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**Information technology – Wireless beacon-enabled energy efficient mesh network (WiBEEM) for wireless home network services –
Part 1: PHY layer**

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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative reference.....	8
3 Terms, definitions and abbreviations.....	8
3.1 Terms and definitions.....	8
3.2 Abbreviations.....	10
3.3 Conventions.....	11
4 Conformance.....	11
5 Overview of the WiBEEM technology.....	12
5.1 General description.....	12
5.2 Functions and descriptions of device types.....	13
5.3 Functional overview of WiBEEM.....	13
5.3.1 General.....	13
5.3.2 Superframe structure of WiBEEM.....	13
5.3.3 Data transfer model.....	14
6 PHY layer specifications.....	15
6.1 General.....	15
6.2 General requirements and definitions.....	16
6.2.1 General.....	16
6.2.2 Operating frequency range.....	16
6.2.3 Channel assignments and numbering.....	16
6.2.4 RF power measurement.....	16
6.2.5 Transmit power.....	17
6.2.6 Out-of-band spurious emission.....	17
6.2.7 Receiver sensitivity definitions.....	17
6.3 PHY service specifications.....	17
6.3.1 General.....	17
6.3.2 PHY data service.....	18
6.3.3 PHY management service.....	20
6.3.4 PHY enumerations description.....	27
6.4 PPDU format.....	28
6.4.1 Function.....	28
6.4.2 General packet format.....	28
6.5 PHY constants and PIB attributes.....	29
6.5.1 Function.....	29
6.5.2 PHY constants.....	30
6.5.3 PHY PIB attributes.....	30
6.6 2 450 MHz PHY specifications.....	30
6.6.1 Requirements.....	30
6.6.2 Data rate.....	30
6.6.3 Modulation and spreading.....	31
6.7 General radio specifications.....	34
6.7.1 Application of specifications.....	34

6.7.2	TX-to-RX turnaround time	34
6.7.3	RX-to-TX turnaround time	34
6.7.4	Error-vector magnitude (EVM) definition	34
6.7.5	Transmit centre frequency tolerance	35
6.7.6	Transmit power	35
6.7.7	Receiver maximum input level of desired signal	35
6.7.8	Receiver ED	35
6.7.9	LQI	35
6.7.10	CCA.....	36
Bibliography.....		37
Figure 1	– Superframe structure of WiBEEM	13
Figure 2	– Communication from an end device to a co-ordinator in a beacon and non-beacon mode	14
Figure 3	– Communication from a co-ordinator to an end device in a beacon and non-beacon mode	14
Figure 4	– Communications between co-ordinators in a beacon and non-beacon mode	15
Figure 5	– Communications between end devices	15
Figure 6	– PHY reference model	17
Figure 7	– Modulation and spreading functions	31
Figure 8	– Symbol-to-chip mapping.....	32
Figure 9	– O-QPSK chip offset.....	32
Figure 10	– Sample baseband chip sequences with pulse shaping.....	33
Figure 11	– Error vector calculation	34
Table 1	– Frequency bands and data rate	16
Table 2	– Receiver sensitivity definitions	17
Table 3	– PD-SAP primitives.....	18
Table 4	– PD_Data.request parameters	18
Table 5	– PD_DATA.confirm parameters.....	19
Table 6	– PD_DATA.indication parameters	20
Table 7	– PLME-SAP primitives	20
Table 8	– PLME-CCA confirm primitive	21
Table 9	– PLME_ED.confirm parameters	22
Table 10	– PLME_GET.request parameters	23
Table 11	– PLME_GET.confirm parameters	24
Table 12	– PLME-SET-TRX-STATE.request parameters	24
Table 13	– PLME-SET-TRX-STATE.confirm parameters	25
Table 14	– PLME_SET.request parameters	26
Table 15	– PLME_SET.confirm parameters.....	27
Table 16	– PHY enumerations description	28
Table 17	– Format of the PDU	28
Table 18	– Format of the SFD field	29
Table 19	– Frame length values	29

Table 20 – PHY constants.....	30
Table 21 – PHY PIB attributes	30
Table 22 – Minimum receiver jamming resistance requirements for 2 450 MHz PHY	33

INFORMATION TECHNOLOGY – WIRELESS BEACON-ENABLED ENERGY EFFICIENT MESH NETWORK (WIBEEM) FOR WIRELESS HOME NETWORK SERVICES –

Part 1: PHY layer

FOREWORD

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International Standard ISO/IEC 29145-1 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 29145 series, under the general title *Information technology – Wireless beacon-enabled energy efficient mesh network (WiBEEEM) for wireless home network services*, can be found on the IEC web site.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This International Standard specifies the WiBEEM (Wireless Beacon-enabled Energy Efficient Mesh network) protocol, which provides low-power-consuming mesh network functions by enabling the “beacon mode operation”. WiBEEM is based on the IEEE 802.15.4 standard with additional upper layer protocols and a specific usage of the MAC layer protocol. Through the novel use of beacons, WiBEEM technology achieves longer battery life, larger network support, quicker response, enhanced mobility and dynamic reconfiguration of the network topology compared with other protocols such as ZigBee.

In the beacon mode, beacon information propagates over the entire mesh network nodes during the BOP (Beacon-Only Period) of the superframe structure without any beacon conflicts by utilising a smart beacon scheduling technique in the BOP. It also provides location information about moving devices without spending extra time running a positioning and locating algorithm by using RSSI (Received Signal Strength Indication). These features allow the WiBEEM protocol to be widely used for wireless home network services in the ubiquitous network era.

One of the key features of the WiBEEM protocol is that it has a special time interval called BOP (Beacon-Only Period) in the superframe structure that allows more than two beacons to be transmitted. This unique time period is located at the beginning of the Superframe. Because the BOP does not use the CSMA/CA mechanism, the network will not work properly in the beacon mode unless an appropriate algorithm is applied. This algorithm needs to manage and control multiple beacons in a single superframe. The solution is the Beacon Scheduling method applied in the BOP to avoid collisions among beacons, providing synchronisation among all the nodes of the entire mesh network.

For the network layer, the NAA (Next Address Available) mechanism, which is a short address allocation algorithm, has been adopted to provide an efficient way of utilising the complete 16-bit address space. The NAA algorithm does not limit the maximum number of children nodes that a node of a mesh network can have. Since the number of children nodes is unlimited, the NAA mechanism allows the WiBEEM protocol to be used not only for home network services, but also for community services. WiBEEM can be used where high network expandability through efficient use of short address spaces, device mobility and end-to-end QoS are required.

This part of ISO/IEC 29145 specifies the Physical (PHY) layer for the WiBEEM protocol.

INFORMATION TECHNOLOGY – WIRELESS BEACON-ENABLED ENERGY EFFICIENT MESH NETWORK (WiBEEM) FOR WIRELESS HOME NETWORK SERVICES –

Part 1: PHY layer

1 Scope

This part of ISO/IEC 29145 specifies the physical (PHY) layer of WiBEEM (Wireless Beacon-enabled Energy Efficient Mesh network) protocol for wireless home network services that supports a low power-consuming wireless mesh network topology as well as device mobility and QoS.

2 Normative reference

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.

ISO/IEC 29145-2, *Information technology – Wireless beacon-enabled energy efficient mesh network (WiBEEM) for wireless home network services – Part 2: MAC layer*