



# Radio Frequency Exposure Evaluation Report

**FOR:** ChargePoint Inc.

**Marketing name:** CPNK

**Model Name:** CPNK500

**Product Description:** CPNK500 is to provide communication between the Chargepoint network and the charging station.

**FCC ID:** W38-28010106

**IC ID:** 8854A-28010106

**Per:**

CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),  
FCC KDB 447498 D01 General RF Exposure Guidance v06

**Report number:** EMC\_CHARG\_017\_18501\_FCC\_ISED\_MPE

**DATE:** 11/30/2018



**CETECOM Inc.**

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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

## 1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 5 under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
ChargePoint Inc.	CPNK500 is to provide communication between the Chargepoint network and the charging station.	CPNK500

### Report reviewed by: TCB Evaluator

11/30/2018      Compliance      Cindy Li  
 (Lab Manager)

Date	Section	Name	Signature
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### Responsible for the Report:

11/30/2018      Compliance      Issa Ghanma  
 (EMC Engineer)

Date	Section	Name	Signature
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## 2 Administrative Data

### 2.1 Identification of the Testing Laboratory Issuing the Test Report

<b>Company Name:</b>	CETECOM Inc.
<b>Department:</b>	Compliance
<b>Street Address:</b>	411 Dixon Landing Road
<b>City/Zip Code</b>	Milpitas, CA 95035
<b>Country</b>	USA
<b>Telephone:</b>	+1 (408) 586 6200
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<b>EMC Lab Manager:</b>	Cindy Li
<b>Responsible Project Leader:</b>	Cathy Palacios

### 2.2 Identification of the Client / Manufacturer

<b>Client Firm/Name:</b>	ChargePoint Inc.
<b>Street Address:</b>	254 E. Hacienda Ave.
<b>City/Zip Code</b>	Campbell, CA 95008-6617
<b>Country</b>	USA

### Identification of the Manufacturer

<b>Manufacturer's Name:</b>	Same as Applicant
<b>Manufacturers Address:</b>	-----
<b>City/Zip Code</b>	-----
<b>Country</b>	-----

### 3 Equipment under Assessment

<b>Model No:</b>	CPNK500
<b>HW Version :</b>	27-01016
<b>SW Version :</b>	7.0.3
<b>FWIN:</b>	7.0.3
<b>HVIN:</b>	27-010106
<b>PMN:</b>	CPNK500, CPNK
<b>Regulatory Band:</b>	<ul style="list-style-type: none"> <li>• Cellular Module:                      LTE module will operate on band 2, 4, 5, 13 and 17 with a fall back 3G band 2, 4, 5.                     <ul style="list-style-type: none"> <li>◆ WCDMA/UMTS FDD BAND II : 1852.4 ~ 1907.6 MHz</li> <li>◆ WCDMA/UMTS FDD BAND IV: 1712.4 ~ 1752.6 MHz</li> <li>◆ WCDMA/UMTS FDD BAND V : 826.4 ~ 846.4 MHz</li> <li>◆ LTE BAND 2 : 1852.5 ~ 1907.5MHz</li> <li>◆ LTE BAND 4 : 1715.0 ~ 1750.0MHz</li> <li>◆ LTE BAND 5 : 824.7 ~ 848.3MHz</li> <li>◆ LTE BAND 13: 779.5 ~ 784.5 MHz</li> <li>◆ LTE BAND 17: 706.5 ~ 713.5</li> </ul> </li> <li>• Bluetooth low energy: 2402 MHz (ch0) – 2480 MHz (ch39), 40 channels.</li> <li>• Bluetooth Classic 4.0: 2402 MHz (ch0) – 2480 MHz (ch78), 79 channels.</li> <li>• Wi-Fi 2.4GHz: 2412 MHz (ch1) – 2462 MHz (ch11), 11 channels.</li> <li>• Wi-Fi 5GHz: UNII-1 5150 MHz (ch36) – 5250 MHz (ch48) and UNII-3 5725 MHz (ch149) – 5850 MHz (ch165)</li> </ul>

<b>Integrated Module Info:</b>	<p>Cellular Module: LTE module will operate on band 2, 4, 5, 13 and 17 with a fall back 3G band 2, 4, 5. FCC ID: QIPPLS8-X / IC ID: 7830A-PLS8X</p> <p>Redpine Module: Radios:</p> <ul style="list-style-type: none"><li>• Bluetooth low energy GFSK modulation.</li><li>• Bluetooth Classic 4.0 / Modulation: GFSK, DQPSK, 8DPSK</li><li>• Wi-Fi 2.4GHz operate on b/g/n modulation.</li><li>• Wi-Fi 5GHz operate a/n modulation.</li></ul> <p>FCC ID: XF6-RS9113DB / IC: 8407ARS9113DB</p>
<b>Antenna Type:</b>	<ul style="list-style-type: none"><li>➤ Embedded 2.4GHZ,WLAN Peak gain:<ul style="list-style-type: none"><li>• 2.390 – 2.490: 1.5 – 2.5dBi</li><li>• 5.150 – 5.350: 2 – 3.5 dBi</li><li>• 5.70 – 5.900: 2 – 3.5 dBi</li></ul>Manufacturer item number: 1000146</li><li>➤ Manufacturer: Ethertronics<ul style="list-style-type: none"><li>• Manufacturer item #: ANTENNA,EMBEDDED,OCTA-BAND,LTE</li><li>• Manufacturer item name: P822601</li><li>• Peak Gain: 3.9 dBi</li></ul></li><li>➤ Manufacturer: Ethertronics<ul style="list-style-type: none"><li>• Manufacturer item #: ANTENNA,EMBEDDED,OCTA-BAND,LTE</li><li>• Manufacturer item name: P822602</li><li>• Peak Gain: 3.9 dBi</li></ul></li></ul>

<b>Maximum Conducted Output Power</b>	<p><b>Bluetooth EDR/BDR:</b> From modular grant [Watts]: 0.02904</p> <p><b>Bluetooth LE:</b> From modular grant [Watts]: 0.05188</p> <p>Wi-Fi 2.4 GHz: From modular grant [Watts]: 0.06095</p> <p><b>Wi-Fi 5GHz:</b> From modular grant [Watts]: 0.01534</p> <p><b>Cellular:</b> From modular grant [Watts]:                  WCDMA Band II: 0.264                  WCDMA Band IV: 0.262                  WCDMA Band V: 0.244                  LTE Band 2: 0.182                  LTE Band 4: 0.2                  LTE Band 5: 0.178                  LTE Band 13: 0.162                  LTE Band 17: 0.158</p>
<b>Power Supply/ Rated Operating Voltage</b>	Low 23 VDC, Nominal 24 VDC, High 25 VDC
<b>Operating Temperature Range:</b>	Low -30° C, Nominal 25° C, High 50° C
<b>Sample Revision</b>	<input type="checkbox"/> Prototype Unit; <input checked="" type="checkbox"/> Production Unit; <input type="checkbox"/> Pre-Production

#### 4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

##### 4.1 Power Density Limits acc. to FCC 1.1310(e) / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

IC

300 – 6000	0.02619 x f (MHz) <sup>0.6834</sup>	6
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##### 4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.109(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC

operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm (EIRP: 33.9);  
 operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9);

IC

300MHz <= operating frequency < 6 GHz: excluded if EIRP < 0.0131 x f (MHz)<sup>0.6834</sup> W

##### 4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (mW/cm<sup>2</sup> or W/m<sup>2</sup>)

P = power input to the antenna (mW or W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm or m)

## 5 Evaluations

### 5.1 Analysis to Exclude Routine RF Exposure evaluation for Stand Alone Operation

Band	Lowest frequency [MHz]	FCC EIRP limit [dBm]	ISED EIRP limit [W]	ISED EIRP limit [dBm]	EIRP [dBm]	Verdict
UMTS II	1852.4	36.90	2.24	33.50	28.116	Exempt
UMTS IV	1712.4	36.90	2.12	33.27	28.083	Exempt
UMTS V	826.4	33.90	1.29	31.11	27.774	Exempt
LTE 2	1852.5	36.90	2.24	33.50	26.501	Exempt
LTE 4	1715.0	36.90	2.13	33.28	26.910	Exempt
LTE 5	824.7	33.90	1.29	31.10	26.404	Exempt
LTE 13	779.5	33.90	1.24	30.94	25.995	Exempt
LTE 17	706.5	33.90	1.16	30.64	25.887	Exempt
BT-LE	2405	36.90	2.68	34.28	17.130	Exempt
BT EDR/BDR	2400	36.90	2.68	34.28	19.650	Exempt
Wi-Fi 2.4	2412	36.90	2.68	34.29	20.350	Exempt
Wi-Fi 5.0	5150	36.90	4.51	36.54	15.758	Exempt

The single radios are exempt from routine environmental evaluation.



## 5.2 Analysis of RF Exposure for simultaneous transmission

- Evaluations are based on worst case power density limits for Canada.
- Calculations are made for 20cm.
- Evaluations are based on EIRP measured or calculated from known gain and conducted output power.
- Cellular can transmit simultaneously with either Wi-Fi 2.4, Wi-Fi 5.0, Bluetooth EDR/BDR or Bluetooth

Radio	Frequency [MHz]	EIRP [W]	Canada [W/m2]	Actual [W/m2]	How much of limit is used up [%]
UMTS II	1852.4	0.2665	4.480	0.530	11.83%
UMTS IV	1712.4	0.2645	4.246	0.526	12.39%
UMTS V	826.4	0.2465	2.581	0.490	19.00%
LTE 2	1852.5	0.1845	4.480	0.367	8.19%
LTE 4	1715.0	0.2025	4.250	0.403	9.48%
LTE 5	824.7	0.1805	2.577	0.359	13.93%
LTE 13	779.5	0.1645	2.480	0.327	13.19%
LTE 17	706.5	0.1605	2.319	0.319	13.77%
BT-LE	2405	0.0308	5.355	0.061	1.14%
BT EDR/BDR	2400	0.0537	5.351	0.107	2.00%
Wi-Fi 2.4	2412	0.0627	5.366	0.125	2.33%
Wi-Fi 5.0	5150	0.0178	9.011	0.035	0.39%

### Conclusion:

- **The worst case simultaneous transmission is Band V simultaneous with Wi-Fi 2.4 which is using 21.33% of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.**

## 6 Revision History

Date	Report Name	Changes to report	Report prepared by
11/30/2017	EMC_CHARG_017_18501_FCC_ISED_MPE	Initial Release	Issa Ghanma

