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IEEE Recommended Practice for Power Quality Data Interchange Format (PQDIF)

IEEE Power and Energy Society

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IEEE Std 1159.3™-2019
(Revision of IEEE Std 1159.3-2003)

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Approved 8 February 2019

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Abstract: A file format suitable for exchanging power quality related measurement and simulation data in a vendor independent manner is defined in this recommended practice. The format is designed to represent all power quality phenomena identified in IEEE Std 1159-2009, IEEE Recommended Practice on Monitoring Electric Power Quality, other power related measurement data, and is extensible to other data types as well. The recommended file format utilizes a highly compressed storage scheme to help reduce disk space and transmission times. The utilization of Globally Unique Identifiers (GUID) to represent each element in the file permits the format to be extensible without the need for a central registration authority.

Keywords: data interchange, file format, IEEE 1159.3, measurement, monitoring, power quality, PQDIF

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Introduction

This introduction is not part of IEEE Std 1159.3-2019, IEEE Recommended Practice for Power Quality Data Interchange Format (PQDIF).

IEEE Std 1159.3-2003 provided the power quality industry with the specification for a Power Quality Data Interchange Format (PQDIF) for the transfer of power quality data between power quality monitoring instruments and computers. This transfer standard allows the processing and analysis of power quality measurements using multi-vendor and multi-device measurements. IEEE Std 1159.3 was reaffirmed in 2009.

The IEEE P1159.3 Working Group completed the following changes in this revision of IEEE Std 1159.3:

— Completed editorial changes and corrections to the 2003 edition of IEEE Std 1159.3

— Added new ID values for existing PQDIF tags in normative Annex B.

— Added new tags and ID values in normative Annex B.

— Added new quantity types in normative Annex B.

— Added an informative Annex C.2, which specifies an XML directory for PQDIF files that can be downloaded from a remote power quality monitor or remote file server.

— Added an informative Annex D on the representation of PQDIF in XML.

— Added an informative Annex E on PQDIF and its relationship to IEEE Std C37.111 COMTRADE.

— Added an informative Annex F on PQDIF and its relationship to IEC 61850.

The physical structure of PQDIF remains unchanged between IEEE Std 1159.3-2003 and this new edition, making PQDIF both backward and forwards compatible. Changes to the logical structure to support new capability are in the form of additional tag and ID values. This allows software that reads PQDIF to maintain compatibility by simply ignoring unrecognized tag and ID values.

The primary user of this standard will be engineers and software developers who are called upon to create software to encode and decode PQDIF files utilized for power quality data interchange using the guidelines in this recommended practice. Although the document is thorough and complete, detailed examples and source code can be quite helpful when implementing the format described herein. Therefore, reference and supporting documentation (header files, sample code, etc.) related to this standard can be found at the IEEE 1159.3 task force website which at the time of this writing could be found at the following URL:
http://grouper.ieee.org/groups/1159/3/docs.html

More published information about PQDIF is available. An overview of IEEE Std 1159.3 is available in Gunther [B2][1]. An example of how PQDIF was used as part of electric utility power quality monitoring program is described in Veloso, Lebre, and Melo [B18]. An overview of the IEEE 1159.3 revision project is available in Saoin and Dabbs [B17].

[1]The numbers in brackets correspond to those of the bibliography in Annex G.

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IEEE Recommended Practice for Power Quality Data Interchange Format (PQDIF)

1. Overview

1.1 Scope

This recommended practice specifies the PQDIF file format for the transfer of power quality data between instruments and computers. This includes raw, processed, simulated, proposed, specified, and calculated data. The transfer file format includes the power quality measurements as well as appropriate characterization parameters, such as sampling rate, resolution, calibration status, instrument identification, location, and other related data or characteristics. The recommended practice also provides guidelines for transferring power quality data.

1.2 Purpose

IEEE Std 1159.3 provides the power quality industry with the specification for PQDIF, which is an open and accepted data format standard for the transfer of power quality data between instruments and computers. This transfer standard allows the processing and analysis of power quality measurements using multi-vendor and multi-device data. Wider acceptance of PQDIF as a power quality data transfer format will significantly add to the value of power quality monitoring and open new opportunities for the resolution, planning, and understanding of power quality activities.

Being able to exchange data between software systems will allow other functions needed in a power quality monitoring campaign, including validation, trending, comparison, overlay, and more.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEC 61000-4-30, Electromagnetic compatibility (EMC)—Part 4-30: Testing and measurement techniques—Power quality measurement methods.[1]

[1] IEC publications are available from the International Electrotechnical Commission (http://www.iec.ch) and the American National Standards Institute (http://www.ansi.org/).

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