

## Installation Instruction

**The Remote Unit, Extension Unit or Master Unit must be mounted by professional / special trained installer.**

### 1.1. MECHANICAL AND ELECTRICAL INSTALLATION

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

Read and observe chapter *1.2 Health and Safety*.

#### General Installation Safety Requirements



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.



This system is a RF Transmitter and continuously emits RF energy. Maintain a minimum clearance from the antenna while the system is operating. Whenever possible, power down the CAP L2 before servicing the antenna.



Do not remove caps from any of the connectors until instructed to do so.



The CAP L2 is to be used only with CommScope (NEC Class 2) or Limited Power Source ERA Subrack, or equivalent.

#### Property Damage Warnings



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



Only license holders for the respective frequency range are allowed to operate this unit.



Read and obey all the warning labels attached to the unit. Make sure that all warning labels are kept in a legible condition. Replace any missing or damaged labels.



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.

## 1.2. HEALTH AND SAFETY

### Health and Safety Precautions



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



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.



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.



If the CAP L2 power connector is not easily accessible, a disconnect device in the mains power circuit must be provided within easy reach.

### Guard Against Damage from Electro-Static Discharge



Electro-Static Discharge (ESD) can damage electronic components. To prevent ESD damage, always wear an ESD wrist strap when working with ERA 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 ERA 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 9 dBi. Antennas having a gain greater than 9 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 minimum separation distance 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 9 dBi. Antennes ayant un gain plus grand que 9 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 minimale par rapport à toute 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	
ISED Company No:	3874A
Company Name:	Celltech Labs Inc.
Address:	21-364 Lougheed Road Kelowna, BC V1X 7R8
Contact Name:	Ben Hewson
Telephone No:	(250) 765-7650 x201
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, which are available from CommScope.

- 7 **Note:** 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 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 RF technician for help.

**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 Note:** 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 2](#).

*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.  For (Part 90) 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. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at <a href="http://www.fcc.gov/signal-boosters/registration">www.fcc.gov/signal-boosters/registration</a> . 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

Table 3 lists the frequencies and maximum power output for bands supported in the CAP L2 variants.

Table 3. Maximum Power Output by Frequency

Band	Radio Module Number	DL Frequency Range	Power Output [dBm]
6	Radio Module L2 B71	619.5 - 649.5 MHz	19
7E	Radio Module L2 B12 +13+14	731.5 - 753.5	19
		748.5 - 753.5 MHz	
		760.5 - 765.5 MHz	
7-8	N/A	758 - 791 MHz 791 - 821 MHz	19
9	N/A	925 - 960 MHz	19
17E	Radio Module L2 B66	2110 - 2170 MHz	21
18	N/A	1805 - 1880 MHz	21
19	Radio Module L2 B25	1932.5 - 1992.5 MHz	21
21	N/A	2110 - 2170 MHz	21
23	Radio Module L2 B30	2352.5 - 2357.5 MHz	19
23T	N/A	2350 - 2390 MHz	21
25T	Radio Module L2 B41	2498.5 - 2687.5 MHz	21
26	N/A	2620 - 2690 MHz	21
80-85	Radio Module L2 B5+27	864.5 - 866.5 MHz	19
		871.5 - 891.5 MHz	
35LT	N/A	3410 - 3640 MHz	23
35HT	N/A	3570 - 3800 MHz	23
C-Band	N/A	3700 - 3980 MHz	23

NOTE: The output power of the internal Radio Module is 3 dB higher than the ANT Port due to the combiner.

## Required Antenna Distances

Table 4. Required Antenna Distances

CAP L2 Model	Antenna Gain without Cable Loss [dBi]	Minimum Distance Between Antennas and All Persons (DL)			
		FCC		ISED	
		Meters	Inches	Meters	Inches
CAP L2 6E/7E/80-85	9	0.20	7.88	0.24	9.45
CAP L2 17E/19/23/25T	9	0.20	7.88	0.20	7.88
CAP L2 C-Band	9	0.22	8.84	N/A	N/A

NOTE: The Maximum Antenna Gain calculation considers the Radio Module in the CAP L2 system is without loss, except for the internal combiner.