

*Recognized as an
American National Standard (ANSI)*

IEEE Std 802.11d-2001
(Amendment to IEEE Std 802.11, 1999 Edition,
IEEE Std 802.11a-1999, and IEEE Std 802.11b-1999)

**IEEE Standard for
Information technology—**

**Telecommunications and information
exchange between systems—**

Local and metropolitan area networks—

Specific requirements

**Part 11: Wireless LAN Medium Access Control (MAC) and
Physical Layer (PHY) specifications**

**Amendment 3: Specification for operation in additional
regulatory domains**

Sponsor

**LAN/MAN Standards Committee
of the
IEEE Computer Society**

Approved 14 June 2001
IEEE-SA Standards Board

Approved 25 October 2001
American National Standards Institute

Abstract: This amendment specifies the extensions to IEEE Std 802.11[□] for Wireless Local Area Networks providing specifications for conformant operation beyond the original six regulatory domains of that standard. These extensions provide a mechanism for an IEEE Std 802.11 access point to deliver the required radio transmitter parameters to an IEEE Std 802.11 mobile station, which allows that station to configure its radio to operate within the applicable regulations of a geographic or political subdivision. This mechanism is applicable to all IEEE Std 802.11 PHY types. A secondary benefit of the mechanism described in this amendment is the ability for an IEEE Std 802.11 mobile station to roam between regulatory domains.

Keywords: *international roaming, local area network (LAN), mobility, radio, roam, roaming, wireless, wireless network*

*The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA*

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*Print: ISBN 0-7381-2928-3 SH94941
PDF: ISBN 0-7381-2929-1 SS94941*

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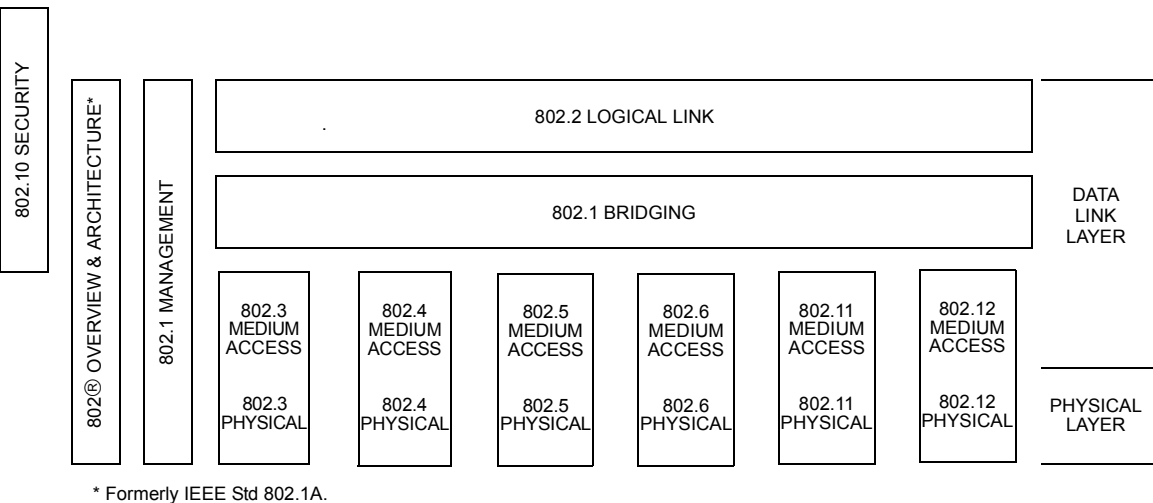
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Introduction

[This introduction is not a part of IEEE Std 802.11d-2001, IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 11: Wireless Medium Access Control (MAC) and Physical Layer (PHY) specifications—Amendment 3: Specification for operation in additional regulatory domains.]

This standard is part of a family of standards for local and metropolitan area networks. The relationship between the standard and other members of the family is shown below. (The numbers in the figure refer to IEEE standard numbers.)



This family of standards deals with the Physical and Data Link Layers as defined by the International Organization for Standardization (ISO) Open Systems Interconnection Basic Reference Model (ISO/IEC 7498-1:1994). The access standards define several types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Other types are under investigation.

The standards defining the technologies noted above are as follows:

- IEEE Std 802¹: *Overview and Architecture.* This standard provides an overview to the family of IEEE 802[®] Standards. This document forms part of the IEEE 802.1 scope of work.

¹The 802 Architecture and Overview Specification, originally known as IEEE Std 802.1A, has been renumbered as IEEE Std 802. This has been done to accommodate recognition of the base standard in a family of standards. References to IEEE Std 802.1A should be considered as references to IEEE Std 802.

- ANSI/IEEE Std 802.1B and 802.1K [ISO/IEC 15802-2]: *LAN/MAN Management*. Defines an Open Systems Interconnection (OSI) management-compatible architecture, and services and protocol elements for use in a LAN/MAN environment for performing remote management.
- ANSI/IEEE Std 802.1D *Medium Access Control (MAC) Bridges*. Specifies an architecture and protocol for the [ISO/IEC 15802-3]: interconnection of IEEE 802 LANs below the MAC service boundary.
- ANSI/IEEE Std 802.1E [ISO/IEC 15802-4]: *System Load Protocol*. Specifies a set of services and protocol for those aspects of management concerned with the loading of systems on IEEE 802 LANs.
- ANSI/IEEE Std 802.1F *Common Definitions and Procedures for IEEE 802 Management Information*.
- ANSI/IEEE Std 802.1G [ISO/IEC 15802-5]: *Remote Media Access Control (MAC) Bridging*. Specifies extensions for the interconnection, using non-LAN systems communication technologies, of geographically separated IEEE 802 LANs below the level of the logical link control protocol.
- ANSI/IEEE Std 802.1H [ISO/IEC TR 11802-5] *Recommended Practice for Media Access Control (MAC) Bridging of Ethernet V2.0 in IEEE 802 Local Area Networks*.
- ANSI/IEEE Std 802.1Q *Virtual Bridged Local Area Networks*. Defines an architecture for Virtual Bridged LANs, the services provided in Virtual Bridged LANs, and the protocols and algorithms involved in the provision of those services.
- ANSI/IEEE Std 802.2 [ISO/IEC 8802-2]: *Logical Link Control*.
- ANSI/IEEE Std 802.3 [ISO/IEC 8802-3]: *CSMA/CD Access Method and Physical Layer Specifications*.
- ANSI/IEEE Std 802.4 [ISO/IEC 8802-4]: *Token Bus Access Method and Physical Layer Specifications*.
- ANSI/IEEE Std 802.5 [ISO/IEC 8802-5]: *Token Ring Access Method and Physical Layer Specifications*.
- ANSI/IEEE Std 802.6 [ISO/IEC 8802-6]: *Distributed Queue Dual Bus Access Method and Physical Layer Specifications*.
- ANSI/IEEE Std 802.10: *Interoperable LAN/MAN Security*. Currently approved: Secure Data Exchange (SDE).
- ANSI/IEEE Std 802.11: [ISO/IEC 8802-11] *Wireless LAN Medium Access Control (MAC) Sublayer and Physical Layer Specifications*.
- ANSI/IEEE Std 802.12: [ISO/IEC 8802-12] *Demand Priority Access Method, Physical Layer and Repeater Specification*.
- IEEE Std 802.15: *Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for: Wireless Personal Area Networks*.

- IEEE Std 802.16: *Standard Air Interface for Fixed Broadband Wireless Access Systems.*
- IEEE Std 802.17: *Resilient Packet Ring Access Method and Physical Layer Specifications.*

In addition to the family of standards, the following is a recommended practice for a common physical layer technology:

- IEEE Std 802.7: *IEEE Recommended Practice for Broadband Local Area Networks.*

The reader of this standard is urged to become familiar with the complete family of standards.

Conformance test methodology

An additional standards series, identified by the number 1802, has been established to identify the conformance test methodology documents for the IEEE 802 family of standards. Thus the conformance test documents for IEEE 802.3 are numbered IEEE 1802.3, the conformance test documents for IEEE 802.5 will be IEEE 1802.5, and so on. Similarly, ISO will use IEEE 18802 to number conformance test standards for IEEE 8802 standards.

Participants

At the time this amendment to the standard was submitted to Sponsor Ballot, the working group had the following membership:

Stuart J. Kerry, *Chair*
Al Petrick and **Harry Worstell**, *Vice-Chairs*
Tim Godfrey, *Secretary*

Bob O'Hara, *Chair Task Group d*
Bob O'Hara, *Technical Editor, 802.11d*

John Fakatselis, *Chair Task Group e*
Michael Fischer, *Technical Editor, 802.11e*

Dave Bagby, *Chair Task Group f*
Bob O'Hara, *Technical Editor, 802.11f*

Matthew Shoemake, *Chair Task Group g*

James Allen
 Matthew Alspaugh
 Keith Amann
 Keith B. Amundsen
 Carl F. Andren
 Jay Bain
 Kevin M. Barry
 Jan Boer
 Ronald Brockmann
 Colum Caldwell
 Naftali Chayat
 W. C. Chen
 Sunghyun Choi
 Ken Clements
 Wm. Caldwell Crosswy
 Wim Diepstraten
 Peter Ecclesine
 Richard Eckard
 Greg Ennis
 Amar Ghorl
 Ian Gifford
 Steven D. Gray
 Evan Green
 Rajugopal Gubbi
 David Halasz
 Christopher J. Hansen
 Kei Hara
 Victor Hayes
 Allen Heberling
 Chris Heegard
 Robert Heile

Juha Heiskala
 Jin-Meng Ho
 Maarten Hoebe
 Frank P. Howley, Jr.
 Robert Y. Huang
 Masataka Iizuka
 Masayuki Ikeda
 Donald C. Johnson
 Tal Kaitz
 Kevin Karcz
 Mika Kasslin
 Jamshid Khun-Jush
 Ryoji Kido
 Ken Kimura
 Etsuzo Kimura
 Duncan Kitchin
 John M. Kowalski
 Bruce P. Kraemer
 Denis Kuwahara
 Jerry Loraine
 André Martin
 Bill McFarland
 Daniel R. McGlynn
 Michael D. McInnis
 Reiner Mim
 Masahiro Morikura
 Peter Murray
 Ravi P. Nalamati
 Erwin R. Noble
 Tomoki Ohsawa
 Kazuhiro Okanoue

Richard H. Paine
 Gregory Parks
 Victoria M. Poncini
 Anand R. Prasad
 Ivan Reede
 Stanley A. Reible
 Carlos A. Rios
 Gunnar Rydnell
 Anil K. Sanwalka
 Sid Schrum
 Thomas Siep
 David Skellern
 Donald I. Sloan
 Gary Spiess
 Hitoshi Takanashi
 Carl Temme
 Steve M. Thatcher
 Satoru Toguchi
 Mike Trompower
 Chih C. Tsien
 Tom Tsoulogiannis
 Jesse R. Walker
 Robert M. Ward Jr.
 Menzo Wentink
 Steven D. Williams
 Alan Winkowski
 Hidehiro Yamashita
 Wen-Ping Ying
 Albert Young
 Chris Zegelin
 Jim Zyren

Major contributions were received from the following individuals:

Ken Clements
 Darwin A. Engwer
 Chris Zegelin
 Johnny Zweig
 Arnoud Zwemmer

The following members of the balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Carl F. Andren	Julio Gonzalez-Sanz	Paul Nikolich
Jack S. Andresen	Chris G. Guy	Erwin R. Noble
Kevin M. Barry	Simon Harrison	Bob O'Hara
Jan Boer	Victor Hayes	Roger Pandanda
James T. Carlo	Bob J. Hughes	Vikram Punj
Keith Chow	James Ivers	Gary S. Robinson
Guru Dutt Dhingra	Raj Jain	James W. Romlein
Muhammad Dhodhi	Jacob W. Joergensen	Doug Rosener
Thomas J. Dineen	A. Kamerman	Robert Russell
Mary A. DuVal	Stuart J. Kerry	Chaim Shenhav
Edward A. Dunlop	Randolph S. Little	Jerry A. Thrasher
Sourav K. Dutta	Gregory Luri	Polychronis D. Tzerefos
Peter Ecclesine	James S. Marin	Mark-Rene Uchida
Darwin A. Engwer	Peter Martini	Scott A. Valcourt
John W. Fendrich	Mobolaji Martins	John Viaplana
Michael A. Fischer	Richard McBride	Paul A. Willis
Gautam Garai	Bennett Meyer	Forrest D. Wright
Patrick S. Gonia	Robert Mortonson	Oren Yuen
	Wayne D. Moyers	

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Contents

2.	Normative references	1
4.	Abbreviations and acronyms	1
7.	Frame formats	2
9.	MAC sublayer functional description	7
11.	MAC sublayer management entity	11
14.	Frequency-Hopping spread spectrum (FHSS) PHY specification for the 2.4 GHz Industrial, Scientific, and Medical (ISM) band.....	11
	Annex A (normative) Protocol Implementation Conformance Statement (PICS) proforma	12
	Annex C (normative) Formal description of MAC operation	14
	Annex D (normative) ASN.1 encoding of the MAC and PHY MIB.....	18
	Annex E (informative) Bibliography.....	26

IEEE Standard for Information technology—

Telecommunications and information exchange between systems—

Local and metropolitan area networks—

Specific requirements

Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications

Amendment 3: Specification for operation in additional regulatory domains

[This amendment is based on the current edition of IEEE Std 802.11, 1999 Edition and the IEEE Std 802.11a-1999 and IEEE Std 802.11b-1999 amendments.]

NOTE—The editing instructions contained in this amendment define how to merge the material contained herein into the existing base standard to form the new comprehensive standard as created by the addition of IEEE Std 802.11-1999.

The editing instructions are shown in ***bold italic***. Three editing instructions are used: change, delete, and insert. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed either by using strikethrough (to remove old material) or underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. Editorial notes will not be carried over into future editions.

2. Normative references

Insert the following text into Clause 2 as follows:

ISO/IEC 3166-1:1997, Codes for the representation of names of countries and their subdivisions—Part 1: Country codes.

4. Abbreviations and acronyms

Insert the following text in the appropriate location in Clause 4 in alphabetical order:

EHCC Extended hyperbolic congruence codes

HCC Hyperbolic congruence codes

7. Frame formats

7.2.3.1 Beacon frame format

Insert the following text at the end of the first paragraph of 7.2.3.1:

If the dot11MultiDomainCapabilityEnabled attribute is true, a STA shall include a Country Information element in the transmission of Beacon frames. Optionally, the Beacon frame format may also include the information described in either or both of orders 12 and 13. If the information in both orders 12 and 13 are sent, they shall describe the same hopping pattern. Note that the information described in orders 12 and 13 also may be contained in the Probe Response frame.

Insert the following rows at the end of Table 5:

Table 5—Beacon frame body

Order	Information	Notes
11	Country Information	The Country Information element shall be present when dot11MultiDomainCapabilityEnabled is true
12	FH Parameters	FH Parameters as specified in 7.3.2.13 may be included if dot11MultiDomainCapabilityEnabled is true
13	FH Pattern Table	FH Pattern Table information as specified in 7.3.2.14 may be included if dot11MultiDomainCapabilityEnabled is true

7.2.3.8 Probe Request frame format

Insert the following text at the end of the first paragraph of 7.2.3.8:

If the dot11MultiDomainCapabilityEnabled attribute is true, a STA may include a Request Information Element in the Probe Request frame. The format of the Request Information Element is specified in 7.3.2.15.

Insert order 3 with information field “Request information” in Table 11 as shown below:

Table 11—Probe Request frame body

Order	Information	Notes
3	Request information	May be included if dot11MultiDomainCapabilityEnabled is true

7.2.3.9 Probe Response frame format

Insert the following text at the end of the first paragraph of 7.2.3.9:

If the dot11MultiDomainCapabilityEnabled attribute is true, the Probe Response frame contains a Country information element and all information elements identified by the Requested Element IDs of a Request Information Element. Note that the information returned as a result of a Probe Request frame with a Request Information Element may include the FH parameters and/or the FH Pattern Table possibly replicating optional elements identified by orders 12 and 13.

A STA shall return only those information elements that it supports. In an improperly formed Request Information Element, a STA may ignore the first information element requested that is not ordered properly and all subsequent information elements requested. In the probe response frame, the STA shall return the requested information elements in the same order as requested in the Request Information Element.

Insert orders 10, 11, 12, and 13 with information fields in Table 12 as shown below.

Table 12—Probe response frame body

Order	Information	Notes
10	Country information	Included if dot11MultiDomainCapabilityEnabled is true
11	FH Parameters	FH parameters, as specified in 7.3.2.13, may be included if dot11MultiDomainCapabilityEnabled is true
12	FH Pattern Table	FH Pattern Table information, as specified in 7.3.2.14, may be included if dot11MultiDomainCapabilityEnabled is true
13-n	Requested information elements	Elements requested by the Request information element of the Probe Request frame.

7.3.2 Information elements

Insert the following information in Table 20 of 7.3.2 to identify new Element IDs in place of the Reserved place for IDs 7–15:

Table 20—Element IDs

Information Element	Element ID
Country	7
Hopping Pattern Parameters	8
Hopping Pattern Table	9
Request	10
Reserved	11-15