

## **Guidelines for the Use of Wireless Communications – Smart Grid Priority Action Plan**

### **What:**

Guidelines for the use of wireless communications for different smart grid applications (6.1.5 Communications Interference in Unlicensed Radio Spectrums)

### **Abstract:**

This work area investigates the strengths, weaknesses, capabilities, and constraints of existing and emerging standards-based technologies for wireless communications. The approach is to work with key SDO committees to determine the characteristics of each technology for smart grid application areas and types. Results are used to assess the appropriateness of wireless communications technologies for meeting smart grid applications.

### **Description:**

Review existing documentation and on-going work to assess the capabilities and weaknesses of wireless technologies operating in both licensed and unlicensed bands and to develop guidelines on their use for different Smart Grid application requirements.

### **Objectives:**

- Identify requirements for use of wireless technologies for different smart grid applications
- Identify approaches to define the strengths and weaknesses of candidate wireless technologies to assist Smart Grid design decisions
- Analyze both intentional and un-intentional interference issues and develop coexistence guidelines for deployment and operation
- Identify guidelines for effectively, safely, and securely employing wireless technologies for different smart grid applications
- Identify key issues to be addressed in wireless assessments and development for the Smart Grid

### **Why:**

Wireless technologies are one of many types of media that could meet many Smart Grid requirements by enabling access where other media are too costly or otherwise not workable. However, different types of wireless technologies also have different availability, time-sensitivity, and security characteristics that may constrain what applications they are suitable for. Therefore, different wireless technology must be used with knowledge of their varying capabilities and weaknesses in all plausible conditions of operation. This work provides objective information on the appropriateness of use.

### **Where:**

Wireless can be used in field environments across the smart grid including generation plants, transmission systems, substations, distribution systems, and customer premises communications.

The choice of wireless or non-wireless, as well as type of wireless must be made with knowledge of the appropriate use of the technology.

**How:**

**Task Descriptions**

1) Segment the SG domains into different wireless environments/groups that could use similar sets of requirements.

Who: IEEE 802 (Bruce Kraemer, Roger Marks, Mark Kelerer, Bob Heile, Phil Beecher) will organize with support from P2030 and others. OpenSG will serve as a reviewer.

2) Develop a common set of terminology and definitions used by wireless and smart grid communities

Who: same participants as task 1

3) Compile and communicate Smart Grid requirements and use cases in a standardized format mapped into categories identified in task 1

Who: OpenSG (Chris Knudsen UCAiug) in coordination with EPRI and DOE clearinghouse, to be reviewed by P2030

4) Create an attribute list and performance metrics for wireless standards

Who: IEEE 802

5) Create an inventory of wireless technologies based on the metric develops in task 4 to be filled by each SDO.

Who: Each SDO, OpenSG to assemble input and solicit expertise from other SDOs (www.ucaiug.org)

6) Perform the mapping and conduct an evaluation of the wireless technologies based on the criteria and metrics developed in task 4.

Identify gaps where appropriate.

Who: OpenSG with coordination from other SDOs

**Deliverables**

Develop along with project team.

**Who:**

Project Team
NIST Lead: David Su, david.su@nist.gov
EPRI Leads: Erich Gunthe, erich@enernex.com

<b>Project Team</b>
SDO Leads: IEEE 802: Paul Nikolich, Roger Marks, Bruce Kraemer, Mark Klerer, Steve Shellhammer, Phil Beecher Zigbee Alliance: Bob Heile, Skip Ashton ISA SP100: Wayne Manges WiFi: Greg Ennis IETF: Geoffrey Mulligan TIA: Ed Tiedemann UCAiug: Chris Knudsen ATIS: Stephen Hayes P2030: Dick DeBlasio
Users Groups: Utility Telecom Council (UTC)

**When:** [*Timeline for deliverables.*]

Task Description	Responsible	Date	Notes
Task 1: Segment the SG domains into different wireless environments/groups	IEEE 802 (Bruce Kraemer, Roger Marks, Mark Kelerer, Phil Beecher) will organize with support from P2030. OpenSG will serve as a reviewer.	TBD	
Task 2: Develop a common set of terminology and definitions	same participants as task 1	TBD	
Task 3: Compile and communicate Smart Grid requirements and use cases based on the grouping defined in task 1.	OpenSG (Chris Knudsen UCAiug) in coordination with EPRI and DOE clearinghouse, to be reviewed by P2030	TBD	Need in a standardized format. To include security, interference, QoS, etc,etc,etc.
Task 4: Create an attribute list and performance metrics for wireless standards	IEEE 802	TBD	
Task 5: Create an inventory of wireless technologies based on the metric develops in task 4	Each SDO, OpenSG to assemble input and solicit expertise from other SDOs (www.ucaiug.org)	TBD	Tasks 5 and 6 need to consider wired tachnologies
Task 6: Perform the mapping and conduct an evaluation of the wireless technologies based on the criteria and metrics developed in task 4	OpenSG with coordination from other SDOs	TBD	Gaps need to be identified

**Metrics:**

*Issues, Comments, or Observations of Note*

The approach developed here to evaluate the suitability of wireless technologies for various Smart Grid environments should also be used to develop guidelines to wired technologies.

The timeline for completion of the tasks needs to be months if the guidelines are going to be useful for meter deployments that are occurring now, or distribution automation which may take longer but in many cases will use the same communications infrastructure