



# PUBLICLY AVAILABLE SPECIFICATION

## PRE-STANDARD



**Industrial communication networks – Fieldbus specifications –  
Wireless systems for industrial automation: process control and related  
applications**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL COMMUNICATION NETWORKS –  
FIELDBUS SPECIFICATIONS –**

**Wireless systems for industrial automation: process control  
and related applications**

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This specification is based on ISA 100.11a-2011.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
65C/650/PAS	65C/667A/RVD

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Withdrawn

## INTRODUCTION

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents from NIVIS LLC (US 20100027437 – Systems and Methods for Determining Link Quality, and US20100098204 – Systems and Methods for Regulating Clock Precision in Distributed Devices).

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## INDUSTRIAL COMMUNICATION NETWORKS – FIELDBUS SPECIFICATIONS –

### Wireless systems for industrial automation: process control and related applications

#### 1 Scope

This Publicly Available Specification defines the OSI layer specifications (e.g., PhL, DL, etc.), security specifications, and management (including network and device configuration) specifications for wireless devices serving application classes 1 through 5 and optionally class 0 for fixed, portable, and moving devices.

NOTE Usage classes are described in Annex C.

It addresses the performance needs for periodic monitoring and process control where latencies on the order of 100 ms can be tolerated, with optional behavior for shorter latency.

The specification addresses:

- low energy consumption devices, and also those applications that have latency and latency variability constraints, with the ability to scale to address large installations;
- wireless infrastructure, interfaces to legacy infrastructure and applications, security, and network management requirements in a functionally scalable manner;
- robustness in the presence of interference found in harsh industrial environments and with legacy systems;
- coexistence with other wireless devices anticipated in the industrial work space, such as IEEE 802.11x, IEEE 802.16x, cell phones, and other relevant standards; and
- interoperability of ISA100 devices.

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE See the bibliography for informative references.

ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange*

ISO/IEC 9649-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements*

ISO/IEC 10118-2, *Information technology – Security techniques – Hash-functions – Part 2: Hash-functions using an n-bit block cipher*

ISO/IEC 10731, *Information technology – Open systems interconnection – Basic reference model – Conventions for the definition of OSI services*

ISO/IEC 19772, *Information technology – Security techniques – Authenticated encryption*

ANSI X9.63:2001, *Public key cryptography for the financial services industry – Key agreement and key transport using elliptic curve cryptography*. American Bankers Association, November 20, 2001

FIPS 197, *Advanced encryption standard (AES)*, Federal Information Processing Standards Publication 197, US Department of Commerce/N.I.S.T., Springfield, Virginia, November 26, 2001

FIPS 198, *The keyed-hash message authentication code (HMAC)*, Federal Information Processing Standards Publication 198, US Department of Commerce/N.I.S.T., Springfield, Virginia, March 6, 2002

IEEE Std 802.15.4™:2006, *Wireless medium access control (MAC) and physical layer (PhL) specifications for low rate wireless personal area networks (WPANs)*

IETF RFC 768, *User Datagram Protocol*

IETF RFC 2460, *Internet Protocol, Version 6 (IPv6) Specification*

IETF RFC 2988, *Computing TCP's Retransmission Timer*

IETF RFC 3610, *Counter with CBC-MAC (CCM)*

IETF RFC 3168, *The Addition of Explicit Congestion Notification (ECN) to IP*

IETF RFC 4944, *Transmission of IPv6 packets over IEEE Std 802.15.4 networks*  
<ftp://ftp.rfc-editor.org/in-notes/internet-drafts/draft-ietf-6LoWPAN-format-13.txt>

ISA 100.11a-2011, *Wireless systems for industrial automation: Process control and related applications*

*Standards for efficient cryptography*, SEC 1: Elliptic curve cryptography, version 1.0, Certicom Research, September 20, 2000

*Standards for efficient cryptography*, SEC 2: Recommended elliptic curve domain parameters, version 1.0, Certicom Research, September 20, 2000

*Standards for efficient cryptography*, SEC 4: Elliptic curve Qu-Vanstone implicit certificate scheme, version 0.9, Certicom Research, November 14, 2007

SEC1 (version 1.0), *Elliptic Curve Cryptography*