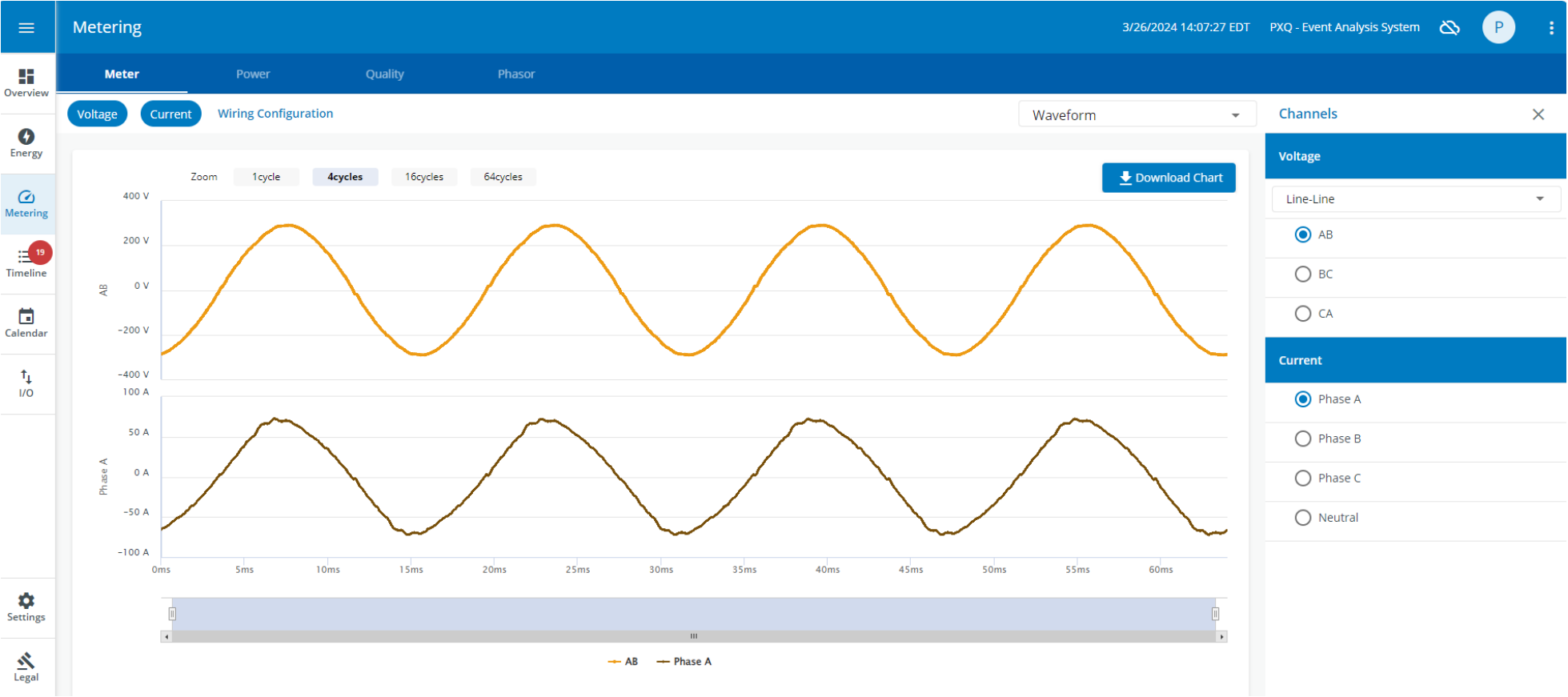
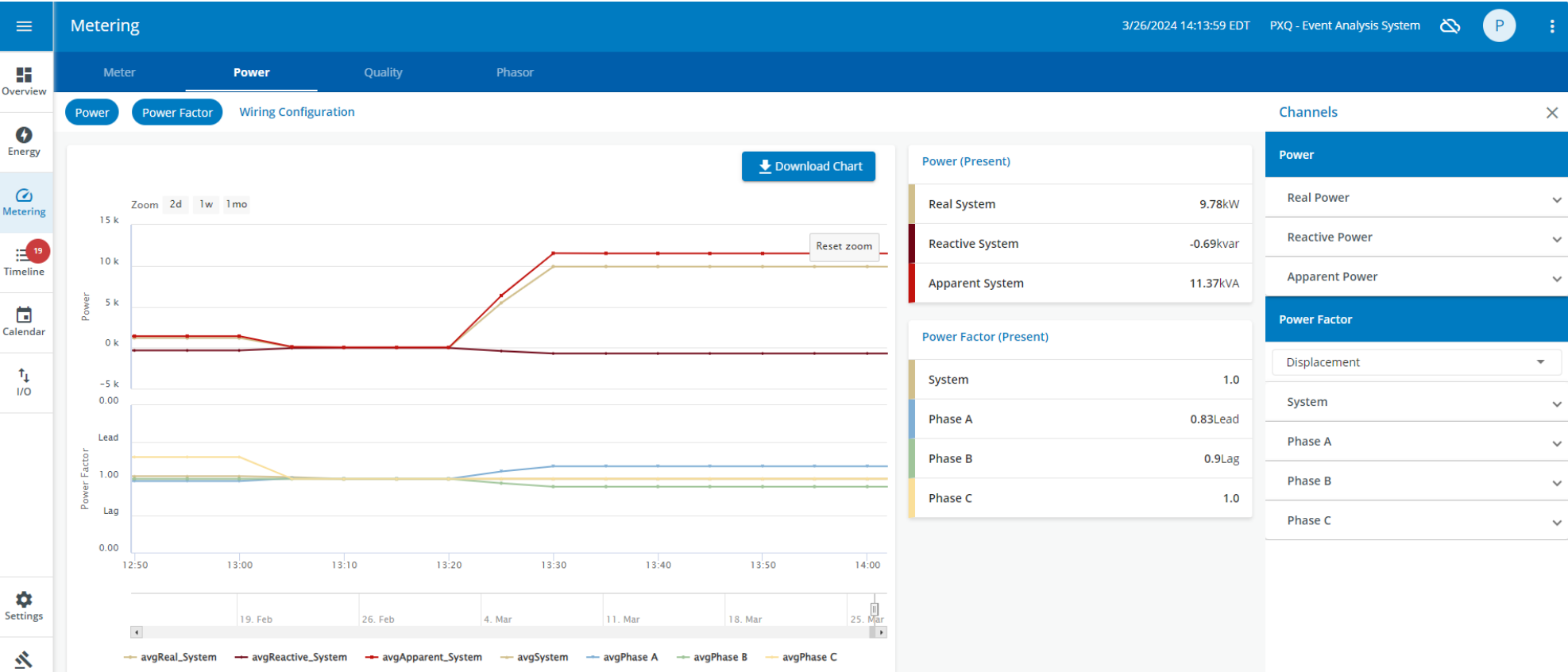


EV CHARGING WAVEFORMS
IEEE Central TN Presentation by Dan Carnovale, Eaton
02/06/25

Chevy Bolt





Ford Lightning

Metering

3/27/2024 07:57:47 EDT PXQ - Event Analysis System

Meter Power Quality Phasor

Voltage Current Wiring Configuration

Waveform

Zoom 1cycle 4cycles 16cycles 64cycles

Download Chart

AB

Phase A

0ms 5ms 10ms 15ms 20ms 25ms 30ms 35ms 40ms 45ms 50ms 55ms 60ms

AB Phase A

Channels

Voltage

Line-Line

AB BC CA

Current

Phase A Phase B Phase C Neutral

Current		
Even THD	0.127A	0.239%
Odd THD	1.372A	2.577%
Interharmonic	0.155A	0.292%
THD	1.378A	2.588%

Voltage

Line-Line

☒ AB

☐ BC

☐ CA

Current

☒ Phase A

☐ Phase B

☐ Phase C

☐ Neutral

Overview

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Metering

3/27/2024 08:01:28 EDT PXQ - Event Analysis System P

MeterPowerQualityPhasor

PowerPower FactorWiring Configuration

Download Chart

Zoom 2d1w1mo

Reset zoom

Power (Present)

Real System	9.36kW
Reactive System	-0.45kvar
Apparent System	10.84kVA

Power Factor (Present)

System	1.0
Phase A	0.89Lag
Phase B	1.0
Phase C	0.84Lead

Channels

Power

Real Power

Reactive Power

Apparent Power

Power Factor

Displacement

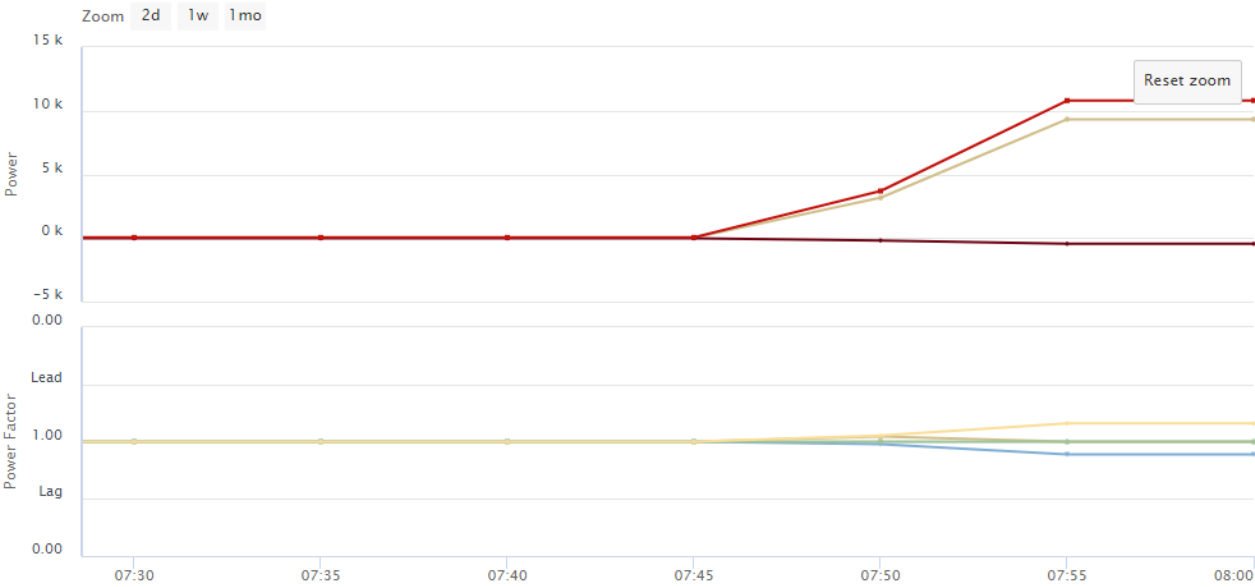
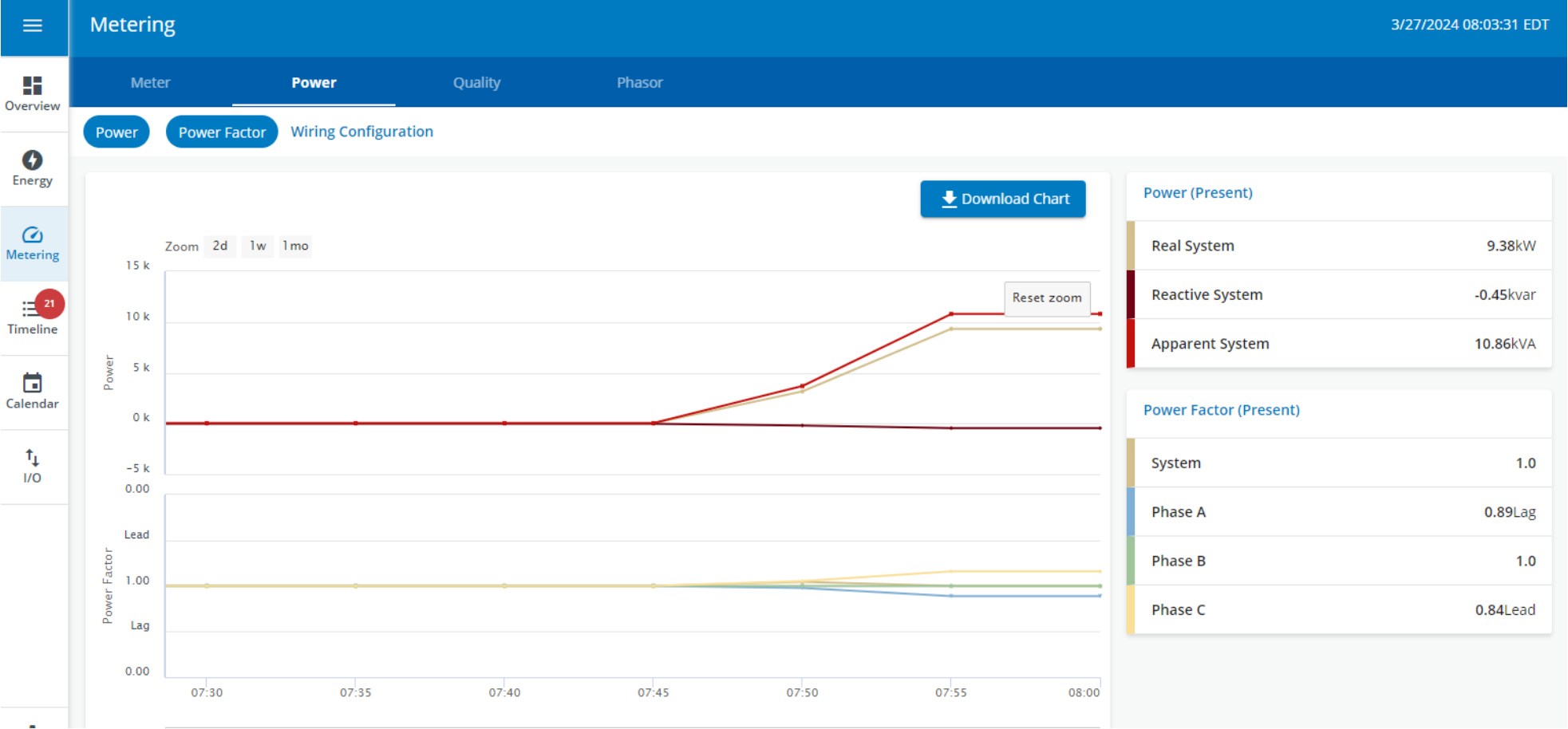
System

Phase A

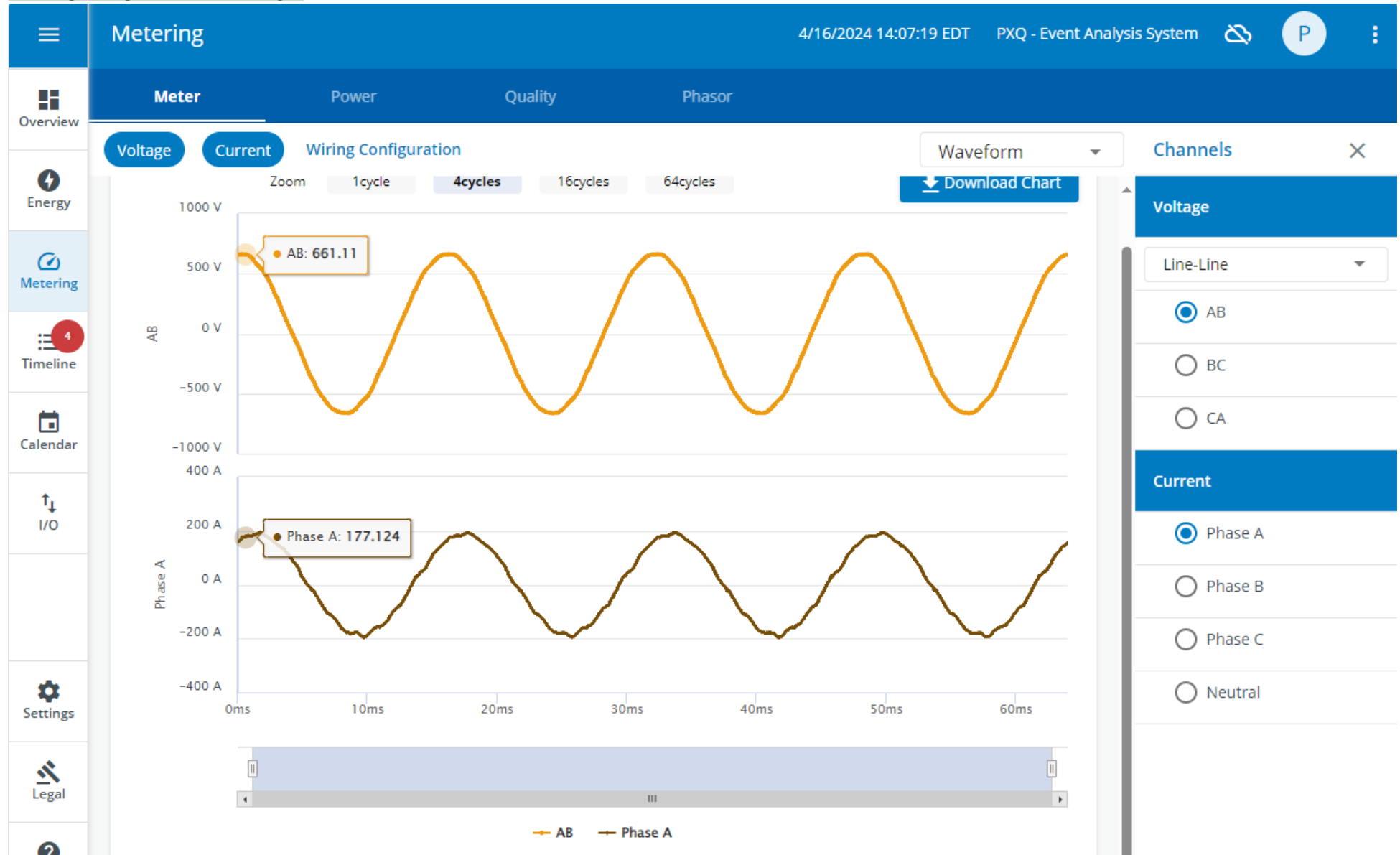
Phase B

Phase C

Ramp time for Ford Lightning

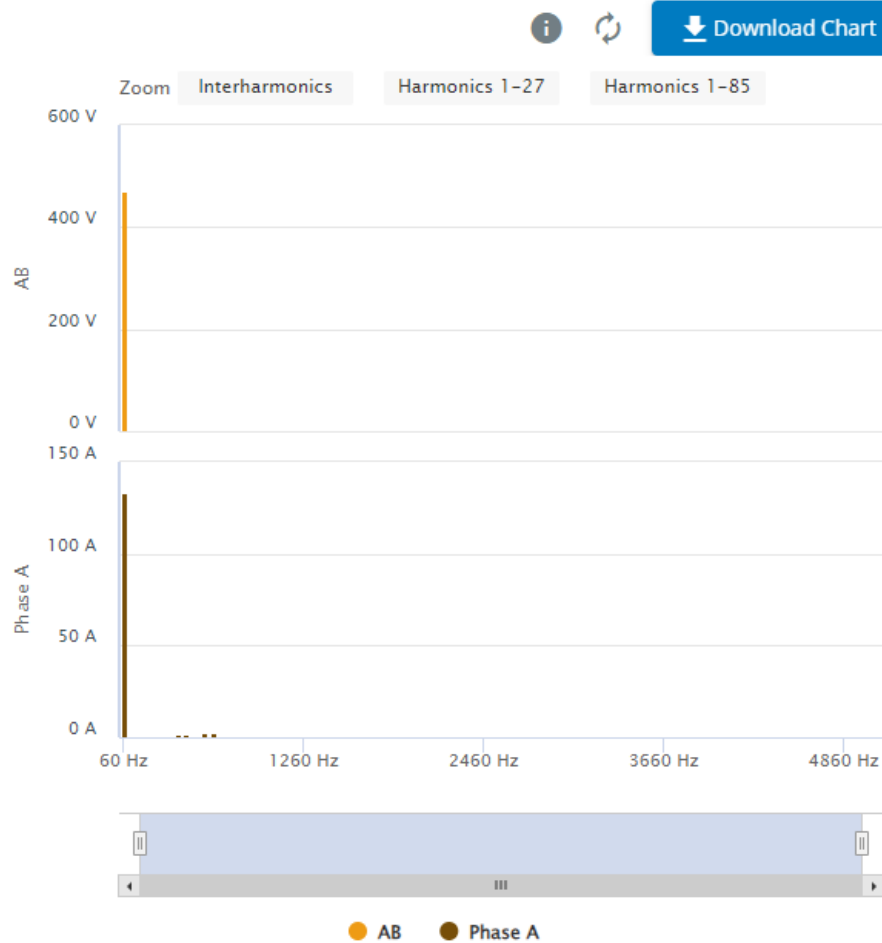


Ford Lightning on DC Fast Charger



Harmonics

Channels



Voltage

Even THD	2.333V	0.496%
Odd THD	5.162V	1.098%
Interharmonic	1.517V	0.323%
THD	5.665V	1.205%

Current

Even THD	2.656A	0.789%
Odd THD	3.838A	1.141%
Interharmonic	0.639A	0.190%
THD	4.667A	1.387%

Voltage

Line-Line

© AB



CA

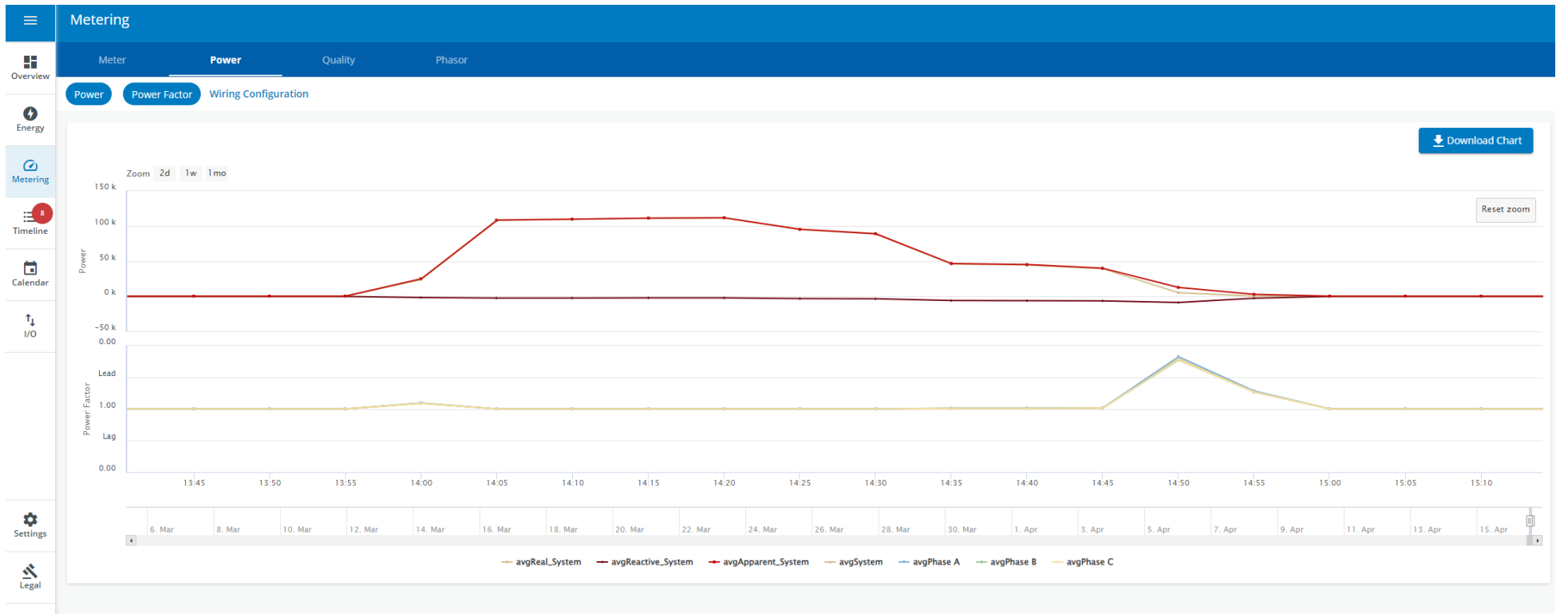
Current

Phase A

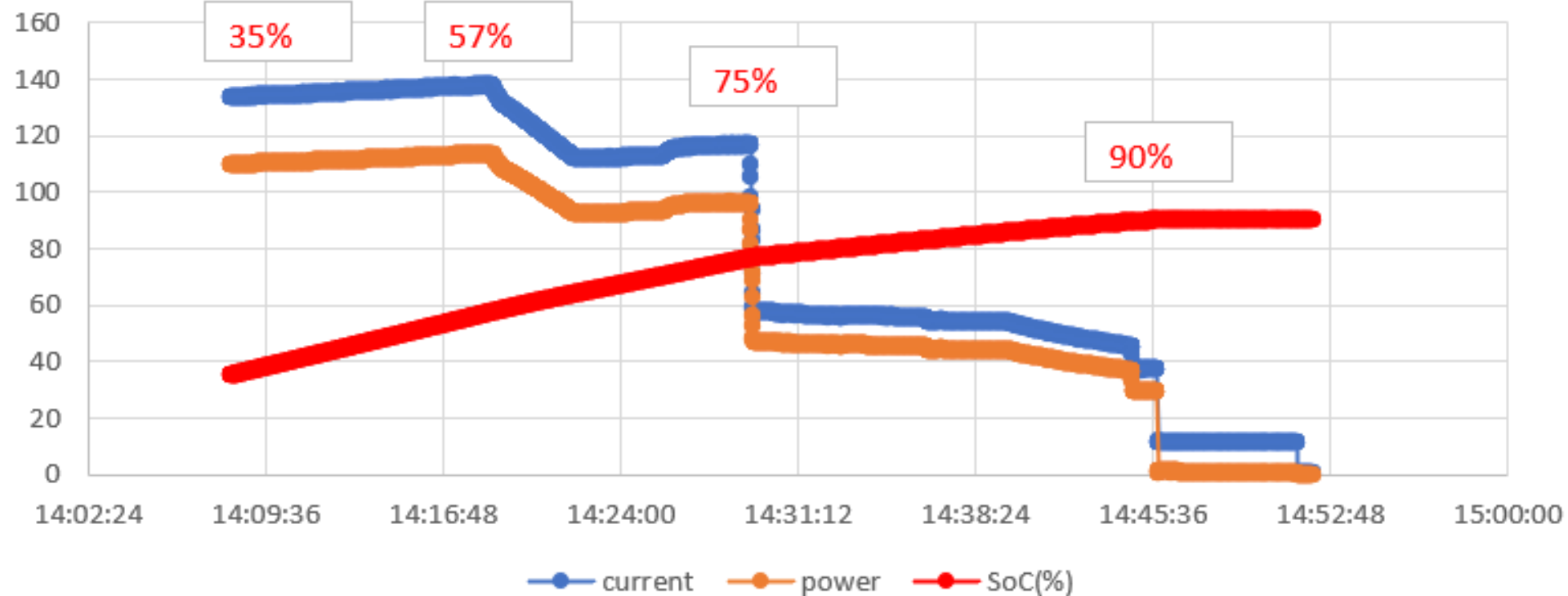
○ Phase B

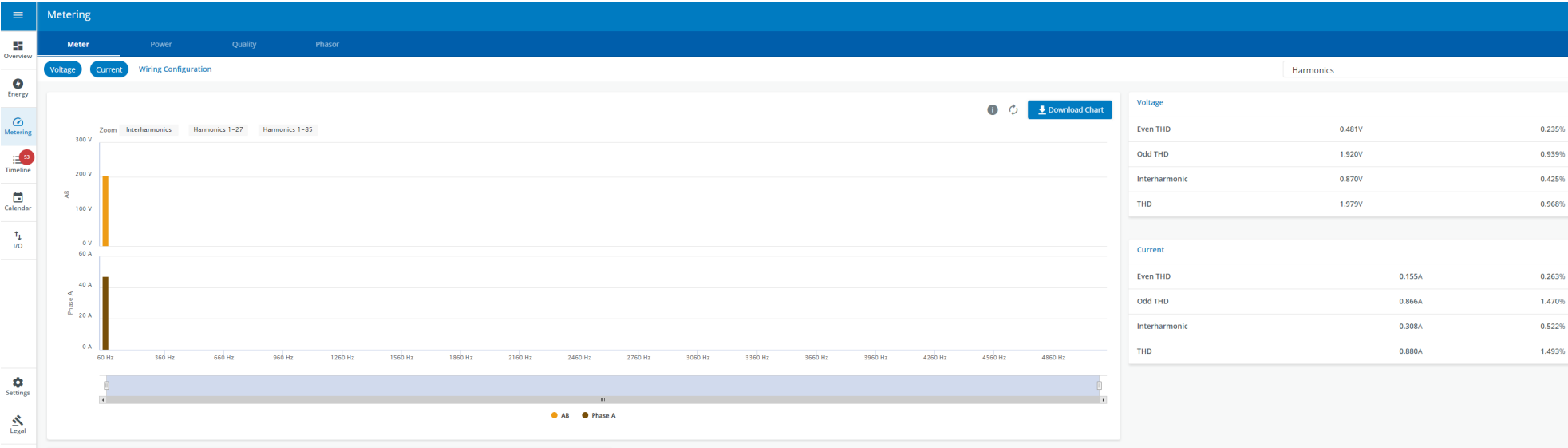
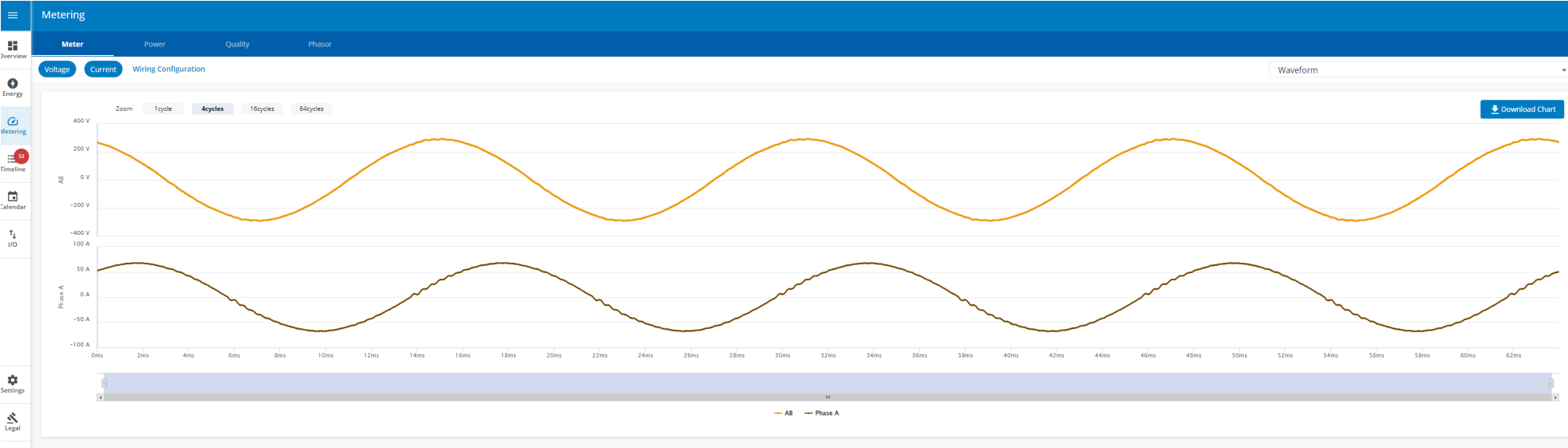
○ Phase C

☐ Neutral



Ford DC Charger





Voltage

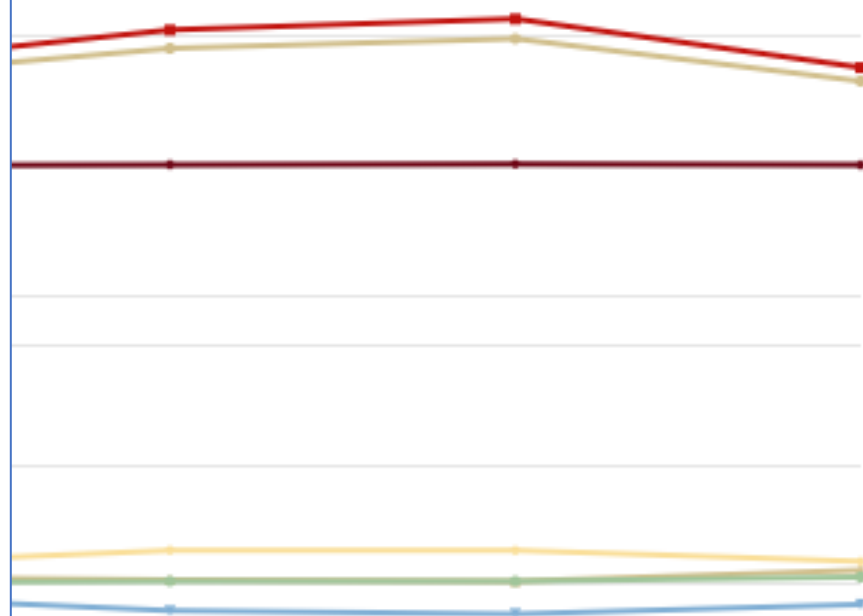
Even THD	0.481V	0.235%
Odd THD	1.920V	0.939%
Interharmonic	0.870V	0.425%
THD	1.979V	0.968%

Current

Even THD	0.155A	0.263%
Odd THD	0.866A	1.470%
Interharmonic	0.308A	0.522%
THD	0.880A	1.493%

Download Chart

Reset zoom



Power (Present)

Real System 9.34kW

Reactive System -0.45kvar

Apparent System 10.83kVA

Power Factor (Present)

System 1.0

Phase A 0.84Lead

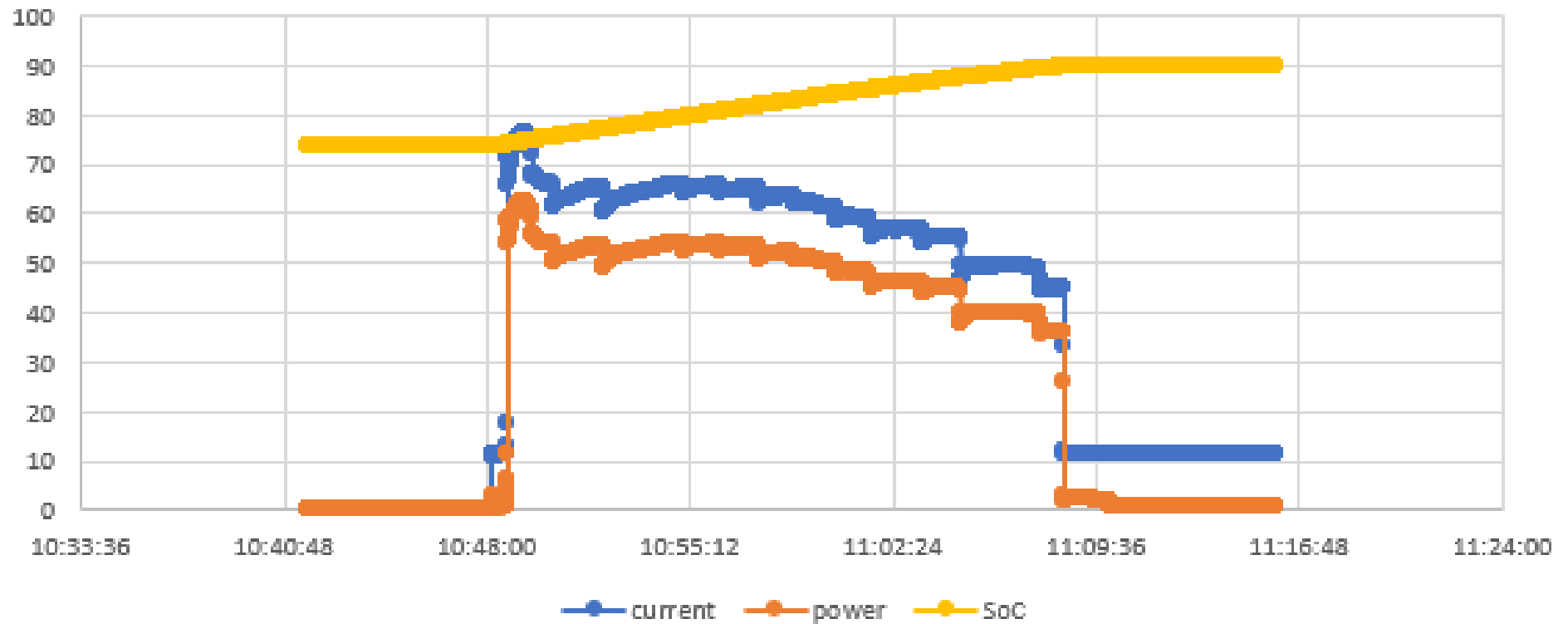
Phase B 0.88Lag

Phase C 1.0

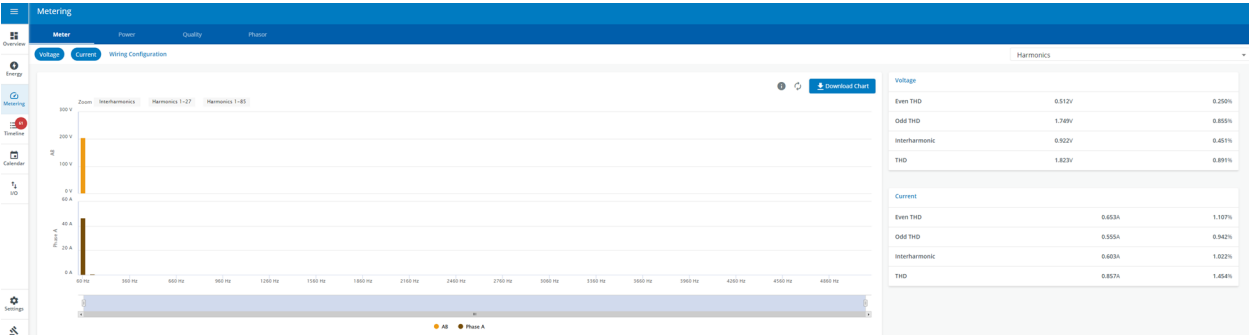
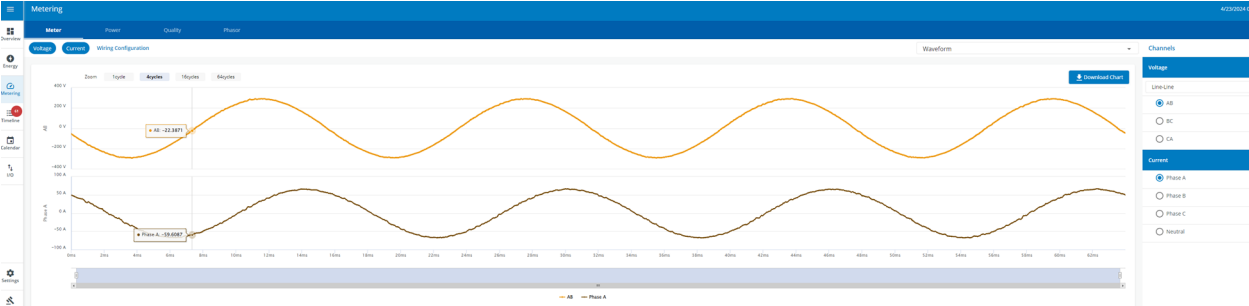




Polestar SoC[74-90]% 4/18, 22min



Rivian – R1T



Multiple EV's charging on DC fast charger

