CT4000

Networked Charging Station

Cellular Signal Reading Guide

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING:

1. **Read and follow all warnings and instructions before servicing, installing, or operating the ChargePoint® charging station.** Install and operate only as instructed. Failure to do so may lead to death, injury, or property damage, and will void the Limited Warranty.
2. **Only use licensed professionals certified by ChargePoint for installation and service, adhere to all national and local building codes and standards, and ensure compliance** with local building and electrical codes and standards, climate conditions, safety standards, and all applicable codes and ordinances. Inspect the charging station for proper installation before use.
3. **Always ground the ChargePoint charging station.** Failure to ground the charging station can lead to risk of electrocution or fire. The charging station must be connected to a grounded, metal, permanent wiring system, or an equipment grounding conductor shall be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all applicable codes and ordinances.
4. **Install the ChargePoint charging station on a concrete pad using a ChargePoint-approved method.** Failure to install on a surface that can support the full weight of the charging station can result in death, personal injury, or property damage. Inspect the charging station for proper installation before use.
5. **This charging station is not suitable for use in Class 1 hazardous locations, such as near flammable, explosive, or combustible vapors or gases.**
6. **Supervise children near this device.**
7. **Do not put fingers into the electric vehicle connector.**
8. **Do not use this product if any cable is frayed, has broken insulation, or shows any other signs of damage.**
9. **Do not use this product if the enclosure or the electric vehicle connector is broken, cracked, open, or shows any other signs of damage.**
10. **Use only copper conductor wire rated for 90 °C (194 °F).**

IMPORTANT: Under no circumstances will compliance with the information in a ChargePoint guide such as this one relieve the user of the responsibility to comply with all applicable codes and safety standards. This document describes approved procedures. If it is not possible to perform the procedures as indicated, contact ChargePoint. **ChargePoint is not responsible for any damages that may result from custom installations or procedures not described in this document or that fail to adhere to ChargePoint recommendations.**

Product Disposal

Do not dispose of as part of unsorted domestic waste. Inquire with local authorities regarding proper disposal. Product materials are recyclable as marked.

Document Accuracy

The specifications and other information in this document were verified to be accurate and complete at the time of its publication. However, due to ongoing product improvement, this information is subject to change at any time without prior notice. For the latest information, see our documentation online at chargepoint.com/guides.

Copyright and Trademarks

Symbols

This guide and product use the following symbols:

DANGER: Risk of electric shock

WARNING: Risk of personal harm or death

CAUTION: Risk of equipment or property damage

IMPORTANT: Crucial step for installation success

Read the manual for instructions

Ground/protective earth

Illustrations Used in This Document

The illustrations used in this document are for demonstration purposes only and may not be an exact representation of the product. However, unless otherwise specified, the underlying instructions are accurate for the product.

Setting up, Surveying, and Reviewing

In This Document

Cellular Connectivity: Using a Snyper LTE Graphyte™ for Site Survey

Scope

A site survey for cellular connectivity is a key requirement for every ChargePoint charging station installation. Cellular connectivity is required for key features such as:

- User authentication, access control, and billing for charging sessions
- Station utilization, energy usage, and session details for retporting
- Power management
- Notification to drivers for waitlists, end of charging session, and pricing increases for overstay
- Station diagnostics
- Software updates

This document explains how to complete a site survey using a Siretta Snyper LTE Graphyte™ in the North American region.

This Siretta Snyper LTE Graphyte™ device is a high performance, multi-language, network signal analyser and cellular signal logger. It is used for surveying and analyzing the 4G/LTE (USA) and the 3G/UMTS North American Networks. You can leave this unit in a fixed location for conducting sequential surveys and automatically saving them. The tool can be purchased online from Newark, Digi-Key, and other suppliers.

CAUTION:

- You must use a device that will give RSRP/RSRQ for LTE like the Siretta Snyper LTE Graphyte™ device that ChargePoint has recommended for taking your cellular signal readings. Do not use other meters that will not give RSRP/RSRQ for LTE.
- If a meter reads out only a single value for an operator or band, or the reading type is not labelled, it isn't acceptable.
- Attach your values and an image to Your Site Values for LTE (4G) Table or Your Site Values for UMTS (3G) Table and send your values back to ChargePoint.

Orientation

(a) Back
(b) Power
(c) OK/Select
(d) Right
(e) Left

(f) Up

(g) Down

Setting up the device

A one time setup of the device is required before beginning the site survey. Check and update each of these settings as needed.

1. Hold the **Power** button 3 seconds to power up the device.
2. Use the **Down** button to navigate to Setup. Press **OK**.
3. Use the **Down** button to navigate to Document. Press **OK**.
4. Update the Document settings to:
    - HTML: **On**
    - CSV: **On**
    - Auto-Save: **On**
5. Press **OK**.
6. Use the **Down** button to navigate to **System**. Press **OK**.
7. Update the Document settings to:
    - Mode: **Advanced**
    - ITU Region: **AMER**
    - Debug Log: **Off**
8. Press **OK**.
9. Use the **Down** button to navigate to **Set Time**. Press **OK**.
10. Verify that the date and time are correct. Otherwise, update it to be correct for your location.

Surveying a Station Location

IMPORTANT:

- **The survey must be conducted for each station** (or, **for each Gateway for CPF stations**, if applicable).
- Surveying the general area is insufficient. **Each individual station** must be checked for connectivity.

To survey a station:

1. To power up the device, hold the **Power** button for 3 seconds.
2. Use the **Down** button to navigate to **Survey**. Press **OK**.
3. Navigate to select **Full Survey**. Press **OK**.

4. Select the number of cycles.

IMPORTANT:

- You must do at least *one cycle* per station.
- But, if cellular service seems problematic or fluctuates, then you may want to run *more than one survey per location*.

5. Press **OK**.

   The device will say "Please wait". Each survey cycle takes approximately 2 minutes. It may take slightly longer if the signal is weak or noisy.

   IMPORTANT: If the display dims during a survey, you can presss OK to wake it.

   When complete, the device displays the results.

6. Record the file names for the *.csv* and *.htm* files and the associated charging station location for these results..
7. Repeat the surveying process for each charging location at the sit.

IMPORTANT: The results represent a snapshot of cellular signal at the time of survey. Results vary by time of location, weather conditions, and various other factors (such as tower load, proximity to the cellular tower, signal through a cellular repeater, competing signals, or physical barriers such as mountains, buildings, trains, etc.) that affect cellular connectivity.

Downloading and Reviewing the Files

Use a Windows or Mac computer to review the files.

To review the files:

1. Hold the **Power** button for 3 seconds to power up the device.
2. Use the **Down** button to navigate to **PC Connect**. Press **OK**.
3. Use the **Right** button to select **On**.

   The device will say "PC Enabled".
4. Use a USB cable to connect the device to your computer.
5. Go to Windows Explorer or Finder (Mac) and find the GRAPHYTE drive or location.
6. Copy the files from the device to a preferred location on your computer.
7. Open the ***.htm*** file for the station location you wish to review.

Understanding Your Results

IMPORTANT:

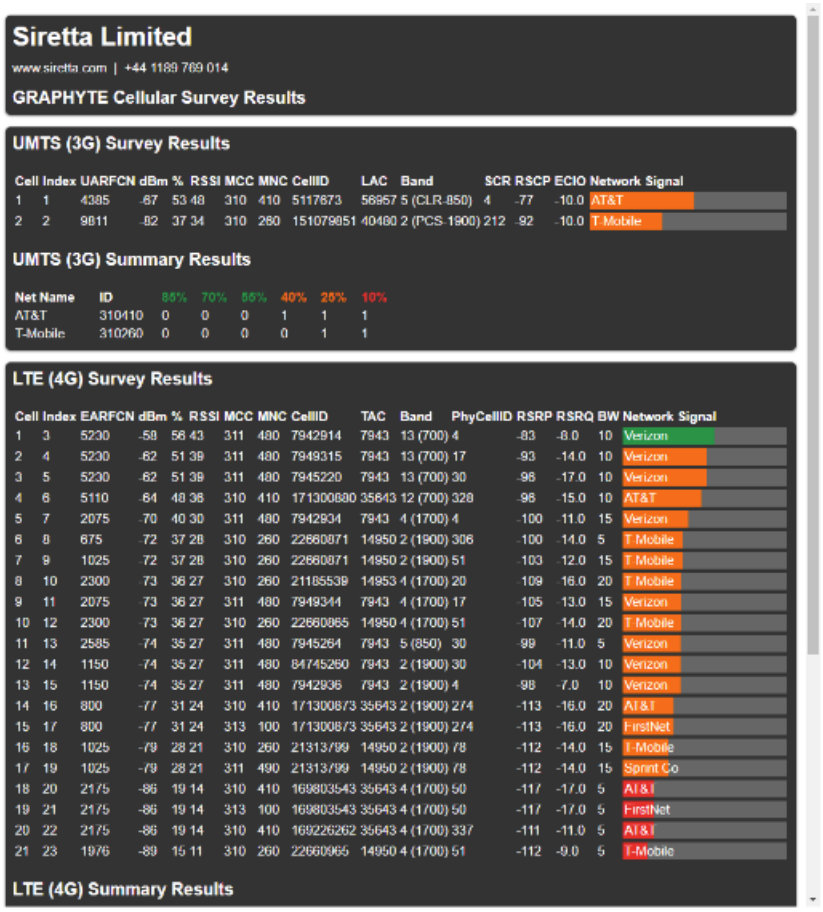
- Results display separately for UMTS (3G) and LTE (4G).

1. Verify what type of modem is in the charging station or Gateway (if applicable) being installed.

IMPORTANT:

- All modems sold by ChargePoint in North America from 2020 are 4G modems with 3G for backup for Canada or Mexico.
- Older modems were 3G only, but, all major United States carriers no longer offer 3G service.

2. Results display in three Network Signal strengths.
    - Green: Good
    - Orange: Marginal to poor
    - Red: Extremely weak or barely detectable



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GRAPHYTE Cellular Survey Results

UMTS (3G) Survey Results

Cell	Index	UARFCN	dBm	%	RSSI	MCC	MNC	CellID	LAC	Band	SCR	RSCP	ECIO	Network	Signal
1	1	4385	-67	53	48	310	410	5117873	56957	5 (CLR-850)	4	-77	-10.0	AT&T	
2	2	9811	-82	37	34	310	260	151079851	40480	2 (PCS-1900)	212	-92	-10.0	T-Mobile	

UMTS (3G) Summary Results

Net Name	ID	85%	70%	55%	40%	25%	10%
AT&T	310410	0	0	0	1	1	1
T-Mobile	310260	0	0	0	0	1	1

LTE (4G) Survey Results

Cell	Index	EARFCN	dBm	%	RSSI	MCC	MNC	CellID	TAC	Band	PhyCellID	RSRP	RSRQ	BW	Network	Signal
1	3	5230	-58	56	43	311	480	7942914	7943	13 (700)	4	-83	-8.0	10	Verizon	
2	4	5230	-62	51	39	311	480	7949315	7943	13 (700)	17	-93	-14.0	10	Verizon	
3	5	5230	-62	51	39	311	480	7945220	7943	13 (700)	30	-98	-17.0	10	Verizon	
4	6	5110	-64	48	38	310	410	171300880	35643	12 (700)	328	-98	-15.0	10	AT&T	
5	7	2075	-70	40	30	311	480	7942934	7943	4 (1700)	4	-100	-11.0	15	Verizon	
6	8	675	-72	37	28	310	260	22660871	14950	2 (1900)	306	-100	-14.0	5	T-Mobile	
7	9	1025	-72	37	28	310	260	22660871	14950	2 (1900)	51	-103	-12.0	15	T-Mobile	
8	10	2300	-73	36	27	310	260	21165539	14953	4 (1700)	20	-109	-16.0	20	T-Mobile	
9	11	2075	-73	36	27	311	480	7949344	7943	4 (1700)	17	-105	-13.0	15	Verizon	
10	12	2300	-73	36	27	310	260	22660865	14950	4 (1700)	51	-107	-14.0	20	T-Mobile	
11	13	2585	-74	35	27	311	480	7945264	7943	5 (850)	30	-99	-11.0	5	Verizon	
12	14	1150	-74	35	27	311	480	84745260	7943	2 (1900)	30	-104	-13.0	10	Verizon	
13	15	1150	-74	35	27	311	480	7942936	7943	2 (1900)	4	-98	-7.0	10	Verizon	
14	16	800	-77	31	24	310	410	171300873	35643	2 (1900)	274	-113	-16.0	20	AT&T	
15	17	800	-77	31	24	313	100	171300873	35643	2 (1900)	274	-113	-16.0	20	FirstNet	
16	18	1025	-79	28	21	310	260	21313799	14950	2 (1900)	78	-112	-14.0	15	T-Mobile	
17	19	1025	-79	28	21	311	490	21313799	14950	2 (1900)	78	-112	-14.0	15	Sprint Co	
18	20	2175	-86	19	14	310	410	169803543	35643	4 (1700)	50	-117	-17.0	5	AT&T	
19	21	2175	-86	19	14	313	100	169803543	35643	4 (1700)	50	-117	-17.0	5	FirstNet	
20	22	2175	-86	19	14	310	410	169226262	35643	4 (1700)	337	-111	-11.0	5	AT&T	
21	23	1976	-89	15	11	310	260	22660965	14950	4 (1700)	51	-112	-9.0	5	T-Mobile	

LTE (4G) Summary Results

Note: Cellular carriers often appear multiple times using different bands. Some bands are more commonly used than others.

3. Review additional details from the graphs below on signal strength where:
    - RSRP (LTE) stands for Reference Signal Received Power
    - RSRQ (LTE) stands for Reference Signal Received Quality
    - RSSI (UMTS) stands for Received Signal Strength Indication
    - EC/IO (UMTS) stands for Downlink carrier-to-interference ratio

A consistently strong cellular signal is needed before installers can activate the vehicle charging station. Weak or sporadic signal can affect crucial aspects of the charging station, including:

- Accuracy in reporting
- Ability for drivers to use the mobile app
- Ability for customer support to troubleshoot problems
- Support for advanced features such as Power Management or Waitlist

A strong signal is also required for the ChargePoint Assure maintenance and management programs.

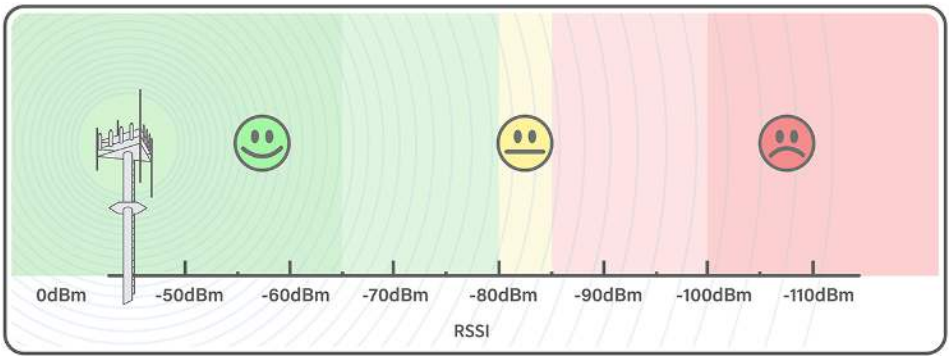
ChargePoint stations use cellular data connections to reach ChargePoint Cloud Services. This allows secure, PCI-compliant data connections without requiring any other form of internet connectivity at an install site or imposing additional network management responsibilities on a site host.

Each station has its own cellular connection.

Signal Strength and Quality

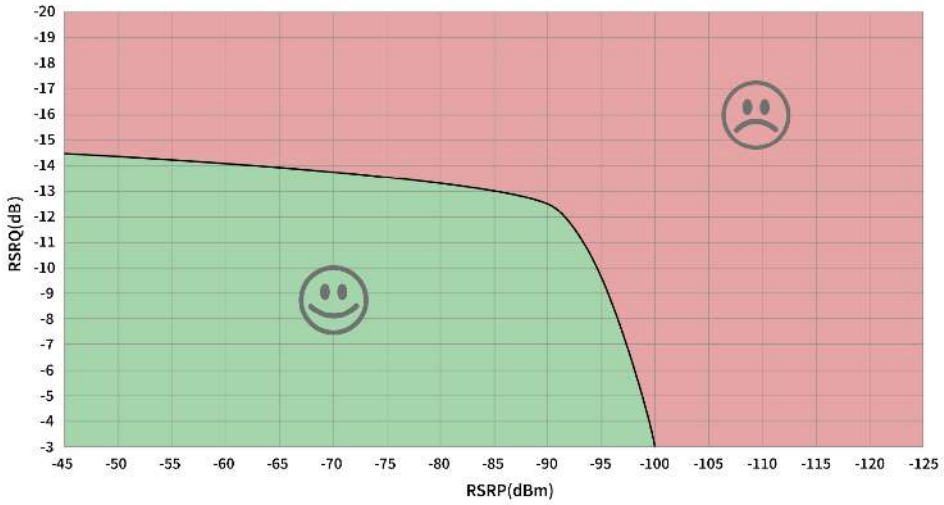
You must use a cellular signal detection device (such as a Siretta Snyper LTE or equivalent) to take signal strength readings at the exact proposed mounting location of the charging station. If the charging station does not have its own cellular connection, take the signal strength reading at the proposed mounting location of the gateway station.

If the location doesn't have consistently strong LTE signal strength, test the 3G or 2G signal strength at the proposed mounting location of every gateway station and ensure it meets the minimum -85 dBm RSSI.

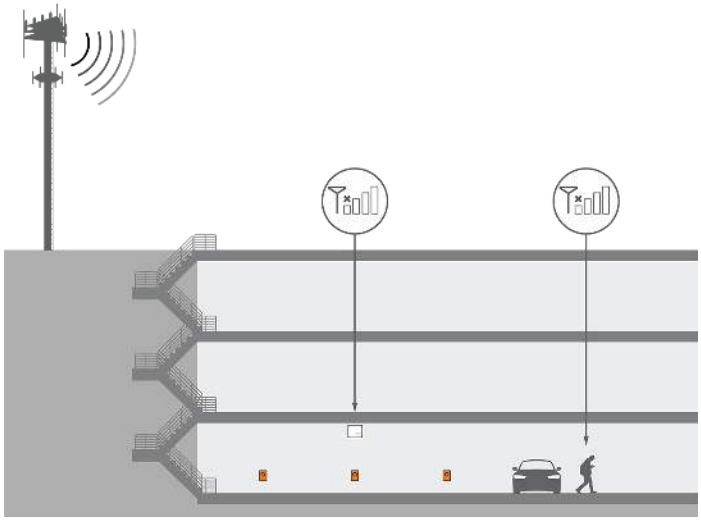


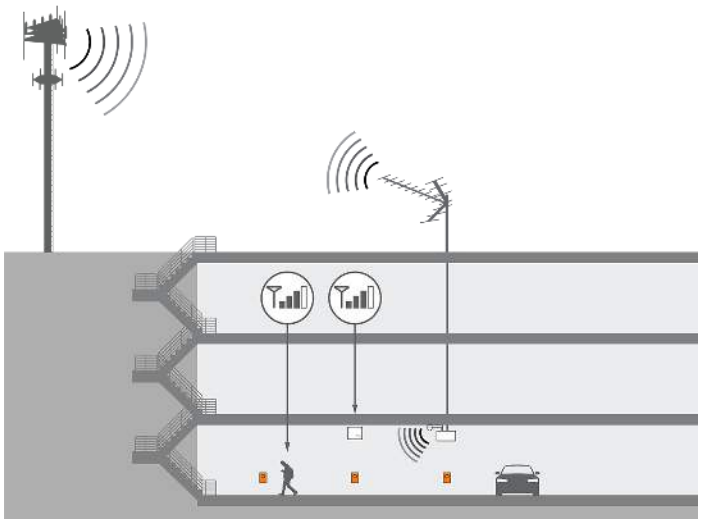
You must test the LTE signal strength at the proposed mounting location of every gateway station and ensure the location meets the minimum RSRQ at -12.5 dB or better, for RSRP measured at -90 dBm or better. Refer to the graph for acceptable combinations.

Note: These numbers are all negative, so -70 dBm is stronger than -85 dBm, and -90 dBm is weaker.



If the signal strength is weaker than this, take cellular readings at the location where any cellular signal booster antennas will be installed. Ensure enough signal exists for that repeater model. Install repeaters to boost the strength of the cellular signals. Repeaters are often required when installing charging stations in an underground garage or enclosed parking structure.





In North America, ChargePoint products all support LTE bands 2, 4, and 5. The most commonly supported carriers to check during site evaluation are:

- US: AT&T, T-Mobile, and Verizon
- Canada: Rogers, Telus, and Bell

For other regions, or if the site does not have strong signal on these bands, contact your ChargePoint representative for additional solutions.

ChargePoint strongly recommends a consultation with a cellular connectivity specialist before all installations. A consultation can verify:

- Service with a supported carrier on a supported LTE band
- Available signal and local noise levels on applicable bands
- Site changes to correctly meet your needs, both for station bandwidth and other phone coverage for customer or tenant satisfaction

Repeaters

Some sites require repeaters to ensure strong signal to all stations. If a repeater is required, look for a model with these features:

- Specifically LTE compatible on the listed bands
- Multi-carrier
- Multi-band
- Not already dedicated to FirstNet or other first responder-specific networks
- Auto-gain recommended

Note: Do not rely on readings taken with a cell phone when conducting site surveys. Many signal boosters and network extenders may not be compatible with ChargePoint hardware, including certain types of Distributed Antenna Systems (DAS), micro/nano/pico/femto-cells, and carrier- or band-specific signal boosters.

Expected Values for LTE (4G)

RSRP	RSRQ	Signal Strength
-90 dBm or better	-12.5 dB or better	Excellent
Note: As the numbers are negative so, the word 'better' means that the RSRP value has to be a number that is lower than -90 dBm or the RSRQ value has to be a number that is lower than -12.5 dB and only then the values indicate that the cellular signal reading has excellent cellular strength.		

Expected LTE (4G) Values

Your Site Values for LTE (4G)

In the Table below, **for each station** (or, **for each Gateway for CPF stations**, if applicable) at your site, do the following:

a. **Note** down your LTE (4G) value readings in the **Carrier** Column.

b. Attach an image of each cellular reading taken at your site under the **Images** Column

Station or Gateway Name	RSRP	RSRQ	Carrier	**Images**

Your LTE (4G) Values

Expected Values for UMTS (3G)

RSSI	EC/IO	Signal Strength
-65 dBm or better	-3 to -10 dB or better	Excellent
Note: As the numbers are negative so, the word 'better' means that the value has to be a number that is lower than -65 dBm for RSSI or lower than -3 dB for EC/IO and only then it indicates that the cellular signal reading has excellent cellular strength.		

Expected UMTS (3G) Values

Your Site Values for UMTS (3G)

In the Table below, **for each station** (or, **for each Gateway for CPF stations**, if applicable) at your site, do the following:

a. **Note** down your UMTS (3G) value readings in the **Carrier** Column.

b. Attach an image of each cellular reading taken at your site under the **Images** Column

Station or Gateway Name	RSSI	**EC/IO**	Carrier	**Images**

Your UMTS (3G) Values

Actions to take

Depending on the results, take these actions:

- If the results show Green results across several carriers and bands, then *no action is needed* and that station is good to go.

- If the results show any of these:
  - Connectivity is Orange or Red
  - Connectivity is only available across one or two bands
  - Connectivity is only available via a single carrier

  Action to take:
  - You most likely need to install a repeater or a distributed antenna system (DAS), but since your DAS has to be compatible with ChargePoint hardware, take the following action:
  - Contact ChargePoint Solutions Engineering at solutionsengineering@chargepoint.com for additional guidance.

IMPORTANT:

- For sites with complex conditions, a cellular specialist may be required to survey and remediate the site.

Limited Warranty Information and Disclaimer

The Limited Warranty you received with your charging station is subject to certain exceptions and exclusions. For example, your use of, installation of, or modification to, the ChargePoint® charging station in a manner in which the ChargePoint® charging station is not intended to be used or modified will void the limited warranty. You should review your limited warranty and become familiar with the terms thereof. Other than any such limited warranty, the ChargePoint products are provided "AS IS," and ChargePoint, Inc. and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

Limitation of Liability

CHARGEPOINT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THE CHARGING STATION, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY, EVEN IF CHARGEPOINT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF CHARGEPOINT FOR ALL CLAIMS WHATSOEVER RELATED TO THE CHARGING STATION WILL NOT EXCEED THE PRICE YOU PAID FOR THE CHARGING STATION. THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF CHARGEPOINT AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

FCC Compliance Statement

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 manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, you will be required to correct the interference at your own expense.

Important: Changes or modifications to this product not authorized by ChargePoint, Inc., could affect the EMC compliance and revoke your authority to operate this product.

Exposure to Radio Frequency Energy: The radiated power output of the 802.11 b/g/n radio and cellular modem (optional) in this device is below the FCC radio frequency exposure limits for uncontrolled equipment. The antenna of this product, used under normal conditions, is at least 20 cm away from the body of the user. This device must not be co-located or operated with any other antenna or transmitter by the manufacturer, subject to the conditions of the FCC Grant.

ISED (formerly Industry Canada)

This device complies with the licence-exempt RSS standard(s) of Innovation, Science and Economic Development Canada (ISED). 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.

Cet appareil est conforme aux flux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada (ISDE). L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

FCC/IC Compliance Labels

Visit chargepoint.com/labels

chargepoint.com/support

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