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TECHNICAL REPORT

colour inside

Information technology – Intelligent homes – Taxonomy of specifications – Part 1: Taxonomy method

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INFORMATION TECHNOLOGY – INTELLIGENT HOMES – TAXONOMY OF SPECIFICATIONS –

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FOREWORD

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- type 2, when the subject is still under technical development or where, for any other reason, there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when the technical committee has collected data of a different kind from that which is normally published as an International Standard, for example 'state of the art'.

ISO/IEC 29107-1, which is a Technical Report of type 3, has been prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology

Technical reports of types 1 and 2 are subject to review within three years of publication to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

This Technical Report of type 3 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.

A list of all parts of the ISO/IEC 29107 series, under the general title *Information technology – Intelligent homes – Taxonomy of specifications*, can be found on the IEC website.

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

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

INTRODUCTION

ISO/IEC 29107 describes a taxonomy for the classification of standards and other specifications applicable to intelligent homes. It consist of two parts.

Part 1: Taxonomy method.

Part 2: Table of specifications.

INFORMATION TECHNOLOGY – INTELLIGENT HOMES – TAXONOMY OF SPECIFICATIONS –

Part 1: Taxonomy method

1 Scope

This part of ISO/IEC 29107 specifies the concept for a taxonomy of standards and other related specifications applicable to intelligent homes. It is intended for the classification of specifications from ISO, IEC, ISO/IEC JTC 1, ITU and from organizations with liaison status with any of these.

The target of this part of ISO/IEC 29107 are the various standardisation bodies that are contributing to the intelligent home. With the help of the concept described in this report they should be able to classify their specifications. This will benefit the standardisation bodies to determine if there are overlapping specifications or areas for which specifications are missing.

NOTE The collection of all classifications, is intended to be specified in ISO/IEC TR 29107-2.[1].

2 Terms, definitions and abbreviations

For the purposes of this document, the following terms and definitions apply.

2.1
intelligent home
home in which the integration of services and interworking of devices improve the residents' comfort, well-being, safety and communication possibilities

NOTE 1 The focus of the integration is on a unified user access to services and devices and the interworking capabilities between different application areas.

NOTE 2 Example application areas are home security, home entertainment, home automation, health care, telecommunication, energy management and personalized information (as traffic, weather,..).

3 Conformance

This Technical Report has no conformance requirements.

4 Taxonomy concept

The background for the need for a taxonomy for specifications applicable to intelligent homes are described in Annex A. It also contains some other alternative taxonomy methods.

The concept of taxonomy in this Technical Report is a multidimensional scheme that allows a predefined set of categories for each dimension. For each dimension, there may be zero, one or several categories that the specification under study matches. The number of dimensions is in principle unlimited, but this Technical Report has limited it to seven that are expected to cover the need for all relevant specifications.

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1 The table of specifications will be held by ISO/IEC JTC 1/SC 25.

The intention is that the standardisation body that has completed a specification, or is in the progress of making one, can see and fill in those boxes in a table of the seven dimensions that the document matches.

Dimension A: What view is the specification addressing? Or in other words, who is the target of the specification. The specification can be the view from

a) the user/owner/resident of the intelligent home,
b) the manufacturer of intelligent home devices,
c) providers of intelligent home services,
d) the designer and integrator of intelligent home systems,
e) the installer of intelligent home systems,
f) other.

Dimension B: Which cluster(s), or application area(s) is the specification addressing?

a) home automation,
b) home security,
c) home appliances,
d) health care,
e) PC and peripherals,
f) entertainment,
g) telecommunications,
h) other.

Dimension C: Which point of control is the specification addressing?

a) PC,
b) TV,
c) mobile phone,
d) PDA (Personal Digital Assistant),
e) fixed display,
f) specific home control device,
g) other.

Dimension D: Which type of content is the specification addressing?

a) architecture,
b) service definitions and protocols,
c) equipment,
d) modules,
e) interoperability,
f) OSI layer 1,
g) OSI layer 2,
h) OSI layer 3,
i) OSI layer 4,
j) OSI layer 5,
k) OSI layer 6,
l) OSI layer 7,

m) user interfaces,

n) test,

o) guidelines,

p) other.

Dimension E: Which part(s) of the service delivery path (from service to a device) is the specification addressing?

a) services protocol,

b) service integration point,

c) management protocol,

d) home integration point,

e) eco system,

f) device access protocol,

g) device networks,

h) other.

Dimension F: What is the geographical target of the specification?

a) worldwide,

b) regional,

c) national.

Dimension G: What is the status of the specification?

a) international standard,

b) international standard in progress,

c) regional standard,

d) regional standard in progress,

e) national standard,

f) national standard in progress,

g) standard from other standardization bodies, consortia, forum, etc.,

h) standard in progress from other standardization bodies, consortia, forum, etc.

5 The presentation of specifications categorized according to this scheme

The presentation will be in a form of a table where the fields that the specification matches are indicated. An example is shown in Table 1 below.

Table 1 – Example of some specifications categorized according to this scheme

Specification	A1	A2	…	B1	B2	…	C1	…	G1	…	G8
Standard 1	X								X		
Standard 2		X			X				X		
Standard 3		X		X					X		
Standard 4							X				X

Annex A
(informative)

Background

A.1 Current situation

Although the market for (parts of) intelligent homes is growing satisfactorily in some parts of the world, a mass market for home systems has not developed yet. The main reason for this difference between expectations and reality are the different directions taken by the different market players. Suppliers forward different technologies, specifications and business models.

Until now there exist several islands of networked devices in modern residential homes (as the clusters for telecommunication, PC/Internet, broadcasting/entertainment, home automation, white goods, home security, energy management and health care. The different technologies and devices of the different industries are shown as horizontal stripes in Figure A.1.

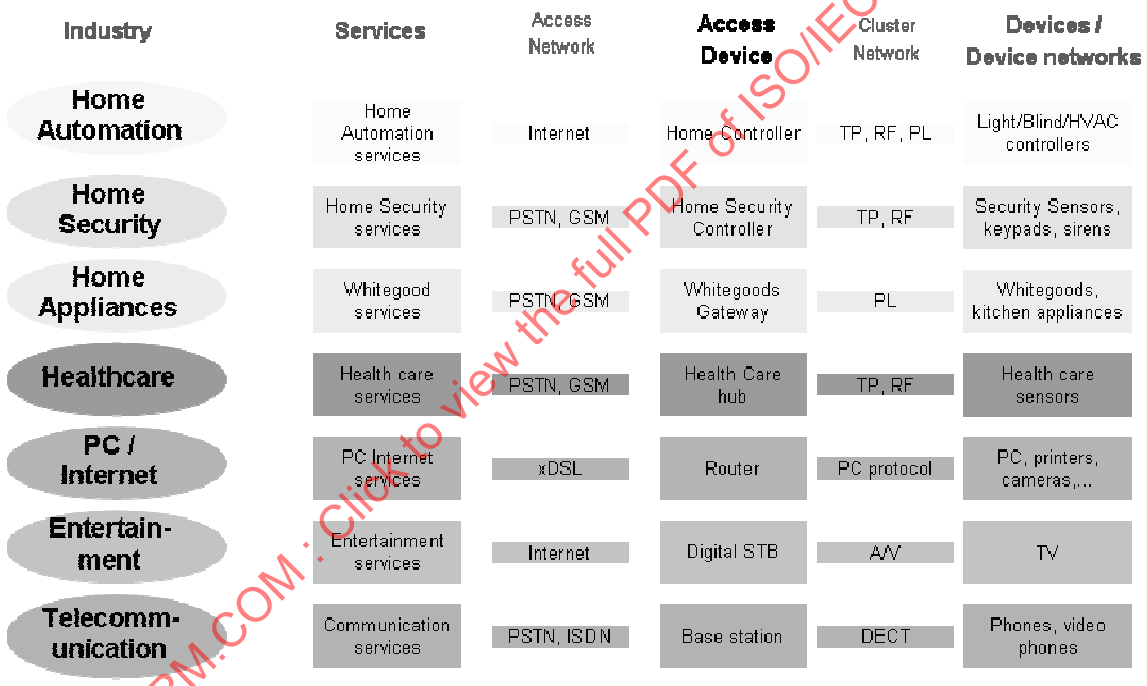

Figure A.1 – Different islands of residential services (with examples for networks)

There are two main problems arising from this situation:

Incompatible existing and established specifications in the different clusters prohibit the integration of devices and services from competing physical network solutions in the home to incompatible protocols for service delivery.

Interworking between different clusters may only be achieved with the extra effort and often customer specific solutions. There exist various remote controls, at least one for each cluster. Furthermore, cross-cluster functions as energy management, comfort functions (as scenes or scenarios) are not possible. However, the consumer mandates unified remote controls and cross-cluster functions.

A trend towards digitalization drives new features into devices, making it easier to implement interworking capabilities. An example is the PC industry driving scenarios and standards for media distribution in the home (interworking between PC and consumer electronic cluster).

However, it is not clear which specification will succeed. Existing ones (either from one or the other cluster) or new ones?

Furthermore, different standards across regions lead to a fragmented market and to incompatible systems.[2]

Some parts of the industry are pushing de-facto standards. Others are pushing them into international standardization bodies (ISO, IEC and ITU).

The long-term intent of this Technical Report is to identify and classify the various specifications and standards for intelligent home systems.

A taxonomy for the functions of an intelligent home is the basis for common understanding of the different parties involved. The application of the taxonomy should allow answering the following questions in a terminology understood by all players.

- What is the scope of a specification?
- Where are specifications missing?
- Where do competing specifications occur?
- Are there regional differences in requirements?

A.2 Integration trends

In order to achieve the integration of services and devices, two integration points are emerging: one in the backend for service integration and one in the home for device and network integration. Figure A.2 shows the two integration points.

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2 NOTE JTC 1 (Resolution 49 of 2008) notes the nature of standardisation is to attract innovative ideas from multiple sources, choose the best ones and quantify them in specifications that facilitate widespread use. Further consistent with ISO's and IEC's "one standard" principle (for example TMB's policy and principal statement on global relevance), there are times when one standard is all that is required instances where multiple standards make the most sense to respond to market requirements and to the need of our society.

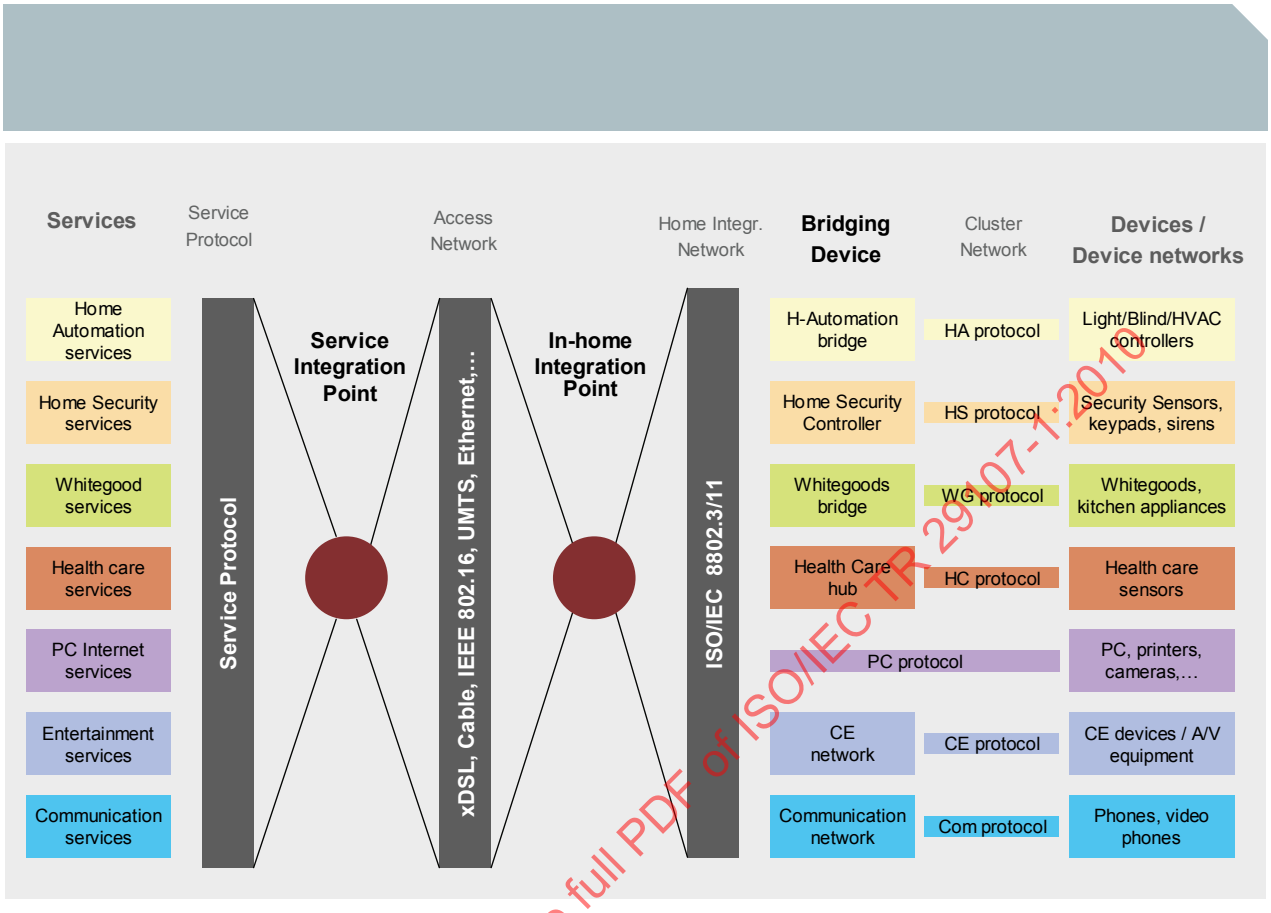

Figure A.2 – Emerging integration points for services and devices

The outlined path from the services to the devices is one possible base for classification base in a taxonomy. See dimension 5 in the following clause.

A.3 Taxonomy

A.3.1 Concept

Basically a taxonomy is a classification of entities into larger categories, in this case specifications for intelligent homes. Considering the many aspects of intelligent home specifications, a multi-dimensional classification is necessary.

The following paragraphs provide several aspects or dimensions, that can be useful in the classification of intelligent home specifications.

A.3.2 Example of a taxonomy with three dimensions

One example of a taxonomy could classify the specifications along three dimensions. The example shown in Figure A.3 uses dimensions 2 (cluster), 5 (service path) and 6 (regions), which provide a good visualization of overlapping specifications and white spaces. For visual representation, a color-coded 2-D diagram is used.

The first axis uses dimension 5, the end-to-end service delivery path from a service provider to a device in the home. The second axis denotes dimension 2, the application areas (cluster). A

third dimension can be added to differentiate regional markets (dimension 6). For better visualization, this dimension is color coded.

The other classifications can be used for deeper analysis, especially to find additional missing standardization aspects.

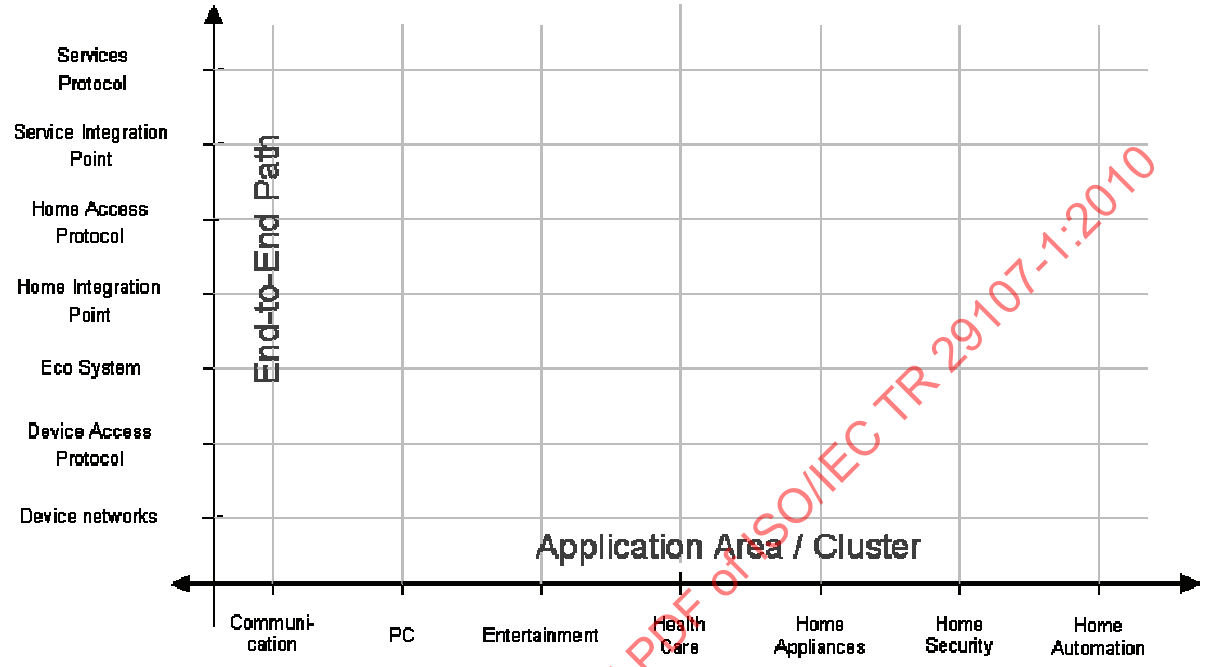

Figure A.3 – Axes of the intelligent home standards taxonomy

Existing and upcoming standards can be placed in the space. Overlapping areas indicate competing standards and white spaces indicate missing standardization areas.

A.3.3 Definition

The main axis is derived from the end-to-end service delivery path along the communication from a residential service to a device in the home. See Figure A.4.

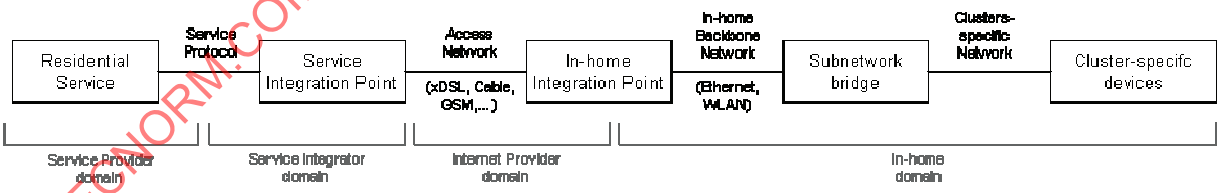

Figure A.4 – Service delivery path

The definition of the service delivery path follows the concept of two integration points: one at a service provider's backend (integrated multiple services) and one integration platform in the home (integrating different devices and networks).

Residential service: an implementation of a value-added service. Can be purely network-based (e.g. information service), or used in combination with in-home devices. Services can be accessed by the service protocol. Example of a residential service is an alarm verification service for home security systems.

Services protocol: the protocol(s) to access services.

Service integration point: realizes common functions for services as billing, logging, service subscription, service deployment, remote access and common user interface.

Access network: network for homes to access the internet (as xDSL, Cable, GSM, WiMax,…)

Key aspects in the intelligent home of the access networks are the protocols on top of the standard IP connectivity to access the home, the devices and from the home the services. Therefore the taxonomy uses Home Access Protocol as the main aspect of this point in the service delivery chain.

Home Access Protocol: protocol between the service integration point and the in-home integration point. Defines secure remote access, remote management and local service provisioning.

In-home integration point: integrating home devices and networks, running local service implementations (examples are schedulers, comfort scenes,…)

In-home backbone network: the in-home network for internet access is driven by PC networks as Ethernet and WLAN. These are the typical interfaces of internet access devices (as router, DSL- or cable modems). Other networks can be attached by sub-network bridges (as powerline, other radio networks, twisted pair cabling). The sub-networks typically do not support IP technology.

Also here the main aspect is on the protocol to access a certain device (the Device Access Protocol)

Device Access Protocol: Protocols for device functionality (start, stop, program,…)

Another set of standards define the use of the Device Access Protocols to form an eco-system between different device categories (e.g. between PC and consumer electronics).

Eco system: standards for device to device applications (e.g. specific scenarios as music streaming from PC to a TV)

Device network: physical protocol for device connectivity (wire, wireless). This is the category where the greatest diversity of standards exists. Diversity is high (each cluster has different standards), also the overlap is high (competing standards in different regions and by different vendors).

A.4 Application

Figure A.5 shows the application of the example taxonomy with a selection of intelligent home specifications.

Potential key standards (crossing multiple clusters) can be easily identified, but also missing specification areas (as health care and home security).

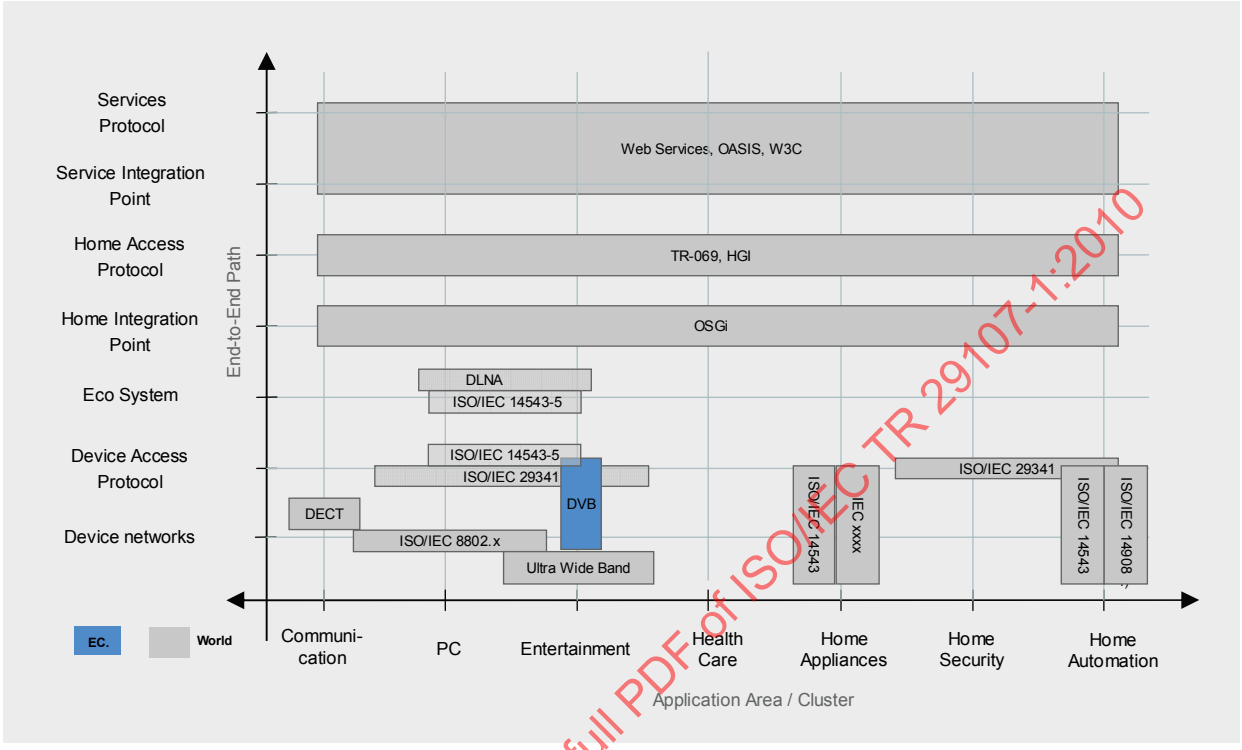

Figure A.5 – Existing specifications in the example taxonomy

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ETSI TR 101 176, *Details and Download Digital Enhanced Cordless Telecommunications (DECT); Global System for Mobile communications (GSM); DECT/GSM advanced integration of DECT/GSM dual-mode terminal equipment*

ETSI TR 101 178, *Details and Download Digital Enhanced Cordless Telecommunications (DECT); A High Level Guide to the DECT Standardization*

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ETSI TS 101 808-1, *Details and Download Digital Enhanced Cordless Telecommunications (DECT); Wireless Relay Station (WRS); Test Case Library (TCL); Part 1: Test Suite Structure (TSS) and Test Purposes (TP) for Medium Access Control (MAC) layer*

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