



# EIFS 2023:3

Site name: Wind Farm Kv J 10kV  
Meter serial no: 22100000  
Period start: 2018-06-01 00:00:00  
Period end: 2018-08-01 00:00:00  
Nominal voltage: 10,60kV  
Version: 24.0

## Summary

|                      |             |
|----------------------|-------------|
| Unbalance            | Passed      |
| Voltage variations   | Passed      |
| THD                  | Passed      |
| PLT                  | Passed      |
| Individual harmonics | Passed      |
| Voltage dips         | Failed      |
| Voltage swells       | Informative |
| RVC                  | Passed      |
| Interruptions        | Informative |



## Table of contents

|           |                                            |           |
|-----------|--------------------------------------------|-----------|
| <b>1.</b> | <b><i>Voltage unbalance</i></b>            | <b>3</b>  |
| <b>2.</b> | <b><i>Voltage variation</i></b>            | <b>4</b>  |
| <b>3.</b> | <b><i>THD analysis</i></b>                 | <b>5</b>  |
| <b>4.</b> | <b><i>PLT analysis</i></b>                 | <b>6</b>  |
| <b>5.</b> | <b><i>Individual harmonic analysis</i></b> | <b>7</b>  |
| <b>6.</b> | <b><i>Voltage dips</i></b>                 | <b>8</b>  |
| <b>7.</b> | <b><i>Voltage swells</i></b>               | <b>9</b>  |
| <b>8.</b> | <b><i>Rapid voltage changes</i></b>        | <b>10</b> |
| <b>9.</b> | <b><i>Long and short interruptions</i></b> | <b>11</b> |

## 1 Voltage unbalance

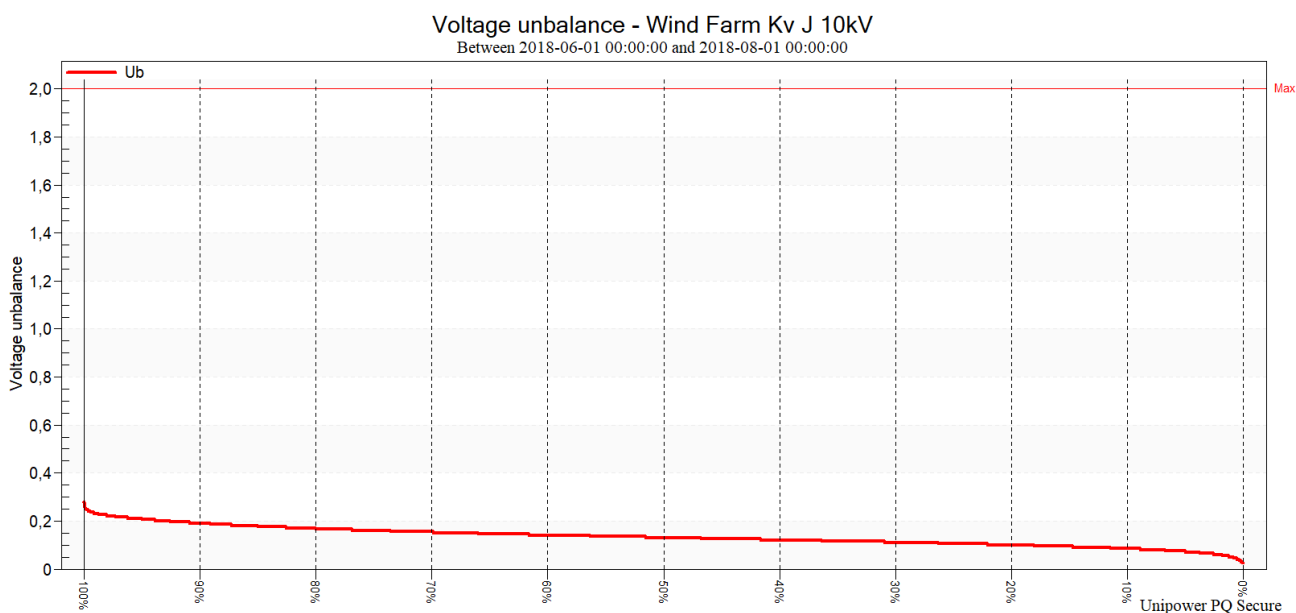
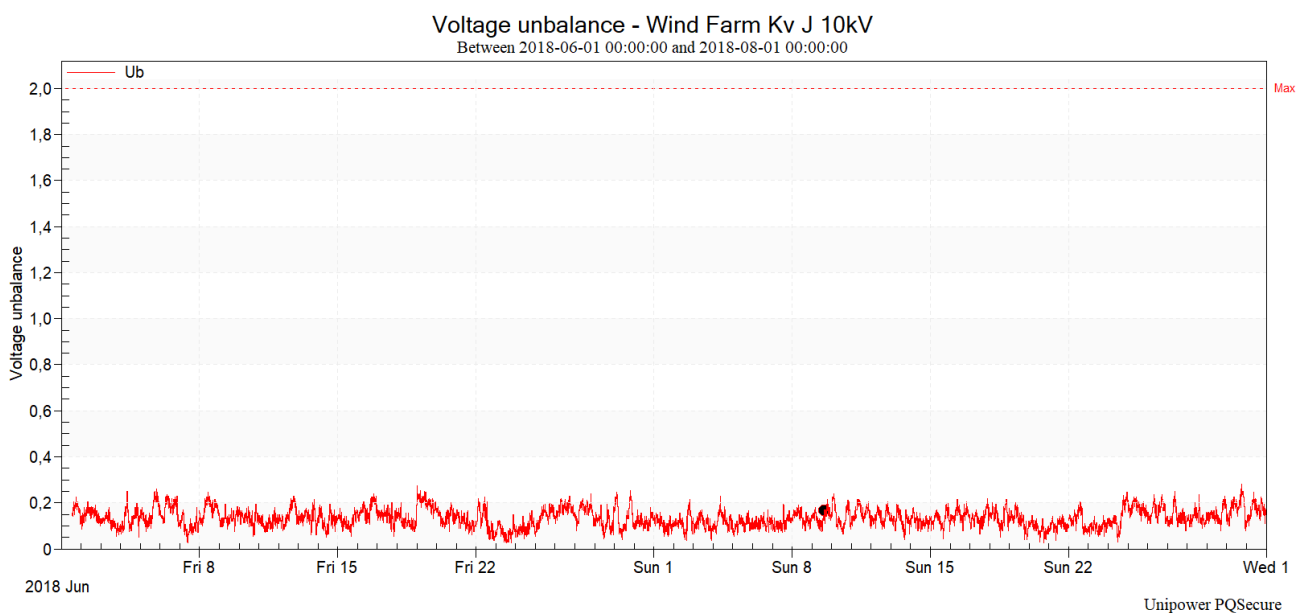
The voltage unbalance is assessed according to EIFS 2023:3 section 7.7.

All 10m values of the voltage asymmetry, measured as negative sequence asymmetry, shall be  $\leq 2\%$ .

Max 2,00% during 100% of time.

| Phase | Within limit [%] | Max [%] | Min [%] | 95% [%] | Result |
|-------|------------------|---------|---------|---------|--------|
| Ub    | 100              | 0,280   | 0,025   | 0,205   | Passed |

Excluded 34 flagged value(s) in the result



## 2 Voltage variation

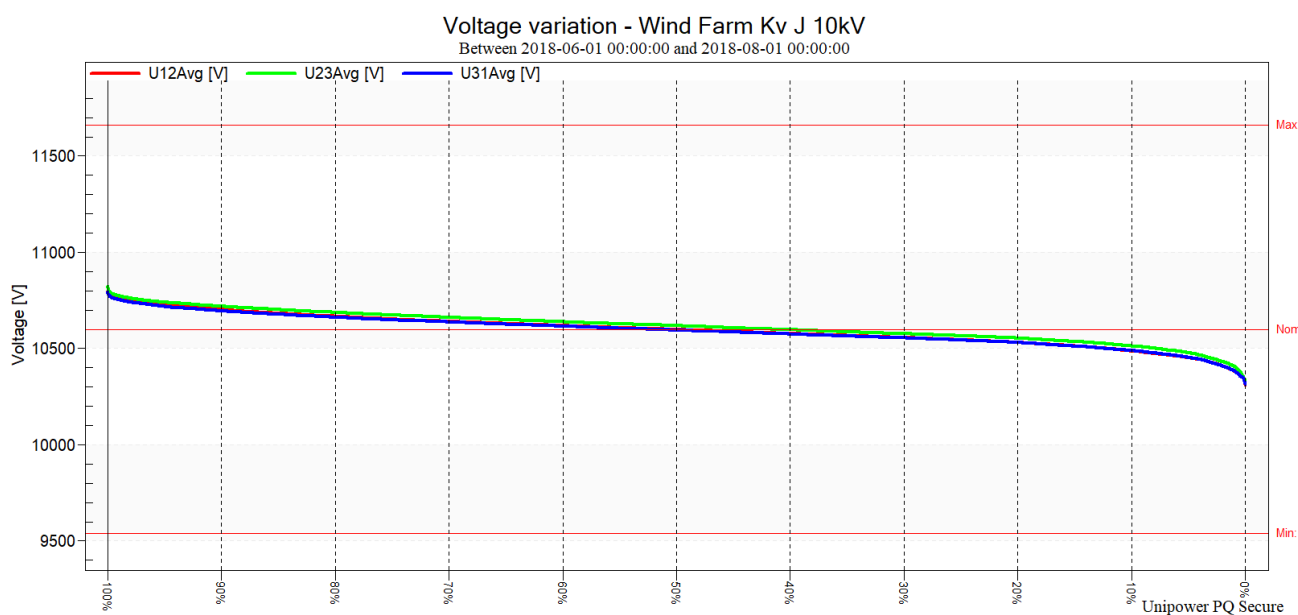
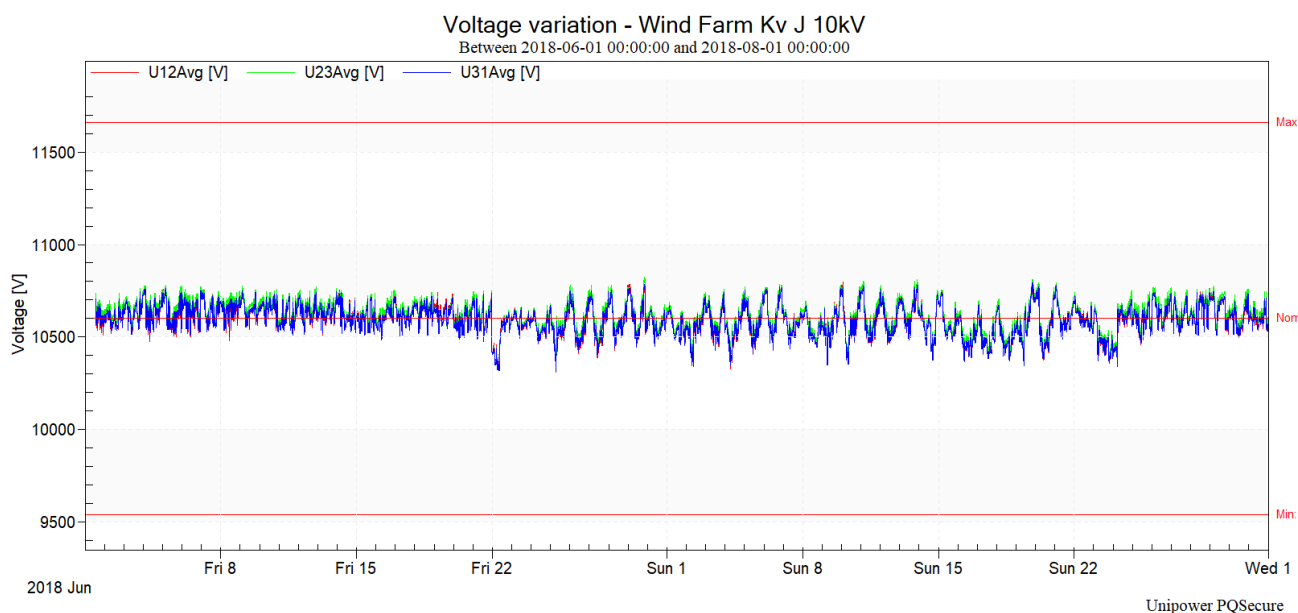
The voltage variation is assessed according to EIFS 2023:3 section 7.3.

All 10m rms values of the supply voltage shall be between 90% and 110% of the reference voltage.

Max 11,66kV, Min 9,54kV during 100% of time.

| Phase  | Within limit [%] | Max [kV] | Min [kV] | 95% [kV] | Result |
|--------|------------------|----------|----------|----------|--------|
| U12Avg | 100              | 10,80    | 10,31    | 10,73    | Passed |
| U23Avg | 100              | 10,82    | 10,32    | 10,74    | Passed |
| U31Avg | 100              | 10,80    | 10,31    | 10,72    | Passed |

Excluded 34 flagged value(s) in the result



### 3 THD analysis

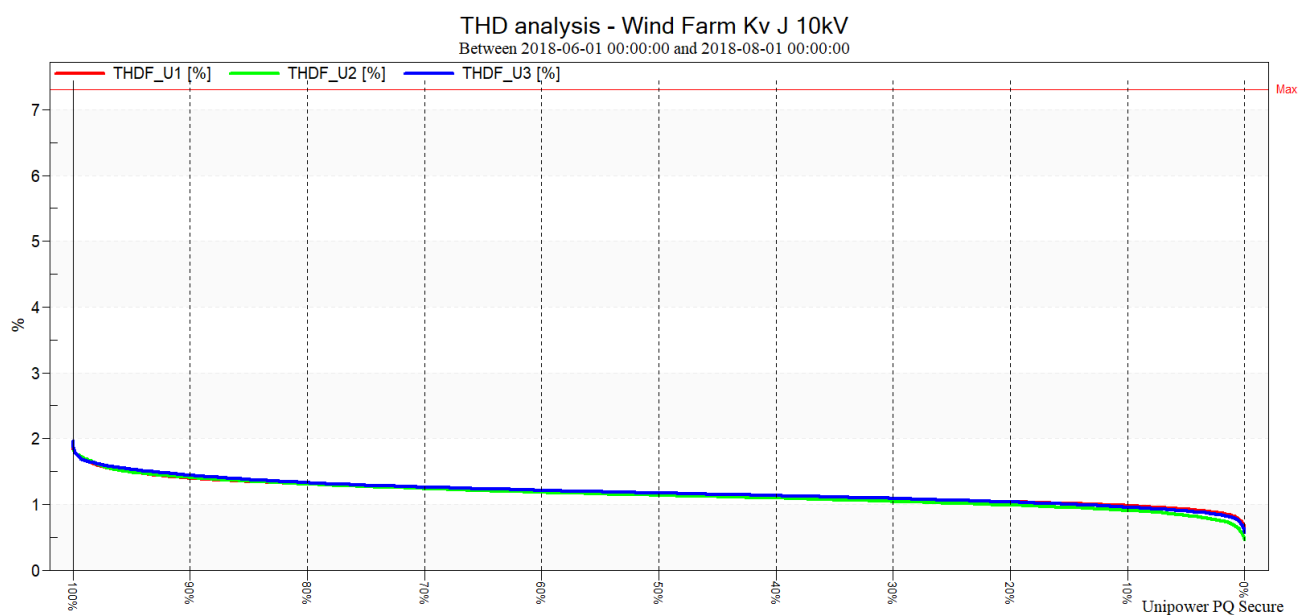
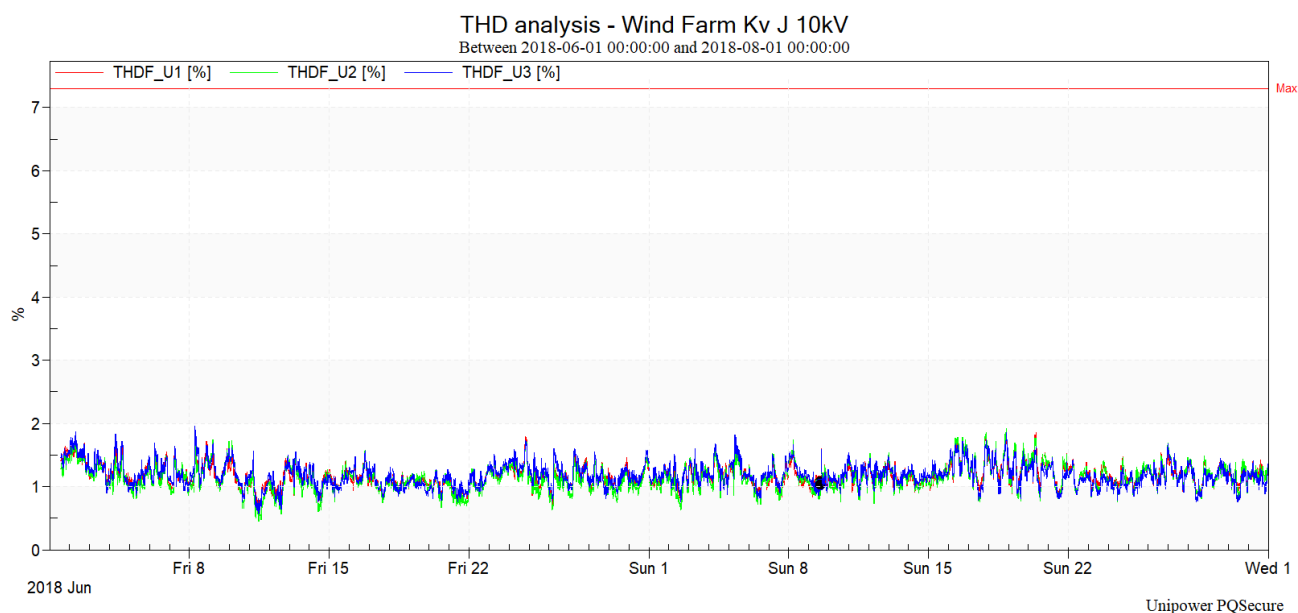
The THD analysis is assessed according to EIFS 2023:3 section 7.4-7.6.

All 10m values of the total harmonic content must be  $\leq 7,3\%$ .

Max 7,30% during 100% of time.

| Phase   | Within limit [%] | Max [%] | Min [%] | 95% [%] | Result |
|---------|------------------|---------|---------|---------|--------|
| THDF U1 | 100              | 1,85    | 0,620   | 1,49    | Passed |
| THDF U2 | 100              | 1,92    | 0,455   | 1,49    | Passed |
| THDF U3 | 100              | 1,96    | 0,565   | 1,53    | Passed |

Excluded 34 flagged value(s) in the result



## 4 PLT analysis

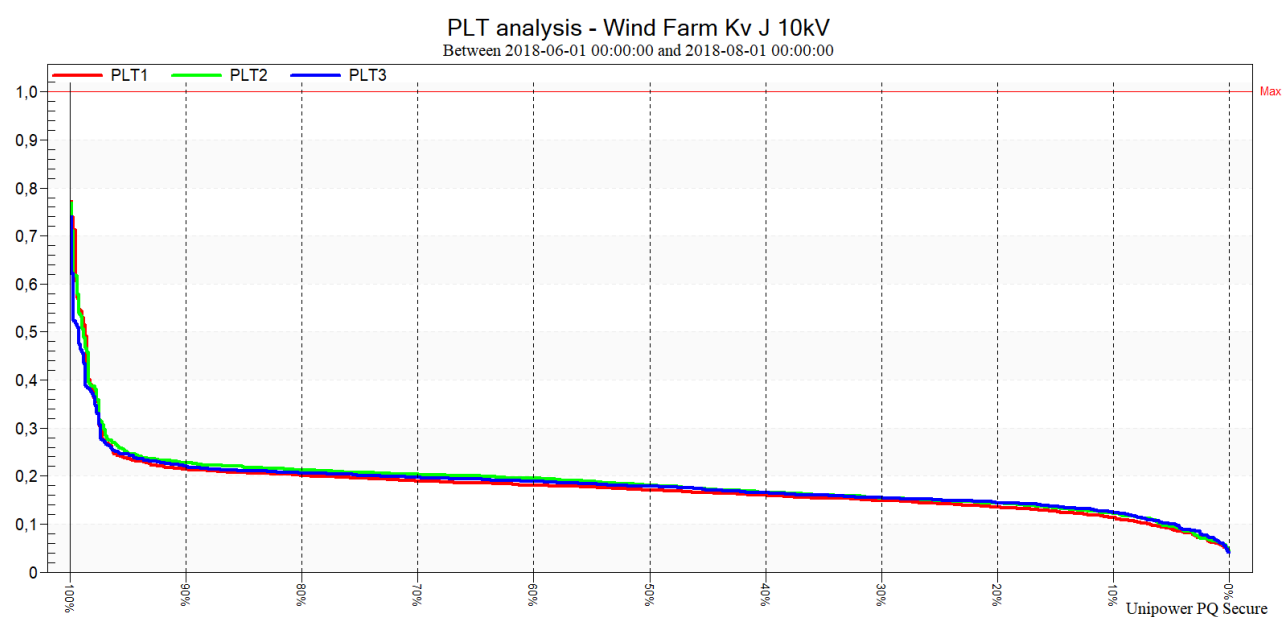
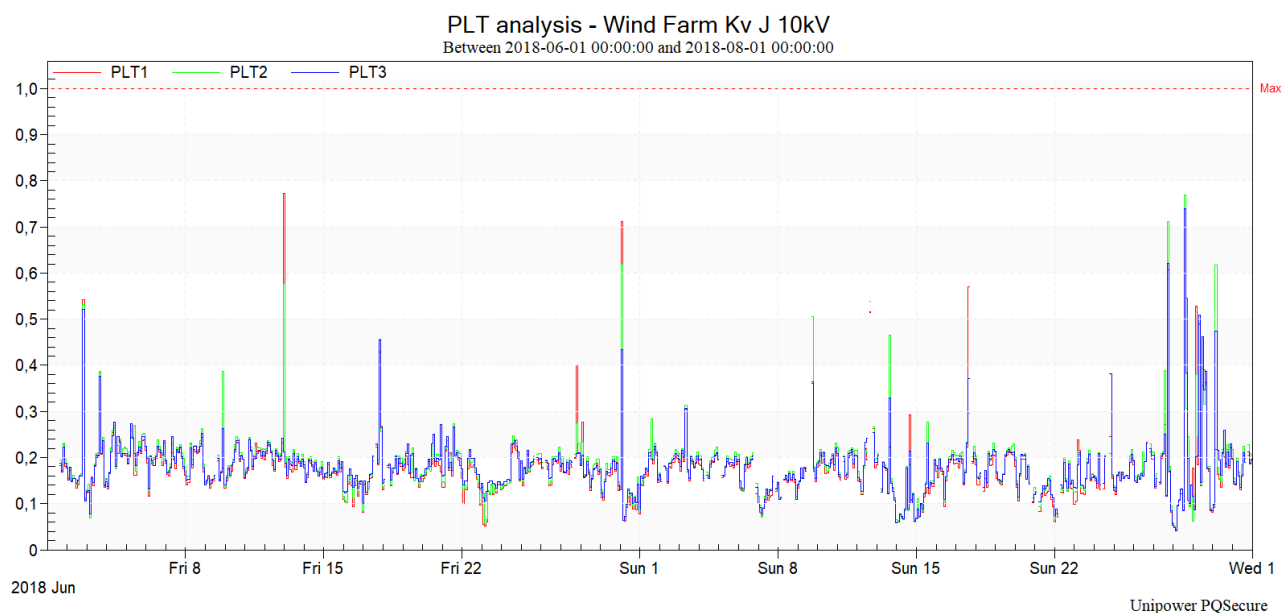
The PLT analysis is assessed according to EIFS 2023:3 section 7.13.

The long term flicker severity (PLT) shall be  $\leq 1$ .

Max 1,000 during 100% of time.

| Phase | Within limit [%] | Max   | Min   | 95%   | Result |
|-------|------------------|-------|-------|-------|--------|
| PLT12 | 100              | 0,772 | 0,044 | 0,236 | Passed |
| PLT23 | 100              | 0,770 | 0,044 | 0,246 | Passed |
| PLT31 | 100              | 0,740 | 0,041 | 0,242 | Passed |

Excluded 30 flagged value(s) in the result





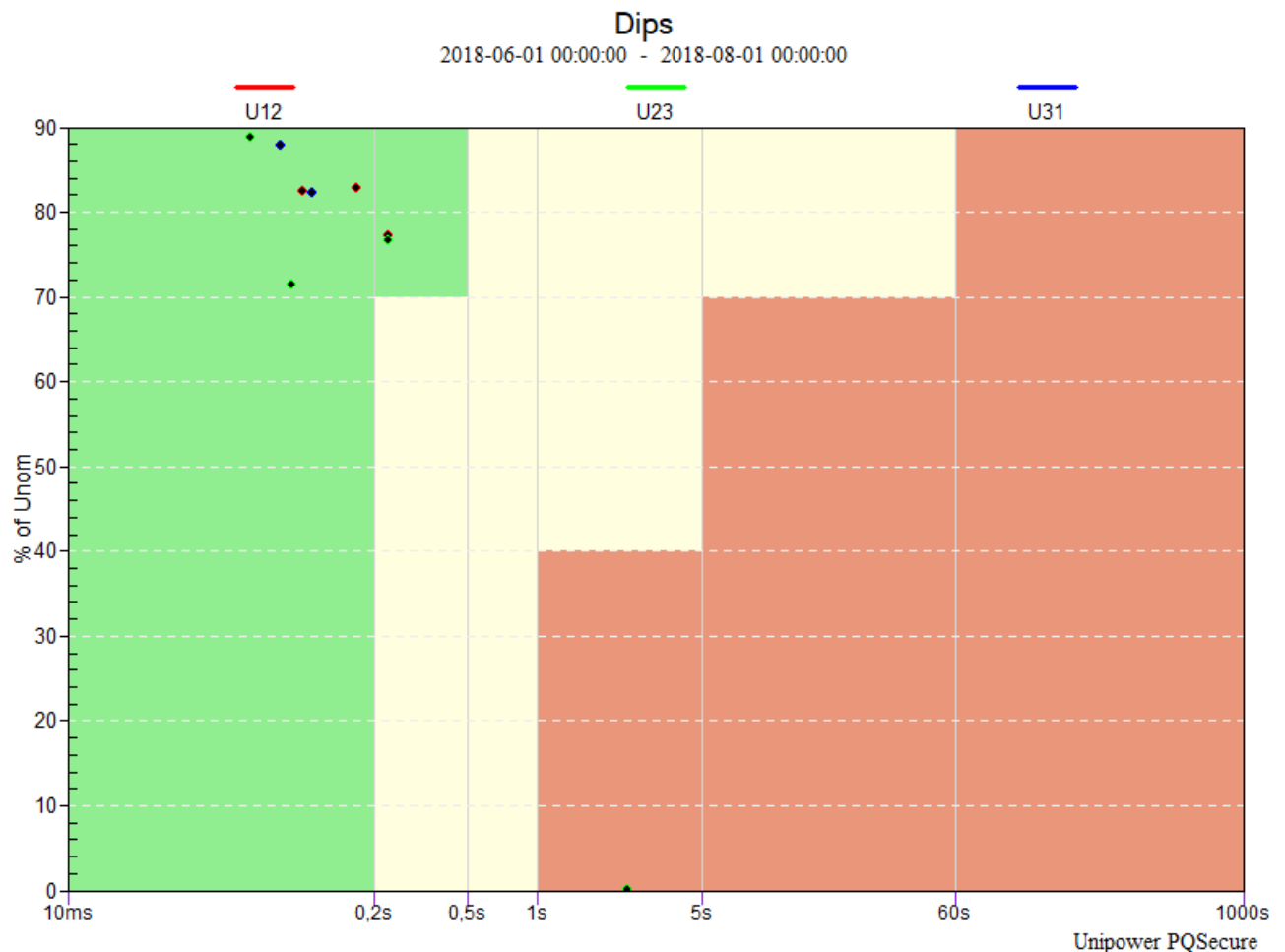
## 6 Voltage dips

The voltage dips are assessed according to EIFS 2023:3 section 7.8-7.9.

Voltage dips in the area A - Good quality is assessed as good voltage quality regardless of the number of dips. It is not good quality if there are voltage dips in the area C - Not good quality. Voltage dips in the area B needs further investigation.

| Area                 | No |
|----------------------|----|
| A - Good quality     | 8  |
| B                    | 0  |
| C - Not good quality | 2  |
| Total:               | 10 |

| Depth (d)     | Duration (t) | 10ms < t ≤ 0.2s | 0.2s < t ≤ 0.5s | 0.5s < t ≤ 1s | 1s < t ≤ 5s | 5s < t ≤ 60s | t > 60s |
|---------------|--------------|-----------------|-----------------|---------------|-------------|--------------|---------|
| 80% ≤ d < 90% |              | 5               | 0               | 0             | 0           | 0            | 0       |
| 70% ≤ d < 80% |              | 1               | 2               | 0             | 0           | 0            | 0       |
| 40% ≤ d < 70% |              | 0               | 0               | 0             | 0           | 0            | 0       |
| 5% ≤ d < 40%  |              | 0               | 0               | 0             | 0           | 0            | 0       |
| 0% ≤ d < 5%   |              | 0               | 0               | 0             | 2           | 0            | 0       |



## 7 Voltage swells

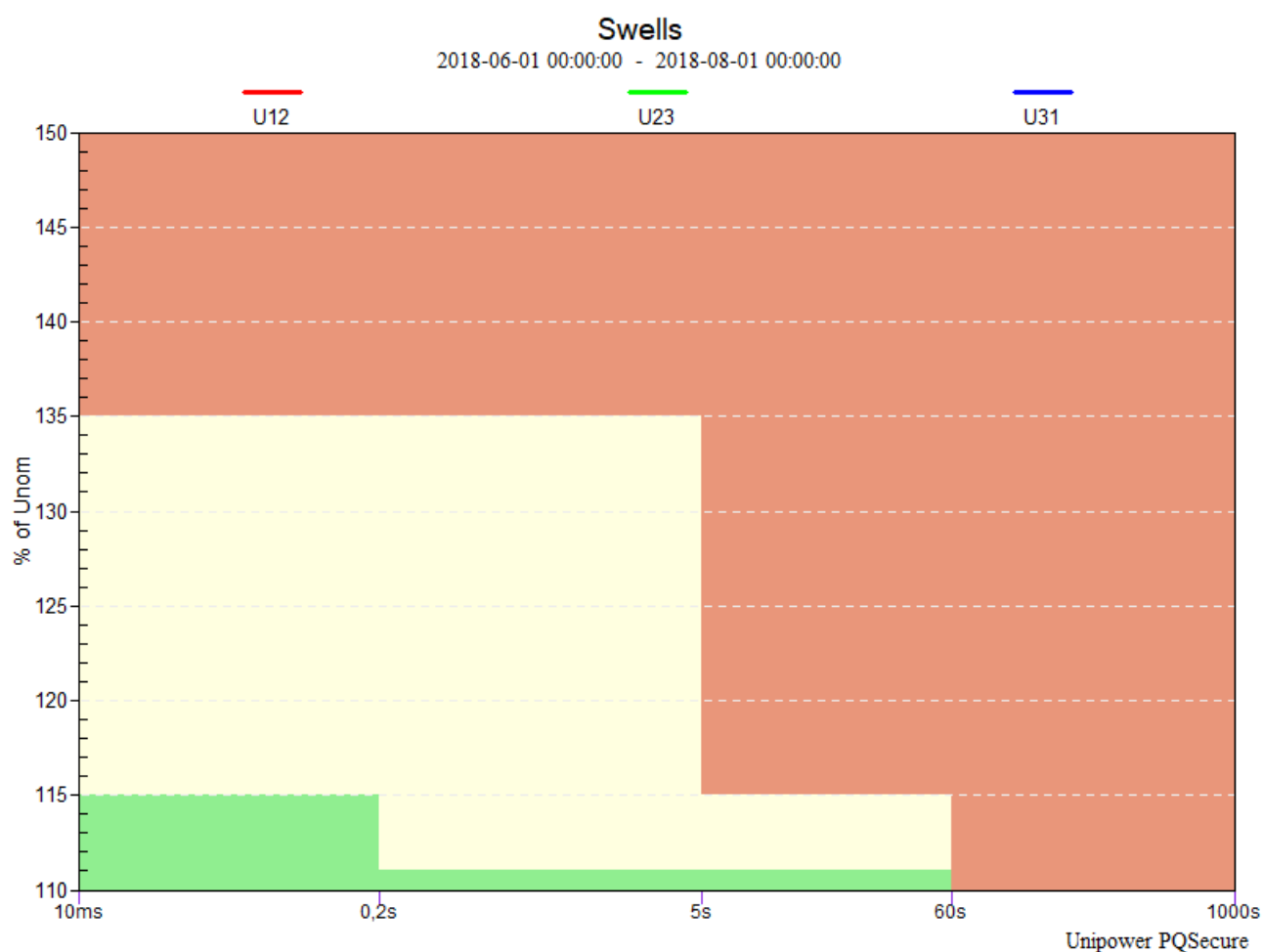
The voltage swells are assessed according to EIFS 2023:3 section 7.10.

Voltage swells in the area A - Good quality is assessed as good voltage quality regardless of the number of swells.

It is not good quality if there are voltage swells in the area C - Not good quality. Voltage swells in the area B needs further investigation.

| Area                 | No |
|----------------------|----|
| A - Good quality     | 0  |
| B                    | 0  |
| C - Not good quality | 0  |
| Total:               | 0  |

| Depth (d)       | Duration (t) | 10ms < t ≤ 0.2s | 0.2s < t ≤ 5s | 5s < t ≤ 60s | t > 60s |
|-----------------|--------------|-----------------|---------------|--------------|---------|
| u ≥ 135%        |              | 0               | 0             | 0            | 0       |
| 115% ≤ u < 135% |              | 0               | 0             | 0            | 0       |
| 111% ≤ u < 115% |              | 0               | 0             | 0            | 0       |
| 110% ≤ u < 111% |              | 0               | 0             | 0            | 0       |



## 8 Rapid voltage changes

The rapid voltage changes is assessed according to EIFS 2023:3 section 7.11-7.12.

The number of rapid voltage changes (Delta Ustationary  $\geq 3\%$ ) added to the number of dips in area A - Good quality (Dip A) must not exceed 24 per day.

At the same time, the number of rapid voltage changes (Delta Umax  $\geq 5\%$ ) added to the number of dips in area A - Good quality (Dip A) must not exceed 24 per day.

Summary of RVC analysis: Passed

| Date       | RVC Delta Ustationary $\geq 3\%$ | RVC Delta Umax $\geq 5\%$ | Dip A | Result |
|------------|----------------------------------|---------------------------|-------|--------|
| 2018-06-02 | 0                                | 1                         | 0     | Passed |
| 2018-06-03 | 0                                | 1                         | 0     | Passed |
| 2018-06-09 | 0                                | 1                         | 0     | Passed |
| 2018-06-12 | 0                                | 1                         | 0     | Passed |
| 2018-06-17 | 0                                | 2                         | 1     | Passed |
| 2018-06-18 | 0                                | 0                         | 1     | Passed |
| 2018-06-27 | 0                                | 1                         | 0     | Passed |
| 2018-06-30 | 0                                | 1                         | 0     | Passed |
| 2018-07-06 | 0                                | 1                         | 1     | Passed |
| 2018-07-09 | 0                                | 1                         | 1     | Passed |
| 2018-07-12 | 0                                | 2                         | 1     | Passed |
| 2018-07-13 | 0                                | 1                         | 0     | Passed |
| 2018-07-17 | 0                                | 1                         | 1     | Passed |
| 2018-07-26 | 0                                | 0                         | 2     | Passed |
| 2018-07-27 | 0                                | 2                         | 0     | Passed |
| 2018-07-28 | 0                                | 3                         | 0     | Passed |
| 2018-07-29 | 0                                | 4                         | 0     | Passed |
| 2018-07-30 | 0                                | 1                         | 0     | Passed |
| 2018-08-01 | 0                                | 1                         | 0     | Passed |

## 9 Long and short interruptions

The quality of the interruptions is assessed according to EIFS 2023:3 sections 4.1-4.4 and 6.1.

Informative. An interruption is classified as a long interruption (longer than 3 min) or a short interruption (longer than 100 ms up to and including 3 min). The quality of the interruptions is assessed according to EIFS 2023:3 sections 4.1-4.4 and 6.1.

| Begin               | Duration<br>[HH:MM:SS.MS] | End                 | Comment                   |
|---------------------|---------------------------|---------------------|---------------------------|
| 2018-07-09 15:23:21 | 00:00:01.440              | 2018-07-09 15:23:22 | Thunder over the country. |
| 2018-07-09 15:23:23 | 00:00:32.460              | 2018-07-09 15:23:55 | Thunder over the country. |
| 2018-07-09 15:47:56 | 00:00:34.660              | 2018-07-09 15:48:30 | Thunder over the country. |