



RESOLUTION NO. 11, Series of 2006

A RESOLUTION ADOPTING THE GUIDELINES FOR THE MONITORING OF POWER QUALITY STANDARDS FOR DISTRIBUTION UTILITIES

WHEREAS, Section 43 (b) of Republic Act No. 9136 (The Electric Power Industry Reform Act of 2001 or the EPIRA) and Rule 3, Section 4 (g) of its Implementing Rules and Regulations (IRR), provide that, in order to facilitate the provision of efficient, reliable and quality service to End-Users, the Commission shall promulgate a Grid Code and a Distribution Code that shall include performance standards;

WHEREAS, Articles 3.2 and 5.2 of the Philippine Distribution Code (PDC) sets the power quality standards for Distribution Utilities;

WHEREAS, on November 16, 2004 the Commission conducted a public consultation for the adoption and promulgation of a set of guidelines for the monitoring of power quality standards for Distribution Utilities;

WHEREAS, on November 21, 2005 the Commission received and considered the comments and recommendations of the Distribution Management Committee (DMC) for the set of guidelines for the monitoring of power quality standards for Distribution Utilities;

WHEREAS, the guidelines seek to: (1) ensure that the power quality specified in Article 3.2 of the PDC are complied with; (2) adopt rules and regulations for assessing the level of power quality of the distribution system; (3) adopt requirements for monitoring power quality in relation with a customer's complaint; (4) provide well-defined data to allow trend analysis over time for a given utility or among distribution utilities; (5) establish a way of tracking and identifying power quality problems; and (6) establish reporting requirements to provide consumers, the ERC, and distribution utilities with methodology for monitoring power quality within a distribution utility's franchise area.

NOW THEREFORE, the Commission, after thorough and due deliberation, hereby **RESOLVED**, as it hereby **RESOLVES** to **APPROVE** and **ADOPT** the set of Guidelines for the Monitoring of Power Quality Standards for Distribution Utilities herein attached as "ANNEX A" and made an integral part of this Resolution.

Resolution No. 11, Series of 2006
A Resolution Adopting the Guidelines for the Monitoring of Power Quality
Standards for Distribution Utilities
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This Resolution shall take effect fifteen (15) days following its publication in a newspaper of general circulation in the country.

Pasig City, March 8, 2006


RODOLFO B. ALBANO, JR.
Chairman

(On Official Leave)
OLIVER B. BUTALID
Commissioner


JESUS N. ALCORDO
Commissioner

(On Official Leave)
RAUF A. TAN
Commissioner


ALEJANDRO Z. BARIN
Commissioner

Republic of the Philippines
ENERGY REGULATORY COMMISSION
San Miguel Avenue, Pasig

**GUIDELINES FOR THE MONITORING OF POWER QUALITY
STANDARDS FOR DISTRIBUTION UTILITIES**

Pursuant to Section 43 (b) of Republic Act No. 9136, Rule 3 Section 4 (g) of its Implementing Rules and Regulations, and Articles 3.2 and 5.2 of the Philippine Distribution Code (PDC), the Energy Regulatory Commission (ERC) hereby adopts and promulgates the following Guidelines for the Enforcement of Power Quality Standards.

ARTICLE I

GENERAL PROVISIONS

1.1 Objectives

- 1.1.1 To ensure that the Power Quality standards specified in Article 3.2 of the PDC are complied with.
- 1.1.2 To adopt rules and regulations for assessing the level of Power Quality of the Distribution System.
- 1.1.3 To adopt requirements for monitoring Power Quality in relation with a Customer's complaint.
- 1.1.4 To provide well-defined data to allow trend analysis over time for a given utility or among Distribution Utilities.
- 1.1.5 To establish a way of tracking and identifying Power Quality problems.
- 1.1.6 To establish reporting requirements to provide Consumers, the ERC, and Distribution Utilities with methodology for monitoring Power Quality within a Distribution Utilities' franchise area.

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1.2 General Obligations of a Distribution Utility

- 1.2.1 Each Distribution Utility shall maintain a Power Quality monitoring system that can monitor performance of its equipment and Distribution System and Customer facilities.
- 1.2.2 Each Distribution Utility shall provide valuable services to its Customers by describing and solving Power Quality problems, which shall include investigation, recommending solutions, and implementing the recommended solutions using a system perspective to ensure Power Quality.

1.3 Scope

- 1.3.1 Privately-owned Distribution Utilities;
- 1.3.2 Electric Cooperatives;
- 1.3.3 Local government unit owned-and-operated Distribution Utilities;
- 1.3.4 Entities duly authorized to own, operate and maintain Distribution facilities within the economic zones; and
- 1.3.5 Other duly authorized entities engaged in the Distribution of Electricity.

1.4 Definition of Terms

Act	Republic Act No. 9136, otherwise known as the "Electric Power Industry Reform Act of 2001."
Customer/Consumer	Any person or entity supplied with electric service under a contract with a Distributor or supplier.
Distribution System	The system of wires and associated facilities belonging to a franchised Distribution Utility extending between the delivery points on the transmission, sub-transmission System, or a generating plant connection and the point of connection to the premises of the End-User.
Distribution Utility/ Distributor	Any electric cooperative, private corporation, government-owned utility or existing local government unit which has an exclusive franchise to operate a Distribution System in accordance with its franchise and the Act.
Energy Regulatory Commission or ERC	The regulatory agency created under Republic Act No. 9136.

High Voltage	A voltage level exceeding 34.5 kV up to 230 kV.
Long Duration Voltage Variation	A variation of the Root-Mean-Square (RMS) Value of the voltage from nominal voltage for a time greater than one (1) minute.
Low Voltage	A voltage level not exceeding 1000 volts.
Measuring Point	A point where to measure the RMS voltage variation, which shall either, be at the substation bus, secondary lead wires of distribution transformer, metering point, customer main switch, or customer's convenience outlet.
Medium Voltage	A voltage level exceeding one (1) kV up to 34.5 kV.
Nominal Voltage	A nominal value assigned by a Distribution Utility to a circuit or system of a given voltage class, for the purpose of convenient designation.
Power Quality	The quality of the voltage, including its frequency and resulting current that are measured in the Grid, Distribution System, or any User System.
RMS Value	The equivalent to the square root of the sum of the squares of the RMS values of its individual components of a complex voltage wave.
User	A person or entity that uses the Distribution System and related distribution facilities.

S A R

ARTICLE II
VOLTAGE VARIATION

2.1 Nominal Voltage

Each Distributor shall adopt a standard Nominal Voltage or voltages which are consistent with the design of the Distribution System for its entire service area and for each of the districts, zones, or work centers into which the Distribution System is divided.

2.2 Limits

Each Distributor shall ensure that no under-voltage or over-voltage is present at the Measuring Point of any User during normal operating conditions.

A Long Duration Voltage Variation is an under-voltage if the RMS Value of the voltage is less than or equal to 90 percent of the Nominal Voltage.

A Long Duration Voltage Variation is an over-voltage if the RMS Value of the voltage is greater than or equal to 110 percent of the nominal value.



2.3 Voltage Outside the Limits not Considered a Violation

Voltage outside the limits specified in Section 2.2 shall not be considered a violation of this rule when such variations:

- 2.3.1. Arise from operation of the affected Customer's equipment at power factor less than 85 percent lagging;
- 2.3.2. Arise from greater than 2.5 percent unbalance operation of the Customer's equipment; or
- 2.3.3. Arise from scheduled maintenance on equipment by the Customer and/or the Distribution Utility.
- 2.3.4. Arise from the result of the measurement of the RMS value of the voltage at the connection point to the grid which is less than 95 percent or greater than 105 percent of the nominal voltage during normal condition.

2.4 Measurement Procedures

A Distributor shall assess the RMS voltage variation in the Distribution System by conducting voltage measurements in each feeder of the Distribution System at two Measuring Points which are the electrically nearest and farthest from the source (substation secondary voltage bus).

 A. 

2.5 System Average RMS Voltage (Variation) Index x (SARVI x).

SARVI x is the average number of RMS value of the voltage variation measurement over the assessment period per feeder, where the measured RMS values are those with magnitude of less than or equal to 90 percent, or is greater than or equal to 110 percent of the Nominal Voltage.

$$\text{SARVI}_{110} = \frac{\sum N_N}{F_T}$$

Where:

SARVI $_{110}$ = the average number of RMS value of the voltage variation measurement over the assessment period per feeder, where the measured RMS value of the voltage is greater than or equal to 110 percent of the nominal value.

N_N = the number of measurements showing RMS voltages greater or equal to 110 percent of the nominal value, which were measured at Measuring Points of the distribution transformers connected to feeders which are electrically nearest the source (substation low voltage bus).

F_T = total number of Feeders being assessed of RMS voltage variation.

$$\text{SARVI}_{90} = \frac{\sum N_F}{F_T}$$

Where:

SARVI $_{90}$ = the average number of RMS value of the voltage variation measurement over the assessment period per feeder, where the measured RMS value is less than or equal to 90 percent of the nominal voltage.

N_F = the number of measurements showing RMS voltages less than or equal to 90 percent of the nominal value, which were measured at Measuring Points of the distribution transformers connected to feeders which are electrically remote from the source (substation low voltage bus).

F_T = total number of Feeders being assessed of RMS voltage variation.

2.6 Voltage Surveys

Each Distributor shall conduct annual voltage tests which shall be in accordance with the measurement procedures of Section 2.4, in any of the same months that recorded the highest demands during the previous year, in order to assess compliance with the voltage limits specified in Section 2.2.

2.7 Required Records

Records of voltage tests shall be sufficient to determine/indicate the following data/information:

2.7.1 Location

2.7.2 Serving Substation

2.7.3 Feeder or Circuit Number

2.7.4 Nominal Voltages

2.7.5 Customer connected electrically nearest to the source (substation low voltage bus) of each feeder

2.7.6 Customer connected electrically farthest from the source (substation secondary voltage bus) of each feeder

2.7.7 Measured Voltages

2.7.8 Date and Time voltage tests were conducted

2.7.9 Total number of Feeders of the Distribution System

2.8 Initial and Subsequent Year's Target

Each Distribution Utility shall be required to conduct voltage tests at all Measuring Points in each feeder of the Distribution System which shall be in accordance with the measurement procedures of Section 2.4, and to submit to the ERC the records on or before the end of the year 2006 using the prescribed Table-1PQ in Annex A. The data shall be used as the basis for computing the Distributor's target of the System Average RMS Voltage (Variation) Index x (SARVI x) for the initial year.

For the subsequent years, the yearly performance target shall be an improvement of the established performance target of the preceding year until such time that under voltage or over voltage is no longer present at all Measuring Points of the Distribution System.

2.9 Voltage Test Report

Records of the voltage tests conducted shall be recorded in the prescribed format using Table-1PQ in Annex A and shall be submitted to the ERC in electronic copy using a Portable Document Format (PDF) or any other

format that cannot be altered, on or before the end of the month following the month that the voltage tests were conducted.

To be included in the report submission are the previous year's annual load curve data of the Distribution System and the load curve data of the month in consideration.

2.10 Summary of Performance

For comparing the quality of service voltages being provided to Customers over time for a given Distribution Utility and among Distribution Utilities, the ERC shall publish in its website, starting year 2007, the summary of the System Average RMS Voltage (Variation) Index x (SARVI x) of all Distribution Utilities before the end of the first semester of each year.

ARTICLE III

OTHER POWER QUALITY STANDARDS

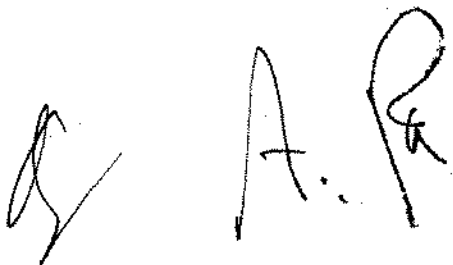
3.1 Distributors Obligation to Monitor and Record Variations of Other Types of Power Quality Standards

The Distributor shall monitor and record variations of these other types of Power Quality standards; Voltage Sags, Voltage Swells, Voltage Unbalance, and Harmonics at all High Voltage and Medium Voltage connection points to the Distribution System, to ensure that the Power Quality variations are within the limits specified in Section 3.2 of the PDC.

3.2 Mitigation of the Impact of Customer's Loads

If in relation to a Power Quality complaint, an evaluation shows that a Customer's loads cause a problem on any of the Power Quality standards mentioned in the preceding section, the Customer causing the Power Quality problem; shall be required to design mitigation measures to reduce the impacts of the Customer's loads on the Distribution System, and shall coordinate with the Distribution Utility in the implementation of the same.

In the event that the Customer's mitigation measures are not satisfactory, the Distribution Utility shall design and implement mitigation measures in coordination with the Customer, and the cost of the design and implementation of the mitigation measures shall be charged to the Customer.






ARTICLE IV
SEPARABILITY

If for any reason any provision of these Guidelines is declared unconstitutional or invalid by final judgment of a competent court, the other parts or provisions hereof which were not affected thereby shall continue to be in full force and effect.

ARTICLE V
EFFECTIVITY

These Guidelines shall take effect fifteen (15) days after publication in two newspapers of general circulation in the country.

Pasig City, March 8, 2006

	 RODOLFO B. ALBANO, JR. Chairman
	 JESUS N. ALCORDO Commissioner
(On Official Leave) OLIVER B. BUTALID Commissioner	 ALEJANDRO Z. BARIN Commissioner

