

Access, Terminals, Transmission and Multiplexing (ATTM); Copper External Network Testing Interface



Reference

DTS/ATTM-02009

Keywords

cable, interface

ETSI

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM).

Introduction

The present document defines the functional and technical characteristics applicable to the External Network Testing Interface ENTI RJ45 which defines the point for testing the operator's network while isolated from the customer's home wiring.

1 Scope

The present document specifies rules to the copper RJ45 ENTI in the case of copper access network.

2 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 reference document (including any amendments) applies.

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2.1 Normative references

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

- [1] CENELEC EN 60603-7 (all sub-parts): "Connectors for electronic equipment -- Part 7: Detail specification for 8-way, unshielded, free and fixed connectors".
- [2] CENELEC EN 50441-1: "Cables for indoor residential telecommunication installations -- Part 1: Unscreened cables".
- [3] CENELEC EN 50441-2: "Cables for indoor residential telecommunication installations -- Part 2: Screened cables".
- [4] CENELEC EN 50441-3: "Cables for indoor residential telecommunication installations -- Part 3: Screened cables".
- [5] CENELEC EN 50406 (all parts): "End user multi-pair cables used in high bit rate telecommunication networks".
- [6] CENELEC EN 50407-1: "Multi-pair cables used in high bit rate digital access telecommunication networks -- Part 1: Outdoor cables".
- [7] CENELEC EN 60950-1: "Information technology equipment - Safety -- Part 1: General requirements".
- [8] CENELEC EN 60512-2 (all parts): "Connectors for electronic equipment - Tests and measurements".
- [9] CENELEC EN 60529: "Degrees of protection provided by enclosures (IP Code)".
- [10] CENELEC EN 60068-2 (all parts): "Environmental testing".
- [11] CENELEC EN 62262: "Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)".
- [12] ETSI ETS 300 019-1-3: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weatherprotected locations".

2.2 Informative references

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] Miniature 6-position plug as described in FCC 47, CFR 68.500: "Code of Federal Regulations (USA); Title 47 Telecommunication; Chapter 1 Federal Communications Commission, Part 68 Connection of Terminal Equipment to the Telephone Network; Subpart F Connectors; Section 68.500 Specification".

3 Definitions and abbreviations

3.1 Definitions

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

distribution space: location in the customer premise enclosing physical telecommunication interfaces, normally lockable that may house the home distributor and associated equipment

3.2 Abbreviations

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

ENTI	External Network Testing Interface
HD	Home Distributor
HDMI	High Definition Multimedia Interface
POTS	Plain Old Telephone Service
STB	Set Top Box
VoIP	Voice over IP
xDSL	Digital Subscriber Line

4 Functional characteristics

4.1 Functional Diagram of the ENTI

Figure 1 shows the diagram of the copper RJ45 ENTI.

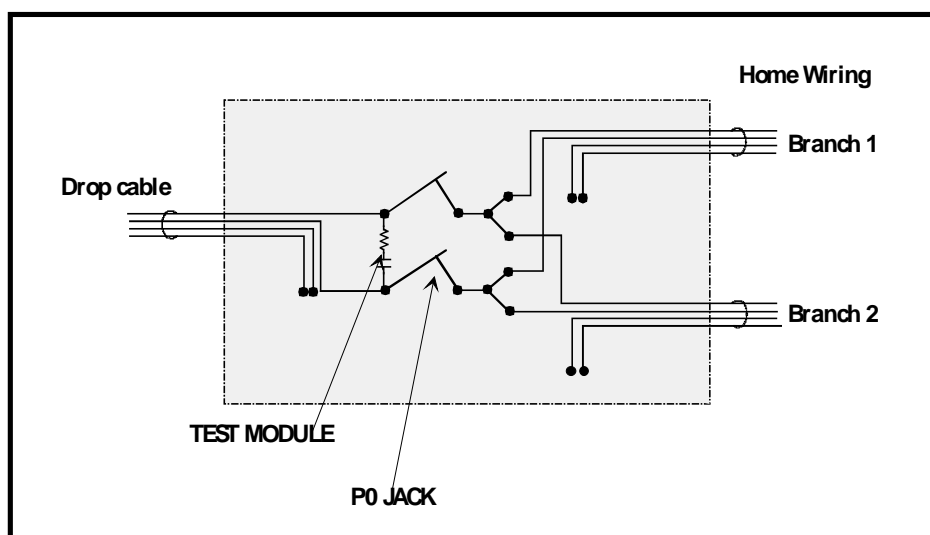


Figure 1: Functional diagram of RJ45 ENTI

4.2 Copper ENTI location

The location of the copper ENTI is inside the distribution space within the Home Distributor (HD) as shown in figure 2.

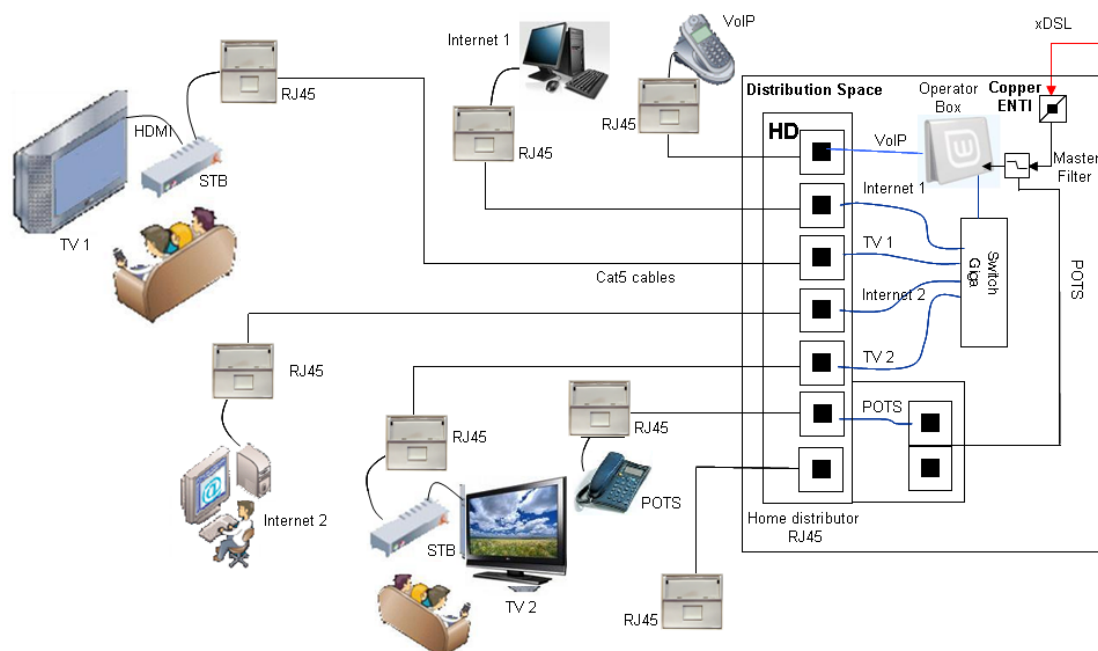


Figure 2: Copper RJ45 ENTI within the distribution space

4.3 Test interface

4.3.1 Generalities

The test outlet is located in the front of the ENTI, it is called P0 jack. In normal use (no insertion in P0), the ENTI ensures continuity between the line of the operator's network and the customer's wiring.

The separation of the network with customer's wiring and the establishment of the communication on P0 is obtained only by the insertion of RJ45 plug.

4.3.2 RJ45 connection

The P0 jack has the same dimensions as defined in EN 60603-7 [1].

It is designed to allow the insertion of RJ45 plug in accordance with EN 60603-7 [1] and RJ11 plug in accordance with FCC 47 C F R Ch [i.1]. The line is connected on pins 4 and 5 of P0.

5 Particular characteristics

5.1 Environmental conditions

The environmental conditions of these materials are those applicable to the equipment of telecommunications in service, at fixed station, in sites protected from the bad weather, at partially controlled temperature: classify 3.2 of ETS 300 019-1-3 [12].

5.2 Installation and dimensioning

The ENTI is designed:

- To be able to be fixed on a wall.
- To be able to be fixed on DIN rail of 35 mm.
- To have an attachment unit allowing horizontal/vertical adjustment.
- Not to require specific tools for installation.
- To form part of a maximum volume of $100 \times 100 \times 35$ mm.
- To ensure a protection against wet wall effects.

5.3 Connection of the cable from the operator network (drop cable)

The ENTI is designed:

- To accept IDC (Insulated Displacement Connector) with a wire of gauge diameter from 0,5 mm to 0,8 mm
- To accept the various types of cables of the standards or following specifications:
 - EN 50406 [5];
 - EN 50407-1 [6];
 - EN 50441-1 [2];
 - National standards of drop cable.

- To maintain the cables of customer wiring:
 - The maintenance of the cable will be marked on its sheath;
 - The cable will support a tensile strength of 1,5 daN.

5.4 Connection of the customer's cable

The ENTI is designed:

- To allow the connection of two branches of customer wiring (two connected directions, two connected wires).
- To accept IDC (Insulated Displacement Connector) with a wire of gauge diameter from 0,5 mm to 0,8 mm.
- To accept the various types of cables of following standards:
 - EN 50441-1 [2];
 - EN 50441-2 [3];
 - EN 50441-3 [4].
- To maintain the cables of customer wiring:
 - The maintenance of the cable will be marked on its sheath.
 - The cable will support a tensile strength of 1,5 daN.
- To allow the connection of the screens of the cables to the ground (when using screened F/UTP cable).

5.5 Test module

The ENTI is designed to be equipped with a test module.

5.6 Test point and electrical measurements

The ENTI is designed to allow the following tests:

- To be able to measure the tension between wires of the line at the connection of the access cable and at the connection of the customer's cable(s).
- To measure the continuity of the device without connected cable (removed cover).
- To measure the continuity of the device without disconnecting the cables.

5.7 Miscellaneous

The inscription "TEST" or another symbol is present beside the P0 jack.

5.8 Documentation

In each package of ENTI, documentation will be provided including a technical note of installation and a technical note of exploitation and maintenance.

5.9 Recycling

The ENTI is designed:

- To limit the number of components and materials.
- To support the concept facilitating the recycling of materials.
- To provide the indications necessary for the recycling of the material at the end of the lifetime.
- To provide a mechanical protection of the connector industry (case).
- To respect the safety requirements EN 60950-1 [7].

6 Test Board

The purpose of the tests described hereafter, applicable to copper ENTI RJ45 are to allow the checking of all the design features required in the present specification.

Table 6.1: Tests applicable to copper RJ45 ENTI and housing

Tests to carry out	Standards or Specifications	Sanctions
Visual inspections and controls	Following the test 1a of the EN 60512-2 [8].	According to the test 1a of the EN 60512-2 [8].
Test of implementation	The test with for goal to test and check all the functions of the product. It makes it possible to validate the proposed note of assembly and wiring.	No observed deformation, no fracture of the various components or subset of the product.
Test of reintervention	The goal is to test the aptitude of ENTI RJ45 to support the mechanical constraints due to handling.	No damage at the end of 10 complete cycles of connection.
Lay-out/deposits, test module	The test has the goal to check that the efforts necessary for the installation and the demounting of a test module are such as they allow an easy exploitation of test module on ENTI RJ45.	The acceptable maximum efforts will not be able to in no case to be higher than 4 daN.
Check test of the degree of envelope protection	The test has the goal to check the level of protection of the envelope against the penetrations of objects EN 60529 [9].	The envelope will be in conformity with the index of protection IP30.
Free shatter test	EN 60068-2-32 [10] method 1.	No damage.
Corrosion of Metal equipment	EN 60068-2-11 [10] Ka Test: salt spray during 96 hours.	No trace of corrosion calling into question the functionality of the product should not be observed on the metal parts.
Vibration test	Classify 3.2 of standard ETS 300 019-1-3 [12] following conditions T 3.2.	No damage, no microcuts > 0,1 microsecond. At the end of the test each product must be able to answer all its functions perfectly.
Impact resistance	EN 62262 [11] (IK 04).	No observed displacement, no visual degradation (crossing cracking, fracture).

Behaviour with the wrenching and the depression of the contacts	The purpose of the test is to make sure that traction or accidental compressive forces exerted on the contacts cannot damage them.	A test of wrenching is carried out by applying according to an axis perpendicular a tractive effort of 15 daN to each contact. A test of depression is applied while applying (according to the same axis but in the opposite direction), a compressive force of 15 daN to each contact.
Behaviour with traction on the cord	The purpose of the test is to check the mechanical resistance of the P0 jack to the wrenching of a plug assembled in end of cord, and electric continuity on the level of each blade of contact, when the cord is subjected to efforts. This test will have to be carried out on the most exhaustive possible panel of existing plugs on the market, in order to check the compatibility of the existing products.	No observed microcuts higher than 10 μ s. No deterioration mechanical nor variation of the resistance of contact of more than 10 milliohms should not be observed.
Resistance of contact	The purpose of the test is to measure the resistance of contact (EN 60512-2 [8]) of ENTI RJ45: - Between the drop cable and the customer installation cable - Between the drop cable and the cord of connection of the terminal connected in P0. In this case, the insulation of wiring customer will be checked.	After will subtraction of the linear electrical resistances of wire, resistances of contact remain lower than 60 mohm and the difference between two measurements lower than 10 mohm. Successive connections: 10 cycles Connections/dis-connections: 10 cycles. Behaviour with torsion: 5 cycles.
Isolation resistance	The purpose of the test is to measure (following the test 3a, method A of the EN 60512-2 [8]) the isolation resistance between the two wires of the pair.	The isolation resistance will remain in all the cases higher than 500 Megohms after 2 mn of electrification.
Test of connection/dis-connection in P0	The goal is to test the aptitude of the P0 jack to receive 100 times a plug.	Before and after the tests measurements of resistances of contact will remain lower than 60 milliohms, Measurements of isolation resistances will be in conformance with the test 3a, method A of the EN 60512-2 [8].
Test relating to IDC	The purpose of the test is to check that the contacts allowing the connection of the various types of cables on ENTI RJ45 answer the design features standardized for IDC connections. For these tests, the contacts are dissociated to their supports, when they do not take part in the function and the quality of connections.	The resistances of contact measured before and after tests (100 times) will be in all the cases lower than 60 mohms Measurements of isolation resistances will be in conformity with the test 3a, method A of the EN 60512-2 [8].
Rigidity in differential mode	The purpose of the test is to measure (according to the test 4a, method A of the EN 60512-2 [8]) dielectric rigidity between: - Two connectors of the pair. - Each connector and the point of connection to the ground of ENTI RJ45.	No observed breakdown, no perforation during the test and the resistance isolation measured after test must be higher than 500 Megohms after 2 minutes of electrification.
Rigidity in common mode	The purpose of the test is to measure the behaviour with the overloads of the device concerning the aspects related to the safety of the user: electric breakdown risk between the external envelope and the wires, ignition risks: EN 60950-1 [7].	There should be neither perforation, neither skirting, neither danger of ignition, nor of deformation. After the test, the isolation resistance will have to be higher than 500 Megohms.

Rigidity between access to vacuum	The purpose of the test is to check the rigidity of entering and outgoing ENTI RJ45 between its accesses (test 4a, method A of the EN 60512-2 [8]).	No observed perforation, no breakdown, nor of emanation during the test.
Tests of transmission	The test aims to measure the value of the resistances of each wire inserted in the branches of ENTI RJ45 (EN 60512-2 [8]).	The difference of the values will not have to exceed 1 Ohm. The sum of these values uninterrupted will not have to exceed 25 Ohms.

History

Document history		
V1.1.1	July 2010	Publication