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BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

Draft *Indian Standard*

Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces

Grid Integration of Renewables Sectional Committee, ETD 46

Last Date of Comments: 10 July 2024

NATIONAL FOREWORD

This draft Indian Standard which is identical with International Publication IEEE Std 1547.1-2020 'IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces' issued by The Institute of Electrical and Electronics Engineers would be adopted by the Bureau of Indian Standards on the recommendation of the Grid Integration of Renewables Sectional Committee and approval of the Electrotechnical Division Council.

This Indian National Standard is made available under license from IEEE and is an adoption of IEEE Std 1547-2018 1547.1-2020 'IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces', 445 Hoes Lane Piscataway, NJ, 08854, USA WITH India specific changes.

This Indian National Standard is only valid in India as an Indian National Standard. India specific changes have been made to the adopted IEEE standard as outlined in National Annexure A.

The text of IEEE Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminology and conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

Wherever the words 'IEEE Standard' appear referring to this standard, they should be read as 'Indian Standard'.

The technical committee has reviewed the provisions of the following international standards referred in this adopted standard and decided that they are acceptable for use in conjunction with this standard.

International Standard	*Title*
DNP3	Application Note AN2018-001, DNP3 Profile for Communications with Distributed Energy Resources.
IEC 61000-3-6	Electromagnetic compatibility (EMC)—Part 3-6: Limits—Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems.
IEC/IEEE 62271-37-013	International Standard for High-voltage switchgear and control gear—Part 37— 013: Alternating-current generator circuit-breakers.
IEEE C37.04™-2018	IEEE Standard for Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V.
IEEE Std C37.09™-2018	IEEE Standard Test Procedures for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000 V.
IEEE Std C37.60™	IEEE/IEC International Standard—High-voltage switchgear and controlgear—Part 111: Automatic circuit reclosers and fault interrupters for alternating current systems up to 38 kV.
IEEE Std C37.90.1™	IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.
IEEE Std C37.90.2™	IEEE Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.
IEEE Std C37.111™/IEC 60255-24	IEEE/IEC Measuring relays and protection equipment—Part 24: Common format for transient data exchange (COMTRADE) for power systems.
IEEE Std C62.41.2™	IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.
IEEE Std C62.45™	IEEE Recommended Practice on Surge Testing for Equipment Connected to LowVoltage (1000 V and Less) AC Power Circuits
IEEE Std C62.92.1™	IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part I: Introduction.
IEEE C62.92.6™	IEEE Guide for Application of Neutral Grounding in Electrical Utility Systems, Part VI—Systems Supplied by Current-Regulated Sources.
IEEE Std 112™	IEEE Standard Test Procedure for Polyphase Induction Motors and Generators.

IEEE Std 115™	IEEE Guide for Test Procedures for Synchronous Machines—Part I—Acceptance and Performance Testing and Part II—Test Procedures and Parameter Determination for Dynamic Analysis.
IEEE Std 421.5™	IEEE Recommended Practice for Excitation System Models for Power System Stability Studies.
IEEE Std 1159.3™	IEEE Recommended Practice for Power Quality Data Interchange Format (PQDIF).
IEEE Std 1547™	IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power systems Interfaces.
IEEE Std 1815™-2012	IEEE Standard for Electric Power Systems Communications-Distributed Network Protocol (DNP3).
IEEE Std 2030.5™-2018	IEEE Standard for Smart Energy Profile Application Protocol.

NATIONAL ANNEXURE A

(*National Foreword*)

(Normative)

A-1 This IEEE standard specifies the frequency as 60Hz for standard testing condition. However, as per Indian conditions, the frequency shall be considered as 50Hz.

A-2 Table 15 — Substitute the following for the existing:

Table 15 – Voltage and frequency trip settings for unintentional islanding testing

Trip function	**Category I and Category II**		**Category III**	
	Voltage (p.u.)	**Clearing time (s)**	**Voltage (p.u.)**	**Clearing time (s)**
OV2	1.2	0.16	1.2	0.16
OV1	1.2	13	1.2	13
UV1	0	21	0	50
UV2	0	2	0	21
	Frequency (Hz)	**Clearing time (s)**	**Frequency (Hz)**	**Clearing time (s)**
OF2	52	1000	52	1000
OF1	52	1000	52	1000
UF1	47.5	1000	47.5	1000
UF2	47.5	1000	47.5	1000

A-3 Table 38 —Category A voltage and frequency regulation priority test steps and expected results

Indian frequency of 50 Hz and proportional frequencies can be referred for Table 38.

A-4 Table 39 —Category B voltage and frequency regulation priority test steps and expected results

Indian frequency of 50 Hz and proportional frequencies can be referred for Table 39.