



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 40783.1-2021

**Information technology - Telecommunications and information
exchange between systems - Magnetic field area
network(MFAN) - Part 1: Air interface**

Issued on: October 11, 2021

Implemented on: May 1, 2022

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviations	2
5 Overview	2
6 Network Elements	5
6.1 General description	5
6.2 Time Element	5
6.3 Physical elements	7
6.4 Address element	7
7 Network status	8
7.1 General description	8
7.2 Network configuration	8
7.3 Network Association	8
7.4 Network Disassociation	9
7.5 Data Transmission	9
7.6 Network Release	9
7.7 MFAN device status	9
8 Physical layer	11
8.1 Physical layer frame format	11
8.2 Coding and modulation	14
9 MAC layer frame format	17
9.1 General description	17
9.2 Frame format	17
9.3 Frame Type	18
9.4 Payload format	20
10 MAC layer functions	26
10.1 General description	26
10.2 Network Association and Disassociation	26
10.3 Data transmission	29
10.4 Group ID setting	31
11 Air interface	32

11.1 Frequency	32
11.2 Signal Waveform	33
Appendix A (informative) Structural changes of this document compared with ISO /IEC 15149-1.2014	35
Reference	36

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents"

Drafting.

This document is the first part of GB/T 40783 "Magnetic Area Network for Remote Communication and Information Exchange between Information Technology Systems".

GB/T 40783 has released the following parts.

---Part 1. Air interface.

This document uses the redrafting law to amend and adopt ISO /IEC 15149-1.2014 "Telecommunications and Information Exchange Between Information Technology Systems"

Magnetic Domain Network Part 1. Air Interface.

Compared with ISO /IEC 15149-1.2014, this document has many adjustments in structure. Appendix A lists this document and ISO /IEC 15149-1.2014.

The comparison table of the chapter number of IEC 15149-1.2014.

Compared with ISO /IEC 15149-1.2014, this document has technical differences.

The vertical single line (|) in the blank position is marked. The main changes are as follows.

a) Added an explanation to Table 13. "Amplitude offset keying modulation is used for the wake-up sequence from MFAN-C to MFAN-N, and the amplitude

The signal modulated by offset keying is shown in Figure 58, and the envelope parameters are defined in Table 13.", in ISO /IEC 15149-1.

Two modulation methods were specified in.2014, namely binary phase shift keying modulation signal and amplitude offset keying modulation

Signal. Figure 58 and Table 13 in the original text are the regulations for amplitude offset keying modulation signals, but the original text does not make corresponding descriptions.

This document has been modified and corresponding provisions have been added (see

11.2).

b) Modified the description of the code types in Table 10 in ISO /IEC 15149-1.2014, and the response confirmation code given in 8.4.4.2

("Responseconfirmationcode/Response Confirmation Code"), the header "Receptionconfirmation" in the form

code/receiving confirmation code" cannot correspond to it (see Table 10). Combined with the original text of the international standard, here is the response to the response frame payload.

The specific content of the code should be confirmed, and this document has been modified (see 9.4.4.3).

Introduction

GB/T 40783 provides an information communication protocol in the Magnetic Area Network (MFAN), which has absorbed the technical advantages of ISO /IEC 15149-1.2014

On the basis of this, the protocol and regulations for the air interface of information communication between magnetic domain networks have been further improved. In order to ensure that the information sensing equipment is in a special environment

It is able to communicate effectively in China, combined with the application requirements of domestic magnetic area network communication technology, improved its security mechanism, and then proposed to meet the domestic industry development

The development of the air interface specification for information and communication between magnetic domain networks. MFAN supports wireless communication based on wireless communication and wireless power transmission in complex environments, etc.

Serve. MFAN communication technology generally includes four parts of protocols. air interface protocol, in-band control protocol, relay protocol and security protocol. Book

The document is to be composed of four parts.

---Part 1.Air interface. The purpose is to establish a protocol suitable for the physical layer and media access control layer in a low carrier frequency magnetic field environment

Air interface.

---Part 2.In-band wireless charging control protocol. The purpose is to enable wireless power transmission and

The in-band network system for data transmission establishes specific requirements.

---Part 3.Extended range relay protocol. The purpose is to establish the addressing, request and response applicable to the relay protocol in the extended range

Code related rules.

---Part 4.Security Authentication Protocol. The purpose is to establish a security authentication protocol for wireless sensor networks that operate reliably in special environments.

Negotiable requirements.

Remote communication and information exchange between information technology systems

Magnetic Domain Network Part 1.Air Interface

1 Scope

This document specifies the physical layer and media access control layer protocol of wireless communication technology in a low carrier frequency magnetic field environment (about 300KHz)

Require.

This document is applicable to the design and application of the physical layer and media access control layer in the magnetic area network.

The physical layer protocol specified in this document applies to.

---Reliable communication in low carrier frequency magnetic field area and harsh environment,

---Convenient, robust modulation, low implementation cost and fault tolerance performance,

---Variable coding and bandwidth for link adaptation.

The media access control layer protocol specified in this document applies to.

---Simple and efficient low-power network topology,

---Variable super frame structure for compact and efficient data transmission,

---Dynamic address allocation and effective address management of small data packets.

This document supports data transmission of several kbit/s in short-distance wireless networks. This communication method can be applied to the following fields.

---Using wireless underground or underwater sensors to monitor water and soil pollution in the environmental protection industry,

---Using wireless internal corrosion sensors in the construction industry to monitor the integrity of buildings and bridges,

---In the consumer electronics industry, it monitors the storage of food in a humid and