



Standards Catalog

Revision 1.0 Monday, May 23, 2011

1 Overview

As part of its Charter obligations, the SGIP produces and maintains a “Catalog of Standards.” This document describes the purpose and scope of the Catalog, as well as the process and procedures for the management of the SGIP Catalog of Standards (CoS). Procedures are described for the management of the lifecycle of an entry into the Catalog, from its proposed inclusion, to its approval for inclusion, its periodic review for relevance and its possible deprecation and removal from the Catalog.

Note that the SGIP Catalog of Standards is anticipated to provide a key but not exclusive source of input to the NIST process for coordinating the development of a framework of protocols and model standards for the Smart Grid under its Energy Independence and Security Act (EISA) of 2007 responsibilities.

The Catalog is a compendium of standards and practices considered to be relevant for the development and deployment of a robust and interoperable Smart Grid. The Catalog may contain multiple entries that may accomplish the same goals and are functionally equivalent; similarly a single Catalog entry may contain optional elements that need not be included in all implementations. In general, compliance with a standard does not guarantee interoperability due to the above reasons. Though standards facilitate interoperability, they rarely, if ever, cover all levels of agreement and configuration required in practice. As a part of its work program, the SGIP is defining a testing and certification program that may be applied to the equipment, devices, and systems built to the standards listed in the Catalog and that, if applied, will substantiate that implementations claiming compliance with the respective standards are also interoperable. Where test profiles have been defined and testing organizations identified for a particular standard this will be indicated in the Catalog entry.

Described in this document are:

- Criteria that standards, practices, and guides must meet for inclusion in the Catalog,
- Artifacts that must be documented to characterize an entry and initiate the process,
- Structure of the Catalog to facilitate searching and understanding the applications and architectural levels targeted in the design of each entry, and
- Procedures to approve the addition of an entry to the Catalog, maintain and update Catalog entries, and deprecate and/or remove an entry from the Catalog.

1.1 Scope

The scope of the Catalog of Standards covers those specifications that have significant import to enabling the Smart Grid and enhancing its capabilities. These documents may be **normative** (*i.e.*, fully fledged implementable standards or safety and security practices), **guides** (*e.g.*, documents that provide information on best practices and are of assistance in uniform deployment of the Smart Grid), and **informative** (*i.e.*, documents that provide context and background information on Smart Grid technologies, practices and policies).

Relevant topical and functional areas covered by documents in this Catalog include

- architectural specifications,
- data format and presentation specifications,
- communications protocols,
- security standards, protocols and practices,
- hardware and software interface standards,
- coexistence and interference guides,
- safety specifications,
- equipment specifications,
- testing and certification specifications,
- best practices guidelines for deployment.

1.2 Purpose

The Catalog of Standards is an integral part of the SGIP Interoperability Knowledge Base (IKB). The IKB is an information resource to Smart Grid professionals in the deployment of the Smart Grid that can assist them by providing information on available standards, practices, and technologies, thereby facilitating Smart Grid interoperability.

The purpose of the Catalog of Standards is to provide an easy and comprehensive reference to the set of specifications relevant to Smart Grid deployments. Inclusion of a specification in this Catalog indicates that in the expert opinion of a consensus of the SGIP members, who represent a large cross-section of all segments of the Smart Grid industry and users, that the specification can be useful in an interoperable deployment of the Smart Grid.

The Catalog characterizes and organizes the listed standards by domain and GridWise Architecture Council (GWAC) stack reference in order to facilitate the use of the catalog across various user communities.

1.3 Definitions and Acronyms

1.3.1 Definitions

Catalog of Standards	Repository of relevant standards, practices, and guidelines for implementation of the Smart Grid
Standard	A technical specification, usually produced by a Standards-Setting Organization (SSO).
Sponsoring Organization	Organization that creates, manages, and is otherwise responsible for the maintenance of a specification for consideration in the Catalog.
Standards-Setting Organization (SSO)	Organization that has defined processes and produces and maintains specifications normally called standards, best practices, and guidelines.

1.3.2 Acronyms

RAND/FRAND	Reasonable and Non-Discriminatory / Fair, Reasonable and Non-Discriminatory
IPR	Intellectual Property Rights
SSO	Standards-Setting Organization
NTTAA	National Technology Transfer and Advancement Act, PL 104-113, 15 U.S.C. §3701 <i>et seq.</i>
EISA	Energy Independence and Security Act
CSWG	SGIP Cyber Security Working Group
SGAC	SGIP Smart Grid Architecture Committee
SGIP	Smart Grid Interoperability Panel
IKB	Interoperability Knowledge Base

GWAC	Gridwise Architecture Council
URL	Uniform Resource Locator
OMB	Office of Management and Budget
ANSI	American National Standards Institute
WG	Working Group

1.4 References

National Technology Transfer and Advancement Act (NTTAA)	http://standards.gov/standards_gov/nttaa.cfm
OMB CIRCULAR NO. A-119, Revised	http://standards.gov/standards_gov/a119.cfm
ANSI Essential Requirements: Due process requirements for American National Standards (January 2010)	http://publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/2010%20ANSI%20Essential%20Requirements%20and%20Related/2010%20ANSI%20Essential%20Requirements.pdf
NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0	http://www.nist.gov/public_affairs/releases/smart_grid_interoperability_final.pdf
IKB Catalog of Standards TWiki Page	http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/SGIPCatalogOfStandards
Catalog Of Standards Record Spreadsheet	http://nistproject.enernex.com/phase2/Project%20Documents/ANSI%20Portal/SGIPCatalogOfStandards.xlsx (note this is a private document at the time of this writing and will be exposed when ready)
GridWise Interoperability Context Setting Framework	v1.1 – http://www.gridwiseac.org/pdfs/interopframework_v1_1.pdf
Standards Information Template	http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate.docx

2 Criteria for Listing in the Catalog

The following Criteria are used to determine whether a specific standard, guide, or practice is to be included in the catalog (all three of these types of documents are hereby referred to as “standards” throughout this document). The Criteria are required attributes for a standard to be included in the Catalog.

Criteria for Inclusion:

1. **Relevancy:** The standard facilitates interoperability related to the integration of Smart Grid devices or systems. Relevant Smart Grid capabilities are as defined by EISA (see “Standards Goals from EISA” inset on right)
2. **Community Acceptance:** The standard should be widely acknowledged as facilitating interoperability related to the integration of devices or systems that enable Smart Grid capabilities.
3. **Deployment Suitability:** The standard must demonstrate evidence of either having been deployed or it must be expected to fulfill a Smart Grid deployment gap with demonstrated adequate performance capabilities in commercial (real-world) applications.
4. **Interface Characterization:** The relevant portions of the standard focus on requirements for integration and interaction through well-defined interfaces. The standard facilitates independence and flexibility in device or system design and implementation choices.
5. **Document Maintenance:** The standard is supported by a multi-member organization that will ensure that it can be unambiguously referenced, that it is regularly revised and improved to meet changing requirements, and that there is a strategy for ensuring its continued relevance.

Standards Goals from EISA:

- Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid.
- Dynamic optimization of grid operations and resources, with full cyber-security.
- Deployment and integration of distributed resources and generation, including renewable resources.
- Development and incorporation of demand response, demand-side resources, and energy-efficiency resources.
- Deployment of “smart” technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation.
- Integration of “smart” appliances and consumer devices.
- Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning.
- Provision to consumers of timely information and control
- Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.
- Lowering of unreasonable or unnecessary barriers to adoption of Smart Grid technologies, practices, and services.

3 Catalog Documentation Structure

The Catalog is represented by three components:

- IKB TWiki Pages:

<http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/SGIPCatalogOfStandards>

The Catalog is presented on the TWiki as a table of records with search and sort capabilities. These records are grouped according to their status (see Catalog Status Record description below).

As part of this record, links to the associated artifacts described in this document are included.

- Artifacts specified in this document:

Standards Information Template, Development Process Statement, and the Criteria and Analysis Report.

- Catalog Tracking Data set:

A data set that tracks the status of all standards in the Catalog having at least the information in the Catalog Status Record.

3.1 Catalog Status Record

Each entry in the Catalog is associated with a Catalog Status Record that maintains a set of summary attributes. These attributes are maintained in electronic form and define the current status of the Catalog entry and the characteristics of the associated standard.

The attributes of the Catalog Status Record and associated values are specified below (this is a subset of the Standards Information Template).

Section I: Smart Grid Standards Catalog Record Definition		
	Attribute Description	Explanation / Permissible Values
Identification and Affiliation		
1	Identifier of the standard	Standard designator assigned by the publishing organization
2	Title of the standard	Text title by which the document is known
3	Name of owner organization	
4	Latest versions, stages, dates	Revision, drafting and date designators assigned by SSO

5	URL(s) for the standard	Document URL(s) if available
6	SSO Working Group / Committee responsible for the standard	Official Committee designator
7	Original source of the content (if applicable)	
8	Brief description of scope of the standard	
Level of Standardization		
1	Level of Standard (check all that apply)	<input type="checkbox"/> International <input type="checkbox"/> National <input type="checkbox"/> Regional <input type="checkbox"/> Industry de facto
2	Type of document	<input type="checkbox"/> Standard <input type="checkbox"/> Report <input type="checkbox"/> Guide <input type="checkbox"/> Technical Specification
3	Level of Release	<input type="checkbox"/> Released <input type="checkbox"/> In Development <input type="checkbox"/> Proposed
Standards Development Process		
1	Openness	<input type="checkbox"/> Yes <input type="checkbox"/> No
2	Balance of interests	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	Due process	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	Appeals process	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	Consensus	<input type="checkbox"/> Yes <input type="checkbox"/> No
6	Process Type (check all that apply)	<input type="checkbox"/> ANSI Accredited <input type="checkbox"/> International SDO <input type="checkbox"/> Industry Consortium <input type="checkbox"/> Users Group <input type="checkbox"/> Multi Company Agreement <input type="checkbox"/> Open Source

7	IPR Regime for the proposed standard	
7a	Information regarding the Sponsoring Organization's IPR Policy documents applicable to the Standard, as provided by the Sponsoring Organization	[insert here]
7b	The Sponsoring Organization's Information, if any, regarding IPR-related Disclosures and Licensing applicable to the Standard (to the extent this information is publicly available), as provided by the Sponsoring Organization:	[insert here]
Support, Conformance, Certification and Testing		
1	Name of the users' group or manufacturers' group (if any)	
2	Test procedures are defined to test compliance and/or interoperability with this standard? (check all that apply)	<input type="checkbox"/> Internal to the lab <input type="checkbox"/> Published by standards organization <input type="checkbox"/> Published by users group <input type="checkbox"/> No procedures, informal testing
3	Scope of defined test procedures (check all that apply)	<input type="checkbox"/> Interoperability Testing <input type="checkbox"/> Conformance Testing <input type="checkbox"/> Security Testing <input type="checkbox"/> No Testing
4	Certification type (check all that apply)	<input type="checkbox"/> Interoperability Certificate <input type="checkbox"/> Conformance Certificate <input type="checkbox"/> Security Certificate (text document) <input type="checkbox"/> No Certificates
5	Is there a program to approve test labs?	<input type="checkbox"/> Yes <input type="checkbox"/> No

6	Is there a published conformance checklist or table?	<input type="checkbox"/> Yes <input type="checkbox"/> No
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Section II: Functional Description of the Standard

NIST Conceptual Model Application Domains:
Please see <http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/SGConceptualModel> for a description of these Domains.

1	Markets	<input type="checkbox"/> Yes <input type="checkbox"/> No
2	Operations	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	Service Provider	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	Bulk Generation	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	Transmission	<input type="checkbox"/> Yes <input type="checkbox"/> No
6	Distribution	<input type="checkbox"/> Yes <input type="checkbox"/> No
7	Customer	<input type="checkbox"/> Yes <input type="checkbox"/> No

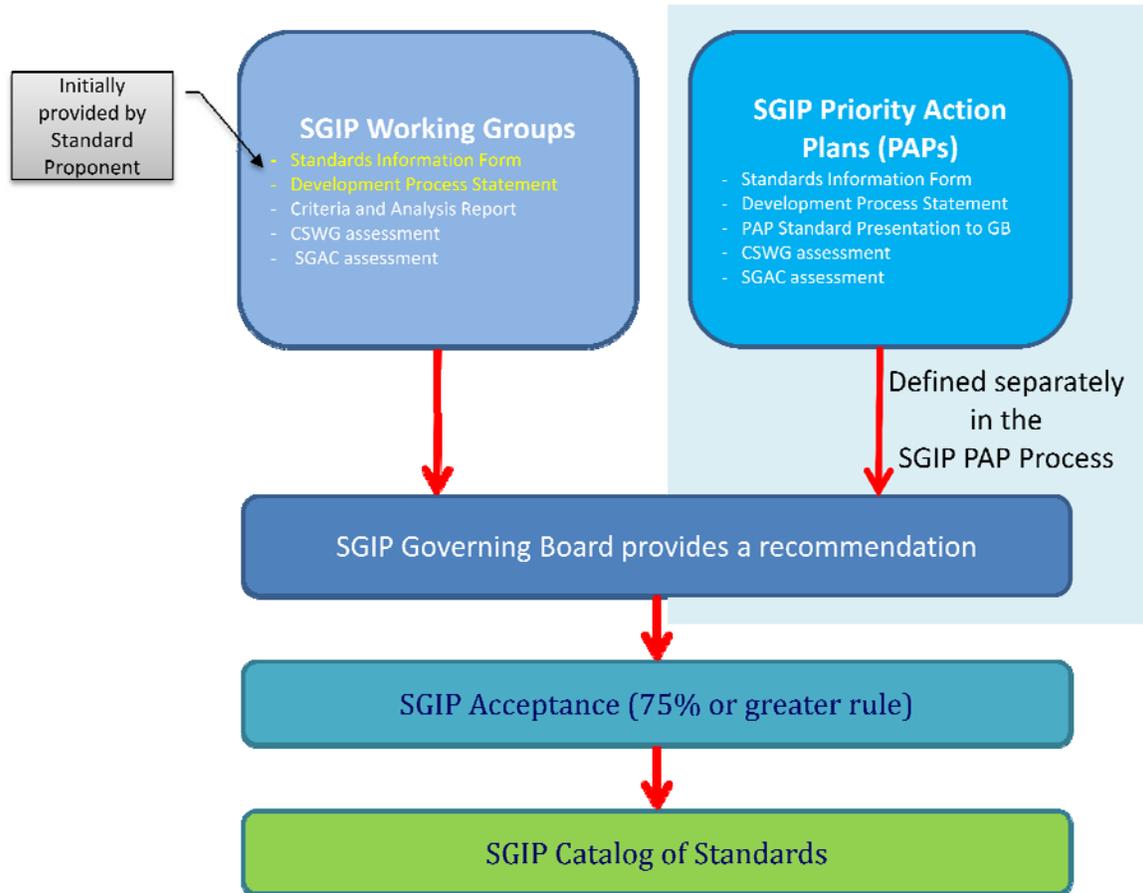
GridWise Architecture:
Please identify which layers this standard specifies, as described in http://www.gridwiseac.org/pdfs/interopframework_v1_1.pdf, and the applicable section of the standard. Note the mapping to the Open Systems Interconnect (OSI) model is approximate.

1	Layer 8: Economic/Regulatory Policy	<input type="checkbox"/> Yes <input type="checkbox"/> No
2	Layer 7: Business Objectives	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	Layer 6: Business Procedures	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	Layer 5: Business Context	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	Layer 4: Semantic Understanding (information model)	<input type="checkbox"/> Yes <input type="checkbox"/> No
6	Layer 3: Syntactic Interoperability (OSI)	<input type="checkbox"/> Yes <input type="checkbox"/> No

	layers 5-7)	
7	Layer 2: Network Interoperability (OSI layers 3-4)	<input type="checkbox"/> Yes <input type="checkbox"/> No
8	Layer 1: Basic Connectivity (OSI layers 1-2)	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Cyber Security and Privacy Issues</p> <p>Please provide an explanation in the box beside the heading for any questions answered “Not applicable.” If the question is not applicable because the function is provided in another layer or standard, please suggest any likely candidates. Note that “the standard” refers to the technology specified by the standard, not the documents themselves.</p>		
1	Cyber Security Support	<input type="checkbox"/> Within this standard <input type="checkbox"/> By other standards <input type="checkbox"/> None
2	Does the standard provide authentication?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3	Does the standard permit role-based access control?	<input type="checkbox"/> Yes <input type="checkbox"/> No
4	Does the standard provide encryption? If so, please list any security algorithms and standards used.	<input type="checkbox"/> Yes <input type="checkbox"/> No
5	Does the standard facilitate logging and auditing of security events?	<input type="checkbox"/> Yes <input type="checkbox"/> No
6	Privacy Support	<input type="checkbox"/> Within this standard <input type="checkbox"/> By other standards <input type="checkbox"/> None

4 Procedures

The following figure illustrates the overall process of bringing standards into the Catalog:



4.1 Adding to Catalog

A standard may be added to the Catalog at any time.

Standards are entered into the Catalog ultimately through a decision by the SGIP voting members. As adding or removing an item to the Catalog is considered a technical matter 75% or greater of the quorum, as detailed in sections 2.5.7 and 2.5.8 of the SGIP bylaws, is required for approval.

The SGIP has a separate process by which Priority Action Plans (PAPs) are created and their standards accepted by the SGIP Governing Board, as shown in the figure. These standards enter the process described herein at step 11.

The following procedure identifies the steps in adding a standard to the Catalog (note the figure above illustrates this process starting at step 4 after a standard has been assigned to a working group):

- 1) Any entity can propose a standard for inclusion in the SGIP Catalog.

- 2) The Sponsoring Organization or other entity cognizant of a standard's detail and applicability shall provide the Standards Information Template¹. In connection with the "IPR Regime" Item under "Standards Development Process" relating to IPR, the Sponsoring Organization will be asked to provide links to relevant information that is maintained on the Sponsoring Organization's Website. If the Sponsoring Organization does not maintain such information on its Website, it will be asked to provide an electronic copy (to the extent that this information is publicly available) to the SGIP that the SGIP can then make available. There are two categories of information that will be sought: (1) information regarding all applicable IPR-related policies that were in effect with regard to the candidate Standard (including policies relating to patents, copyrights, confidential information, marks and logos and any other proprietary rights), and (2) information regarding any IPR-related disclosures or licensing statements regarding the candidate Standard.
- 3) Organization constructs Development Process Statement (see section 5.2).
- 4) These two initial documents are provided to the SGIP Administrator who consults with the Plenary leadership to assign a specific Working Group to produce the Criteria and Analysis Report.
- 5) The assigned SGIP Working Group constructs the Criteria and Analysis Report.
- 6) The Criteria and Analysis Report recommends one of the following:
 - a. Approve inclusion of the standard as is;
 - b. Decline inclusion of the standard with cause. Such a recommendation may recommend revisions to the specification or it may propose that a PAP be formed to address gaps needed for better satisfying the selection criteria.
- 7) The CSWG makes an assessment whether the standard is consistent with its requirements.
- 8) The SGAC makes an assessment whether the standard is consistent with its requirements.
- 9) WG reaches a consensus or if it is unable to reach a consensus conducts a vote. Upon arriving at a consensus or voting in the affirmative, the issue is elevated to the SGIP GB to make a recommendation before being sent to the SGIP Plenary for disposition.
- 10) SGIP GB reaches a consensus or if it is unable to reach a consensus conducts a vote whether to recommend the standard to the SGIP Plenary. Since this is considered a technical matter 75% or greater of the quorum, as detailed in sections 2.5.7 and 2.5.8 of the SGIP bylaws, is required for approval.
- 11) SGIP Plenary conducts a vote on a single standard basis. Since this is considered a technical matter 75% or greater of the quorum, as detailed in sections 2.5.7 and 2.5.8 of the SGIP bylaws, is required for approval.

¹ <http://collaborate.nist.gov/wiki-sggrid/pub/SmartGrid/SGIPCatalogOfStandards/SmartGridStandardsInformationTemplate.docx>

4.2 Removal from Catalog

A standard may be removed from the Catalog at any time. The following procedure identifies the steps in removing a standard from the Catalog:

- 1) Any SGIP Working Group may produce a Removal Rationale White Paper
- 2) The proposing Working Group reaches a consensus or if it is unable to reach a consensus conducts a vote. Since this is considered a technical matter 75% or greater of the quorum, as detailed in sections 2.5.7 and 2.5.8 of the SGIP bylaws, is required for approval. Upon arriving at a consensus or voting in the affirmative, the issue is elevated to the SGIP GB to make a recommendation before being sent to the SGIP Plenary for disposition.
- 3) SGIP GB reaches a consensus or if it is unable to reach a consensus conducts a vote whether to recommend removing the standard from the Catalog to the SGIP Plenary. Since this is considered a technical matter 75% or greater of the quorum, as detailed in sections 2.5.7 and 2.5.8 of the SGIP bylaws, is required for approval.
- 4) SGIP Plenary conducts a vote on a single standard basis on whether to remove the standard from the Catalog. Since this is considered a technical matter 75% or greater of the quorum, as detailed in sections 2.5.7 and 2.5.8 of the SGIP bylaws, is required for approval.

4.3 Maintenance and Reaffirmation of the Catalog Entries

Standards in the Catalog are assumed to be under continuous review. Should the SGIP community detect a significant change in the applicability or availability of a standard, the Adding or Removing procedures can be invoked. Additionally the Catalog status can be reviewed and updated using the “Adding to Catalog” procedure steps 5) through 11).

A review of the applicability of a specification and reaffirmation of its inclusion in the Catalog shall be mandatory if the applicability has not otherwise been reaffirmed after 7 years from its inclusion or a prior reaffirmation.

5 Artifacts Produced to Manage the Catalog

These artifacts are produced in conjunction with the initiation, affirmation, and removal of Catalog entries.

5.1 Standards Information Template

The Standards Information Template provides a list of characteristics about a Catalog entry. It is developed as a survey to be completed by the Sponsoring Organization or other entity cognizant of a standard's detail and applicability. Refer to the Standards Information Template in the references section for the current template (1.4 References). This template provides the list and definition of the characteristics collected for each entry.

5.2 Development Process Statement

The entity proposing inclusion of a Standard into the Catalog shall provide materials describing the process under which the proposed specification was developed.

The National Technology Transfer and Advancement Act (NTTAA) describes characteristics desirable to aid the uptake of technologies developed, in part, with United States government support. OMB Circular A-119 elaborates the definitions and requirements for voluntary consensus standards. Support for these characteristics is therefore encouraged, although not required.

If the Standard was produced under an ANSI-accredited process, this statement can be a simple statement referring to this ANSI accreditation of the organization and its application to this standard.

If ANSI accreditation was not sought or obtained, the organization should make statements of support for the maxims "i" through "v" which are quoted below for reference (NTTAA reference, OMB Circular A-119 section 4 "What are Voluntary, Consensus Standards"; refer to *ANSI Essential Requirements: Due process requirements for American National Standards* (January 2010) for definitions of terms). The organization should indicate how support for each maxim in the excerpt below, from the above-mentioned reference, is achieved for the standard:

a. For purposes of this policy, "voluntary consensus standards" are standards developed or adopted by voluntary consensus standards bodies, both domestic and international. These standards include provisions requiring that owners of relevant intellectual property have agreed to make that intellectual property available on a non-discriminatory, royalty-free or reasonable royalty basis to all interested parties. For purposes of this document, "technical standards that are developed or adopted by voluntary consensus standard bodies" is an equivalent term.

(1) "Voluntary consensus standards bodies" are domestic or international organizations which plan, develop, establish, or coordinate voluntary

consensus standards using agreed-upon procedures. A voluntary consensus standards body is defined by the following attributes:

- (i) Openness.
- (ii) Balance of interests.
- (iii) Due process.
- (iv) An appeals process.
- (v) Consensus, which is defined as general agreement, but not necessarily unanimity, and includes a process for attempting to resolve objections by interested parties, as long as all comments have been fairly considered, each objector is advised of the disposition of his or her objection(s) and the reasons why, and the consensus body members are given an opportunity to change their votes after reviewing the comments.

Additionally, the intellectual property rights associated with use of this standard should be described.

5.3 Criteria and Analysis Report

A white paper is produced by an SGIP Working Group (WG) analyzing the standards applicability to the SGIP Catalog according to the specific criteria presented in Section 2, Criteria for Listing in the Catalog.

5.4 Removal Rationale White Paper

A White Paper is produced stating the rationale for recommended removal of a standard from the SGIP Catalog.