



**Integrated broadband cable
telecommunication networks (CABLE);
Cable Customer Premises Equipment (CPE) with
Integrated Radio and Non-Radio Interfaces;
Technical Specification covering the cable equipment
technical requirements in support of
Harmonised Standards for the essential requirements
of article 3.1b of the Directive 2014/53/EU**

Reference

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Integrated broadband cable telecommunication networks (CABLE).

Modal verbs terminology

In the present document "shall", "shall not", "should", "should not", "may", "need not", "will", "will not", "can" and "cannot" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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Introduction

In 2014 the new Radio Equipment directive has been published by the EU commission (Radio Equipment Directive 2014/53/EU, OJ L153 22 May 2014 [i.1]). This directive will replace the existing Radio & Telecommunication Terminal Equipment Directive (RTTED) 1999/5/EC [i.2]. The new directive has to be implemented into national law before the 13th of June 2016. Before this date, Harmonised Standards need to be developed to be compliant with the new requirements included in the Directive 2014/53/EU [i.1] such that Cable Customer Premises Equipment (CPE) with integral non-radio and radio network interfaces compliance to article 3.1 of Directive 2014/53/EU [i.1] may be verified.

The present document applies to Cable CPE with integrated non-radio and radio interfaces.

The schedule for the Radio Equipment Directive 2014/53/EU [i.1] is:

- 12th June 2014, RED [i.1] comes into force;
- 12th June 2016 is the date by when Member States are required to implement RED [i.1] into their national laws;
- July 2017 is a transition period for RED [i.1] during which period the RTTED [i.2] may still be used i.e. one year transition period.

A new product entering the market after the 13th June 2016 is required to meet the requirements of RED [i.1].

The RED [i.1] is replacing the RTTED [i.2], however as the name implies, RTTE has become RE (no more 'TTE') therefore Telecom Terminal Equipment (TTE), has been removed from the Radio Equipment Directive:

- Cable modems and cable receiver equipment with a non-radio network interface i.e. fixed line cable RF network interface, will continue to have to comply with all other applicable Directives. In terms of the Directives EMC [i.3] and LVD [i.4].
- New LVD [i.4] and EMC Directives [i.3] apply from 20 April 2016.

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<https://standards.iteh.ai/catalog/standards/sist/03d06139-69b0-4b2e-b5b0-834f806d4191/etsi-ts-103-429-v1.1.1-2016-07>

1 Scope

The present document provides technical requirements for cable CPE with integrated radio and non-radio interfaces in support of Harmonised Standards for the essential requirements of article 3.1b of the Radio Equipment Directive 2014/53/EU [i.1].

Cable equipment comprises integrated non-radio and radio network interfaces. These functions are integrated either on the same integrated electronic components on the same printed circuit board or by separate integrated components on the same printed circuit boards but housed in the same equipment enclosure. The non-radio function is the Cable RF as specified by ETSI EN 302 878-2 [1] for data communication services and by ETSI EN 300 429 [2] for video communication services. The radio function is a wireless local area network operating in the 2,4 GHz and 5 GHz frequency bands according to IEEE 802.11 [3].

NOTE: Cable equipment does not comprise separate radio and non-radio products that are combined in one enclosure. Where cable equipment of this type exist then the essential requirements of article 3.1b of Directive 2014/53/EU [i.1] apply to the equipment and the equipment requirements are as specified by ETSI draft harmonised standard ETSI EN 303 446-1 [i.5], at the time of writing it is under development ETSI TC ERM WGEMC.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

- [1] ETSI EN 302 878-2: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 2: Physical Layer; DOCSIS 3.0".
- [2] ETSI EN 300 429: "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems".
- [3] IEEE 802.11™-2012: "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".
- [4] ETSI EN 302 878-3: "Access, Terminals, Transmission and Multiplexing (ATTM); Third Generation Transmission Systems for Interactive Cable Television Services - IP Cable Modems; Part 3: Downstream Radio Frequency Interface; DOCSIS 3.0".
- [5] CENELEC EN 60728-1: "Cable networks for television signals, sound signals and interactive services - Part 1: System performance of forward paths".
- [6] ETSI EN 301 489-1: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU and the essential requirements of article 6 of the Directive 2014/30/EU; Part 1: Common technical requirements".

- [7] ETSI EN 301 489-17: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.
- [i.3] Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).
- [i.4] Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast).
- [i.5] ETSI EN 303 446-1: "ElectroMagnetic Compatibility (EMC) Standard for radio equipment and services; Part 60: Specific conditions for combined radio and non-radio equipment in the domestic environment. Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU".
- [i.6] IEEE 802.11b™: "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Higher-Speed Physical Layer (PHY) Extension in the 2.4 GHz band".
- [i.7] IEEE 802.11g™: "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Further Higher Data Rate Extension in the 2.4 GHz Band".
- [i.8] IEEE 802.11n™: "IEEE Standard for Information technology -- Local and metropolitan area networks -- Specific requirements -- Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 5: Enhancements for Higher Throughput".
- [i.9] IEEE 802.11a™: "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: High Speed Physical Layer in the 5 GHz band".
- [i.10] CM-SP-CMCIv3.0-I02-140729: "Cable Modem to Customer Premise Equipment Interface Specification".
- [i.11] ETSI TS 103 161-14: "Access, Terminals, Transmission and Multiplexing (ATTM); Integrated Broadband Cable and Television Networks; IPCablecom 1.5; Part 14: Embedded MTA Analog Interface and Powering Specification".

- [i.12] IEEE 802.11ac™: "IEEE Standard for Information technology -- Telecommunications and information exchange between systems - Local and metropolitan area networks -- Specific requirements -- Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications -- Amendment 4: Enhancements for Very High Throughput for Operation in Bands below 6 GHz".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Bluetooth™ system: equipment in compliance with Bluetooth™ specification

NOTE: Bluetooth™ is an example of a suitable product available commercially. This information is given for the convenience of users of the present document and does not constitute an endorsement by ETSI of this product.

combined equipment: any combination of non-radio equipment that requires a plug-in radio device to offer full functionality

Cable Equipment: cable modem and cable receiver (analogue or digital) within the domestic environment

Cable Equipment with integrated radio and non-radio functions: cable equipment with a DOCSIS® [1] and/or DVB-C [2] transceiver and a wireless LAN IEEE 802.11 [3] operating in the 2,4 GHz and 5 GHz frequency bands with their functions integrated either on the same integrated electronic components on the same printed circuit board or by separate integrated components on the same printed circuit boards but housed in the same equipment enclosure

Customer Premises Equipment (CPE): equipment at the end user's premises; may be provided by the end user or the service provider

Decibels (dB): logarithmic unit used to express the ratio of two values of a physical quantity

Decibel-Millivolt (dBmV): dB measurement system wherein 0 dBmV is defined as 1 millivolt over 75 Ω

MOCA 2.0: set of standards developed by Multimedia Over Coax Alliance.

USB: common interface that enables communication between devices and a host controller

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

BER	Bit Error Rate
C/I	Carrier to Interference
C/N	Carrier to Noise
CENELEC	European Committee for Electrotechnical Standardisation
CMCI	Cable Modem to CPE Interface
CPE	Customer Premises Equipment
DECT	Digital European Cordless Telecommunications
DOCSIS®	Data Over Cable Service Interface Specification
DVB-C	Digital audio broadcast - cable
EMC	Electro-Magnetic Compatibility
EN	European Norm
ETSI	European Telecommunications Institute
EUT	Equipment under test
HDMI	High Definition Multimedia Interface
IP	Internet Protocol
ISM	Industrial, scientific and medical
LAN	Local Area Network

LVD	Low Voltage Directive
MOCA	Multimedia over Coax Alliance
PAL	Phase alternation line
PHY	Physical
QAM	Quadrature Amplitude Modulation
RED	Radio Equipment Directive
RF	Radio Frequency
SECAM	Séquentiel couleur avec mémoire (French colour TV standard)
TV	Television
USB	Universal Serial Bus
WGEMC	Working group electromagnetic compatibility
WiFi	Wireless Fidelity

4 Overview of Types of Cable Equipment

There are two categories of equipment to consider:

- Cable Modem Equipment supporting DOCSIS® for data and telephony services
- Cable Receiver Equipment either PAL & SECAM video analogue services or DVB-C video digital services

Within the present document these two categories of equipment are covered. There may be several equipment types of these two categories supporting a combination of data, telephony and video services. Such equipment may be classified by the cable industry such as a Residential Gateway of a headend and headless type, a set-top box and a TV receiver, all of which may support both an integrated radio and non-radio network interface.

There may be several types of radio and non-radio network functions integrated within the equipment. There is always a non-radio network interface i.e. a RF fixed line interface supporting DOCSIS® [1] and DVB-C [2] and there may also be other fixed line interfaces such as MOCA 2.0, Ethernet, USB, HDMI [i.9], etc. Similarly there may be one or more different radio functions in addition to the wireless LAN IEEE 802.11 [3] such as DECT, Bluetooth™ and RF wireless remote controller.

The present document refers only to the Equipment's RF cable fixed line function supporting DOCSIS® [1], [4] and DVB-C [2] i.e. its non-radio interface and its wireless LAN IEEE 802.11 [3] function i.e. its radio interface when considering the cable equipment in terms of article 3.1b of the radio equipment Directive 2014/53/EU [i.1].

Throughout the following clauses the term **Cable Equipment** where used is intended to refer to both categories of equipment, cable modem and cable receiver equipment, with integrated radio and non-radio network interfaces comprising at least a:

- wireless LAN IEEE 802.11 [3] function
- DOCSIS® [1]/DVB-C [2] cable RF function

NOTE: During the development of the present document, industry from the cable operator sector were consulted on their evaluation of cable equipment to requirements of article 3.1b of the Directive 2014/53/EU [i.1]. The industry identified no additional EMC tests are carried out beyond those carried out by the equipment manufacture to verify its compliance to the EMC Directive 2014/30/EU [i.3]. The industry primarily implements tests to verify the performance of the cable equipment's DOCSIS® Downstream signal in the presence of its wireless LAN IEEE 802.11 [3] but in absence of any EMC phenomenon. These tests are used to verify the integrity of the DOCSIS® signal is maintained when it is operated within the limits of its minimum and maximum signal levels across its operating frequency range with its wireless LAN IEEE 802.11 [3] radio signal active and operated on each of its radio channels. Performance of the DOCSIS® Downstream signal is measured to verify there are no additional code errors resulting from the wireless LAN 802.11 signals. These measurements are not reported within the present document as they relate to the effective use of the DOCSIS® spectrum which is out of scope of article 3.1b of the radio equipment Directive 2014/53/EU [i.1] and out of scope of the present document.