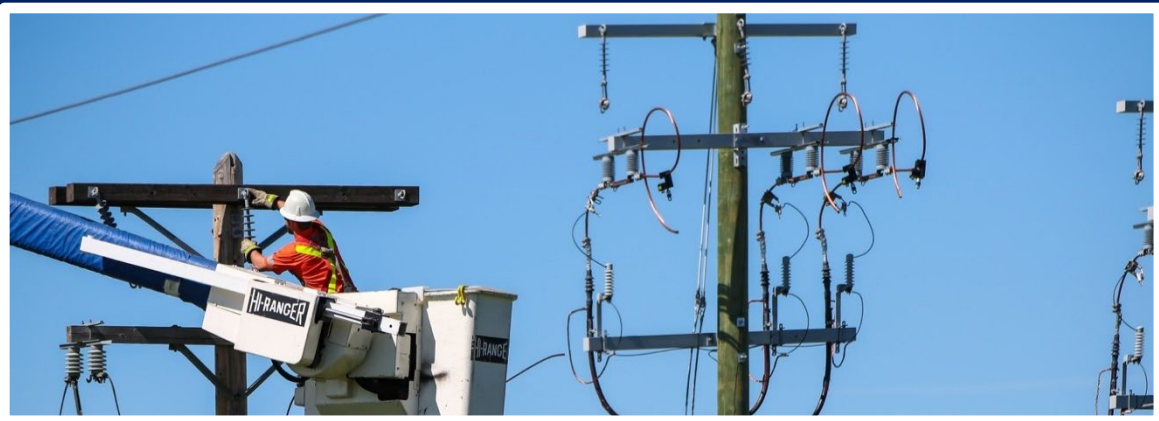


# DER PQ Compliance Report



**Customer Name: XYZ**  
**CRM#: 66000XXXX**  
**Report Date: July 5, 2022**  
**Prepared by: Mike Jones**  
**Approved by: John Smith**

# Introduction

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The purpose of this report is to present a summary and supporting data to confirm the DER facility meets FortisAlberta DER-02/PQ-SPEC-01 compliance requirements when connecting to the FortisAlberta distribution system.

## Customer Description

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XYZ (Site ID: 4000XXXXXXX, CRM#: 66000XXXX) at SWXX-XX-XX-X in the area of XXXS-XXLN is a DER customer with generation type **Solar** and a maximum power output of **15MW** with power factor of **0.92**.

### Monitored Devices and Installations

The power quality monitor equipment for the purpose of power quality benchmark report shall be installed at the PCC and conforming to IEC 61000-4-30 Class A measurement standards.

The monitoring device shall be installed and take the measurement on the primary side (25kV). It is recommended that the customer provide a single line diagram indicating the location of monitoring in their facility.

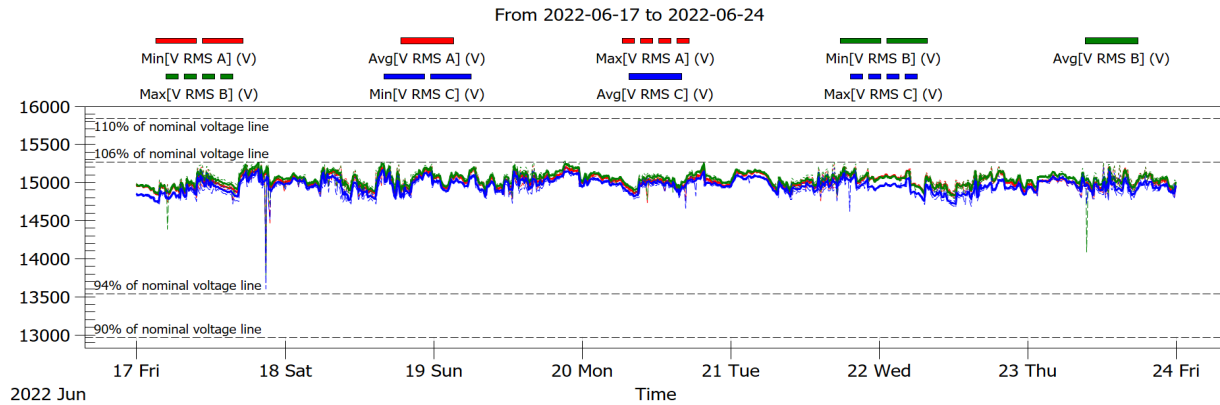
7 days of Compliance monitoring period (After Commissioning with normal generation): From **2022-06-17** to **2022-06-24**.

**[Insert facility SLD indicating location of monitoring]**

# Data Analysis and Graphs

## VRMS

### Voltage RMS graph



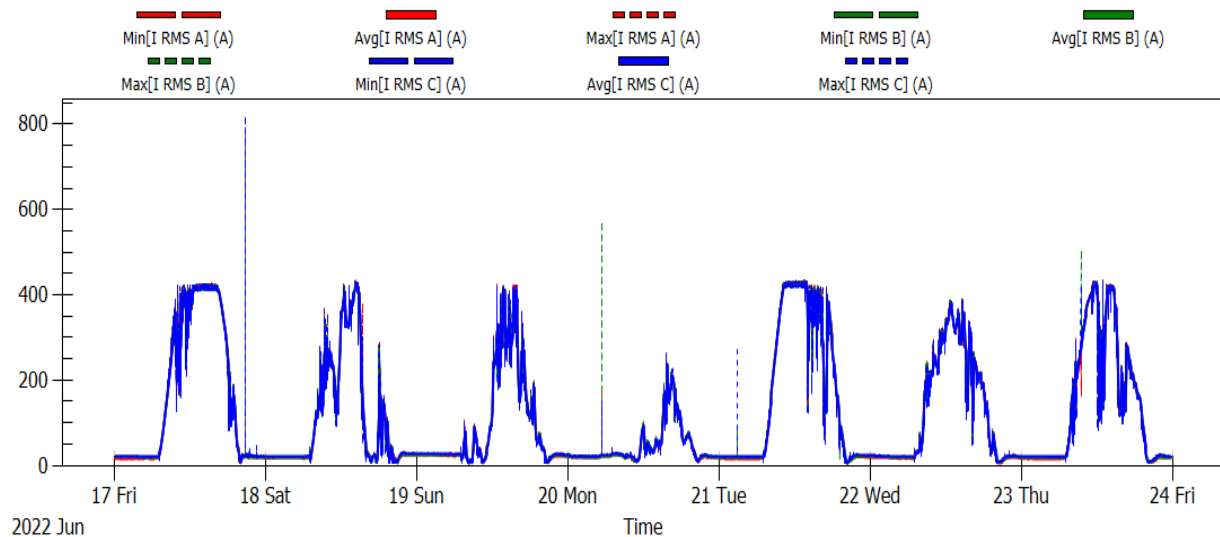
Note:  $V_{rms}$  95% weekly value should meet CSA C235 normal operating conditions.

Based on rms voltage graph/data, the average voltage statistical data shows the following:

5 <sup>th</sup> percentile	14855V
Average	15008V
95 <sup>th</sup> percentile	15149V

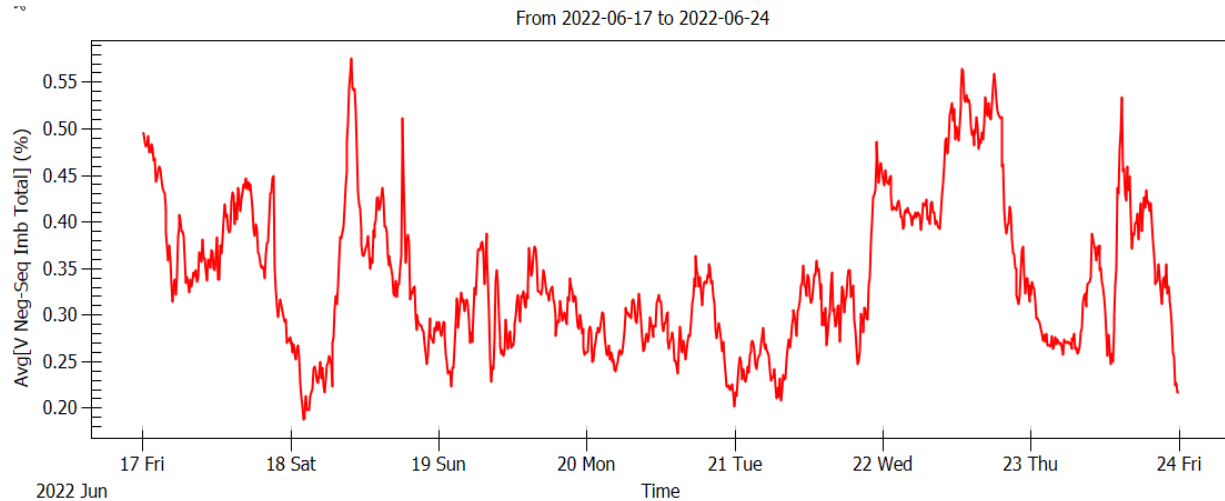
## IRMS

### Current RMS Graph



## Voltage Unbalance

### Voltage Unbalance Graph



*Note: Voltage unbalance (based on sequence components) should not exceed the limit of 3%.*

## Voltage THD and Individual Voltage Harmonics Summary

The voltage harmonics are represented as a percentage (%) of the fundamental (60Hz) voltage for each phase accordingly.

V Harmonic	Average (%)	Maximum (%)	CP 95 (%)	Compliant (Yes/No)
V THD A	0.9659567	1.826495	1.63391	<b>Yes</b>
V THD B	0.8172211	1.40502	1.253725	<b>Yes</b>
V THD C	0.8255258	1.503068	1.404232	<b>Yes</b>
V H2 A	0.02432364	0.068516394	0.038925585	<b>Yes</b>
V H2 B	0.025142286	0.069174703	0.045217065	<b>Yes</b>
V H2 C	0.030641248	0.07855111	0.055799743	<b>Yes</b>
V H3 A	0.299017121	0.349512875	0.333414325	<b>Yes</b>
V H3 B	0.244740226	0.344194733	0.310915985	<b>Yes</b>
V H3 C	0.270445391	0.358111859	0.321941873	<b>Yes</b>
V H4 A	0.031084776	0.132673792	0.062463663	<b>Yes</b>
V H4 B	0.038176912	0.115819953	0.070327647	<b>Yes</b>
V H4 C	0.036671043	0.106000335	0.069022404	<b>Yes</b>
V H5 A	0.732527566	1.640655112	1.389476582	<b>Yes</b>
V H5 B	0.564137285	1.207448517	0.999679062	<b>Yes</b>
V H5 C	0.521735715	1.239491172	1.062617702	<b>Yes</b>
V H6 A	0.017713179	0.105338705	0.038516103	<b>Yes</b>

V H6 B	0.019582071	0.05182706	0.032197768	<b>Yes</b>
V H6 C	0.012896609	0.08737879	0.023583456	<b>Yes</b>
V H7 A	0.365476774	0.944875851	0.698018567	<b>Yes</b>
V H7 B	0.397849794	0.845203144	0.677299585	<b>Yes</b>
V H7 C	0.416266487	1.036569074	0.845925082	<b>Yes</b>
V H8 A	0.016425307	0.041325333	0.028851953	<b>Yes</b>
V H8 B	0.029595939	0.062707593	0.046148656	<b>Yes</b>
V H8 C	0.029041575	0.063346255	0.048434441	<b>Yes</b>
V H9 A	0.133095461	0.222843358	0.179908698	<b>Yes</b>
V H9 B	0.089091946	0.190215962	0.133176774	<b>Yes</b>
V H9 C	0.167614105	0.357733179	0.306527821	<b>Yes</b>
V H10 A	0.017774251	0.035407485	0.025869816	<b>Yes</b>
V H10 B	0.024569567	0.059484163	0.039938027	<b>Yes</b>
V H10 C	0.02334206	0.061946852	0.034939978	<b>Yes</b>
V H11 A	0.2267902	0.88054198	0.557603745	<b>Yes</b>
V H11 B	0.182210343	0.685937572	0.484281738	<b>Yes</b>
V H11 C	0.195941668	0.724094048	0.464352963	<b>Yes</b>
V H12 A	0.010212187	0.023828303	0.012972104	<b>Yes</b>
V H12 B	0.009542151	0.016863264	0.01160597	<b>Yes</b>
V H12 C	0.008382123	0.020740323	0.011111397	<b>Yes</b>
V H13 A	0.089372418	0.205859506	0.174511342	<b>Yes</b>
V H13 B	0.085076464	0.214017584	0.150482066	<b>Yes</b>
V H13 C	0.072215028	0.185277552	0.133262718	<b>Yes</b>
V H14 A	0.006103	0.014961226	0.009001613	<b>Yes</b>
V H14 B	0.008828675	0.017167583	0.012929817	<b>Yes</b>
V H14 C	0.006374083	0.014254712	0.010026082	<b>Yes</b>
V H15 A	0.027331569	0.047345203	0.040303862	<b>Yes</b>
V H15 B	0.02874997	0.064660696	0.048412285	<b>Yes</b>
V H15 C	0.015940024	0.039970071	0.030830039	<b>Yes</b>
V H16 A	0.010677732	0.016874575	0.014375028	<b>Yes</b>
V H16 B	0.010230956	0.017480177	0.014616555	<b>Yes</b>
V H16 C	0.009199933	0.015252575	0.013017924	<b>Yes</b>
V H17 A	0.051033707	0.114786003	0.089938573	<b>Yes</b>
V H17 B	0.047894481	0.124414432	0.083249266	<b>Yes</b>
V H17 C	0.046221815	0.098923039	0.078910815	<b>Yes</b>
V H18 A	0.004154885	0.007896182	0.006222266	<b>Yes</b>
V H18 B	0.003888044	0.00681107	0.004893041	<b>Yes</b>
V H18 C	0.004377765	0.007899045	0.007101272	<b>Yes</b>
V H19 A	0.034391625	0.094895846	0.067810522	<b>Yes</b>
V H19 B	0.033770805	0.093925797	0.067125448	<b>Yes</b>

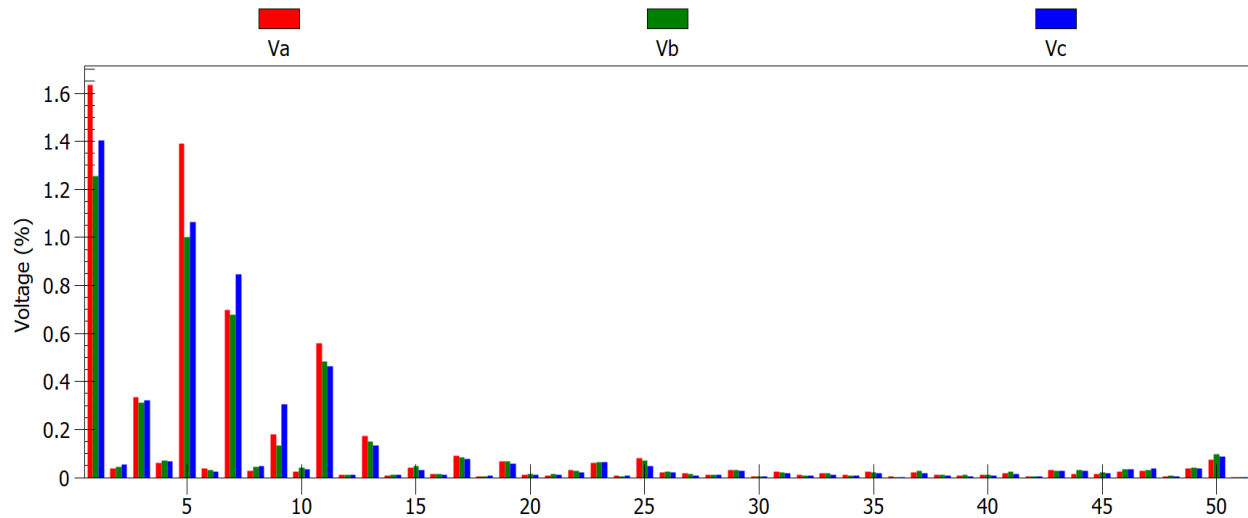
V H19 C	0.02821153	0.086261145	0.056789744	<b>Yes</b>
V H20 A	0.00695339	0.016728201	0.012933898	<b>Yes</b>
V H20 B	0.008278712	0.02087713	0.015456147	<b>Yes</b>
V H20 C	0.006060511	0.014189309	0.010816687	<b>Yes</b>
V H21 A	0.006229585	0.014420403	0.009645464	<b>Yes</b>
V H21 B	0.009184971	0.019217896	0.014666442	<b>Yes</b>
V H21 C	0.006721552	0.017188836	0.010636011	<b>Yes</b>
V H22 A	0.015570533	0.040586095	0.030899368	<b>Yes</b>
V H22 B	0.014178908	0.036488091	0.02893726	<b>Yes</b>
V H22 C	0.010671539	0.027816069	0.020719398	<b>Yes</b>
V H23 A	0.032041461	0.088167461	0.059442713	<b>Yes</b>
V H23 B	0.033805487	0.090609072	0.065008185	<b>Yes</b>
V H23 C	0.037218448	0.086059969	0.064548436	<b>Yes</b>
V H24 A	0.004283445	0.0130796	0.009060506	<b>Yes</b>
V H24 B	0.003161132	0.006596026	0.004335642	<b>Yes</b>
V H24 C	0.003837772	0.00945515	0.007617483	<b>Yes</b>
V H25 A	0.042261793	0.141709606	0.080587261	<b>Yes</b>
V H25 B	0.039125611	0.142544533	0.070803321	<b>Yes</b>
V H25 C	0.026243182	0.103300514	0.048460126	<b>Yes</b>
V H26 A	0.011884472	0.028853593	0.022923918	<b>Yes</b>
V H26 B	0.013671578	0.031098927	0.025577181	<b>Yes</b>
V H26 C	0.011282041	0.026433282	0.02147642	<b>Yes</b>
V H27 A	0.010821288	0.027950807	0.018705329	<b>Yes</b>
V H27 B	0.007909991	0.017432219	0.013351827	<b>Yes</b>
V H27 C	0.005489562	0.013657409	0.008864132	<b>Yes</b>
V H28 A	0.006803427	0.012499056	0.010804052	<b>Yes</b>
V H28 B	0.006725084	0.012958112	0.010932751	<b>Yes</b>
V H28 C	0.006397281	0.011959202	0.010190039	<b>Yes</b>
V H29 A	0.015884564	0.042588121	0.032110248	<b>Yes</b>
V H29 B	0.015714067	0.048921719	0.032774962	<b>Yes</b>
V H29 C	0.01376349	0.035597145	0.027108594	<b>Yes</b>
V H30 A	0.003077089	0.005551229	0.004179235	<b>Yes</b>
V H30 B	0.003278582	0.007679893	0.004521226	<b>Yes</b>
V H30 C	0.002561334	0.005751333	0.003892641	<b>Yes</b>
V H31 A	0.013019291	0.037043904	0.024530821	<b>Yes</b>
V H31 B	0.012133639	0.029071686	0.02253843	<b>Yes</b>
V H31 C	0.008958582	0.022363809	0.017977881	<b>Yes</b>
V H32 A	0.006877919	0.012706344	0.010457905	<b>Yes</b>
V H32 B	0.005115817	0.009903302	0.007841457	<b>Yes</b>
V H32 C	0.004613754	0.008811301	0.007271312	<b>Yes</b>

V H33 A	0.010985136	0.027479955	0.018543939	<b>Yes</b>
V H33 B	0.011683289	0.025989169	0.019745899	<b>Yes</b>
V H33 C	0.005820767	0.017027737	0.01094903	<b>Yes</b>
V H34 A	0.006732738	0.012340132	0.010035479	<b>Yes</b>
V H34 B	0.006553334	0.012401319	0.009740804	<b>Yes</b>
V H34 C	0.005376482	0.0096056	0.007840396	<b>Yes</b>
V H35 A	0.012624428	0.036815069	0.024769051	<b>Yes</b>
V H35 B	0.011488544	0.030767982	0.019974042	<b>Yes</b>
V H35 C	0.008959177	0.02257264	0.01666188	<b>Yes</b>
V H36 A	0.003071689	0.004690123	0.00384194	<b>Yes</b>
V H36 B	0.002158082	0.004169224	0.002978186	<b>Yes</b>
V H36 C	0.001769553	0.002592947	0.002100165	<b>Yes</b>
V H37 A	0.013630157	0.030165903	0.022232647	<b>Yes</b>
V H37 B	0.015204032	0.040608843	0.027343258	<b>Yes</b>
V H37 C	0.010543219	0.024984993	0.016826646	<b>Yes</b>
V H38 A	0.007277077	0.013409715	0.011382006	<b>Yes</b>
V H38 B	0.006871877	0.013843883	0.011595241	<b>Yes</b>
V H38 C	0.005831913	0.011208837	0.009599181	<b>Yes</b>
V H39 A	0.006395772	0.013892222	0.009871957	<b>Yes</b>
V H39 B	0.006067347	0.015020226	0.010286189	<b>Yes</b>
V H39 C	0.003024678	0.006538005	0.004578622	<b>Yes</b>
V H40 A	0.00738044	0.01384155	0.011297318	<b>Yes</b>
V H40 B	0.007691547	0.014035633	0.0112476	<b>Yes</b>
V H40 C	0.005835588	0.0105639	0.00839351	<b>Yes</b>
V H41 A	0.010025401	0.027890407	0.018951751	<b>Yes</b>
V H41 B	0.011914344	0.035697345	0.024710503	<b>Yes</b>
V H41 C	0.008427744	0.018602746	0.01464438	<b>Yes</b>
V H42 A	0.004016449	0.00611475	0.00494741	<b>Yes</b>
V H42 B	0.003238302	0.006201998	0.004707235	<b>Yes</b>
V H42 C	0.003005147	0.005724358	0.004358886	<b>Yes</b>
V H43 A	0.015744358	0.045525215	0.029941352	<b>Yes</b>
V H43 B	0.015717112	0.044455585	0.029592527	<b>Yes</b>
V H43 C	0.013586707	0.036103185	0.026459125	<b>Yes</b>
V H44 A	0.010124015	0.021594383	0.016149526	<b>Yes</b>
V H44 B	0.017103225	0.03919053	0.031564505	<b>Yes</b>
V H44 C	0.013820932	0.036015487	0.027615277	<b>Yes</b>
V H45 A	0.008170526	0.019183359	0.014337238	<b>Yes</b>
V H45 B	0.012257311	0.032036387	0.022113461	<b>Yes</b>
V H45 C	0.008460743	0.025279378	0.0175456	<b>Yes</b>
V H46 A	0.015356388	0.032183458	0.025784547	<b>Yes</b>

V H46 B	0.020389489	0.039170127	0.033373397	<b>Yes</b>
V H46 C	0.01995623	0.040446583	0.033026221	<b>Yes</b>
V H47 A	0.015035917	0.036277555	0.027178111	<b>Yes</b>
V H47 B	0.017706392	0.046095695	0.03108427	<b>Yes</b>
V H47 C	0.02154649	0.064342924	0.038990584	<b>Yes</b>
V H48 A	0.003902651	0.005798489	0.004941985	<b>Yes</b>
V H48 B	0.005015173	0.008573348	0.006868012	<b>Yes</b>
V H48 C	0.004712816	0.007714439	0.006350308	<b>Yes</b>
V H49 A	0.023838101	0.051185753	0.039484918	<b>Yes</b>
V H49 B	0.024801732	0.055327647	0.041354175	<b>Yes</b>
V H49 C	0.024382315	0.057920093	0.038964608	<b>Yes</b>
V H50 A	0.040732384	0.092567304	0.07401331	<b>Yes</b>
V H50 B	0.053027573	0.121593685	0.097759232	<b>Yes</b>
V H50 C	0.04738293	0.108837702	0.087096633	<b>Yes</b>

Note: Please refer to specific sections of the PQ-SPEC-01 for detailed compliance limits

### 95th Percentile VTHD and Individual Harmonic Spectrum Graph



### Voltage Interharmonics Summary

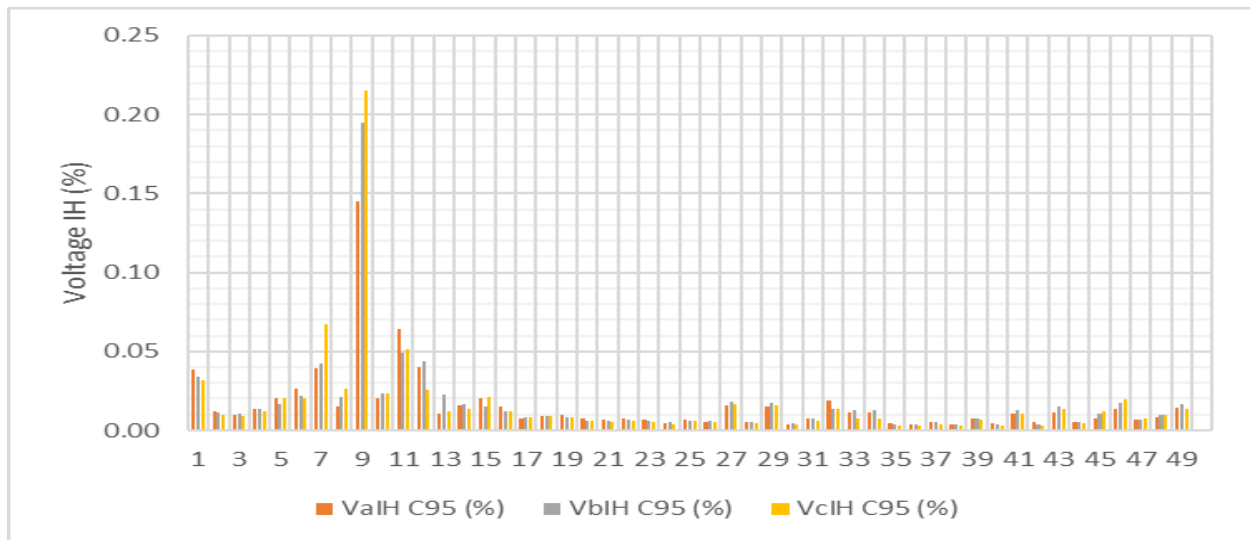
The voltage interharmonics are represented as a percentage (%) of the fundamental (60Hz) voltage for each phase accordingly.



IH Order	ValH avg (%)	ValH max (%)	ValH C95 (%)	VbIH avg (%)	VbIH max (%)	VbIH C95 (%)	VclH avg (%)	VclH max (%)	VclH C95 (%)
1	0.03	0.08	0.04	0.03	0.08	0.03	0.03	0.06	0.03
2	0.01	0.03	0.01	0.01	0.06	0.01	0.01	0.03	0.01
3	0.01	0.02	0.01	0.01	0.07	0.01	0.01	0.02	0.01
4	0.01	0.02	0.01	0.01	0.04	0.01	0.01	0.02	0.01
5	0.01	0.02	0.02	0.01	0.04	0.02	0.01	0.02	0.02
6	0.01	0.03	0.03	0.01	0.04	0.02	0.01	0.02	0.02
7	0.02	0.05	0.04	0.02	0.05	0.04	0.03	0.08	0.07
8	0.01	0.02	0.02	0.01	0.03	0.02	0.01	0.03	0.03
9	0.09	0.17	0.14	0.11	0.24	0.19	0.12	0.26	0.22
10	0.01	0.03	0.02	0.01	0.03	0.02	0.02	0.03	0.02
11	0.05	0.07	0.06	0.04	0.06	0.05	0.04	0.06	0.05
12	0.03	0.07	0.04	0.03	0.06	0.04	0.02	0.04	0.03
13	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.01	0.01
14	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.01
15	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.02	0.02
16	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
17	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
19	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
20	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01
21	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
22	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
23	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
24	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00
25	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
26	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00
27	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
28	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00
29	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
32	0.01	0.03	0.02	0.01	0.02	0.01	0.01	0.02	0.01
33	0.01	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.01
34	0.01	0.01	0.01	0.01	0.02	0.01	0.00	0.01	0.01
35	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
36	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
37	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00
38	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
39	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01

40	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
41	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01
42	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00
43	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01
44	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00
45	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
46	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02
47	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
48	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
49	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.01
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 95th Percentile Individual Voltage Interharmonic Spectrum Graph



### Current TDD and Individual Voltage Harmonics Summary

The current distortion and harmonics are based on CSA 22.3 No.9:20 standard.

I Harmonic	Average (%)	Maximum (%)	CP 95 (%)	Limit (%)	Compliant (Yes/No)
I TDD A	1.057067321	2.299106217	1.902450391	5	<b>Yes</b>
I TDD B	0.989903163	2.134262832	1.751606099	5	<b>Yes</b>
I TDD C	1.075705074	2.22690624	1.82206809	5	<b>Yes</b>
I H2 A	0.035938111	0.136992956	0.066437133	1	<b>Yes</b>
I H2 B	0.031437933	0.138347511	0.057023933	1	<b>Yes</b>
I H2 C	0.036103267	0.184373156	0.070280089	1	<b>Yes</b>

I H3 A	0.333539556	0.531996444	0.416300667	4	Yes
I H3 B	0.384503333	0.473682222	0.446219111	4	Yes
I H3 C	0.458839778	0.650712889	0.564222	4	Yes
I H4 A	0.037799444	0.1567386	0.070446178	1	Yes
I H4 B	0.034688956	0.143687533	0.065238267	1	Yes
I H4 C	0.037870378	0.154987889	0.076998244	1	Yes
I H5 A	0.692602222	1.571693333	1.373688444	4	Yes
I H5 B	0.545345111	1.337225111	1.132028889	4	Yes
I H5 C	0.655232	1.366056889	1.189266444	4	Yes
I H6 A	0.009622673	0.152114867	0.014661669	1	Yes
I H6 B	0.018116584	0.082217778	0.029349067	1	Yes
I H6 C	0.014498213	0.132965333	0.021125627	1	Yes
I H7 A	0.639597111	1.073819111	0.876806889	4	Yes
I H7 B	0.668398444	1.242791111	1.008941333	4	Yes
I H7 C	0.654638444	1.258856444	0.993206444	4	Yes
I H8 A	0.019512696	0.041159289	0.028126733	1	Yes
I H8 B	0.026673311	0.046256467	0.035784222	1	Yes
I H8 C	0.018396456	0.054605311	0.028465844	1	Yes
I H9 A	0.123778578	0.1867964	0.153578844	4	Yes
I H9 B	0.059998	0.132536467	0.095197244	4	Yes
I H9 C	0.050919578	0.112509578	0.0910856	4	Yes
I H10 A	0.017387173	0.036413889	0.0224384	1	Yes
I H10 B	0.022808333	0.058349756	0.035788778	1	Yes
I H10 C	0.019439004	0.051370756	0.027558356	1	Yes
I H11 A	0.280749111	1.052428667	0.822407111	2	Yes
I H11 B	0.232035111	0.831094222	0.655986222	2	Yes
I H11 C	0.242927333	0.901669556	0.700428889	2	Yes
I H12 A	0.00955022	0.031102244	0.013799642	0.5	Yes
I H12 B	0.012546071	0.033632756	0.017705502	0.5	Yes
I H12 C	0.010279344	0.029523689	0.014392678	0.5	Yes
I H13 A	0.075252133	0.271749333	0.169488222	2	Yes
I H13 B	0.098647244	0.356860222	0.243555333	2	Yes
I H13 C	0.098792911	0.290116667	0.206664356	2	Yes
I H14 A	0.007436027	0.023275067	0.011897878	0.5	Yes
I H14 B	0.008139993	0.017169942	0.012602802	0.5	Yes
I H14 C	0.006405409	0.022209707	0.009507811	0.5	Yes
I H15 A	0.01090326	0.022218702	0.01669324	2	Yes
I H15 B	0.018747529	0.045284844	0.032564244	2	Yes
I H15 C	0.012368018	0.046191933	0.024802778	2	Yes
I H16 A	0.008497596	0.016448927	0.013481689	0.5	Yes

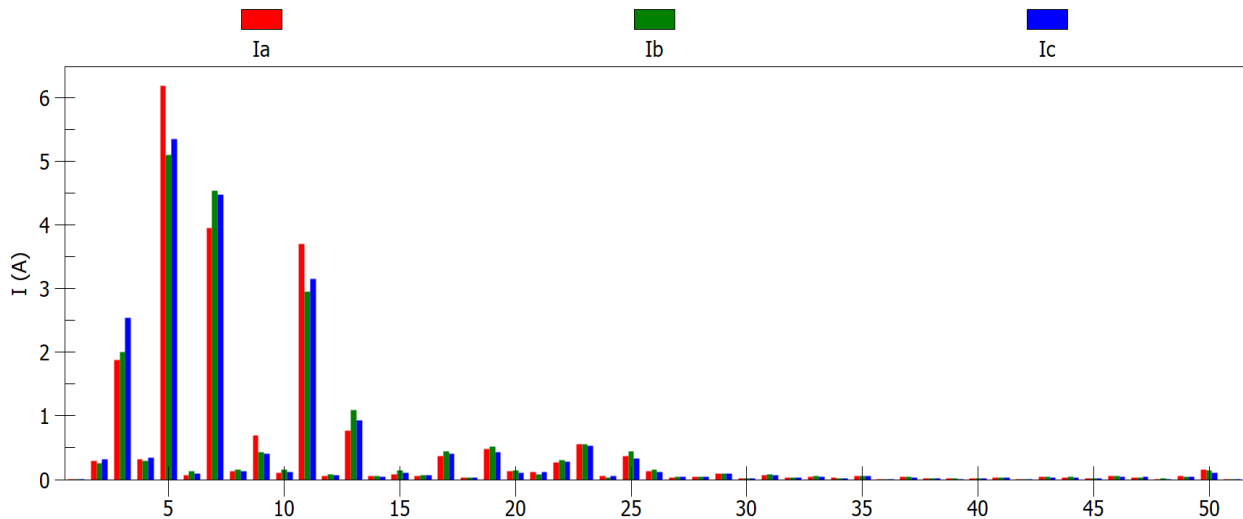
I H16 B	0.00918878	0.019534704	0.015599382	0.5	Yes
I H16 C	0.008922044	0.017688391	0.01495796	0.5	Yes
I H17 A	0.040702911	0.1075642	0.082473711	1.5	Yes
I H17 B	0.050588533	0.117353111	0.098635533	1.5	Yes
I H17 C	0.046018911	0.112037667	0.089668556	1.5	Yes
I H18 A	0.003801436	0.007861456	0.006148851	0.375	Yes
I H18 B	0.00384862	0.007370676	0.005586013	0.375	Yes
I H18 C	0.004075993	0.007796369	0.006524996	0.375	Yes
I H19 A	0.0591462	0.133230356	0.107711044	1.5	Yes
I H19 B	0.063287778	0.147282333	0.114555644	1.5	Yes
I H19 C	0.054373756	0.1362118	0.096880511	1.5	Yes
I H20 A	0.013991596	0.037875067	0.030441911	0.375	Yes
I H20 B	0.015204011	0.040529689	0.0311148	0.375	Yes
I H20 C	0.011645396	0.029905022	0.023210956	0.375	Yes
I H21 A	0.014014844	0.033547156	0.025305356	1.5	Yes
I H21 B	0.010544829	0.0228092	0.0179696	1.5	Yes
I H21 C	0.018799753	0.031977956	0.026011156	1.5	Yes
I H22 A	0.029870533	0.079224333	0.060868	0.375	Yes
I H22 B	0.0329354	0.084142578	0.067603	0.375	Yes
I H22 C	0.030745022	0.079699422	0.063023889	0.375	Yes
I H23 A	0.066325022	0.169107956	0.124355622	0.6	Yes
I H23 B	0.067049067	0.172927111	0.123593333	0.6	Yes
I H23 C	0.066377067	0.169971178	0.117331111	0.6	Yes
I H24 A	0.005554851	0.020112087	0.01362864	0.15	Yes
I H24 B	0.004887907	0.013010298	0.007903191	0.15	Yes
I H24 C	0.00605194	0.015949233	0.012287478	0.15	Yes
I H25 A	0.040270822	0.131589911	0.081338378	0.6	Yes
I H25 B	0.050500444	0.156275	0.099621356	0.6	Yes
I H25 C	0.037517	0.127617689	0.0748762	0.6	Yes
I H26 A	0.014860727	0.037078422	0.0294216	0.15	Yes
I H26 B	0.017259704	0.041860756	0.033766933	0.15	Yes
I H26 C	0.013737287	0.032717244	0.026107422	0.15	Yes
I H27 A	0.004674733	0.011890949	0.007498171	0.6	Yes
I H27 B	0.005078627	0.010613316	0.008646578	0.6	Yes
I H27 C	0.006043476	0.014033362	0.010268049	0.6	Yes
I H28 A	0.005793778	0.011891871	0.009761571	0.15	Yes
I H28 B	0.006248569	0.013012971	0.010800258	0.15	Yes
I H28 C	0.005468978	0.01103696	0.00915282	0.15	Yes
I H29 A	0.010749671	0.031943711	0.01995872	0.6	Yes
I H29 B	0.012452636	0.033499	0.021422902	0.6	Yes

I H29 C	0.010940142	0.026581578	0.020744793	0.6	Yes
I H30 A	0.00255796	0.004104973	0.003116724	0.15	Yes
I H30 B	0.002806051	0.005100187	0.003713687	0.15	Yes
I H30 C	0.002711658	0.004654238	0.003807138	0.15	Yes
I H31 A	0.008481116	0.022655956	0.015796389	0.6	Yes
I H31 B	0.008506969	0.0246048	0.0190685	0.6	Yes
I H31 C	0.007662424	0.020618676	0.014478953	0.6	Yes
I H32 A	0.004552724	0.00790462	0.006671987	0.15	Yes
I H32 B	0.004579533	0.009156387	0.006628951	0.15	Yes
I H32 C	0.004403471	0.007159202	0.006139113	0.15	Yes
I H33 A	0.005610936	0.017576224	0.010481076	0.6	Yes
I H33 B	0.005918329	0.017393582	0.011994953	0.6	Yes
I H33 C	0.005185669	0.014495798	0.009834149	0.6	Yes
I H34 A	0.004217378	0.007625636	0.006028407	0.15	Yes
I H34 B	0.003746527	0.006484098	0.005204164	0.15	Yes
I H34 C	0.003825304	0.006408	0.00527044	0.15	Yes
I H35 A	0.006782304	0.018247673	0.012283831	0.3	Yes
I H35 B	0.006522002	0.017544267	0.012634698	0.3	Yes
I H35 C	0.006174464	0.016854444	0.011269044	0.3	Yes
I H36 A	0.002188478	0.003153469	0.002508351	0.075	Yes
I H36 B	0.002189528	0.004505098	0.00273562	0.075	Yes
I H36 C	0.002182028	0.003236536	0.002700493	0.075	Yes
I H37 A	0.005271571	0.011421313	0.008466653	0.3	Yes
I H37 B	0.005147818	0.01235376	0.008999218	0.3	Yes
I H37 C	0.004523842	0.010640749	0.00756702	0.3	Yes
I H38 A	0.003811293	0.006440507	0.005429249	0.075	Yes
I H38 B	0.003629322	0.006097736	0.005051804	0.075	Yes
I H38 C	0.003481896	0.005941013	0.00484036	0.075	Yes
I H39 A	0.00252652	0.004468591	0.003168878	0.3	Yes
I H39 B	0.002290556	0.004340862	0.002849198	0.3	Yes
I H39 C	0.002210039	0.003442384	0.002677829	0.3	Yes
I H40 A	0.00332928	0.005967638	0.00466264	0.075	Yes
I H40 B	0.003395171	0.005872233	0.004781493	0.075	Yes
I H40 C	0.003303593	0.005475371	0.004457062	0.075	Yes
I H41 A	0.004231264	0.009373202	0.007098158	0.3	Yes
I H41 B	0.004040987	0.009334851	0.006853596	0.3	Yes
I H41 C	0.003492698	0.007604733	0.005686044	0.3	Yes
I H42 A	0.002165174	0.002897787	0.002484304	0.075	Yes
I H42 B	0.002167234	0.004521482	0.002595136	0.075	Yes
I H42 C	0.002182348	0.003368822	0.002675384	0.075	Yes

I H43 A	0.005010491	0.013833078	0.0096113	0.3	Yes
I H43 B	0.004901573	0.011437498	0.008610331	0.3	Yes
I H43 C	0.004282351	0.01104404	0.008082742	0.3	Yes
I H44 A	0.004729193	0.009263911	0.007511293	0.075	Yes
I H44 B	0.005163411	0.010761367	0.008706142	0.075	Yes
I H44 C	0.004474331	0.009217647	0.007299424	0.075	Yes
I H45 A	0.00291014	0.005218109	0.004276178	0.3	Yes
I H45 B	0.003398207	0.006586042	0.005531071	0.3	Yes
I H45 C	0.003090716	0.00628154	0.004815098	0.3	Yes
I H46 A	0.007850213	0.016764567	0.013405347	0.075	Yes
I H46 B	0.00690806	0.01459474	0.011603393	0.075	Yes
I H46 C	0.006108051	0.012410953	0.009996618	0.075	Yes
I H47 A	0.004560371	0.010113607	0.007430516	0.3	Yes
I H47 B	0.004622189	0.01117832	0.007911207	0.3	Yes
I H47 C	0.005099502	0.012232347	0.008737229	0.3	Yes
I H48 A	0.002264276	0.00313804	0.002599462	0.075	Yes
I H48 B	0.002303504	0.004234047	0.002813196	0.075	Yes
I H48 C	0.00229072	0.003335278	0.002714369	0.075	Yes
I H49 A	0.007233024	0.014094847	0.011178807	0.3	Yes
I H49 B	0.005531016	0.013753604	0.008930789	0.3	Yes
I H49 C	0.006169104	0.01261428	0.009779284	0.3	Yes
I H50 A	0.018653898	0.041370667	0.033631356	0.075	Yes
I H50 B	0.016997353	0.037878844	0.030676622	0.075	Yes
I H50 C	0.013314738	0.030106911	0.023953689	0.075	Yes

Note: Please refer to specific sections of the PQ-SPEC-01 for detailed compliance limits

### 95th Percentile ITHD and Individual Harmonic Spectrum Graph



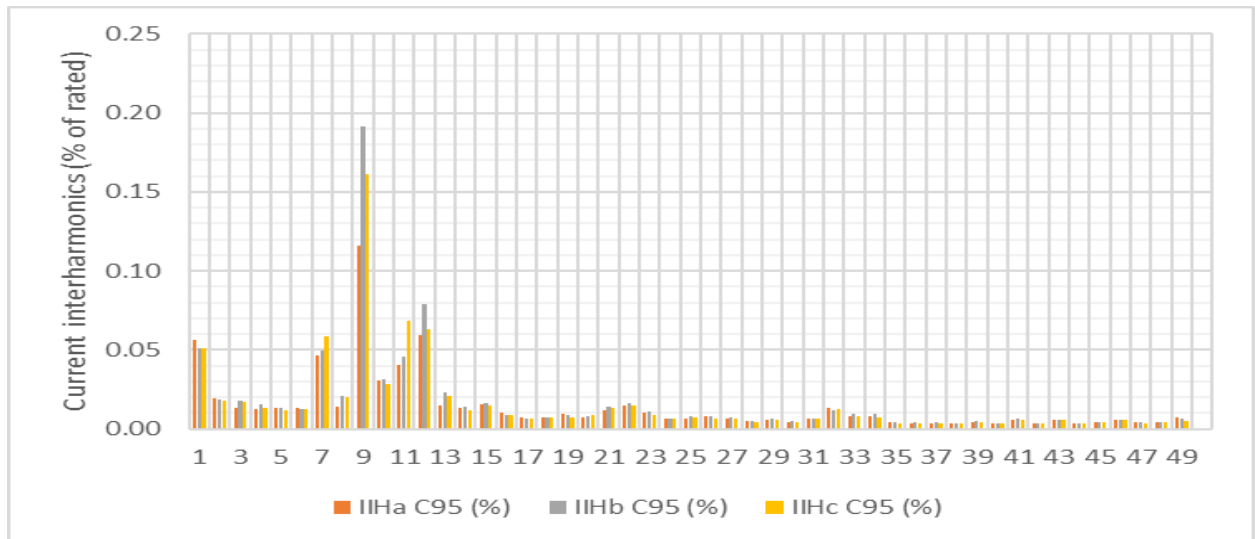
## Current Interharmonics Summary

All current interharmonics are a percentage of the rated current or 95 percentiles of the current during the monitoring period.

IH order	IaIH avg (%)	IaIH max (%)	IaIH C95 (%)	IbIH avg (%)	IbIH max (%)	IbIH C95 (%)	IcIH avg (%)	IcIH max (%)	IcIH C95 (%)
1	0.03	0.48	0.06	0.03	0.47	0.05	0.03	0.35	0.05
2	0.01	0.11	0.02	0.01	0.20	0.02	0.01	0.12	0.02
3	0.01	0.04	0.01	0.01	0.15	0.02	0.01	0.06	0.02
4	0.01	0.02	0.01	0.01	0.09	0.02	0.01	0.04	0.01
5	0.01	0.02	0.01	0.01	0.07	0.01	0.01	0.03	0.01
6	0.01	0.02	0.01	0.01	0.06	0.01	0.01	0.03	0.01
7	0.03	0.06	0.05	0.03	0.07	0.05	0.03	0.07	0.06
8	0.01	0.02	0.01	0.01	0.04	0.02	0.01	0.02	0.02
9	0.09	0.15	0.12	0.12	0.24	0.19	0.11	0.21	0.16
10	0.02	0.06	0.03	0.02	0.06	0.03	0.02	0.05	0.03
11	0.03	0.06	0.04	0.03	0.08	0.05	0.05	0.10	0.07
12	0.04	0.12	0.06	0.05	0.16	0.08	0.04	0.13	0.06
13	0.01	0.02	0.01	0.02	0.03	0.02	0.02	0.02	0.02
14	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01
15	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.01
16	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
17	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
19	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
20	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
21	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01
22	0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.02
23	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01
24	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
25	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
26	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
27	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
28	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00
29	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
30	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
31	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
32	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01
33	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
34	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01

35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
46	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01
47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01

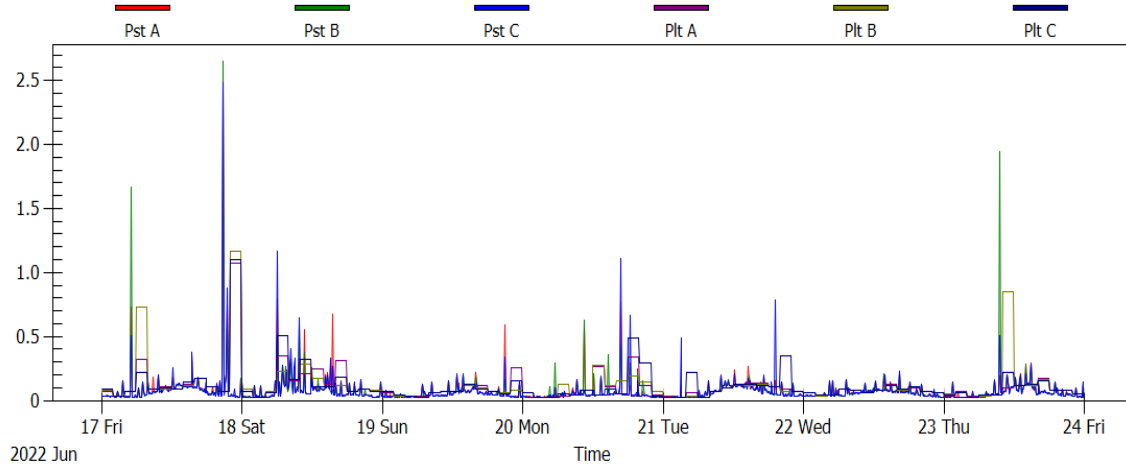
**95th Percentile Individual Current Interharmonic Spectrum Graph**





## Voltage Flicker ( $P_{st}$ , $P_{It}$ )

### $P_{st}/P_{It}$ Graph



The 95<sup>th</sup> percentile value of  $P_{st}$  is **0.16**.

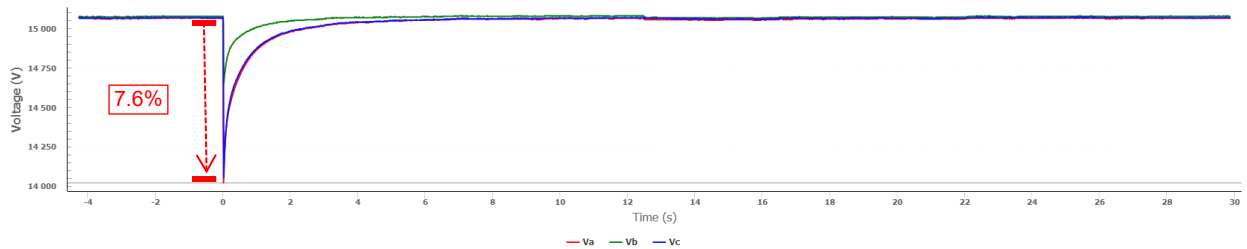
The 95<sup>th</sup> percentile value of  $P_{It}$  is **0.31**.

*Note: The 95<sup>th</sup> percentile values of  $P_{st}$  and  $P_{It}$  should be below the standard limit of PQ-SPEC-01.*

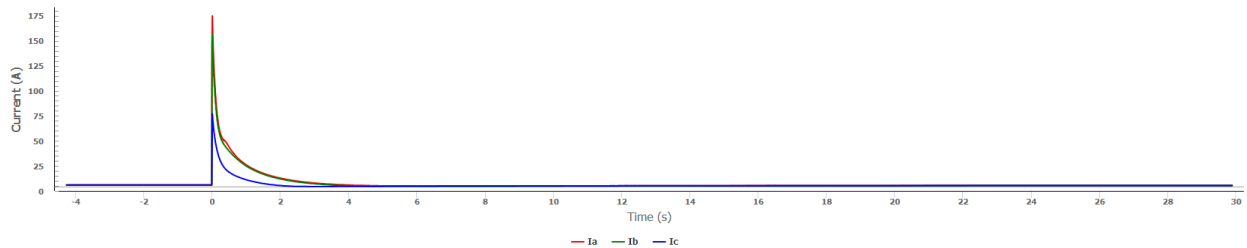
## RVC (Rapid Voltage Change)

### Single transformer energization

#### Voltage RMS Graph



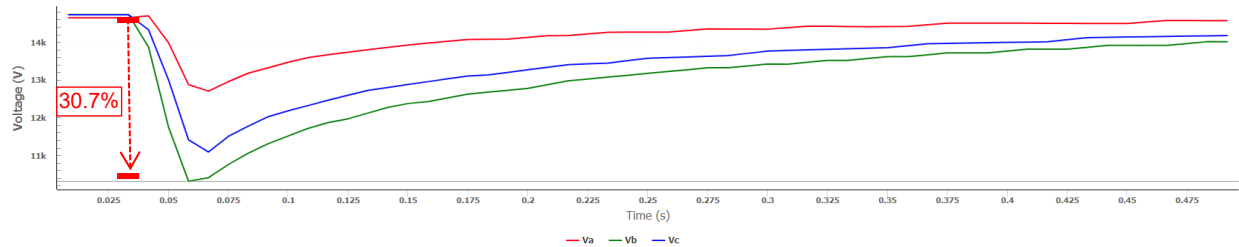
#### Current RMS Graph



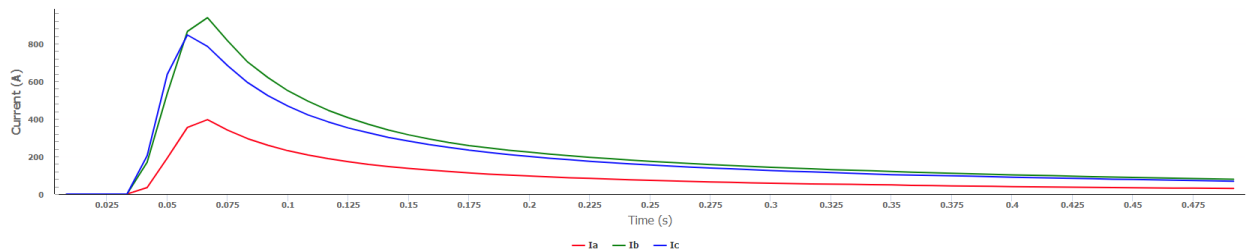
The RVC of single transformer energization (**3.6MVA**) results in **7.6%**.

### All transformer energization

#### Voltage RMS Graph



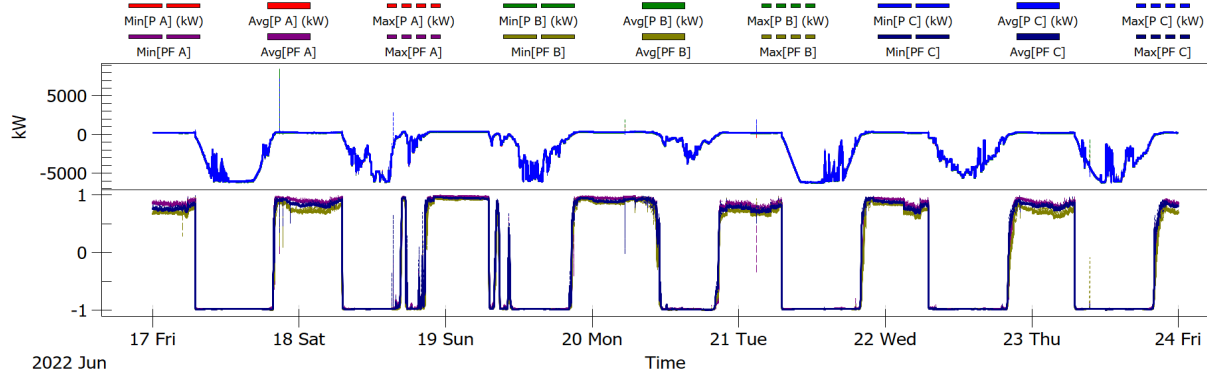
#### Current RMS Graph



The RVC of all transformer energization (**5 x 3.6MVA**) simultaneously results in **30.7%**. All transformers will be energized at once during facility maintenance, twice a year.

### Power and Power Factor

#### Power and Power Factor Graph



The real power on each phase varies between **400kW (load)** and **-6000kW (generation)** during the monitoring period, with power factor varying between **0.95** and **-0.98**.

*Note: The Power Factor setting should be the same as the agreed operating power factor during generation periods.*

# Summary of the Measurement Results

The summary of power quality compliance assessments are shown below assessment period between **2022-06-17** and **2022-06-24**. Detailed data and charts are presented in following sections for PQ indices that are identified to be not in compliance with the specification.

Assessments	Compliant (Yes/No)
Voltage THD and Individual Harmonics	<b>Yes</b>
Current THD and Individual Harmonics	<b>Yes</b>
Voltage Flicker ( $P_{st}$ and $P_{lt}$ )	<b>Yes</b>
RVC (infrequent)	<b>No</b>

*Note: Please refer to specific sections of the PQ-SPEC-01 for detailed compliance limits*

## Additional Comments

Due to the causes of RVC is infrequent in nature, twice a year due to maintenance purposes, the limit RVC limit 3% would not apply.

However, with the infrequent RVC requirement from distribution facility owner FortisAlberta, the infrequent RVC of 30% is too excessive for the 25kV system, so each transformer must be energized one at a time, not together at the same time. DER owner has acknowledged and will mitigate by adopting the single transformer switching philosophy going forward during maintenance or other unforeseen activities that is infrequent in nature.

## Provided by:

**John Smith / XYZ**

Power Producer or Engineering Consultant (name / company)

**Electrical Engineer**

Title (P.Eng Required)

*John Smith*

Signature

**July 13, 2022**

Date

**Power Quality report to be reviewed by engineering, customer/consultant shall be contacted directly if any questions regarding the content.**