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IEEE Std 802.15.1™-2002

IEEE Standard for Information technology—  
Telecommunications and information exchange between systems—  
Local and metropolitan area networks—  
Specific requirements,

## **Part 15.1: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Wireless Personal Area Networks (WPANS)**

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## 5. General description

This standard is derived from the Bluetooth core, profiles, and test specifications (version 1.1) (see Siep [B13]). Portions of this standard consist of unaltered or minimally altered text of the Bluetooth specifications (see 2.4). This clause provides the general description of this standard and identifies the source of each of the subsequent clauses. The Bluetooth wireless technology is an industry specification for small form factor, low-cost wireless communication and networking between personal computers (PCs), mobile phones, and other portable devices.

### 5.1 IEEE and Bluetooth Special Interest Group (SIG), Inc., license agreement

The Bluetooth SIG wanted to have the IEEE adopt the Bluetooth specifications and make them a formal IEEE 802 standard. The IEEE requested and was granted a limited, nonexclusive, nontransferable license from the Bluetooth SIG to adopt or adapt and copy a portion of the Bluetooth specifications to be used as base material in IEEE Std 802.15.1-2002. An agreement in principle was struck in mid-1999, and final agreement was achieved in 2000.

Specifically, the license allows IEEE to create, publish, and distribute the standard as a stand-alone publication or as part of a collection together with other IEEE standards. The area covered by this standard is undergoing evolution. Revisions are anticipated within the next few years to clarify existing material, correct possible errors, and incorporate new related or supplement material. Information on the license or current revision state of this standard may be obtained from the Secretary, IEEE Standards Board. Information on the license or the current Bluetooth specifications should be directed to the Bluetooth SIG.

### 5.2 The origin of the document and layout

The first five clauses are standard IEEE introductory information. The overview, reference citation, unique definition, and acronym and abbreviation clauses are common to all IEEE 802 base standards. This clause, Clause 5, is generally used in these standards to provide guidance to the reader about the form and content of the standard. In this standard, Clause 5 is devoted to the specific relationship between this document and the original Bluetooth specifications. Clause 6 describes the interworkings and architecture of this standard. It also relates those attributes to the original Bluetooth constructs.

For the next five clauses, Clause 7 through Clause 11, the standard is derived from the Bluetooth core (Volume 1) specification (see 2.4.1). Clause 11 about host controller interface (HCI) is the only Bluetooth-derived section that has undergone significant editorial modification. These edits were applied to delete implementation-specific text as well as unrelated text. Clause 12 was added by IEEE to define the service access points (SAPs). IEEE 802-specific interfaces are documented in Clause 12. These interfaces describe how the lower layers of a Bluetooth implementation would interface with the traditional IEEE 802.2<sup>9</sup> logical link control (LLC) entity.

Annex A is also a derived text and corresponds to the Bluetooth Protocol Implementation Conformance Statement (PICS) proforma, which is a separate document from the Bluetooth specifications. Annex B was added by IEEE to define the high-level behavioral specification and description language (SDL) model for an integrated WPAN Bluetooth MAC sublayer (e.g., L2CAP, LM, and baseband) based on ITU-T Recommendation Z.100 (11/99)<sup>10</sup>. For the next five annexes, Annex C through Annex G, the standard uses additional derivation materials from the Bluetooth core (Volume 1) and profiles (Volume 2) specifications (see 2.4.1 and 2.3) to assist the reader: Part K:1, Generic Access Profile, from Volume 2, and Appendix VII, Optional Paging Scheme; Part I:1, Bluetooth Test Mode; Appendix VI, Baseband Timers; and Appendix IX, Message Sequence Charts, from Volume 1, respectively. The last annex is the bibliography.

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<sup>10</sup>For information on references, see Clause 2.

Figure 1 maps the IEEE Std 802.15.1-2002 clauses to the applicable portion of the Bluetooth protocol stack.

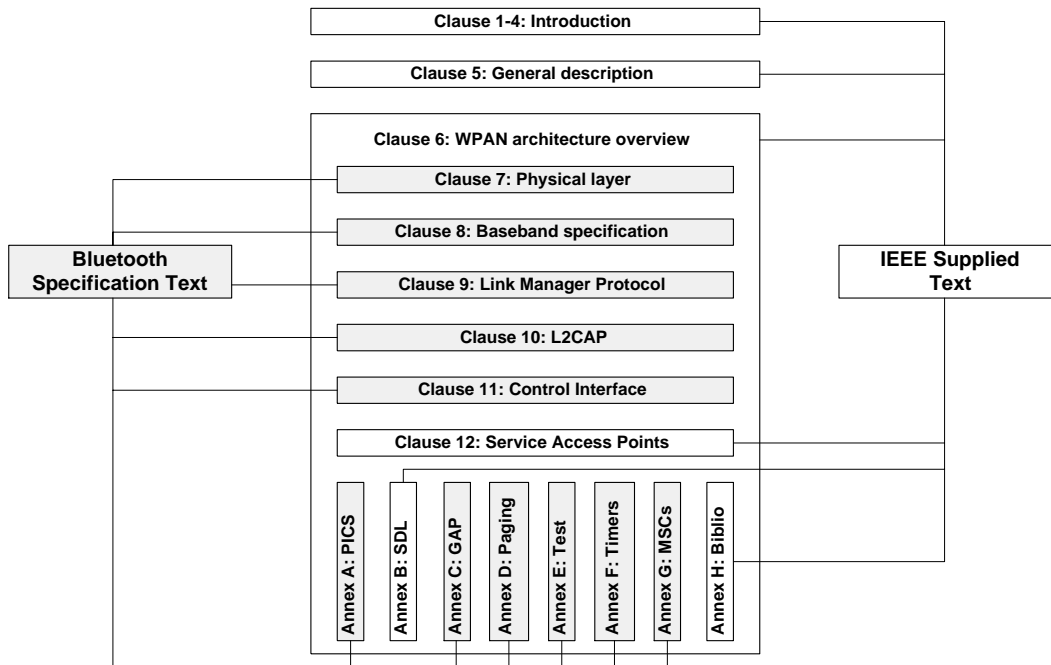


Figure 1—IEEE Std 802.15.1-2002 derived text

In Figure 1 the lines from the left-hand graphic clearly identify the shaded portions of this IEEE standard that consist of the text of the Bluetooth specifications. In most cases the shaded portions of this IEEE standard consist of unaltered or minimally altered text from the Bluetooth specifications.

Table 1 provides a detailed description of each of the clauses and annexes.

Table 1—Clause and annex descriptions

IEEE clause or annex (Bluetooth specification part)	Title	Description
Front matter	Front matter	The front matter includes mutually agreed-to copyright statement from the Bluetooth SIG and IEEE-SA.
Clause 1	Overview	Overview
Clause 2	References	The references include the derivative documents from the the Bluetooth SIG.
Clause 3	Definitions	Definitions
Clause 4	Acronyms and abbreviations	Acronyms and abbreviations
Clause 5	General description	This clause describes the source, contents, and format of the standard. The purpose is to identify the Bluetooth specification source material and make the standard easier to read for readers familiar with the Bluetooth specifications.

**Table 1—Clause and annex descriptions (continued)**

IEEE clause or annex (Bluetooth specification part)	Title	Description
Clause 6	WPAN architecture overview	The architectural clause emphasizes the large-scale separation of the system into two parts: the IEEE 802.15.1 PHY and the MAC sublayer of the data link layer (DLL).
Clause 7 (Part A)	Physical layer (PHY)	The radio clause defines the requirements for a Bluetooth transceiver operating in the unlicensed ISM band.
Clause 8 (Part B)	Baseband specification	The baseband clause describes the specifications of the Bluetooth link controller (LC) that carries out the baseband protocols and other low-level link routines.
Clause 9 (Part C)	Link Manager Protocol (LMP)	The LMP is used for link setup and control. The signals are interpreted and filtered out by the LM on the receiving side and are not propagated to higher layers.
Clause 10 (Part D)	Logical link control and adaptation protocol (L2CAP)	The Bluetooth L2CAP supports higher level protocol multiplexing, packet SAR, and the conveying of quality-of-service information. This clause also describes the protocol state machine, the packet format and composition, and a test interface required for the Bluetooth test and certification program.
Clause 11 (Part H:1)	Control interface	Control information from upper layers flows through this interface. The text of this clause was taken from the host controller interface section of the Bluetooth specification and modified to eliminate references to specific physical interfaces and their control parameters.
Clause 12	Service access point interfaces and primitives	Various entities within this standard interact in various ways. Some of these interactions are defined explicitly within this standard, via a SAP across which defined primitives are exchanged.
Annex A (Bluetooth ICS & IXIT pro forma)	Protocol implementation conformance statement (PICS proforma)	The supplier of a protocol implementation that is claimed to conform to IEEE Std 802.15.1-2002 shall complete the PICS proforma.
Annex B	Formal description of IEEE Std 802.15.1-2002 operation	SDL is the formal, object-oriented language that defines the IEEE Std 802.15.1-2002 MAC sublayer.
Annex C (V2, Part K:1)	Generic access profile	This annex defines the generic procedures related to discovery of Bluetooth devices (idle mode procedures) and link management aspects of connecting to Bluetooth devices (connecting mode procedures). It also defines procedures related to the use of different security levels. In addition, this profile includes common format requirements for parameters accessible on the user interface level.
Annex D (Appendix VII)	Optional paging schemes	For the access procedure, several paging schemes may be used. One mandatory paging scheme shall be supported by all Bluetooth devices. (This scheme is described in Clause 8.) In addition to the mandatory scheme, a Bluetooth unit may support one or more optional paging schemes. This annex contains these optional schemes.
Annex E (Part I:1)	Bluetooth test mode	This annex describes the test mode for hardware and low-level functionality tests of Bluetooth devices. The test mode includes transmitter tests (packets with constant bit patterns) and loopback tests.

**Table 1—Clause and annex descriptions (continued)**

<b>IEEE clause or annex (Bluetooth specification part)</b>	<b>Title</b>	<b>Description</b>
Annex F (Appendix VI)	Baseband timers	This annex contains a list of all timers defined in the baseband specification. Definitions and default values of the timers are listed. All timer values are given in slots.
Annex G (Appendix IX)	Message sequence charts (MSCs)	This annex shows examples of interworking between HCI commands and LM protocol data units (PDUs) in the form of MSCs. It helps the reader understand and correctly use the HCI commands.
Annex H	Bibliography	Bibliography