk of eye injury in operation. Do not stare into the laser beam; do not view the laser beam directly or with optical instruments.




**Note:**  High frequency radiation in operation. Risk of health hazards associated with radiation from the antenna(s) connected to the unit. Implement prevention measures to avoid the possibility of close proximity to the antenna(s) while in operation.






**Note:**  If the CAP M2 power connector is not easily accessible, a disconnect device in the mains power circuit must be provided within easy reach.




### Property Damage Warnings




**Note:**  Keep operating instructions within easy reach and make them available to all users.

-  **Note:** ⚠️ Only license holders for the respective frequency range are allowed to operate this unit.
-  **Note:** ⚠️ Read and obey all the warning labels attached to the unit. Keep all warning labels are kept in a legible condition. Replace missing or damaged labels.
-  **Note:** ⚠️ Make sure the unit's settings are correct for the intended use (refer to the manufacturer product information) and regulatory requirements are met. Do not carry out any modifications or fit any spare parts, which are not sold or recommended by the manufacturer.

## General Installation Safety Requirements

-  **Note:** ⚠️ Wet conditions increase the potential for receiving an electrical shock when installing or using electrically powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.
-  **Note:** ⚠️ This system is a RF Transmitter and continuously emits RF energy. Maintain a minimum clearance from the antenna, according to [Table 4: Minimum Antenna Distances](#) (page 12) while the system is operating. Whenever possible, power down the CAP M2 before servicing the antenna.
-  **Note:** ⚠️ Do not remove protective caps from any of the connectors until instructed to do so.

## Guard Against Damage from Electro-Static Discharge

-  **Note:** ⚠️ Electro-Static Discharge (ESD) can damage electronic components. To prevent ESD damage, always wear an ESD wrist strap when working with hardware components. Not all ERA hardware requires grounding. For those ERA hardware components for which grounding is required, connect the ground wire on the ESD wrist strap to an earth ground source before touching the component. Wear the wrist strap the entire time that you work with the ERA hardware.

## Compliance

1. **Notice:** For installations, which have to comply with FCC RF exposure requirements, the antenna selection and installation must be completed in a way to ensure compliance with those FCC requirements. Depending on the RF frequency, rated output power, antenna gain, and the loss between the repeater and antenna, the minimum distance D to be maintained between the antenna location and human beings is calculated according to this formula:

$$D_{[cm]} = \sqrt{\frac{P_{[mW]}}{4 * \pi * PD_{[mW/cm^2]}}}$$

where

- P (mW) is the radiated power at the antenna, i.e. the max. rated repeater output power in addition to the antenna gain minus the loss between the repeater and the antenna.
- PD (mW/cm<sup>2</sup>) is the allowed Power Density limit acc. to 47 CFR 1.1310 (B) for general population / uncontrolled exposures which is
  - $f$  (MHz) / 1500 for frequencies from 300MHz to 1500MHz
  - 1 for frequencies from 1500MHz to 100,000MHz

RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC Bureau(s), including antenna co-location requirements of 1.1307(b)(3).

2. **Notice:** For installations which have to comply with European EN50385 exposure compliance requirements, the following Power Density limits/guidelines (mW/cm<sup>2</sup>) according to ICNIRP are valid:
  - 0.2 for frequencies from 10 MHz to 400 MHz
  - $F$  (MHz) / 2000 for frequencies from 400 MHz to 2 GHz
  - 1 for frequencies from 2 GHz to 300 GHz
3. **Notice:** Installation of this equipment is in full responsibility of the installer, who has also the responsibility, that cables and couplers are calculated into the maximum gain of the antennas, so that this value, which is filed in the FCC Grant and can be requested from the FCC data base, is not exceeded. The industrial boosters are shipped only as a naked booster without any installation devices or antennas as it needs for professional installation.
4. **Notice:** For installations which have to comply with FCC/ISED requirements:

#### English:

This device complies with FCC Part 15. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device complies with Health Canada's Safety Code. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php).

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **Antenna Statement for ISED:**

This device has been designated to operate with the antennas having a maximum gain of 15 dBi. Antennas having a gain greater than 15 dBi are prohibited for use with this device without consent by ISED regulators. The required antenna impedance is 50 ohms.

The antenna(s) used for this transmitter must be installed to provide a separation distance according to [Table 4: Minimum Antenna Distances](#) (page 12) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

#### French:

Cet appareil est conforme avec Santé Canada Code de sécurité 6. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues: [http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio\\_guide-lignes\\_direct-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php)

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser cet équipement.

## Antenne déclaration pour ISDE:

Ce dispositif a été désigné pour fonctionner avec les antennes ayant un gain maximal de 15 dBi. Antennes ayant un gain plus grand que 15 dBi sont interdites pour une utilisation avec cet appareil sans le consentement des organismes de réglementation d'ISDE. L'impédance d'antenne requise est 50 ohms.

L'antenne (s) utilisé pour cet émetteur doit être installé pour fournir une distance de séparation selon le Tableau [Table 4: Minimum Antenna Distances](#) (page 12) de toutes les personnes et ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou émetteur. Les utilisateurs et les installateurs doivent être fournis avec des instructions d'installation de l'antenne et des conditions de fonctionnement de l'émetteur pour satisfaire la conformité aux expositions RF.

Canadian Representative	
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Company Name:	Celltech Labs Inc.
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Contact Name:	Ben Hewson
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Email:	IC-Rep@celltechlabs.com

5. **Notice:** The unit complies with Overvoltage Category II. It also complies with the surge requirement according to EN 61000-4-5 (fine protection); however, installation of an additional medium (via local supply connection) and/or coarse protection (external surge protection) is recommended depending on the individual application in order to avoid damage caused by overcurrent.

For Canada and US, components used to reduce the Overvoltage Category shall comply with the requirements of IEC 61643-series. As an alternative, components used to reduce the Overvoltage Category may comply with ANSI/IEEE C62.11, CSA Certification Notice No. 516, CSA C22.2 No. 1, or UL 1449. Suitability of the component for the application shall be determined for the intended installation.

6. **Notice:** Corresponding local particularities and regulations must be observed. For national deviations, please refer to the respective documents included in the manual CD that is delivered with the unit.
7. **Notice:** For a Class B digital device or peripheral:

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.

8. **Notice:** For a Class A digital device or peripheral.

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.

9. **Notice:** This unit complies with European standard EN62368-1.

## Equipment Symbols Used / Compliance

Please observe the meanings of the following symbols used in our equipment and the compliance warnings listed in table below.

**TABLE 2:** Compliance Labels

Symbol	Compliance	Meaning
-	FCC	For industrial (Part 20) signal booster: WARNING: This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.
-	ISED	WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISED licensee. You MUST have an ISED LICENCE or the express consent of an ISED licensee to operate this device. AVERTISSEMENT: Ce produit N'EST PAS un appareil de CONSOMMATION. Il est conçu pour être installé par un installateur approuvé par un titulaire de licence d'ISDE. Pour utiliser cet appareil, vous DEVEZ détenir une LICENCE d'ISDE ou avoir obtenu le consentement exprès d'un titulaire de licence autorisé par ISDE.
CE	CE	To be sold exclusively to mobile operators or authorized installers - no harmonized frequency bands, operation requires license. Intended use: EU and EFTA countries. Indicates conformity with the RED directive 2014/53/EU and/or RoHS directive 2011/65/EU.

## Maximum Output Power Levels

Below table lists the frequencies and maximum power output for bands supported in the CAP M2 variants.

**TABLE 3: Maximum Power Output by Frequency**

Band	DL Frequency Range	Power Output [dBm]
PCS 1900	1930 - 1995 MHz	33
AWS 1700E	2110 - 2200 MHz	33
WCS 2300	2350 - 2360 MHz	32
BRS	2496 - 2690 MHz	33
34T	3450 - 3550 MHz	32
35LT	3410 - 3640 MHz	34
35HT	3570 - 3800 MHz	34
C-Band	3700 - 3980 MHz	35
37T (Ant 1 + 3)	3700 - 3980 MHz	34
37T (Ant 2 + 4)	3700 - 3980 MHz	35

## Required Antenna Distances

**TABLE 4: Minimum Antenna Distances**

Model	Antenna Gain Without Cable Loss (dBi)	Minimum Distance (meters)	
		FCC	ISED
CAP M2 C-Band	15	1.784	2.751
CAP M2 17E/19/23/25T	15	1.952	2.752
CAP M2 34T/37T/37T	15	1.911	2.266