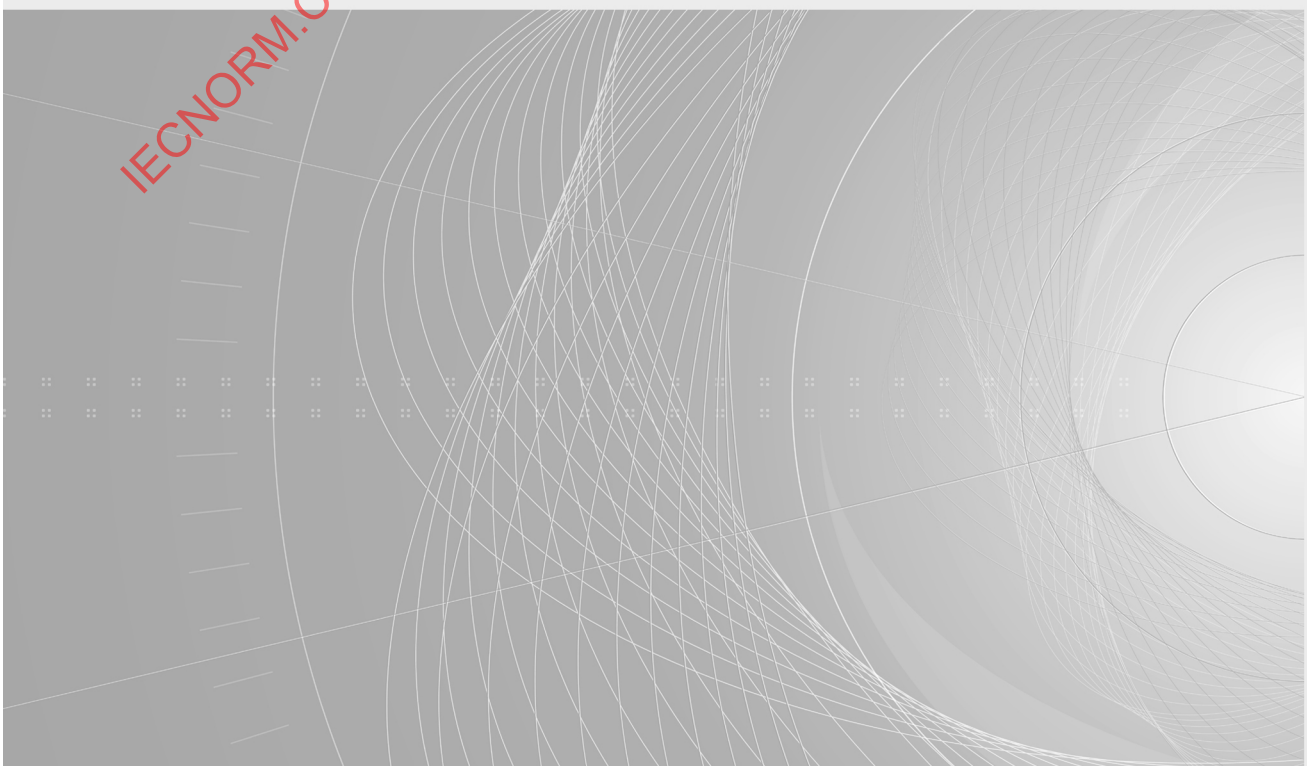
# ISO/IEC 14543-5-4

Edition 1.0 2010-11

# INTERNATIONAL STANDARD



**Information technology – Home electronic system (HES) architecture – Part 5-4: Intelligent grouping and resource sharing for Class 2 and Class 3 – Device validation**



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## Information technology – Home electronic system (HES) architecture – Part 5-4: Intelligent grouping and resource sharing for Class 2 and Class 3 – Device validation

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# INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

## Part 5-4: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Device validation

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International Standard ISO/IEC 14543-5-4 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard has to be read in conjunction with ISO/IEC 14543-5-1.

The list of all currently available parts of the ISO/IEC 14543 series, under the general title *Information technology – Home electronic system (HES) architecture*, 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.

# INTRODUCTION

ISO/IEC 14543-5, *Information technology – Home electronic system (HES) architecture – Part 5: Intelligent grouping and resource sharing (IGRS)* consists of the following parts:

- **Part 5-1: Core protocol**
  - Specifies the TCP/IP protocol stack as the basis and the HTTP protocol as the message-exchanging framework among devices.
  - Specifies a series of device and service interaction/invocation standards, including device and service discovery protocol, device and service description, service invocation, security mechanisms, etc.
  - Specifies core protocols for a type of home network that supports streaming media and other high-speed data transport within a home.
- **Part 5-2#: Application profiles**
  - Based on the IGRS Core Protocol.
  - Defines a device and service interaction mechanism, as well as application interfaces used in IGRS Basic Applications.
  - Multiple application profiles have been developed, including:
    - **Part 5-21: AV profile** (under consideration)
    - **Part 5-22: File profile** (under consideration)
  - Additional application profiles are planned (part numbers to be assigned)
    - **Part 5-2w: DVD profile**
    - **Part 5-2x: QoS profile**
    - **Part 5-2y: DMCP profile**
    - **Part 5-2z: Universal control profile**
- **Part 5-3: Basic application** (under consideration)
  - Includes an IGRS basic application list.
  - Defines a basic application framework.
  - Specifies addresses, operation details (device grouping, service description template, etc.), function definitions, and service invocation interfaces.
- **Part 5-4: Device validation**
  - Defines a standard method to confirm that a decive is IGRS-compliant.
- **Part 5-5: Device types** (under consideration)
  - Defines IGRS Device types used in IGRS applications.
- **Part 5-6: Service types** (under consideration)
  - Defines basic service types used in IGRS applications.

# INFORMATION TECHNOLOGY – HOME ELECTRONIC SYSTEM (HES) ARCHITECTURE –

# Part 5-4: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Device validation

## 1 Scope

This part of ISO/IEC 14543 specifies device validation methods for information devices that implement ISO/IEC 14543-5-1. It defines an architecture framework for a device validation system used by test devices and devices under test. Also, it describes and specifies the device interaction process, message exchange requirements and conformance rules.

This part of ISO/IEC 14543 is applicable to resource sharing and service collaboration among computers, consumer electronics, and communication devices in a Local Area Network (LAN) or Personal Area Network (PAN) environment, especially in a wireless dynamic network.

## 2 Normative reference

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including any amendments, applies.

ISO/IEC 14543-5-1, *Information technology – Home electronic system (HES) architecture – Part 5-1: Intelligent grouping and resource sharing for HES Class 2 and Class 3 – Core protocol*

## 3 Terms, definitions, abbreviations and conventions

### 3.1 Terms and definitions

For the purposes of this document the following terms and definitions apply. These terms are commonly used in other industry publications.

**3.2**
**centralised device group**
set of IGRS devices with one IGRS device acting as the master

NOTE 1 The master is responsible for managing the setup, for dismissing a device group, and for processing a joint request from other devices.

NOTE 2 The master device and other IGRS devices in such a device group form a centralised or master-slave relationship.

**3.3**
**client identifier**
unique identifier associated with a client on an IGRS device to which this client belongs

**3.4**
**device group**
multiple IGRS devices that are organised into a logical group through the device group management mechanism specified in ISO/IEC 14543-5-1

NOTE Each IGRS device in a device group follows common interaction rules. Two types of device groups are defined: peer-to-peer device group and centralised (master-slave) device group.

**3.5**
**device identifier**
globally unique device identifier associated with one IGRS device

**3.6**
**device pipe**
channel used to transfer device interaction messages

NOTE This channel is set up through the pipe setup mechanism specified in ISO/IEC 14543-5-1.

**3.7**
**IGRS client**
application that draws upon the services of one or more connected IGRS devices

NOTE Multiple client instances can exist on a network at the same time.

**3.8**
**IGRS device**
information device that conforms to ISO/IEC 14543-5-1

**3.9**
**IGRS protocol**
communications protocol that conforms to ISO/IEC 14543-5-1

**3.10**
**IGRS service**
sharable resource encapsulated in an IGRS device by implementing application interfaces and providing services for other IGRS devices

NOTE An IGRS service has an invocation interface that meets the requirements of ISO/IEC 14543-5-1. These invocation interfaces are described and announced on the network through the IGRS service description specification.

**3.11**
**IGRS user**
owner of an IGRS device and client

**3.12**
**peer-to-peer device group**
set of IGRS devices where each IGRS device in the set has a peer-to-peer relationship with each other

**3.13**
**service identifier**
unique identifier assigned to a service provided by a specific IGRS device

NOTE The same type of service may be provided by multiple IGRS devices within the same network. Each instance of a service has a unique service identifier on the IGRS device providing that service.

**3.14**
**service type**
category of IGRS service defined according to the set of resources encapsulated

NOTE The service type enables service applications in the same category to have common invocation interfaces.

**3.15**
**test device**
physical entity that can send, receive and validate network messages that conform to ISO/IEC 14543-5-1

**3.16**
**user identifier**
identifier of an IGRS user

### 3.17 Abbreviations

| | |
|---|---|
| HTTP | Hypertext Transport Protocol |
| IGRS | Intelligent Grouping and Resource Sharing |
| IP | Internet Protocol |
| LAN | Local Area Network |
| PAN | Personal Area Network |
| TCP | Transmission Control Protocol |
| UDP | User Datagram Protocol |

### 3.18 Conventions

Lower case is used for words having the normal English meaning. Certain words and terms used in this standard have a specific meaning beyond the normal English meaning and are written in upper case. These words and terms are defined either in this clause or in the text where they first appear.

## 4 Conformance: IGRS device validation

### 4.1 Purpose

The IGRS core protocol (ISO/IEC 14543-5-1) shall be supported and implemented by all IGRS-compliant devices. Although different manufacturers may have different implementations, all implementations shall conform to the requirements defined in ISO/IEC 14543-5-1 in order to guarantee that all networked devices using the IGRS protocol can communicate properly with one another. Therefore, in order to ensure successful interoperability among devices manufactured by different vendors, IGRS protocol conformance tests specified in this International Standard shall be met.

IGRS device validation is a type of black-box test that defines a series of conformance test suites to analyse and determine whether required and optional interaction messages supported by IGRS devices, as well as response messages returned, have passed conformance rules.

### 4.2 Conformance requirements

To be considered compliant with ISO/IEC 14543-5-1, each device shall meet the criteria defined by the IGRS device validation conformance test suite described in Clause 6.

In addition, to be considered in compliance with this International Standard, the test methods used shall meet all the mandatory requirements defined in the IGRS device grouping conformance test suites specified in 6.1 to 6.7, and the IGRS resource sharing conformance test suites specified in 6.8 to 6.13.

### 4.3 Test setup and method

In Figure 1, a device under test and one or more test devices are located in the same LAN IP broadcast domain.

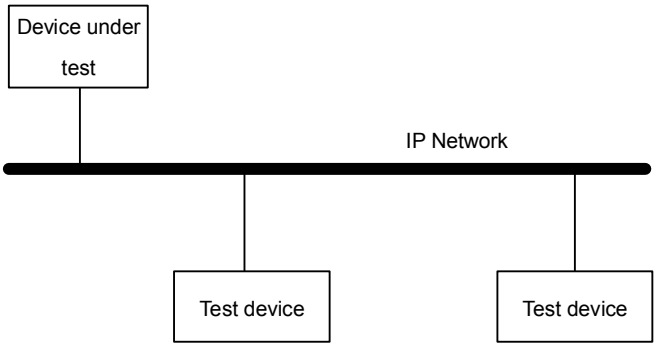


**Figure 1 – IGRS conformance test setup**

For each test case, the test devices shall send appropriate IGRS messages to the device under test, receive response messages and determine the correctness of the response messages.

IGRS device validation shall not consider the following test scenarios: lost message sent by test devices and the device under test due to network link layer transport issues, multicast message across subnets and conformance testing of IGRS devices over non-IP network.

### 4.4 Device validation requirements

The test cases that comprise a test suite test the various implementation requirements of the IGRS core protocol feature specifications (see Clauses 5, 6, 7, 8, 9 and 10 of ISO/IEC 14543-5-1). The test suite is divided into two categories: mandatory and optional. Every IGRS device shall pass all mandatory reference test cases. If an IGRS device implements one or more optional features defined in ISO/IEC 14543-5-1, that device shall also pass relevant reference test cases of the test suite.

## 5 IGRS test suite overview

### 5.1 Test suite structure

As shown in Figure 2, the IGRS conformance test suite structure is divided into two categories: device grouping and resource sharing. The device grouping test suite is further divided according to the primary functions of the IGRS core protocol (see Clauses 9 and 10 of ISO/IEC 14543-5-1). The resource sharing test suite specifies each primary function of IGRS core protocol in detailed sub-function test suites.

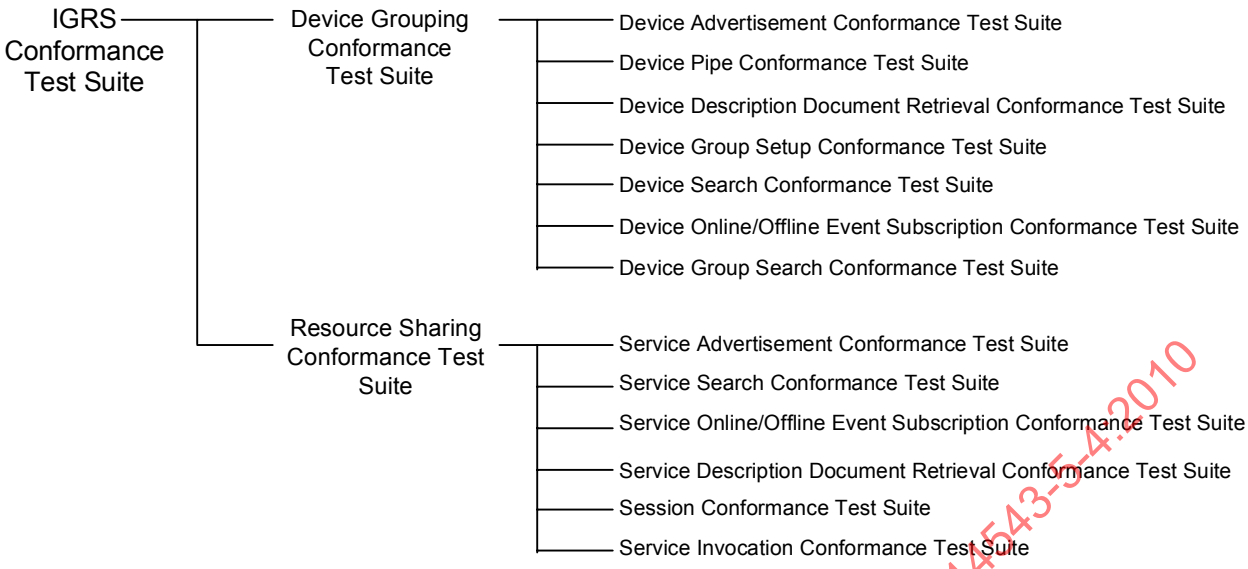


**Figure 2 – IGRS conformance test suite structure**



## 5.2 Test suite description

### 5.2.1 IGRS device grouping test suite

This test suite focuses on the device grouping capabilities of IGRS devices. It is divided into seven sub-function test suites, each of which is specified in the subclause listed below.

a) Device advertisement conformance test suite (see 6.1).
b) Device pipe conformance test suite (see 6.2).
c) Device description document retrieval conformance test suite (see 6.3).
d) Device group setup conformance test suite (see 6.4).
e) Device search conformance test suite (see 6.5).
f) Device online/offline event subscription conformance test suite (see 6.6).
g) Device group search conformance test suite (see 6.7).

### 5.2.2 IGRS resource sharing test suite

This test suite focuses on resource sharing capabilities of IGRS services. It is divided into six sub-function test suites, each of which is specified in the subclause listed below:

a) Service advertisement conformance test suite (see 6.8).
b) Service search conformance test suite (see 6.9).
c) Service online/offline event subscription conformance test suite (see 6.10).
d) Service description document retrieval conformance test suite (see 6.11).
e) Session conformance test suite (see 6.12).
f) Service invocation conformance test suite (see 6.13).

### 5.2.3 Test suite description rules

The description of each IGRS sub-function test suite is divided into two parts:

a) reference messages related to the test suite;

b) test case suite; includes pre-conditions and test cases. The pre-condition lists prerequisite test conditions used by each test case of that test suite. The test case consists of the test purpose, reference, test procedure, conformance category and the pass criteria, called the pass verdict condition.

# 6 IGRS conformance test suite

## 6.1 Device advertisement conformance test suite

### 6.1.1 Reference messages

Device Online Advertisement refers to Table 7 of ISO/IEC 14543-5-1.

Device Offline Advertisement refers to Table 8 of ISO/IEC 14543-5-1.

### 6.1.2 Test case suite

#### 6.1.2.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are located in the same LAN IP broadcast domain;
– the test device is listening to multicast port 239.255.255.250:3880.

Pre-condition 2, applicable to test case 2 through 5:

– the test device and the device under test are located in the same LAN IP broadcast domain;
– the test device is listening to multicast port 239.255.255.250:3880;
– the IGRS protocol on the device under test is initiated and running normally.

#### 6.1.2.2 Test case 1

– Test purpose

The test purpose is to ensure that the device under test can automatically send a correct Device Online Advertisement message to the multicast address port 239.255.255.250:3880 when the IGRS protocol is initiated.

– Reference

Device Online Advertisement; see 9.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The device under test initiates the IGRS protocol.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device can listen for a Device Online Advertisement message sent from the device under test on multicast address port.
b) The Device Online Advertisement message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 7 of ISO/IEC 14543-5-1.

#### 6.1.2.3 Test case 2

– Test purpose

The test purpose is to ensure that the device under test can resend a Device Online Advertisement message to the multicast address 239.255.255.250:3880 before the maximum advertising valid time defined in the cache-control: max-age field is reached.

– Reference

Device Online Advertisement; see 9.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device receives the Device Online Advertisement message sent by the device under test at the multicast address and retrieves cache-control: max-age field value to be *n* (maximum advertising valid time in seconds); at the same time, the test device listens to multicast address 239.255.255.250:3880 for *n* s.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device can receive another Device Online Advertisement message less than *n* s after receiving the first Device Online Advertisement message from the device under test.

b) The Device Online Advertisement message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 7 of ISO/IEC 14543-5-1.

#### 6.1.2.4 Test case 3

– Test purpose

The test purpose is to ensure that, when there is configuration data change on the device under test, a new Device Online Advertisement will be sent to multicast address 239.255.255.250:3880. If 01-ConfigId field value is at maximum value (see Table 7 of ISO/IEC 14543-5-1), then 01-ConfigId will be reset to 1; otherwise 01-ConfigId will be incremented by 1.

– Reference

Device Online Advertisement; see 9.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

a) The test device receives a Device Online Advertisement sent from the device under test at multicast address 239.255.255.250:3880. The value in 01-ConfigId field is c1.

b) A new service is added or a service is terminated on the device under test.

c) The test device receives another Device Online Advertisement sent from the device under test at multicast address 239.255.255.250:3880. The value in 01-ConfigId field is c2.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 3 of the test procedure, the Device Online Advertisement message received by the test device shall conform to the definitions in Table 7 of ISO/IEC 14543-5-1.

b) If c1 is not the maximum value, then c2 = c1+1; otherwise c2 = 1.

#### 6.1.2.5 Test case 4

– Test purpose

The test purpose is to ensure that, when the device under test resets, a Device Online Advertisement is sent to multicast address 239.255.255.250:3880. If 01-BootId field value is at maximum value (see Table 7 of ISO/IEC 14543-5-1), then 01-BootId will be reset to 1; otherwise 01-BootId will be incremented by 1.

– Reference

Device Online Advertisement; see 9.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

a) The test device receives a Device Online Advertisement sent from the device under test at multicast address 239.255.255.250:3880. The value in 01-BootId field is b1.

b) The device under test is rebooted.

c) The test device receives another Device Online Advertisement sent from the device under test at multicast address 239.255.255.250:3880. The value in 01-BootId field is b2.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) In step 3 of the test procedure, the Device Online Advertisement message received by the test device shall conform to the definitions in Table 7 of ISO/IEC 14543-5-1.

b) If b1 is not the maximum value, then b2 = b1+1; otherwise b2 = 1.

#### 6.1.2.6 Test case 5

– Test purpose

The test purpose is to ensure that the device under test can send the Device Offline Advertisement message to multicast address 239.255.255.250:3880 under normal offline operation.

– Reference

Device Offline Advertisement; see 9.1.2 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The online device under test goes offline normally.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) The test device can receive a Device Offline Advertisement message from the device under test at multicast address 239.255.255.250:3880.

b) The Device Offline Advertisement message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 8 of ISO/IEC 14543-5-1.

## 6.2 Device pipe conformance test suite

### 6.2.1 Reference messages

Pipe Setup Request based on Symmetric-key Cryptosystem refers to Table 9 of ISO/IEC 14543-5-1.

Pipe Setup Response based on Symmetric-key Cryptosystem refers to Table 10 of ISO/IEC 14543-5-1.

Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 17 of ISO/IEC 14543-5-1.

Authentication Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 18 of ISO/IEC 14543-5-1.

Authentication Result Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 19 of ISO/IEC 14543-5-1.

Authentication Result Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 20 of ISO/IEC 14543-5-1.

Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism refers to Table 11 of ISO/IEC 14543-5-1.

Pipe Setup Response based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism refers to Table 12 of ISO/IEC 14543-5-1.

Authentication Request based on Identity Authentication and Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 21 of ISO/IEC 14543-5-1.

Authentication Response based on Identity Authentication and Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 22 of ISO/IEC 14543-5-1.

Authentication Result Request based on Identity Authentication and Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 23 of ISO/IEC 14543-5-1.

Authentication Result Response based on Identity Authentication and Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem refers to Table 24 of ISO/IEC 14543-5-1.

Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem refers to Table 13 of ISO/IEC 14543-5-1.

Pipe Setup Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem refers to Table 14 of ISO/IEC 14543-5-1.

Authentication Request based on Authentication and Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem refers to Table 25 of ISO/IEC 14543-5-1.

Authentication Response based on Authentication and Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem refers to Table 26 of ISO/IEC 14543-5-1.

Authentication Result Request based on Authentication and Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem refers to Table 27 of ISO/IEC 14543-5-1.

Authentication Result Response based on Authentication and Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem refers to Table 28 of ISO/IEC 14543-5-1.

Pipe Setup Request based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism refers to Table 15 of ISO/IEC 14543-5-1.

Pipe Setup Response based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism refers to Table 16 of ISO/IEC 14543-5-1.

Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party refers to Table 29 of ISO/IEC 14543-5-1.

Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party refers to Table 30 of ISO/IEC 14543-5-1.

Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party refers to Table 31 of ISO/IEC 14543-5-1.

Authentication Result Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party refers to Table 32 of ISO/IEC 14543-5-1.

Secure Device Pipe Setup Confirmation Request refers to Table 33 of ISO/IEC 14543-5-1.

Secure Device Pipe Setup Confirmation Response refers to Table 34 of ISO/IEC 14543-5-1.

Secure Device Pipe Teardown Notification Message refers to Table 35 of ISO/IEC 14543-5-1.

Device Online Detection Request Message refers to Table 37 of ISO/IEC 14543-5-1.

Device Online Detection Response Message refers to Table 38 of ISO/IEC 14543-5-1.



### 6.2.2 Unsecure device pipe conformance test suite

#### 6.2.2.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive Device Online Advertisement sent by the device under test. 01-ListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-ListenerList field contains IP address to set up an unsecure device pipe;
– both test device and the device under test use IGRS: DeviceSecurity:NULL security mechanism.

Pre-condition 2, applicable to test case 2:

– the test device and the device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-ListenerList field is retrieved;
– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-ListenerList field contains IP address to set up an unsecure device pipe;
– both the test device and the device under test use IGRS: DeviceSecurity:NULL security mechanism;
– the device under test is equipped with a control interface that can be used to initiate an unsecure device pipe setup with other devices.

Pre-condition 3, applicable to test case 3:

– the test device and the device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880 to receive Device Online Advertisement sent by the device under test. 01-ListenerList field is retrieved;
– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-ListenerList field contains IP address to set up unsecure device pipe;
– both test device and the device under test use IGRS: DeviceSecurity:NULL security mechanism;
– the device under test is equipped with a control interface that can be used to initiate unsecure device pipe teardown.

#### 6.2.2.2 Test case 1

– Test purpose

The test purpose is to ensure that the device under test allows other devices to set up an unsecure device pipe (TCP connection) with itself, using 01-ListenerList field address retrieved from Device Online Advertisement.

– Reference

Unsecure Device Pipe Setup; see 9.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device uses 01-ListenerList field address retrieved from Device Online Advertisement sent by the device under test to set up TCP connection.

– Pass verdict condition

The test device and the device under test set up TCP connection successfully.

#### 6.2.2.3 Test case 2

– Test purpose

The test purpose is to ensure that the device under test can set up unsecure device pipe (TCP connection) using 01-ListenerList field address retrieved from Device Online Advertisement sent by other devices.

– Reference

Unsecure Device Pipe Setup; see 9.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device listens to 01-ListenerList field address given by its own Device Online Advertisement. The device under test initiates an unsecure device pipe setup with the test device.

– Pass verdict condition

The following conditions are required so that the device passes this test.

The test device and the device under test set up TCP connection successfully.

#### 6.2.2.4 Test case 3

– Test purpose

The test purpose is to ensure that the device under test can tear down an unsecure device pipe normally with other devices.

– Reference

Unsecure Device Pipe Teardown; see 9.2.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

a) The test device uses 01-ListenerList field address retrieved from Device Online Advertisement sent by the device under test to set up TCP connection.

b) The device under test tears down the TCP connection with the test device.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, the test device and the device under test set up TCP connection successfully.

b) In step 2 of the test procedure, the device under test tears down the TCP connection with the test device successfully.

### 6.2.3 Secure device pipe setup based on symmetric-key authentication and message authentication mechanism conformance test suite

#### 6.2.3.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both the test device and the device under test use device security mechanism based on symmetric-key authentication and message authentication mechanism.

Pre-condition 2, applicable to test case 2 through test case 4:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both the test device and the device under test use device security mechanism based on symmetric-key authentication and message authentication mechanism;

– the test device sets up a secure device pipe with the device under test and completes the pipe setup request/response message interaction process required by device security mechanism based on symmetric-key authentication and message authentication mechanism.

Pre-condition 3, applicable to test case 5 and test case 6:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up a secure device pipe;

– both the test device and the device under test use device security mechanism based on symmetric-key authentication and message authentication mechanism;

– the device under test is equipped with a control interface that can be used to initiate a secure device pipe setup with other devices.

Pre-condition 4, applicable to test case 7 and test case 8:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;
– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;
– both the test device and the device under test use a device security mechanism based on symmetric-key authentication and message authentication mechanism.
– the device under test sets up a secure device pipe with the test device and completes a pipe setup request/response message interaction process required by device security mechanism based on symmetric-key authentication and message authentication mechanism.

#### 6.2.3.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test receives a Pipe Setup Request based on Symmetric-key Cryptosystem, it will return a proper secure device pipe setup response.

– Reference

Pipe Setup Request based on Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

a) The test device uses the field: 01-SecureListenerList addresses retrieved from the Device Online Advertisement sent by the device under test to set up a TCP connection.
b) The test device uses the existing TCP connection to send a Pipe Setup Request based on Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 9 of ISO/IEC 14543-5-1. The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) In step 1 of the test procedure, the test device and device under test set up TCP connection successfully;
b) In step 2 of the test procedure, the test device receives a Pipe Setup Response based on Symmetric-key Cryptosystem returned by the device under test;
c) In step 2 of the test procedure, the pipe setup response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 10 of ISO/IEC 14543-5-1.

#### 6.2.3.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem (includes challenge 1), it sends out the correct authentication response (includes the correct response value to challenge 1) within 30 s.

– Reference

Authentication Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device uses the existing TCP connection to send an Authentication Request based on Identity Authentication and a Message Authentication Mechanism of Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 17 of ISO/IEC 14543-5-1 (includes a random number as challenge 1). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) After sending an authentication request, the test device receives an Authentication Response based on Identity Authentication and a Message Authentication Mechanism of Symmetric-key Cryptosystem from the device under test within 30 s.

b) The response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 18 of ISO/IEC 14543-5-1.

c) The response received by the test device shall include the correct response value to challenge 1.

#### 6.2.3.4 Test case 3

– Test purpose

The test purpose is to ensure that, when a device under test receives an Authentication Result Request based on Identity Authentication and a Message Authentication Mechanism of Symmetric-key Cryptosystem, and its response value matches the calculated result, it will send out the correct authentication result response to confirm successful authentication (01-ReturnCode field value = 100 (success)).

– Reference

Authentication Result Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1, 9.2.3.3.1 and clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

a) The test device uses the existing TCP connection to send an Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem to the device under test and receives the correct authentication response from the device under test.

b) The test device uses the existing TCP connection to send an Authentication Result Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 19 of ISO/IEC 14543-5-1 (including the correct

response value). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) In step 2 of the test procedure, after sending out a request, the test device receives an Authentication Result Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 20 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by the test device shall be 100.

#### 6.2.3.5 Test case 4

– Test purpose

The test purpose is to ensure that, when a device under test receives an Authentication Result Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem and its response value does not match the calculated result, it will send out the correct Secure Device Pipe Setup Confirmation Response within 30 s, to indicate failure to setup secure device pipe. (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

a) The test device uses the existing TCP connection to send an Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem to the device under test and receives the correct authentication response from the device under test.

b) The test device uses the existing TCP connection to send an Authentication Result Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 19 of ISO/IEC 14543-5-1 (includes the wrong response value). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) In step 2 of the test procedure, after sending out a request, the test device receives a Secure Device Pipe Setup Confirmation Response from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by the test device shall be 405.

#### 6.2.3.6 Test case 5

– Test purpose

The test purpose is to ensure that the device under test can set up TCP connection with other devices by using the 01-SecureListenerList field address in the Device Online Advertisement. When the device security mechanism based on symmetric-key authentication and message authentication mechanism is selected, the device under test can send out the correct Pipe Setup Request based on Symmetric-key Cryptosystem.

– Reference

Pipe Setup Request based on Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.2.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates a secure device pipe setup with the test device; at the same time the test device is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up a TCP connection with the device under test.

b) The test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, the device under test and the test device set up TCP connection successfully.

b) In step 2 of the test procedure, the test device receives a Pipe Setup Request based on Symmetric-key Cryptosystem sent by the device under test.

c) In step 2 of the test procedure, the pipe setup request received by test device shall conform to the definitions of the HTTP command and the required fields shown in Table 9 of ISO/IEC 14543-5-1.

#### 6.2.3.7 Test case 6

– Test purpose

The test purpose is to ensure that, after the device under test has received a Pipe Setup Response based on Symmetric-key Cryptosystem, it can send out the correct Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem.

– Reference

Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates secure device pipe setup with a test device; at the same time, the test device is listening to the 01-SecureListenerList field address included in

its own Device Online Advertisement to set up TCP connection with the device under test.

b) After the test device has received a Pipe Setup Request based on Symmetric-key Cryptosystem, it will send out secure device pipe setup response to confirm the security mechanism selected. This message format conforms to the requirement definitions in Table 10 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, the test device receives an Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem sent by the device under test.

b) In step 2 of the test procedure, the request received by the test device shall conform to the requirement definitions in Table 17 of ISO/IEC 14543-5-1.

#### 6.2.3.8 Test case 7

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem and its response value matches the calculated result, it will send out the correct authentication result request (this includes the correct response value).

– Reference

Authentication Result Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device has received an Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem sent by the device under test, it will send out the correct authentication response (includes the correct response value). This message format conforms to the requirement definitions in Table 18 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives an Authentication Result Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem sent from the device under test.

b) The request message received by the test device shall conform to the requirement definitions in Table 19 of ISO/IEC 14543-5-1.

#### 6.2.3.9 Test case 8

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Response based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem and its response value does not match the calculated result, it will send out the correct Secure Device Pipe Setup Confirmation Response to indicate

failure and to set up secure device pipe (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device has received an Authentication Request based on Identity Authentication and Message Authentication Mechanism of Symmetric-key Cryptosystem sent by the device under test, it will send out the authentication response with wrong response value. This message format conforms to the requirement definitions in Table 18 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives a Secure Device Pipe Setup Confirmation Response from the device under test.

b) The response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

c) The 01-ReturnCode field in the response received by the test device shall be 405.

### 6.2.4 Secure device pipe setup based on symmetric-key authentication, encrypted message transmission and authentication mechanism conformance test suite

#### 6.2.4.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both the test device and the device under test use a device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism.

Pre-condition 2, applicable to test case 2 through test case 4:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up a secure device pipe;

– both the test device and the device under test use device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism;

– the test device sets up secure device pipe with the device under test and completes a pipe setup request/response message interaction process required by device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism.

Pre-condition 3, applicable to test case 5 and test case 6:

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. The 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up a secure device pipe;

– both the test device and the device under test use device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism;

– the device under test is equipped with a control interface that can be used to initiate a secure device pipe setup request with other devices.

Pre-condition 4, applicable to test case 7 and test case 8:

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up a secure device pipe;

– both the test device and the device under test use device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism;

– the device under test sets up secure device pipe with test device and completes a pipe setup request/response message interaction process required by device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism.

#### 6.2.4.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test receives a Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism, it will return the proper secure device pipe setup response.

– Reference

Pipe Setup Response based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism; see 9.2.3.1 and 9.2.3.2.3 of ISO/IEC 14543-5-1

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device uses the field: 01-SecureListenerList addresses retrieved from a Device Online Advertisement sent by the device under test to setup TCP connection.

b) The test device uses the existing TCP connection to send a Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism to the device under test. This message format conforms to the requirement definitions in Table 11 of ISO/IEC 14543-5-1. The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, the test device and device under test set up TCP connection successfully.

b) In step 2 of the test procedure, the test device receives a Pipe Setup Response based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism returned by the device under test.

c) In step 2 of the test procedure, the pipe setup response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 12 of ISO/IEC 14543-5-1.

#### 6.2.4.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem (including Challenge 1), it sends out the correct authentication response (including the correct response value to Challenge 1) within 30 s.

– Reference

Authentication Response based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device uses the existing TCP connection to send an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 21 of ISO/IEC 14543-5-1 (includes a random number as Challenge 1). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After sending out an authentication request, the test device receives an authentication response based on identity authentication and encrypted message transmission and authentication mechanism of Symmetric-Key Cryptosystem from the device under test within 30 s.

b) The response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 22 of ISO/IEC 14543-5-1.

c) The response received by the test device shall include the correct response value to Challenge 1, as specified in 9.2.3.3.2 of ISO/IEC 14543-5-1.

#### 6.2.4.4 Test case 3

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Result Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem and its response value matches the calculated result, it will send out the correct authentication result response to confirm successful authentication (01-ReturnCode field value = 100 (success)).

– Reference

Authentication Result Response based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1, 9.2.3.3.2 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device uses the existing TCP connection to send an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem to the device under test and receives the correct authentication response from the device under test.

b) The test device uses the existing TCP connection to send an Authentication Result Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 23 of ISO/IEC 14543-5-1 (this includes the correct response value). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after sending out a request, the test device receives an Authentication Result Response based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 24 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by the test device shall be 100.

#### 6.2.4.5 Test case 4

– Test purpose

The test purpose is to ensure that, when a device under test receives an Authentication Result Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem and its response value does not match the calculated result, it will send out the correct Secure Device Pipe Setup

Confirmation Response within 30 s so as to indicate failure and to set up secure device pipe (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device uses the existing TCP connection to send an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem to the device under test and receives the correct authentication response from the device under test.

b) The test device uses the existing TCP connection to send an Authentication Result Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 23 of ISO/IEC 14543-5-1 (this includes the wrong response value). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after sending out a request, the test device receives a Secure Device Pipe Setup Confirmation Response from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by the test device shall be 405.

#### 6.2.4.6 Test case 5

– Test purpose

The test purpose is to ensure that the device under test can set up TCP connection with other devices by using the 01-SecureListenerList field address in the Device Online Advertisement. When device security mechanism based on symmetric-key authentication, encrypted message transmission and authentication mechanism is selected, the device under test can send out the correct Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism.

– Reference

Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism; see 9.2.3.1 and 9.2.3.2.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates secure device pipe setup with the test device. At the same time, the test device is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up TCP connection with the device under test.

b) The test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, the device under test and test device set up TCP connection successfully.

b) In step 2 of the test procedure, the test device receives a Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism sent by the device under test.

c) In step 2 of the test procedure, the pipe setup request received by test device shall conform to the definitions of the HTTP command and the required fields shown in Table 11 of ISO/IEC 14543-5-1.

#### 6.2.4.7 Test case 6

– Test purpose

The test purpose is to ensure that, after the device under test has received a Pipe Setup Response based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism (to confirm security mechanism selection), it can send out the correct Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem.

– Reference

Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates secure device pipe setup with the test device; at the same time, the test device is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up TCP connection with the device under test.

b) After the test device has received a Pipe Setup Request based on Symmetric-key Authentication, Encrypted Message Transmission and Authentication Mechanism, it will send out secure device pipe setup response to confirm security mechanism selected. This message format conforms to the requirement definitions in Table 12 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, the test device receives an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem sent by the device under test.

b) In step 2 of the test procedure, the request received by the test device shall conform to the requirement definitions in Table 21 of ISO/IEC 14543-5-1.

#### 6.2.4.8 Test case 7

– Test purpose

The test purpose is to ensure that, when the device under test receives authentication response based on identity authentication and encrypted message transmission and authentication mechanism of Symmetric-key Cryptosystem, and when its response value matches the calculated result, it will send out the correct authentication result request (this includes the correct response value).

– Reference

Authentication Result Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device has received an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem sent by the device under test, it will send out the correct authentication response (this includes the correct response value). This message format conforms to the requirement definitions in Table 22 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives an Authentication Result Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem sent from the device under test.

b) The request message received by the test device shall conform to the requirement definitions in Table 23 of ISO/IEC 14543-5-1.

#### 6.2.4.9 Test case 8

– Test purpose

The test purpose is to ensure that, when the device under test receives authentication response based on identity authentication and encrypted message transmission and authentication mechanism of Symmetric-key Cryptosystem, and its response value does not match the calculated result, it will send out the correct Secure Device Pipe Setup Confirmation Response to indicate failure to setup secure device pipe (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device has received an Authentication Request based on Identity Authentication, Encrypted Message Transmission and Authentication Mechanism of Symmetric-key Cryptosystem sent by the device under test, it will send out the authentication response with wrong response value. This message format conforms to the requirement definitions in Table 22 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives a Secure Device Pipe Setup Confirmation Response from the device under test.

b) The response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1;

c) The 01-ReturnCode field in the response received by the test device shall be 405.

### 6.2.5 Secure device pipe setup based on authentication, encrypted message transmission and authentication mechanism of public-key cryptosystem conformance test suite

#### 6.2.5.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both the test device and the device under test use authentication, encrypted message transmission and authentication mechanism based on public-key cryptosystem.

Pre-condition 2, applicable to test case 2 through test case 4:

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up a secure device pipe;

– both the test device and the device under test use authentication, encrypted message transmission and authentication mechanism based on public-key cryptosystem;

– the test device sets up secure device pipe with the device under test and completes a pipe setup request/response message interaction process required by authentication, encrypted message transmission and authentication mechanism based on public-key cryptosystem.

Pre-condition 3, applicable to test case 5 and test case 6:

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;
– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;
– both the test device and the device under test use authentication, encrypted message transmission and authentication mechanism based on public-key cryptosystem;
– the device under test is equipped with a control interface that can be used to initiate secure a device pipe setup request with other devices.

Pre-condition 4, applicable to test case 7 and test case 8:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;
– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up a secure device pipe;
– both test device and the device under test use authentication, encrypted message transmission and authentication mechanism based on public-key cryptosystem;
– the device under test sets up secure device pipe with the test device and completes a pipe setup request/response message interaction process required by authentication, encrypted message transmission and authentication mechanism based on public-key cryptosystem.

#### 6.2.5.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test receives a Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem, it will return a proper secure device pipe setup response.

– Reference

Pipe Setup Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem; see 9.2.3.1 and 9.2.3.2.4 of ISO/IEC 14543-5-1

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device uses the field: 01-SecureListenerList addresses retrieved from a Device Online Advertisement sent by the device under test to setup TCP connection;

b) The test device uses the existing TCP connection to send a Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 13 of ISO/IEC 14543-5-1. The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, the test device and the device under test set up TCP connection successfully;

b) In step 2 of the test procedure, the test device receives a Pipe Setup Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem returned by the device under test.

c) In step 2 of the test procedure, the pipe setup response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 14 of ISO/IEC 14543-5-1.

#### 6.2.5.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem (this includes Challenge 1), it sends out the correct authentication response (this includes the correct response value to Challenge 1) within 30 s.

– Reference

Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device uses the existing TCP connection to send an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 25 of ISO/IEC 14543-5-1 (this includes a random number as Challenge 1). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After sending out a authentication request, the test device receives an Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem from the device under test within 30 s.

b) The response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 26 of ISO/IEC 14543-5-1.

c) The response received by the test device shall include the correct response value to Challenge 1 as specified in 9.2.3.3.3 of ISO/IEC 14543-5-1.

#### 6.2.5.4 Test case 3

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem and its response value matches the calculated result, it will send out the correct authentication result response within 30 s so as to confirm successful authentication (01-ReturnCode field value = 100 (success)).

– Reference

Authentication Result Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem; see 9.2.3.1, 9.2.3.3.3 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device uses the existing TCP connection to send an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem to the device under test and receives the correct authentication response from the device under test.

b) The test device uses the existing TCP connection to send an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 27 of ISO/IEC 14543-5-1 (includes the correct response value). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after sending out a request, the test device receives an Authentication Result Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 28 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by the test device shall be 100.

#### 6.2.5.5 Test case 4

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem and its response value does not match the calculated result, it will send out the correct Secure Device Pipe Setup Confirmation Response within 30 s so as to indicate failure and to set up secure device pipe (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device uses the existing TCP connection to send an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem to the device under test and receives the correct authentication response from the device under test.

b) The test device uses the existing TCP connection to send an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem to the device under test. This message format conforms to the requirement definitions in Table 27 of ISO/IEC 14543-5-1 (includes the wrong response value). The test device is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after sending out a request, the test device receives a Secure Device Pipe Setup Confirmation Response from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by the test device shall be 405.

#### 6.2.5.6 Test case 5

– Test purpose

The test purpose is to ensure that the device under test can set up TCP connection with other devices by using the 01-SecureListenerList field address in the Device Online Advertisement. When the security mechanism between devices is an authentication, encrypted message transmission and the authentication mechanism is based on public-key cryptosystem, the device under test can send out the correct Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem.

– Reference

Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem; see 9.2.3.1 and 9.2.3.2.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates a secure device pipe setup request with the test device. At the same time, the test device is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up TCP connection with the device under test.

b) The test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, the device under test and test device set up TCP connection successfully.

b) In step 2 of the test procedure, the test device receives a Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem sent by the device under test.

c) In step 2 of the test procedure, the pipe setup request received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 13 of ISO/IEC 14543-5-1.

#### 6.2.5.7 Test case 6

– Test purpose

The test purpose is to ensure that, after the device under test has received a Pipe Setup Response based on Authentication, Encrypted Message Transmission, Authentication Mechanism of Public-key Cryptosystem (confirm security mechanism selection), it can send out the correct Authentication Request based on Authentication and Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem.

– Reference

Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates a secure device pipe setup with the test device. At the same time, the test device is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up TCP connection with the device under test.

b) After the test device has received a Pipe Setup Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem, it will send out a secure device pipe setup response to confirm the selected security mechanism. This message format conforms to the requirement definitions in Table 14 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, the test device receives an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem sent by the device under test.

b) In step 2 of the test procedure, the request received by the test device shall conform to the requirement definitions in Table 25 of ISO/IEC 14543-5-1.

#### 6.2.5.8 Test case 7

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem and its response value matches the calculated result, it will send out the correct authentication result request (this includes the correct response value).

– Reference

Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem; see 9.2.3.1 and 9.2.3.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device has received an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem sent by the device under test, it will send out the correct authentication response (this includes the correct response value). This message format conforms to the requirement definitions in Table 26 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem sent from the device under test.

b) The request message received by the test device shall conform to the requirement definitions in Table 27 of ISO/IEC 14543-5-1.

#### 6.2.5.9 Test case 8

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Public-key Cryptosystem and its response value does not match the calculated result, it will send out the correct Secure Device Pipe Setup Confirmation Response to indicate failure and to set up secure device pipe (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device has received an Authentication Request based on Authentication and Encrypted Message Transmission, Authentication Mechanism of Public-key Cryptosystem sent by the device under test, it will send out the authentication response with wrong response value. This message format conforms to the requirement definitions in Table 26 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the setup TCP connection with the device under test to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives a Secure Device Pipe Setup Confirmation Response from the device under test.

b) The response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

c) The 01-ReturnCode field in the response received by the test device shall be 405.

### 6.2.6 Secure device pipe setup based on trusted third party authentication, encrypted message transmission and authentication mechanism conformance test suite

#### 6.2.6.1 Pre-condition

Pre-condition 1, applicable to test case 1 and test case 6:

– the test device A, the test device B and the device under test are located in the same LAN IP broadcast domain. Test device B provides security identity authentication service for both test device A and device under test;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device A is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device A sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both the test device A and the device under test use device security mechanism based on trusted third party authentication, encrypted message transmission and authentication mechanism;

– the device under test is equipped with a control interface that can be used to initiate secure device pipe setup with other devices.

Pre-condition 2, applicable to test case 2:

– the test device A, the test device B and the device under test are located in the same LAN IP broadcast domain. Test device B provides security identity authentication service for both test device A and device under test;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device A is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device A sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both test device A and the device under test use the device security mechanism based on trusted third party authentication, encrypted message transmission and authentication mechanism.

Pre-condition 3, applicable to test case 3:

– the test device A, the test device B and the device under test are located in the same LAN IP broadcast domain. The device under test provides security identity authentication service for both test device A and test device B;

– the IGRS protocol on the device under test is initiated and running normally.

Pre-condition 4, applicable to test case 4 and test case 5:

– the test device A, the test device B and the device under test are located in the same LAN IP broadcast domain. Test device B provides security identity authentication service for both test device A and the device under test;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device A is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device A sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both the test device A and the device under test use a device security mechanism based on trusted third party authentication, encrypted message transmission and authentication mechanism;

– the test device A sets up a secure device pipe with the device under test and completes a pipe setup request/response message interaction process required by device security mechanism based on trusted third party authentication, encrypted message transmission and authentication mechanism.

Pre-condition 5, applicable to test case 7:

– the test device A, the test device B and the device under test are located in the same LAN IP broadcast domain. The test device B provides a security identity authentication service for both test device A and the device under test;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device A is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device A sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– both test device A and the device under test use a device security mechanism based on trusted third party authentication, encrypted message transmission and authentication mechanism;

– the device under test sets up a secure device pipe with the test device A and completes a pipe setup request/response message interaction process required by device security mechanism based on trusted third party authentication, encrypted message transmission and authentication mechanism.

#### 6.2.6.2 Test case 1

– Test purpose

The test purpose is to ensure the correctness of Pipe Setup Request based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism sent by the device under test.

– Reference

Pipe Setup Request based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism; see 9.2.3.1 and 9.2.3.2.5 of ISO/IEC 14543-5-1

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates a secure device pipe setup request with the test device A. At the same time, test device A is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up TCP connection with the device under test.

b) The test device A is listening to any request message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, test device A and the device under test set up TCP connection successfully.

b) In step 2 of the test procedure, test device A receives a pipe setup request based on trusted third party authentication, encrypted message transmission and authentication mechanism sent by the device under test.

c) In step 2 of the test procedure, the pipe setup request received by test device A shall conform to the definitions of the HTTP command and the required fields shown in Table 15 of ISO/IEC 14543-5-1.

#### 6.2.6.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives a Pipe Setup Request based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism, it will return a proper secure device pipe setup response.

– Reference

Pipe Setup Request based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism; see 9.2.3.1 and 9.2.3.2.5 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device A uses the field: 01-SecureListenerList addresses retrieved from a Device Online Advertisement sent by the device under test to set up TCP connection.

b) The test device A uses the existing TCP connection to send a pipe setup request based on trusted third party authentication, encrypted message transmission and authentication mechanism to the device under test. This message format conforms to the requirement definitions in Table 15 of ISO/IEC 14543-5-1. The test device A is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 1 of the test procedure, test device A and the device under test set up TCP connection successfully.

b) In step 2 of the test procedure, the test device A receives a Pipe Setup Response based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism sent by the device under test.

c) In step 2 of the test procedure, the pipe setup response received by the test device A shall conform to the definitions of the HTTP command and the required fields shown in Table 16 of ISO/IEC 14543-5-1.

#### 6.2.6.4 Test case 3

– Test purpose

The test purpose is to ensure that, when the device under test (as security identity service provider) receives an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party, it will return a proper authentication response within 30 s.

– Reference

Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party; see 9.2.3.1 and 9.2.3.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device A uses the existing TCP connection to send an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party to the device under test. This message format conforms to the requirement definitions in Table 29 of ISO/IEC 14543-5-1. The test device A is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After sending out an authentication request, the test device A receives an Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party from the device under test within 30 s.

b) The response received by the test device A shall conform to the definitions of the HTTP command and the required fields shown in Table 30 of ISO/IEC 14543-5-1.

#### 6.2.6.5 Test case 4

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party and its content authentication passes, it will send out the correct authentication result response within 30 s to confirm successful authentication (01-ReturnCode field value = 100 (success)).

– Reference

Authentication Result Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party; see 9.2.3.1, 9.2.3.3.4 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device A sends an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party through the test device B to the device under test and receives the correct authentication response from the device under test through the test device B.

b) The test device A uses the existing TCP connection to send an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party to the device under test. This message format conforms to the requirement definitions in Table 31 of ISO/IEC 14543-5-1 (includes the correct authentication in the response message from

test device B in step 1). The test device A is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after sending out a request, the test device A receives an Authentication Result Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by test device A shall conform to the definitions of the HTTP command and the required fields shown in Table 32 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by test device A shall be 100.

#### 6.2.6.6 Test case 5

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party and its content authentication fails, it will send out the correct Secure Device Pipe Setup Confirmation Response within 30 s to indicate failure and to set up secure device pipe (01-ReturnCode field value = 405 (device setup failed)).

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.1, 9.2.3.4 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device A sends an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party through test device B to the device under test and receives the correct authentication response from the device under test through test device B.

b) The test device A uses the existing TCP connection to send an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party to the device under test. This message format conforms to the requirement definitions in Table 31 of ISO/IEC 14543-5-1 (includes the wrong authentication). The test device A is also listening to any response message on the TCP connection.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after sending out a request, test device A receives a Secure Device Pipe Setup Confirmation Response from the device under test within 30 s.

b) In step 2 of the test procedure, the response received by test device A shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the 01-ReturnCode field in the response received by test device A shall be 405.

#### 6.2.6.7 Test case 6

– Test purpose

The test purpose is to verify that the device under test sends a correct Authentication Request based on Authentication, Encryption Message Transmission and Authentication Mechanism of Trusted Third Party to the security identity service provider after receiving a Pipe Setup Response based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechnism that confirms the secuity mechanism selection and sets up a secure device pipe based on Trusted Third Party Autentication, Encryption Message Transmission and Authentication Mechanism.

– Reference

Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party; see 9.2.3.1 and 9.2.3.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The device under test initiates a secure device pipe setup with test device A. At the same time, test device A is listening to the 01-SecureListenerList field address included in its own Device Online Advertisement, to set up TCP connection with the device under test.

b) After the test device A has received a Pipe Setup Request based on Trusted Third Party Authentication, Encrypted Message Transmission and Authentication Mechanism, it will send out a secure device pipe setup response to confirm the selected security mechanism. This message format conforms to the requirement definitions in Table 16 of ISO/IEC 14543-5-1. At the same time, test device B is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, test device B receives an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party sent by the device under test.

b) In step 2 of the test procedure, the request received by test device B shall conform to the requirement definitions in Table 29 of ISO/IEC 14543-5-1.

#### 6.2.6.8 Test case 7

– Test purpose

The test purpose is to ensure that, when the device under test receives an Authentication Response based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party, it will send out the correct Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party.

– Reference

Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party; see 9.2.3.1 and 9.2.3.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

After the test device B has received an Authentication Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party sent by the device under test, it will send out the correct authentication response. This message format conforms to the requirement definitions in Table 30 of ISO/IEC 14543-5-1. At the same time, the test device A is listening to the setup TCP connection with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device A receives an Authentication Result Request based on Authentication, Encrypted Message Transmission and Authentication Mechanism of Trusted Third Party sent from the device under test.

b) The request message received by the test device A shall conform to the requirement definitions in Table 31 of ISO/IEC 14543-5-1.

### 6.2.7 Secure device pipe setup confirmation conformance test suite

#### 6.2.7.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to set up secure device pipe;

– the test device connects to the device under test using 01-SecureListenerList field address retrieved from a Device Online Advertisement sent by the device under test to set up TCP connection.

Pre-condition 2, applicable to test case 2

– the test device and device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test. 01-SecureListenerList field is retrieved;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880. The 01-SecureListenerList field contains IP address to setup secure device pipe;

– the device under test connects to the test device using 01-SecureListenerList field address retrieved from a Device Online Advertisement sent by the test device to set up TCP connection.

#### 6.2.7.2 Test case 1

– Test purpose

The test purpose is to ensure that, if the device under test initiates the setup of secure device pipe, when the device under test receives the response message which indicates

initialization, and identity authentication phases have been completed properly, it sends the correct Secure Device Pipe Setup Confirmation Request to the test device.

– Reference

Secure Device Pipe Setup Confirmation Request; see 9.2.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device and the device under test complete secure device pipe set up initiation, security identity authentication and secure device pipe key negotiation between them normally.

b) The test device is listening to the TCP connection setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After the first two phases of device pipe setup are completed, the test device receives a Secure Device Pipe Setup Confirmation Request from the device under test.

b) The request received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 33 of ISO/IEC 14543-5-1.

c) The 01-CreatePipeResult field in the request received by the test device shall be OK(success).

#### 6.2.7.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives a Secure Device Pipe Setup Confirmation Request from test device, it sends out the proper Secure Device Pipe Setup Confirmation Response.

– Reference

Secure Device Pipe Setup Confirmation Response; see 9.2.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device and device under test complete secure device pipe setup initiation, security identity authentication and secure device pipe key negotiation between them normally.

b) The test device sends a Secure Device Pipe Setup Confirmation Request to the device under test. This message format conforms to the requirement definitions in Table 33 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the TCP connection setup with the device under test to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after the test device has sent a Secure Device Pipe Setup Confirmation Request, it receives a Secure Device Pipe Setup Confirmation Response sent by the device under test.

b) In step 2 of the test procedure, the response received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 34 of ISO/IEC 14543-5-1.

### 6.2.8 Secure device pipe teardown conformance test suite

#### 6.2.8.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device has setup a secure device pipe with the device under test;

– the device under test is equipped with a control interface that can be used to tear down a secure device pipe with other devices.

#### 6.2.8.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test is tearing down a secure device pipe, it can send out the proper Secure Device Pipe Teardown Notification Message.

– Reference

Secure Device Pipe Teardown Notification Message; see 9.2.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a secure device pipe setup tear down with the test device. At the same time, the test device is listening to the secure device pipe setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives a Secure Device Pipe Teardown Notification Message sent from the device under test.

b) The notification message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 35 of ISO/IEC 14543-5-1.

### 6.2.9 Device online detection conformance test suite

#### 6.2.9.1 Pre-condition

Pre-condition 1, applicable to test case 1 and test case 2:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;

– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test;

– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880;

– the test device sets up an unsecure device pipe with the device under test.

Pre-condition 2, applicable to test case 3:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880 to receive a Device Online Advertisement sent by the device under test;
– the test device sends a Device Online Advertisement periodically to multicast address 239.255.255.250:3880;
– the test device sets up an unsecure device pipe with the device under test;
– the device under test is equipped with a control interface that can be used to send a Device Online Detection Request Message.

#### 6.2.9.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Online Detection Request Message and the 01-TargetDeviceId field in that request message matches device id of the device under test, it returns a proper Device Online Detection Response Message within 30 s.

– Reference

Device Online Detection Response Message; see 9.2.6 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Online Detection Request Message to the device under test through device pipe setup. This message format conforms to the requirement definitions in Table 37 of ISO/IEC 14543-5-1. In addition, 01-TargetDeviceId field value is configured to be the same as the NT field in the Device Online Advertisement sent by the device under test. At the same time, the test device is also listening to the device pipe between two devices for 30 s to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) Within 30 s after the test device has sent out the request message, it shall receive a Device Online Detection Response Message sent by the device under test on the device pipe.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 38 of ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following.

- SourceDeviceId field in the response message shall match 01-TargetDeviceId field in the request message.
- The 01-TargetDeviceId field in the response message shall match 01-SourceDeviceId field in the request message.
- The 01-AcknowledgeId field in the response message shall match 01-SequenceId field in the request message.

#### 6.2.9.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Online Detection Request Message, but 01-TargetDeviceId field in that request message does

not match device id of the device under test, it does not return a Device Online Detection Response Message.

– Reference

Device Online Detection Response Message; see 9.2.6 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Online Detection Request Message to the device under test through device pipe setup. This message format conforms to the requirement definitions in Table 37 of ISO/IEC 14543-5-1. In addition, 01-TargetDeviceId field value is configured to be different from the NT field in the Device Online Advertisement sent by the device under test. At the same time, the test device is also listening to the device pipe between two devices for 30 s to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test:

After the test device has sent out the request message, it shall not receive a Device Online Detection Response Message sent by the device under test.

#### 6.2.9.4 Test case 3

– Test purpose

The test purpose is to ensure that, after the device under test has set up a device pipe and needs to detect whether the other device is online, it can send out a proper Device Online Detection Request Message.

– Reference

Device Online Detection Request Message; see 9.2.6 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a Device Online Detection Request Message through device pipe setup to the test device. At the same time, the test device is listening to the device pipe setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device receives a Device Online Detection Request Message sent by the device under test.

b) The request message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 37 of ISO/IEC 14543-5-1.

## 6.3 Device description document retrieval conformance test suite

### 6.3.1 Reference messages

Device Description Document Retrieval Request Message refers to Table 39 of ISO/IEC 14543-5-1.

Device Description Document Retrieval Response Message refers to Table 40 of ISO/IEC 14543-5-1.

### 6.3.2 Test case suite

#### 6.3.2.1 Pre-condition

Pre-condition 1, applicable to test case 1 through test case 4:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a device pipe with the device under test;
– the detailed device description document is stored on the device under test.

Pre-condition 2, applicable to test case 5:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a device pipe with the device under test;
– the device under test is equipped with a control interface that can be used to access detailed device description documents of other devices.

#### 6.3.2.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Description Document Retrieval Request Message, it can send out the proper Device Description Document Retrieval Response Message within 30 s.

– Reference

Device Description Document Retrieval Response Message; see 9.3.2 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Description Document Retrieval Request Message to the device under test. This message format conforms to the requirement definitions in Table 39 of ISO/IEC 14543-5-1. At the same time, the test device is listening to any messages sent by the device under test for 30 s.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After the test device has sent a Device Description Document Retrieval Request Message, it shall receive a Device Description Document Retrieval Response Message from the device under test within 30 s.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 40 of ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following.

- The 01-AcknowledgeId field in the response message shall match 01-SequenceId field in the request message.
- The <AcknowledgeId> field value in the response message body shall match <SequenceId> field value in the request message body.
- The 01-SourceDeviceId field in the response message shall match 01-TargetDeviceId field in the request message.
- The 01-TargetDeviceId field in the response message shall match 01-SourceDeviceId field in the request message.
- The <ClientId> field value in the response message body shall match <ClientId> field value in the request message body.

#### 6.3.2.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Description Document Retrieval Request Message and it retrieves the proper device description document, the <ReturnCode> field value in the response message body is 100 (success).

– Reference

Device Description Document Retrieval Response Message; see 9.3.2 and clause 11 of ISO/IEC 14543-5-1

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Description Document Retrieval Request Message to the device under test. This message format conforms to the requirement definitions in Table 39 of ISO/IEC 14543-5-1. At the same time, the test device is listening to any messages sent by the device under test for 30 s.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) After the test device has sent a Device Description Document Retrieval Request Message, it shall receive a Device Description Document Retrieval Response Message from the device under test within 30 s;

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 40 of ISO/IEC 14543-5-1;

c) The <ReturnCode> field in the response message body received by the test device shall be 100.

#### 6.3.2.4 Test case 3

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Description Document Retrieval Request Message and it cannot retrieve the proper device description document, the <ReturnCode> field value in the response message body is 204 (the device detailed description information access failed, or the device detailed description information does not exist or is blank).

– Reference

Device Description Document Retrieval Response Message; see 9.3.2 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status Codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test procedure shall contain the following actions.

a) Delete the detailed device description document stored in the device under test.

b) The test device sends a Device Description Document Retrieval Request Message to the device under test. This message format conforms to the requirement definitions in Table 39 of ISO/IEC 14543-5-1. At the same time, the test device is listening to any messages sent by the device under test for 30 s.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) In step 2 of the test procedure, after the test device has sent a Device Description Document Retrieval Request Message, it shall receive a Device Description Document Retrieval Response Message from the device under test within 30 s.

b) In step 2 of the test procedure, the response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 40 of ISO/IEC 14543-5-1.

c) In step 2 of the test procedure, the <ReturnCode> field in the response message body received by the test device shall be 204.

#### 6.3.2.5 Test case 4

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Description Document Retrieval Request Message and it retrieves the proper device description document, the transmitted response message body contains the proper detailed device description document.

– Reference

Device Description Document Retrieval Response Message; see 9.3.2 and Clause 11 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Description Document Retrieval Request Message to the device under test. This message format conforms to the requirement definitions in Table 39 of ISO/IEC 14543-5-1. At the same time, the test device is listening to any messages sent by the device under test for 30 s.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After the test device has sent a Device Description Document Retrieval Request Message, it shall receive a Device Description Document Retrieval Response Message from the device under test within 30 s.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 40 of ISO/IEC 14543-5-1.

c) The device description document in the response message body received by the test device shall match the device description document stored in the device.

#### 6.3.2.6 Test case 5

– Test purpose

The test purpose is to ensure that, when the device under test needs to access detailed device description documents of other devices, it can send out the proper Device Description Document Retrieval Request Message.

– Reference

Device Description Document Retrieval Request Message; see 9.3.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to access detailed device description document of test device. At the same time, the test device is listening to the device pipe setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Description Document Retrieval Request Message from the device under test.

b) The request message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 39 of ISO/IEC 14543-5-1.

### 6.4 Device group setup conformance test suite

#### 6.4.1 Reference messages

Device Group Advertisement Message of Specified Peer-to-peer Device Group refers to Table 41 of ISO/IEC 14543-5-1.

Device Leaves Specified Peer-to-peer Device Group Quit Group Message refers to Table 42 of ISO/IEC 14543-5-1.

Device Group Advertisement Message of Master-slave Device Group refers to Table 43 of ISO/IEC 14543-5-1.

Request Message to Join a Master-slave Device Group refers to Table 44 of ISO/IEC 14543-5-1.

Response Message to Join a Master-slave Device Group refers to Table 45 of ISO/IEC 14543-5-1.

Device Group Dissolve Notification Message Sent by Master Device refers to Table 46 of ISO/IEC 14543-5-1.

Withdraw Notification Message Sent by Slave Device refers to Table 47 of ISO/IEC 14543-5-1.

### 6.4.2 Test case suite

#### 6.4.2.1 Pre-Condition

Pre-condition 1, applicable to test case 1:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880;
– the device under test is equipped with a control interface that can be used to setup specified peer-to-peer device group.

Pre-condition 2, applicable to test case 2:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a specified peer-to-peer device group and sends specified peer-to-peer device group advertisement periodically to multicast address 239.255.255.250:3880;
– the test device is listening to multicast port 239.255.255.250:3880;
– the device under test is equipped with a control interface that can be used to join specified peer-to-peer device group.

Pre-condition 3, applicable to test case 3:

– the test device A, test device B and the device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device A sets up a specified peer-to-peer device group. The test device B and the device under test join this specified peer-to-peer device group;
– the test device A is listening to multicast port 239.255.255.250:3880.

Pre-condition 4, applicable to test case 4:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a specified peer-to-peer device group and the device under test joins this specified peer-to-peer device group;
– the test device is listening to multicast port 239.255.255.250:3880;
– the device under test is equipped with a control interface that can be used to leave the specified peer-to-peer device group.

Pre-condition 5, applicable to test case 5:

– the test device and the device under test are located in the same LAN IP broadcast domain;

– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast port 239.255.255.250:3880;
– the device under test is equipped with a control interface that can be used to set up a master-slave device group.

Pre-condition 6, applicable to test case 6:

– the test device and the device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the device under test sets up a master-slave device group as the master device;
– the test device sets up a device pipe with the device under test.

Pre-condition 7, applicable to test case 7:

– the test device and the device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the device under test sets up a master-slave device group as the master device;
– the test device sets up a device pipe with the device under test;
– the test device is listening to multicast port 239.255.255.250:3880;
– the device under test is equipped with a control interface that can be used to dissolve the master-slave device group.

Pre-condition 8, applicable to test case 8:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a master-slave device group as the master device and sends out master-slave device group advertisement periodically;
– the test device sets up a device pipe with the device under test;
– the device under test is equipped with a control interface that can be used to join a master-slave device group.

Pre-condition 9, applicable to test case 9:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a master-slave device group as the master device and sends master-slave device group advertisement periodically;
– the device under test joins this master-slave device group as a slave device;
– the test device sets up a device pipe with the device under test;
– the device under test is equipped with a control interface that can be used to leave the master-slave device group.

#### 6.4.2.2 Test case 1

– Test purpose

  The test purpose is to ensure that, when the device under test sets up a specified peer-to-peer device group, it can send out the proper Device Online Advertisement (this includes its specified peer-to-peer device group ID) and the specified peer-to-peer device group advertisement.

– Reference

Device Group Advertisement Message of Specified Peer-to-peer Device Group; see 9.5.2.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a specified peer-to-peer device group setup.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Online Advertisement message from the device under test at multicast address port. This message received by the test device shall conform to the definitions in Table 7 of ISO/IEC 14543-5-1.

b) The test device shall receive a Device Group Advertisement Message of Specified Peer-to-peer Device Group from the device under test at multicast address port. The message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 41 of ISO/IEC 14543-5-1.

#### 6.4.2.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test joins a specified peer-to-peer device group, it can send out the proper Device Online Advertisement (this includes its specified peer-to-peer device group ID).

– Reference

Device Online Advertisement; see 9.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to join a specified peer-to-peer device group setup by the test device.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Online Advertisement message from the device under test at multicast address port. This message received by the test device shall conform to the definitions in Table 7 of ISO/IEC 14543-5-1.

b) The 01-DeviceGroupList field in the advertisement message received by the test device shall include the specified peer-to-peer device group ID used by the test device.

#### 6.4.2.4 Test case 3

– Test purpose

The test purpose is to ensure that, when the device under test is selected to be responsible for sending a device group advertisement in a specified peer-to-peer device group that it belongs to, it can send out the proper specified peer-to-peer device group advertisement.

– Reference

Device Group Advertisement Message of Specified Peer-to-peer Device Group; see 9.5.2.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The test device A sends a Device Offline Advertisement message through multicast address 239.255.255.250:3880.

b) Between the test device B and device under test, the device under test is selected to be responsible for device group advertisement.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device A shall receive a Device Group Advertisement Message of Specified Peer-to-peer Device Group from the device under test at multicast address port.

b) This advertisement message received by the test device A shall conform to the definitions in Table 41 of ISO/IEC 14543-5-1.

#### 6.4.2.5 Test case 4

– Test purpose

The test purpose is to ensure that, when the device under test leaves a specified peer-to-peer device group, it can send out the proper Device Leaves a Specified Peer-to-peer Device Group Quit Group Message.

– Reference

Device Leaves a Specified Peer-to-peer Device Group Quit Group Message; see 9.5.2.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to leave a specified peer-to-peer device group set up by the test device.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Leaves a Specified Peer-to-peer Device Group Quit Group Message from the device under test at multicast address port.

b) This message received by the test device shall conform to the definitions in Table 42 of ISO/IEC 14543-5-1.

#### 6.4.2.6 Test case 5

– Test purpose

The test purpose is to ensure that, when the device under test sets up a master-slave (centralized) device group, it can send out the proper Device Group Advertisement Message of Master-slave Device Group periodically.

– Reference

Device Group Advertisement Message of Master-slave Device Group; see 9.5.3.1 and 9.5.3.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a master-slave (centralised) device group setup.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Advertisement Message of Master-slave Device Group periodically from the device under test.

b) This message received by the test device shall conform to the definitions in Table 43 of ISO/IEC 14543-5-1.

#### 6.4.2.7 Test case 6

– Test purpose

The test purpose is to ensure that, when the device under test is the master device and receives a Request Message to Join a Master-slave Device Group, it can send out the proper Response Message to Join a Master-slave Device Group.

– Reference

Response Message to Join a Master-slave Device Group; see 9.5.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Request Message to Join a Master-slave Device Group to the device under test based on device pipe. This message format conforms to the requirement definitions in Table 44 of ISO/IEC 14543-5-1. At the same time, the test device is listening to the device pipe setup with the device under test to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After the test device has sent a Request Message to Join a Master-slave Device Group, it shall receive a Response Message to Join a Master-slave Device Group from the device under test through device pipe within 30 s.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 45 of ISO/IEC 14543-5-1.

#### 6.4.2.8 Test case 7

– Test purpose

The test purpose is to ensure that, when the device under test is the master device and needs to dissolve the master-slave (centralised) device group, it can send out the proper Device Group Dissolve Notification Message Sent by Master Device.

– Reference

Device Group Dissolve Notification Message Sent by Master Device; see 9.5.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to dissolve master-slave (centralised) device group.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) The test device shall receive a Device Group Dissolve Notification Message Sent by Master Device from the device under test at multicast address 239.255.255.250:3880;

b) This message received by the test device shall conform to the definitions in Table 46 of ISO/IEC 14543-5-1.

#### 6.4.2.9 Test case 8

– Test purpose

The test purpose is to ensure that, when the device under test joins a master-slave (centralised) device group, it can send out the proper Request Message to Join a Master-slave Device Group to the master device.

– Reference

Request Message to Join a Master-slave Device Group; see 9.5.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to join a master-slave (centralised) device group setup by the test device. At the same time, the test device is listening to the device pipe setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Request Message to Join a Master-slave Device Group from the device under test based on device pipe.

b) This message received by the test device shall conform to the definitions in Table 44 of ISO/IEC 14543-5-1.

#### 6.4.2.10 Test case 9

– Test purpose

The test purpose is to ensure that, when the device under test leaves a master-slave (centralised) device group, it can send out the proper Withdraw Notification Message Sent by a slave device to a master device.

– Reference

Withdraw Notification Message Sent by slave device; see 9.5.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to leave a master-slave (centralised) device group setup by the test device. At the same time, the test device is listening to the device pipe setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Withdraw Notification Message Sent by slave device based on device pipe from the device under test.

b) This message received by the test device shall conform to the definitions in Table 47 of ISO/IEC 14543-5-1.

## 6.5 Device search conformance test suite

### 6.5.1 Reference messages

Device Search Request Message refers to Table 48 of ISO/IEC 14543-5-1.

Device Search Response Message refers to Table 49 of ISO/IEC 14543-5-1.

Device Search Request Message by Proxy refers to Table 50 of ISO/IEC 14543-5-1.

Device Search Response Message by Proxy refers to Table 51 of ISO/IEC 14543-5-1.

### 6.5.2 Test case suite

#### 6.5.2.1 Pre-condition

Pre-condition 1, applicable to test case 1 through test case 7, test case 9 through test case 11:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device is listening to multicast address port 239.255.255.250:3880 to receive a Device Online Advertisement message sent by the device under test;
– the IGRS service on the device under test is running normally;
– the test device is listening to multicast address port 239.255.255.250:3880 to receive a Service Online Advertisement Message sent by the device under test.

Pre-condition 2, applicable to test case 8:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a specified peer-to-peer device group or master-slave (centralised) device group and the device under test joins that device group;
– the test device is listening to multicast address port 239.255.255.250:3880 to receive a Device Online Advertisement message sent by the device under test.

Pre-condition 3, applicable to test case 12:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device sets up a device pipe with the device under test;
– the device under test is equipped with a control interface that can be used to search for devices using multicast.

Pre-condition 4, applicable to test case 13:

– the test device and device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;

– the device under test is equipped with a control interface that can be used to search by proxy.

Pre-condition 5, applicable to test case 14:

– the test device A, test device B and the device under test are located in the same LAN IP broadcast domain;
– the IGRS protocol on the device under test is initiated and running normally;
– the test device A sets up a device pipe with the device under test;
– the test device B sets up a device pipe with the device under test;
– the device under test sets up master-slave device group, the test device A and test device B join this device group as slave devices.

#### 6.5.2.2 Test case 1

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast and there is a match in search condition, it can send out the proper Device Search Response Message based on UDP to port 3880 of the requesting device.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1 and includes 01-SearchAll:TRUE field in the message. At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following:

- the USN field value, 01-SourceDeviceId field value in the response message shall match <DeviceId> value in the message body and NT field value in the Device Online Advertisement sent by the device under test;
- the 01-TargetDeviceId field in the response message shall match 01-SourceDeviceId field in the request message;
- the <AcknowledgeId> field value in the response message body shall match 01-SequenceId field value in the request message;
- the <ClientId> field value in the response message body shall match 01-ClientId field value in the request message.

#### 6.5.2.3 Test case 2

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast and the search condition is set to SearchAll, it can treat all other search conditions as invalid, and send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message also includes the following:

a) 01-SearchAll:TRUE field;

b) 01-SearchByDeviceName field, but this field value is different from 01-DeviceName value included in the Device Online Advertisement of the device under test.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

#### 6.5.2.4 Test case 3

– Test purpose

The test purpose is to ensure that the device under test sends out the proper Device Search Response Message when the device under test receives a Device Search Request Message based on a multicast message that contains a search condition for the DeviceName that matches its own search condition UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) includes 01-SearchByDeviceName field, and this field value is the same as 01-DeviceName value included in the Device Online Advertisement of the device under test,

b) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

c) The <DeviceName> field value in the response message body shall match 01-SearchByDeviceName field value in the request message.

#### 6.5.2.5 Test case 4

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast that contains a search condition for the DeviceType and if there is a match in the search condition, it can then send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) includes 01-SearchByDeviceType field, and this field value is the same as 01-DeviceType value included in the Device Online Advertisement of the device under test,

b) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

c) The <DeviceType> field value in the response message body shall match 01-SearchByDeviceType field value in the request message.

#### 6.5.2.6 Test case 5

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast that contains a search condition for the ServiceType and if there is a match in the search condition, it can then send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) Includes 01-SearchByServiceType field, and this field value is the same as 01-ServiceType value included in the Device Online Advertisement of the device under test;

b) And none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

#### 6.5.2.7 Test case 6

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast that contains a search condition for the ServiceName and if there is a match in the search condition, it can then send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) includes 01-SearchByServiceName field, and this field value is the same as 01-ServiceName value included in the Device Online Advertisement of the device under test,

b) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

#### 6.5.2.8 Test case 7

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast that contains a search condition for the DeviceId and if there is a match in the search condition, it can then send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) includes 01-SearchByDeviceId field, and this field value is the same as USN value included in the Device Online Advertisement of the device under test,
b) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.
b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

#### 6.5.2.9 Test case 8

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast that contains a search condition for the DeviceGroupId and if there is a match in the search condition, it can then send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) includes 01-SearchByDeviceGroupId field, and this field value is the same as one of the DeviceGroupId value in 01-DeviceGroupIdList field included in the Device Online Advertisement of the device under test,

b) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

#### 6.5.2.10 Test case 9

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast that contains a combination of several search conditions and if there is a match in the search condition, it can then send out the proper Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) includes 01-SearchByDeviceId field, and this field value is the same as USN value included in the Device Online Advertisement of the device under test,

b) includes 01-SearchByDeviceType field, and this field value is the same as 01-DeviceType value included in the Device Online Advertisement of the device under test,

c) includes 01-SearchByServiceName field, and this field value is the same as 01-ServiceName value included in the service online advertisement of the device under test,

d) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

#### 6.5.2.11 Test case 10

– Test purpose

The test purpose is to ensure that, when the device under test receives a Device Search Request Message based on multicast and if there is no match in the search condition, it does not send a Device Search Response Message based on UDP.

– Reference

Device Search Response Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1. The message

a) does not include 01-SearchAll:TRUE field,

b) includes 01-SearchByServiceName field, and this field value is different from 01-ServiceName value included in the service online advertisement of the device under test,

c) and none of the other optional search conditions are included.

At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall not receive a Device Search Response Message based on UDP at port 3880 from the device under test.

#### 6.5.2.12 Test case 11

– Test purpose

The test purpose is to ensure that, under normal circumstances, when the device under test receives a Device Search Request Message based on multicast and if there is a match in the search condition, the <ReturnCode> value in the Device Search Response Message it sent based on UDP is 100 (success).

– Reference

Device Search Response Message; see 9.6.1 and Clause 11 of ISO/IEC 14543-5-1.

Request/Response status codes, see Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a Device Search Request Message based on multicast to address port 239.255.255.250:3880. This message format conforms to the requirement definitions in Table 48 of ISO/IEC 14543-5-1, and the message also includes 01-SearchAll:TRUE field. At the same time, the test device is listening to any UDP messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Response Message based on UDP at port 3880 from the device under test.

b) The response message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 49 of ISO/IEC 14543-5-1.

c) The <ReturnCode> field value in the response message received by the test device shall be 100.

#### 6.5.2.13 Test case 12

– Test purpose

The test purpose is to ensure that, when the device under test needs to search for devices based on multicast, it can send out the proper Device Search Request Message based on multicast to address port 239.255.255.250:3880.

– Reference

Device Search Request Message; see 9.6.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a device search based on multicast; at the same time, the test device is listening to any messages on multicast address port 239.255.255.250:3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Request Message based on multicast at address port 239.255.255.250:3880 from the device under test.

b) The request message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 48 of ISO/IEC 14543-5-1.

#### 6.5.2.14 Test case 13

– Test purpose

The test purpose is to ensure that, when the device under test needs to conduct a device search by proxy, it can send out the proper Device Search Request Message by proxy.

– Reference

Device Search Request Message by proxy; see 9.6.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a device search with the test device. At the same time, the test device is listening to the device pipe setup with the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Search Request Message by proxy from the device under test.

b) The request message received by the test device shall conform to the definitions of the HTTP command and the required fields shown in Table 50 of ISO/IEC 14543-5-1.

#### 6.5.2.15 Test case 14

– Test purpose

The test purpose is to ensure that, after receiving a Device Search Request Message by proxy from its slave device, the device under test, as the master device, can search and acquire all device information to return a proper response message.

– Reference

Device Search Response Message; see 9.6.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device A sends Device Search Request Message by proxy to the device under test through mutual device pipe. This message format conforms to the requirement definitions in Table 50 of ISO/IEC 14543-5-1, and the message also includes 01-SearchAll:TRUE field. At the same time, the test device A is listening to the device pipe setup with the device under test to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device A shall receive a Device Search Response Message by proxy from the device under test through mutual device pipe.

b) The response message received by the test device A shall conform to the definitions of the HTTP command and the required fields shown in Table 51 of ISO/IEC 14543-5-1.

## 6.6 Device online/offline event subscription conformance test suite

### 6.6.1 Reference messages

Device Online/Offline Event Subscription Request Message refers to Table 52 of ISO/IEC 14543-5-1.

Device Online/Offline Event Subscription Renewal Request Message refers to Table 53 of ISO/IEC 14543-5-1.

Device Online/Offline Event Subscription Response Message refers to Table 54 of ISO/IEC 14543-5-1.

Device Online/Offline Event Unsubscription Message refers to Table 55 of ISO/IEC 14543-5-1.

Device Online/Offline Event Notification Message refers to Table 56 of ISO/IEC 14543-5-1.

### 6.6.2 Test case suite

#### 6.6.2.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are in the same IP broadcast domain of Local Area Networks (LAN);
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the device under test has a control interface through which the device under test can be controlled to initiate the device online/offline event subscription.

Pre-condition 2, applicable to test case 2:

– the test device and the device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;

– the device under test successfully subscribes to device online/offline event through the test device;
– the device under test has a control interface through which the device under test can be controlled to initiate the device online/offline event subscription renewal.

Pre-condition 3, applicable to test case 3:

– the test device and the device under test are in the same IP broadcast domain of LAN;
– the test device is listening for message on multicast port 239.255.255.250:3880;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the device under test successfully subscribes to device online/offline event on the test device;
– the device under test has a control interface through which the device under test can be controlled to initiate the device online/offline event unsubscription.

Pre-condition 4, applicable to test case 4:

– the test device and the device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the test device and the device under test belongs to the same master-slave group in which the test device is slave device and the device under test is master device.

Pre-condition 5, applicable to test case 5:

– the test device and device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and the device under test;
– the test device and the device under test belongs to the same master-slave group in which the test device is slave device and the device under test is master device;
– the test device successfully subscribes to device online/offline event on the device under test.

Pre-condition 6, applicable to test case 6:

– the test device A, test device B and the device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device A and device under test;
– the device pipe is successfully set up between the test device B and device under test;
– the device under test sets up a centralised group and the test device A and B join the group as slave devices;
– the test device A successfully subscribes to device online/offline event on the device under test.

#### 6.6.2.2 Test case 1

– Test purpose

The test purpose is to verify whether the device under test can send a correct Device Online/Offline Event Subscription Request Message when it needs to subscribe to the device online/offline event.

– Reference

Device Online/Offline Event Subscription Request Message; see 9.7.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to subscribe online/offline event on the test device and simultaneously the test device listens to the device pipe between the test device and the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Online/Offline Event Subscription Request Message from the device under test.

b) The request message shall conform to the definitions of the HTTP command and the required fields shown in Table 52 of ISO/IEC 14543-5-1.

#### 6.6.2.3 Test case 2

– Test purpose

The test purpose is to ensure that the device under test can send a correct Device Online/Offline Event Subscription Renewal Request Message when it needs to renew its subscription after successfully subscribing to a device online/offline event.

– Reference

Device Online/Offline Event Subscription Renewal Request Message; see 9.7.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to renew the online/offline event subscription through the test device and simultaneously the test device listens to the device pipe between the test device and the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Online/Offline Event Subscription Renewal Request Message from the device under test.

b) The request message shall conform to the definitions of the HTTP command and the required fields shown in Table 53 of ISO/IEC 14543-5-1.

#### 6.6.2.4 Test case 3

– Test purpose

The test purpose is to ensure whether the device under test can send a correct Device Online/Offline Event Unsubscription Message when it needs to cancel its subscription after successfully subscribing to a device online/offline event.

– Reference

Device Online/Offline Event Unsubscription Message; see 9.7.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to cancel the device online/offline event subscription on the test device and simultaneously the test device listens to the device pipe between the test device and the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Online/Offline Event Unsubscription Message from the device under test.

b) The message shall conform to the definitions of the HTTP command and the required fields shown in Table 55 of ISO/IEC 14543-5-1.

#### 6.6.2.5 Test case 4

– Test purpose

The test purpose is to verify whether the device under test can send a correct Device Online/Offline Event Subscription Response Message within 30 s when the device under test (master device) receives a Device Online/Offline Event Subscription Request Message.

– Reference

Device Online/Offline Event Subscription Response Message; see 9.7.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Online/Offline Event Subscription Request Message to the device under test through a device pipe between the test device and the device under test, and this message conforms to definitions and requirements of Table 52 of ISO/IEC 14543-5-1, simultaneously the test device listens to the device pipe to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test:

a) After sending its request, the test device shall receive a Device Online/Offline Event Subscription Response Message from the device under test within 30 s.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 54 of ISO/IEC 14543-5-1.

#### 6.6.2.6 Test case 5

– Test purpose

The test purpose is to verify whether the device under test can send a correct Device Online/Offline Event Subscription Response Message within 30 s when the device under test (master device) receives a Device Online/Offline Event Subscription Renewal Request Message.

– Reference

Device Online/Offline Event Subscription Response Message; see 9.7.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Online/Offline Event Subscription Renewal Request Message to the device under test through a device pipe between the test device and the device under test, and this message conforms to definitions and requirements of Table 53 of ISO/IEC 14543-5-1. Simultaneously the test device listens to the device pipe to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After sending its request, the test device shall receive a Device Online/Offline Event Subscription Response Message from the device under test within 30 s.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 54 of ISO/IEC 14543-5-1.

#### 6.6.2.7 Test case 6

– Test purpose

The test purpose is to verify, after receiving a device online/offline event subscription, whether the device under test (master device) can send a correct Device Online/Offline Event Notification Message if a device event is triggered.

– Reference

Device Online/Offline Event Notification Message; see 9.7.5 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The rest device B triggers a device event. Simultaneously test device A listens to the device pipe between the test device A and the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device A shall receive a Device Online/Offline Event Notification Message from the device under test.

b) The notification message shall conform to the definitions of the HTTP command and the required fields shown in Table 56 of ISO/IEC 14543-5-1.

### 6.7 Device group search conformance test suite

#### 6.7.1 Reference messages

Device Group Search Request Message refers to Table 57 of ISO/IEC 14543-5-1.

Device Group Search Response Message refers to Table 58 of ISO/IEC 14543-5-1.

### 6.7.2 Test case suite

#### 6.7.2.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);

– the IGRS protocol on the device under test is initiated and running normally;

– the test device can detect and listen to a Device Online Advertisement message of the device under test and get its device information on multicast port 239.255.255.250:3880;

– the device under test has a control interface through which the device under test can be controlled to initiate device group search.

Pre-condition 2, applicable in test case 2 through test case 8:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);

– the IGRS protocol on the device under test is initiated and running normally;

– the test device can detect and listen to a Device Online Advertisement message of the device under test and get its device information on multicast port 239.255.255.250:3880;

– the device under test belongs to a certain device group, and it is responsible for the device group advertisement of this device group (selected in the specified peer-to-peer device groups or it is the master device in a centralised device group);

– the test device can detect and listen to device group online advertisement message sent by the device under test and get the information of its device group on multicast port 239.255.255.250:3880.

#### 6.7.2.2 Test case 1

– Test purpose

The test purpose is to verify whether the device under test can send a correct Device Group Search Request Message to multicast port 239.255.255.250:3880 when the device under test is searching for a device group.

– Reference

Device Group Search Request Message; see 9.8.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates searches for a device group. Simultaneously the test device listens to multicast port 239.255.255.250:3880 to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Request Message based on multicast from the device under test multicast.

b) The request message shall conform to the definitions of the HTTP command and the required fields shown in Table 57 of ISO/IEC 14543-5-1.

#### 6.7.2.3 Test case 2

– Test purpose

The test purpose is to verify whether the device under test can send a correct UDP-based unicast Device Group Search Response Message to port 3880 of the requesting device.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1, and it includes field: 01-SearchAll:TRUE. Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Response Message from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 58 of ISO/IEC 14543-5-1.

#### 6.7.2.4 Test case 3

– Test purpose

The test purpose is to verify whether the device under test can ignore other search conditions and send a correct UDP-based unicast Device Group Search Response Message to port 3880 of the requesting device when the device under test receives a Device Group Search Request Message and the message includes field: 01-SearchAll:TRUE.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:3880.

This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1 and it includes:

a) Field: 01-SearchAll:TRUE;

b) Field: 01-SearchByDeviceGroupName whose value is different from field: <DeviceGroupName> in the device group notification message sent by the device under test.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Response Message from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 58 of ISO/IEC 14543-5-1.

#### 6.7.2.5 Test case 4

– Test purpose

The test purpose is to verify whether the device under test can send a correct UDP-based unicast Device Group Search Response Message to port 3880 of the requesting device when the device under test receives a Device Group Search Request Message with a test device group name condition match.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:3880.

This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceGroupName whose value is the same as field: <DeviceGroupName> in the device group notification message sent by the device under test,

b) it does not include other optional search fields.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Response Message from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 58 of ISO/IEC 14543-5-1.

#### 6.7.2.6 Test case 5

– Test purpose

The test purpose is to verify whether the device under test can send a correct UDP-based unicast Device Group Search Response Message to port 3880 of the requesting device when the device under test receives a Device Group Search Request Message with a test device group ID condition match.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:3880.

This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceGroupID whose value is the same as field: <DeviceGroupID> in the device group notification message sent by the device under test,

b) it does not include other fields of optional search precondition.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Response Message from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 58 of ISO/IEC 14543-5-1.

#### 6.7.2.7 Test case 6

– Test purpose

The test purpose is to verify whether the device under test can send a correct UDP-based unicast Device Group Search Response Message to port 3880 of the requesting device when the device under test receives a Device Group Search Request Message with a test device group type condition match.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:3880.

This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceGroupType whose type is the same as the type of the device group which includes the device under test,

b) it does not include other fields of optional search precondition.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Response Message from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 58 of ISO/IEC 14543-5-1.

#### 6.7.2.8 Test case 7

– Test purpose

The test purpose is to verify whether a device under test can send a correct UDP-based unicast Device Group Search Response Message to port 3880 of the requesting device when the device under test receives a Device Group Search Request Message with multi-condition match.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1

– Conformance category

Optional

– 80. Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:38

This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceGroupName whose value is the same as field: <DeviceGroupName> in the device group notification message sent by the device under test,

b) it includes field: 01-SearchByDeviceGroupId whose value is the same as field: <DeviceGroupID> in the device group notification message sent by the device under test,

c) it does not include other fields of optional search precondition.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Device Group Search Response Message from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 58 of ISO/IEC 14543-5-1.

#### 6.7.2.9 Test case 8

– Test purpose

The test purpose is to ensure that the device under test will not send a Device Group Search Response Message when the device under test receives a Device Group Search Request Message that does not match a search precondition.

– Reference

Device Group Search Response Message; see 9.8.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Device Group Search Request Message to multicast port 239.255.255.250:3880.

This message conforms to the definitions and requirements of Table 57 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceGroupName whose value is the same as field: <DeviceGroupName> in the device group notification message sent by the device under test,

b) it includes field: 01-SearchByDeviceGroupId whose value is different from field: <DeviceGroupID> in the device group notification message sent by the device under test,

c) it does not include other fields of optional search precondition.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

The test device shall not receive a Device Group Search Response Message from the device under test.

## 6.8 Service advertisement conformance test suite

### 6.8.1 Reference messages

Service Online Advertisement Message refers to Table 59 of ISO/IEC 14543-5-1.

Service Offline Advertisement Message refers to Table 60 of ISO/IEC 14543-5-1.

Service Online Registration Notification Message refers to Table 61 of ISO/IEC 14543-5-1.

Service Offline Notification Message based on Device Pipe refers to Table 62 of ISO/IEC 14543-5-1.

### 6.8.2 Test case suite

#### 6.8.2.1 Pre-condition

Pre-condition 1, applicable to test case 1 and 2:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);

– the test device listens to multicast port: 239.255.255.250:3880;

– the IGRS protocol on the device under test is initiated and running normally.

Pre-condition 2, applicable to test case 3 and 4:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);

– the IGRS protocol on the device under test is initiated and running normally;

– the test device sets up centralised device group as master device;

– the device under test joins the centralised device group as slave device and device pipe is successfully set up between the test device (master device) and device under test;

– the test device listens to the device pipe.

#### 6.8.2.2 Test case 1

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Online Advertisement Message to multicast port: 239.255.255.250:3880 when IGRS service of the device under test is added to network.

– Reference

Service Online Advertisement Message; see 10.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The IGRS service is running on the device under test.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Online Advertisement Message from the device under test on port 239.255.255.250:3880.

b) The advertisement message shall conform to the definitions and requirements of Table 59 of ISO/IEC 14543-5-1.

#### 6.8.2.3 Test case 2

– Test purpose

The test purpose is to verify whether the device under test can send a correct Service Offline Advertisement Message to multicast port: 239.255.255.250:3880 when IGRS service is offline.

– Reference

Service Offline Advertisement Message; see 10.1.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test procedure shall contain the following actions.

a) The IGRS service is running on the device under test.

b) The IGRS service is terminating normally on the device under test.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Offline Advertisement Message from the device under test on port 239.255.255.250:3880 after cancelling IGRS service on the device under test;

b) The advertisement message shall conform to the definitions and requirements of Table 60 of ISO/IEC 14543-5-1.

#### 6.8.2.4 Test case 3

– Test purpose

The test purpose is to verify whether the device under test can send a correct Service Online Registration Notification Message to the master device through the device pipe if

the device under test is a slave device in a centralised device group, when an IGRS service is added to the network.

– Reference

Service Online Registration Notification Message; see 10.1.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The IGRS service is running on the device under test.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Online Registration Notification Message from the device under test through the device pipe.

b) The notification message shall conform to the definitions and requirements of Table 61 of ISO/IEC 14543-5-1.

#### 6.8.2.5 Test case 4

– Test purpose

The test purpose is to verify whether the device under test can send a correct Service Offline Notification Message based on Device Pipe to master device in if the device under test is a slave device in a centralised device group when an IGRS service is not connected with the device under test.

– Reference

Service Offline Notification Message based on Device Pipe; see 10.1.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test procedure shall contain the following actions.

a) The IGRS service is running on the device under test.

b) The IGRS service is terminating normally on the device under test.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Offline Notification Message based on Device Pipe from the device under test after terminating the IGRS service on the device under test.

b) The notification message shall conform to the definitions and requirements of Table 62 of ISO/IEC 14543-5-1.

### 6.9 Service search conformance test suite

#### 6.9.1 Reference messages

Service Search Request Message based on Multicast refers to Table 63 of ISO/IEC 14543-5-1.

Service Search Response Message based on UDP Unicast refers to Table 64 of ISO/IEC 14543-5-1.

Service Search Request Message by Proxy refers to Table 65 of ISO/IEC 14543-5-1.

Service Search Response Message by Proxy refers to Table 66 of ISO/IEC 14543-5-1.

### 6.9.2 Test case suite

#### 6.9.2.1 Pre-condition

Pre-condition 1, applicable to test case 1 through 6, test case 8 and test case 9:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);
– the IGRS protocol on the device under test is initiated and running normally;
– the test device captures a Device Online Advertisement message from the device under test by listening to multicast port: 239.255.255.250:3880;
– the IGRS service on the device under test works normally;
– the test device captures a Service Online Advertisement Message from the device under test by listening to multicast port: 239.255.255.250:3880.

Pre-condition 2, applicable to test case 7:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);
– the IGRS protocol on the device under test is initiated and running normally;
– the test device captures a Device Online Advertisement message from the device under test by listening to multicast port: 239.255.255.250:3880;
– the IGRS service on the device under test works normally;
– the test device captures a Service Online Advertisement Message from the device under test by listening to multicast port: 239.255.255.250:3880;
– the test device sets up a centralised device group or specified peer-to-peer device group, and the device under test joins that device group.

Pre-condition 3, applicable to test case 10:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);
– the IGRS protocol on the device under test is initiated and running normally;
– the test device captures a Device Online Advertisement message from the device under test by listening to multicast port: 239.255.255.250:3880;
– the IGRS service on the device under test works normally;
– the test device captures a Service Online Advertisement Message from the device under test by listening to multicast port: 239.255.255.250:3880;
– the device under test has a control interface through which the device under test can be controlled to initiate service search by multicast.

Pre-condition 4, applicable to test case 11:

– the test device and device under test are in the same IP broadcast domain of Local Area Networks (LAN);
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is set up between the test device and device under test;
– the device under test has a control interface through which the device under test can be controlled to initiate service search by proxy.

Pre-condition 5, applicable to test case 12:

– the test device A, B, and device under test are in the same IP broadcast domain of Local Area Networks (LAN);
– the IGRS protocol on the device under test is initiated and running normally;
– the test device A captures a Device Online Advertisement message from the device under test by listening to multicast port: 239.255.255.250:3880;
– the IGRS service on the device under test works normally;
– the device pipe is set up between the test device A and device under test;
– the device pipe is set up between the test device B and device under test;
– the device under test sets up a centralised device group and the test device A and test device B join the group as slave devices. They both register service on the device under test (master device).

#### 6.9.2.2 Test case 1

– Test purpose

The test purpose is to verify whether the device under test can send a correct Service Search Response Message based on UDP Unicast to port 3880 of the other party when the device under test receives a Service Search Request Message based on Multicast and if there is a match in the search precondition.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 of ISO/IEC 14543-5-1 and it includes field: 01-SearchAll:TRUE whose value is the same as field: DeviceGroupName in the device group notification message sent by the device under test. Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.
b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 64 of ISO/IEC 14543-5-1.
c) The response message received by the test device shall satisfy the following:
   - the value of field: 01-SourceDeviceId in the response message and field: <DeviceId> in message body is the same as field: NT in the device under test online advertisement message;
   - the value of field: 01-TargetDeviceId in the response message is the same as field: 01-SourceDeviceId in search request message sent by the test device;
   - the content of field: <AcknowledgeId> in the response message body is the same as the value of field: 01-SequenceId in search request message sent by the test device;
   - the content of field: <ClientId> in the response message body is the same as the value of field: 01-ClientId in search request message sent by the test device.

#### 6.9.2.3 Test case 2

– Test purpose

The test purpose is to verify whether the device under test can ignore other search preconditions and send a correct Service Search Response Message based on UDP Unicast when the device under test receives a Service Search Request Message based on Multicast which is requesting search all.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchAll:TRUE,

b) it includes field: 01-SearchByDeviceName whose value is different from field: 01-DeviceName in the device under test online advertisement message.

Simultaneously the test device listens to UDP-based unicast message on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 of ISO/IEC 14543-5-1.

#### 6.9.2.4 Test case 3

– Test purpose

The test purpose is to verify whether the device under test can send a correct Service Search Response Message based on UDP Unicast that includes all of the device information and the value of field: <ReturnCode> is 100 (successful) when the device under test receives a Service Search Request Message based on Multicast with a device name as the match condition.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 and Clause 11 of ISO/IEC 14543-5-1.

Response status code of response message in Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 in ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceName whose value is the same as field: 01-DeviceName in the device under test online advertisement message,

b) it does not include other fields of optional search preconditions.

Simultaneously the test device listens whether it receives any UDP-based unicast messages on port 3880 which need to be validated.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 of ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy

- Field: <ServiceInfoList> of the response message includes all the basic service information of the device under test and its value is the same as corresponding field in Service Online Advertisement Message of the device under test,
- the value of field: <ReturnCode> of the response message is 100.

#### 6.9.2.5 Test case 4

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Response Message based on UDP Unicast including all of the device information and the value of field <ReturnCode> is 100 (successful) when the device under test receives a Service Search Request Message based on Multicast with a device ID condition.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 and Clause 11 of ISO/IEC 14543-5-1.

Response status code of response message in Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 of ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceId whose value is the same as field: NT in the device under test online advertisement message,

b) it does not include other fields of optional search precondition.

Simultaneously the test device listens to receive any UDP-based unicast messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 in ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following:

- Field: <ServiceInfoList> of the response message includes all the basic service information of the device under test and its value is the same as corresponding field in Service Online Advertisement Message of device under test;
- the value of field: <ReturnCode> of the response message is 100.

#### 6.9.2.6 Test case 5

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Response Message based on UDP Unicast including all the basic service information of the device which matches to search precondition and the value of field: <ReturnCode> of the message is 100 (successful) when the device under test receives Service Search Request Message based on Multicast with a service type condition match.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 and Clause 11 of ISO/IEC 14543-5-1.

Response status code of response message in Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 in ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByServiceType whose value is the same as field: 01-ServiceType in online advertisement message sent by the device under test,

b) it does not include other fields of optional search precondition.

Simultaneously the test device listens to receive any UDP-based unicast messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 of ISO/IEC 14543-5-1.

c) The response message received by test device shall satisfy the following:

- Field: <ServiceInfoList> of the response message includes all the basic service information of the device under test that matches to search precondition;
- the value of field: <ReturnCode> of the response message is 100.

#### 6.9.2.7 Test case 6

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Response Message based on UDP Unicast including all the basic service

information of the device which matches to search precondition and the value of field: <ReturnCode> of the message is 100 (successful) when the device under test receives Service Search Request Message based on Multicast with a service name condition match.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 and Clause 11 of ISO/IEC 14543-5-1.

Response status code of response message in Table 85 and Table 86 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 in ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByServiceName whose value is the same as field: 01-ServiceName in online advertisement message sent by the device under test,

b) it does not include other fields of optional search precondition.

Simultaneously the test device listens to receive any UDP-based unicast messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 of ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following:

- Field: <ServiceInfoList> of the response message includes all the basic service information of the device under test that matches to search precondition;
- the value of field: <ReturnCode> of the response message is 100.

#### 6.9.2.8 Test case 7

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Response Message based on UDP Unicast including all the basic service information of the device which matches to search precondition and the value of field: <ReturnCode> of the message is 100 (successful) when the device under test receives Service Search Request Message based on Multicast with a service group ID condition match.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 and Clause 11 of ISO/IEC 14543-5-1.

Response status code of response message in Table 85 and Table 86 in ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 in ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceGroupId whose value is the same as the device group ID in field: 01-DeviceGroupIdList which is in the online advertisement message of the device under test,

b) it does not include other fields of optional search preconditions.

Simultaneously the test device listens to receive any UDP-based unicast messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 in ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following:

- Field: <ServiceInfoList> of the response message includes all the basic service information of the device under test and its value is the same as the corresponding field in Service Online Advertisement Message of the device under test;
- the value of field: <ReturnCode> of the response message is 100.

#### 6.9.2.9 Test case 8

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Response Message based on UDP Unicast when the device under test receives Service Search Request Message based on Multicast with a combination of search condition matches.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 and Clause 11 of ISO/IEC 14543-5-1.

Response status code of response message in Table 85 and Table 86 in ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 in ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByDeviceId whose value is the same as field: USN of the device under test online advertisement message,

b) it includes field: 01-SearchByServiceName whose value is the same as field: 01-ServiceName of online advertisement message sent by the device under test,

c) it does not include other fields of optional search preconditions.

Simultaneously the test device listens to receive any UDP-based unicast messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

b) The response message shall conform to the definitions and requirements of Table 64 of ISO/IEC 14543-5-1.

c) The response message received by the test device shall satisfy the following:

- Field: <ServiceInfoList> of the response message includes all the basic service information of the device under test which matches with search precondition;
- the value of field: <ReturnCode> of the response message is 100.

#### 6.9.2.10 Test case 9

– Test purpose

The test purpose is to ensure that the device under test will not send a Service Search Response Message based on UDP Unicast if the device under test receives Service Search Request Message based on Multicast which does not match to search condition.

– Reference

Service Search Response Message based on UDP Unicast; see 10.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Mandatory

– Test procedure

The test device sends a correct Service Search Request Message based on Multicast to multicast port 239.255.255.250:3880. This message conforms to the definitions and requirements of Table 63 in ISO/IEC 14543-5-1 and

a) it includes field: 01-SearchByServiceName whose value is different from field: 01-ServiceName in Service Online Advertisement Message of the device under test,

b) it does not include other fields of optional search preconditions.

Simultaneously the test device listens to receive any UDP-based unicast messages on port 3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

The test device shall not receive a Service Search Response Message based on UDP Unicast from the device under test on port 3880.

#### 6.9.2.11 Test case10

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Request Message based on Multicast to multicast port: 239.255.255.250:3880 when the device under test needs to search service based on multicast.

– Reference

Service Search Request Message based on Multicast; see 10.2.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a search request for service based on multicast; simultaneously the test device listens to all messages on multicast port 239.255.255.250:3880.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Request Message based on Multicast from the device under test on multicast port.

b) The request message shall conform to the definitions and requirements of Table 63 of ISO/IEC 14543-5-1.

#### 6.9.2.12 Test case 11

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Search Request Message by Proxy through the device pipe when the device under test needs to search service on a specified device.

– Reference

Service Search Request Message by Proxy; see 10.2.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to search service on the test device; simultaneously the test device listens to all messages on the device pipe between the test device and device under test.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Search Request Message by Proxy from the device under test.

b) The request message shall conform to the definitions of the HTTP command and the required fields shown in Table 65 in ISO/IEC 14543-5-1.

#### 6.9.2.13 Test case 12

– Test purpose

The test purpose is to verify whether the device under test can inquire about all the information it receives and send the correct response message when the device under test as the master device receives a Service Search Request Message by Proxy from the slave device.

– Reference

Service Search Response Message by Proxy, see 10.2.2 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device A sends a correct Service Search Request Message by Proxy to the device under test through the device pipe between test device A and the device under test. The message conforms to the definitions and requirements of Table 65 of ISO/IEC 14543-5-1 and it includes field: 01-SearchAll:TRUE. Simultaneously the test device A listens to all messages on the device pipe between test device A and the device under test.

– Pass verdict condition

a) The test device A shall receive a Service Search Response Message by Proxy from the device under test.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 66 of ISO/IEC 14543-5-1.

c) Field: <ServiceInfoList> of the response message includes all the service information which the device under test can receive.

### 6.10 Service online/offline event subscription conformance test suite

#### 6.10.1 Reference messages

Service Online/Offline Event Subscription Request Message refers to Table 67 of ISO/IEC 14543-5-1.

Service Online/Offline Event Subscription Renewal Request Message refers to Table 68 of ISO/IEC 14543-5-1.

Service Online/Offline Event Subscription Response Message refers to Table 69 of ISO/IEC 14543-5-1.

Service Online/Offline Event Unsubscription Message refers to Table 70 of ISO/IEC 14543-5-1.

Service Online/Offline Event Notification Message refers to Table 71 of ISO/IEC 14543-5-1.

#### 6.10.2 Test case suite

##### 6.10.2.1 Pre-condition

Pre-condition 1, applicable to test case 1:

– the test device and the device under test are in the same IP broadcast domain of LAN;

– the IGRS protocol on the device under test is initiated and running normally;

– the device pipe is successfully set up between the test device and device under test;
– the device under test has a control interface through which the device under test can be controlled to initiate service online/offline event subscription.

Pre-condition 2, applicable to test case 2:

– the test device and device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the device under test successfully subscribes to service online/offline event on the test device;
– the device under test has a control interface through which the device under test can be controlled to initiate service online/offline event subscription renewal.

Pre-condition 3, applicable to test case 3:

– the test device and the device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the device under test successfully subscribes to service online/offline event on the test device;
– the device under test has a control interface through which the device under test can be controlled to initiate service online/offline event unsubscription.

Pre-condition 4, applicable to test case 4:

– the test device and device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the device under test sets up a centralised device group and the test device joins the group as slave device.

Pre-condition 5, applicable to test case 5 and 6:

– the test device and device under test are in the same IP broadcast domain of LAN;
– the IGRS protocol on the device under test is initiated and running normally;
– the device pipe is successfully set up between the test device and device under test;
– the device under test sets up a centralised device group and the test device joins the group as slave device;
– the test device successfully subscribes to service online/offline event on the device under test.



#### 6.10.2.2 Test case 1

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Online/Offline Event Subscription Request Message when it needs to subscribe to a service online/offline event.

– Reference

Service Online/Offline Event Subscription Request Message; see 10.3.1 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to subscribe online/offline event on the test device and simultaneously the test device listens to the device pipe between the test device and the device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Online/Offline Event Subscription Request Message from the device under test.

b) The request message shall conform to the definitions of the HTTP command and the required fields shown in Table 67 in ISO/IEC 14543-5-1.

#### 6.10.2.3 Test case 2

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Online/Offline Event Subscription Renewal Request Message if it needs to renew subscription after successfully subscribing to a service online/offline event.

– Reference

Service Online/Offline Event Subscription Renewal Request Message; see 10.3.2 of ISO/IEC 14543-5-1

– Conformance category

Optional

– Test procedure

The device under test initiates a request to renew the online/offline event subscription on the test device and simultaneously the test device listens to the device pipe between the test device and device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Online/Offline Event Subscription Renewal Request Message from the device under test.

b) The request message shall conform to the definitions of the HTTP command and the required fields shown in Table 68 in ISO/IEC 14543-5-1.

#### 6.10.2.4 Test case 3

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Online/Offline Event Unsubscription Message when it needs to cancel the subscription after successfully subscribing to a service online/offline event.

– Reference

Service Online/Offline Event Unsubscription Message, see 10.3.4 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The device under test initiates a request to cancel service online/offline event subscription on the test device and simultaneously the test device listens to the device pipe between the test device and device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test devicte shall receive a Service Online/Offline Event Unsubscription Message from the device under test.

b) The message shall conform to the definitions of the HTTP command and the required fields shown in Table 70 in ISO/IEC 14543-5-1.

#### 6.10.2.5 Test case 4

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Online/Offline Event Subscription Response Message within 30 s when the device under test (master device) receives a Service Online/Offline Event Subscription Request Message.

– Reference

Service Online/Offline Event Subscription Response Message, see 10.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a Service Online/Offline Event Subscription Request Message to the device under test through device pipe between the test device and device under test, and this message conforms to the definitions and requirements of Table 67 of ISO/IEC 14543-5-1. Simultaneously the test device listens to the device pipe to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After sending its request, the test device shall receive a Service Online/Offline Event Subscription Response Message from the device under test within 30 s.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 69 in ISO/IEC 14543-5-1.

#### 6.10.2.6 Test case 5

– Test purpose

The test purpose is to verify whether the device under test can send the correct Service Online/Offline Event Subscription Response Message within 30 s when the device under test (master device) receives a Service Online/Offline Event Subscription Renewal Request Message.

– Reference

Service Online/Offline Event Subscription Response Message, see 10.3.3 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

The test device sends a service online/offline subscription renewal request message to the device under test through device pipe between the test device and the device under test, and this message conforms to the definitions and requirements of Table 68 of ISO/IEC 14543-5-1. Simultaneously the test device listens to the device pipe to receive any response messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) After sending its request, the test device shall receive a Service Online/Offline Event Subscription Response Message from the device under test within 30 s.

b) The response message shall conform to the definitions of the HTTP command and the required fields shown in Table 69 of ISO/IEC 14543-5-1.

#### 6.10.2.7 Test case 6

– Test purpose

The test purpose is to verify, when receiving a service online/offline event subscription, whether the device under test (master device) can send the correct Service Online/Offline Event Notification Message if a service event is triggered.

– Reference

Service Online/Offline Event Notification Message; see 10.3.5 of ISO/IEC 14543-5-1.

– Conformance category

Optional

– Test procedure

Triggered service event: the test device starts a service and sends a Service Online Registration Notification Message to the device under test. The test device cancels a service and sends a Service Offline Notification Message based on Device Pipe to the device under test. Simultaneously the test device listens to the device pipe between the test device and device under test to receive any messages.

– Pass verdict condition

The following conditions are required so that the device passes this test.

a) The test device shall receive a Service Online/Offline Event Notification Message from the device under test.

b) The notification message shall conform to the definitions of the HTTP command and the required fields shown in Table 71 of ISO/IEC 14543-5-1.

### 6.11 Service description document retrieval conformance test suite

#### 6.11.1 Reference messages

Retrieve Service Description Document Request Message refers to Table 72 in ISO/IEC 14543-5-1.

Retrieve Service Description Document Response Message refers to Table 73 in ISO/IEC 14543-5-1.