

TECHNICAL REPORT

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**Wireless User Requirements
for Factory Automation**

Approved 26 May 2011

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Wireless User Requirements for Factory Automation

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ISA
67 Alexander Drive
P. O. Box 12277
Research Triangle Park, North Carolina 27709
USA

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Introduction

The International Society of Automation (ISA) established ISA100, Wireless Systems for Automation, to address wireless manufacturing and control systems issues, such as:

- The environment in which the wireless technology is deployed;
- Technology and life cycle for wireless equipment and systems; and
- The application of wireless technology.

The Committee's focus is to improve the confidence in, integrity of, and availability of components or systems used for manufacturing or control, and to provide criteria for procuring and implementing wireless technology in the control system environment. Compliance with the Committee's guidance will improve manufacturing and control system deployment and will help identify vulnerabilities and address them, thereby reducing the risk of compromising or causing manufacturing control systems degradation or failure.

This ISA Technical Report is intended to define user and market-related requirements for design, operation, and maintenance of a wireless system throughout its life cycle in applications described as factory automation. Specific technology or technology-related requirements have not been explicitly addressed in this document so that designers and developers of wireless systems for factory automation can apply their expertise, creativity, and innovation to develop solutions to meet the users' requirements of the technology. For the purposes of this technical report, factory automation refers to control and information systems that are characterized by discrete operations with possible extensions into batch process control (the combination of discrete and batch is often referred to as hybrid control).

NOTE The ISA100 standards development committee welcomes and values feedback on this technical report. If you have comments on the value of this document or suggestions for improvements or additional topics, please send or email those comments to:

ISA100
ISA Standards
67 Alexander Drive
Research Triangle Park, NC 27709 USA
Email: standards@isa.org

Tel: +1 919 990 9200
Fax: +1 919 549 8288

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1 Scope

This technical report presents descriptive user and market-related requirements of wireless communication in factory automation applications. It provides

- references to all six ISA100 usage classes;
- use case descriptions and comparisons;
- descriptions of factory automation topologies; and
- recommendations for attributes and values for existing, emerging, and conceptual solutions for wireless communications as applied to factory automation applications.

2 Normative references

There are no normative references involved in using this document. However, see Annex C for a bibliography.

3 Terms, definitions, and acronyms

3.1 Terms and definitions

3.1.1

access point

device that serves as the aggregation point for wireless signals from multiple nodes and as a wired or wireless bridge for those signals to a control system (e.g., PLC)

3.1.2

actuator

device providing output to the process or machine under control e.g. solenoid, motor starter, or lamp

3.1.3

asymmetric parallel operation

multiple gateways attached to a network of devices, each using a different application protocol with each network able to route the various protocols through tunneling mechanisms

3.1.4

cluster

group of nodes in close proximity, all sharing a common access point

3.1.5

cluster capacity

maximum number of nodes in a single cluster

3.1.6

coexistence

ability of multiple systems to perform their tasks in a given environment where they may or may not be using a similar set of rules (from ISA-100.11a-2009)

3.1.7

critical communication path

prescribed route for connecting two or more devices together to provide a high degree of assurance of successful communication while also defining clear expectations for device behavior in the event of communication faults or failure

3.1.8

determinism

ability for all messages from one system to another to arrive within a defined time interval given a specific error rate