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# TLN WRO Specification type Document

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< Specification and Certification Coax Patchcord >

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## Document Category and type

CAT	TYPE	DOC ID	Comment
TV	SPEC	TLN_WRO_TA_A_S_PAAB	<b>Specification type documents (-SPEC) are documents specifying logical / physical interfaces / protocols, etc., to which AO equipment/systems need to comply</b>

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## Document Status

EDITION	DATE	STATUS
1.0	09/10/2013	Final
<a href="#">2.0</a>	<a href="#">29.12.2018</a>	<a href="#">Final</a>

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## List of Appendixes

This document may refer to further detailed documents that are added in Appendixes to this document.

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The list with appendixes of this document:

None.

## List of References

This document may refer to external documents or information sources.

A reference to an external document or information source is in this document highlighted with grey background.

The list of referred external documents or information sources in this document:

Reference 1: TLN\_WRO\_TA\_G\_C\_PAAA - General Certification Procedures

Reference 2: TLN\_WRO\_TA\_A\_S\_PAAA - Specification and Certification TV Wall Outlet

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# 1 Abstract

This document describes functional specification, requirements and non-functional requirements for TLN coax patch cord which is used for connecting AO STB/TV to WO or AO Docsis CPE (modem) to NIU. TLN implies AO to follow the requirements and specifications stated in this document.

Following cables are typically used for these connections:

- IEC male (straight) to IEC female (angled) 2.5m
- IEC male (straight) to IEC female (straight) 1.5m
- F male to F male 59U 2m (Docsis CPE to NIU)

Generic sections specifying certification procedures applicable to all AO CPE or network equipment that will be connected to the TLN network are described in General Certification Procedures Document [TLN\\_WRO\\_TA\\_G\\_C\\_PAAA](#) - General Certification Procedures.

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## 2 TLN Coax Patchcord Functional Description

- (1) The purpose of Telenet approved coax patch-cords are to realize in home connections over short distance (0-2,5m range) between WO/NIU and AO CPE equipment (Docusis, STB). The specifications ensure quality full and reliable transport of all RF signals in the supported spectrum ranges and also protect network and other equipment integrity on the RF level (ingress and egress radiation).
- (2) Several variants are provided to ensure convenient use and installation taking into account different customer home conditions.

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### 3 TLN coax patch cord for AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)

#### 3.1 TLN Coax Patchcord Functional Requirements

##### 3.1.1 RF Requirements

###### 3.1.1.1 Insertion Loss

- (3) Insertion Loss Requirement for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) is shown in below figure.

Parameter	Requirement
Insertion loss 5 - 1000MHz	$\leq 1.5\text{dB}$

Figure 3-1: Insertion Loss

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###### 3.1.1.2 Return Loss

- (4) Return Loss Requirement for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) is shown in below figure.

Parameter	Requirement
Return loss 5 - 1000MHz In	$\geq$ Cenelec Category B
Return loss 5 - 1000MHz Out	$\geq$ Cenelec Category B

Figure 3-2: Return Loss

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###### 3.1.1.3 Attenuation

- (5) Attenuation Requirement TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) is shown in below figure.

Parameter	Requirement
Attenuation at 20°C	$\leq 1.5\text{dB}$

Figure 3-3: Attenuation

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###### 3.1.1.4 Impedance

- (6) Impedance Requirement for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) is shown in below figure.

Parameter	Requirement
Impedance	75Ω

Figure 3-4: Impedance

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###### 3.1.1.5 EMC Screening

- (7) EMC Screening Requirements for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) are shown in below figures.



Parameter	Requirement
Screening effectiveness	Conform Cenelec EN50083-2: Class A

Parameter	Requirement
Screening effectiveness 5 - 300MHz	≥85dB
Screening effectiveness 300 - 470MHz	≥80dB
Screening effectiveness 470 - 950MHz	≥75dB
Screening effectiveness 950 - 1000MHz	≥55dB

Figure 3-5: EMC Screening

### 3.1.2 AO Device Management by TLN Requirements

#### 3.1.2.1 Concept and purpose

- (8) As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)”, concept and purpose for AO Device Management is not applicable.

#### 3.1.2.2 Device management Functions

- (9) As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)”, device management functions are not applicable.

#### 3.1.2.3 SNMP MIB specifications

- (10)As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)”, SNMP management is not applicable.

#### 3.1.2.4 Reset and Factory Reset specifications

- (11)As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)”, Reset and Factory Reset are not applicable.

## 3.2 TLN Coax Patchcord Non - Functional Requirements

### 3.2.1 Mechanical Requirements

#### 3.2.1.1 Cable mechanical characteristics

(12) Mechanical Requirements for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) is shown in below figure.

Parameter	Requirement
Length	2.5m tolerance +0,1m (connectors included)
Connector 1	IEC male (straight) conform Cenelec EN50083-4 HD 134.2 S2 IEC 169-2
Connector 2	IEC female (90° angled) conform Cenelec EN50083-4 HD 134.2 S2 IEC 169-2
Center conductor	Solid CU
Dielectric	Full PE (recommended by Telenet)
Inner shield	AL foil or AL-PET foil bonded
Braid	Tinned CU braid >50% coverage; >50 micron thick
Jacket	White PVC
Bend radius	All specifications must be met after 1 bend with radius of 4cm and 10 bends with radius of 8cm

Figure 3-6: Cable Mechanical Characteristics

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#### 3.2.1.2 Diagnostic Leds

(13) As this document describes the "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)", diagnostic leds are not available.

#### 3.2.1.3 Labels

(14) Following Labels for "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)" must be printed on cable (indelible - letter height 3...5mm);

- "TELENET - INTERKABEL"
- Vendor name
- Product type

(15) Coax patch cords should be used widespread between TLN and AO connections; so AO WO must strictly comply with all TLN requirements.

#### 3.2.1.4 Connectors

(16) The connectors of "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)" are IEC male (straight) to IEC female (90° angled) 2.5m.

(17) The clamping force of the female connector of "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)" must withstand at least 200g on the outer conductor and 100g on the inner conductor conform EN50083-4 HD 134.2 S2 IEC 169-2.

(18) The connectors of "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m)" must withstand a pulling force of 35cNm (=5kgf).

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## 4 TLN coax patch cord for AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)

### 4.1 TLN Coax Patchcord Functional Requirements

#### 4.1.1 RF Requirements

##### 4.1.1.1 Insertion Loss

(19) Insertion Loss Requirement for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m) is shown in below figure.

Parameter	Requirement
Insertion loss 5 - 1000MHz	$\leq 1.5\text{dB}$

Figure 4-1: Insertion Loss

##### 4.1.1.2 Return Loss

(20) Return Loss Requirement for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m) is shown in below figure.

Parameter	Requirement
Return loss 5 - 1000MHz In	$\geq$ Cenelec Category B
Return loss 5 - 1000MHz Out	$\geq$ Cenelec Category B

Figure 4-2: Return Loss

##### 4.1.1.3 Attenuation

(21) Attenuation Requirement TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m) is shown in below figure.

Parameter	Requirement
Attenuation at 20°C	$\leq 1.5\text{dB}$

Figure 4-3: Attenuation

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##### 4.1.1.4 Impedance

(22) Impedance Requirement for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m) is shown in below figure.

Parameter	Requirement
Impedance	75Ω

Figure 4-4: Impedance

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##### 4.1.1.5 EMC Screening

(23) EMC Screening Requirements for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m) are shown in below figures.

Parameter	Requirement
Screening effectiveness	Conform Cenelec EN50083-2: Class A

Parameter	Requirement
Screening effectiveness 5 - 300MHz	≥85dB
Screening effectiveness 300 - 470MHz	≥80dB
Screening effectiveness 470 - 950MHz	≥75dB
Screening effectiveness 950 - 1000MHz	≥55dB

Figure 4-5: EMC screening

#### 4.1.2 AO Device Management by TLN Requirements

##### 4.1.2.1 Concept and purpose

(24)As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)”, concept and purpose for AO Device Management is not applicable.

##### 4.1.2.2 Device management Functions

(25)As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)”, device management functions are not applicable.

##### 4.1.2.3 SNMP MIB specifications

(26)As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)”, SNMP management is not applicable.

##### 4.1.2.4 Reset and Factory Reset specifications

(27)As this document describes the “TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)”, Reset and Factory Reset are not applicable.

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## 4.2 TLN Coax Patchcord Non - Functional Requirements

### 4.2.1 Mechanical Requirements

#### 4.2.1.1 Cable mechanical characteristics

(28) Mechanical Requirements for TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m) is shown in below figure.

Parameter	Requirement
Length	1.5m tolerance +0,1m (connectors included)
Connector 1	IEC male conform Cenelec EN50083-4 HD 134.2 S2 IEC 169-2
Connector 2	IEC female conform Cenelec EN50083-4 HD 134.2 S2 IEC 169-2
Center conductor	Solid CU
Dielectric	Full PE (recommended by Telenet)
Inner shield	AL foil or AL-PET foil bonded
Braid	Tinned CU braid >50% coverage; >50 micron thick
Jacket	White PVC
Bend radius	All specifications must be met after 1 bend with radius of 4cm and 10 bends with radius of 8cm

Figure 4-6: Cable Mechanical Characteristics

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#### 4.2.1.2 Diagnostic Leds

(29) As this document describes the "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)", diagnostic leds are not available.

#### 4.2.1.3 Labels

(30) Following Labels for "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)" must be printed on cable after TELENET-INTERKABEL certification (indelible - letter height 3...5mm);

- d. "TELENET - INTERKABEL"
- e. Vendor name
- f. Product type

(31) Coax patch cords could be used widespread between TLN and AO connections; so AO WO must strictly comply with all TLN requirements.

#### 4.2.1.4 Connectors

(32) The connectors of "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)" are IEC male (straight) to IEC female (90° angled) 2.5m.

(33) The clamping force of the female connector of "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)" must withstand at least 200g on the outer conductor and 100g on the inner conductor conform EN50083-4 HD 134.2 S2 IEC 169-2.

(34) The connectors of "TLN coax patch cord for connection AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m)" must withstand a pulling force of 35cNm (=5kgf).

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## 5 TLN coax patch cord for AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)

### 5.1 TLN Coax Patchcord Functional Requirements

#### 5.1.1 RF Requirements

##### 5.1.1.1 Insertion Loss

(35) Insertion Loss Requirement for TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) is shown in below figure.

Parameter	Requirement
Insertion loss 5 - 1000MHz	$\leq 1.5\text{dB}$

Figure 5-1: Insertion Loss

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##### 5.1.1.2 Return Loss

(36) Return Loss Requirement for TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) is shown in below figure.

Parameter	Requirement
Return loss 5 - 1000MHz In	$\geq$ Cenelec Category B
Return loss 5 - 1000MHz Out	$\geq$ Cenelec Category B

Figure 5-2: Return Loss

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##### 5.1.1.3 Attenuation

(37) Attenuation Requirement TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) is shown in below figure.

Parameter	Requirement
Attenuation at 20°C	$< 1.5\text{dB}$

Figure 5-3: Attenuation

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##### 5.1.1.4 Impedance

(38) Impedance Requirement for TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) is shown in below figure.

Parameter	Requirement
Impedance	75Ω

Figure 5-4: Impedance

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##### 5.1.1.5 EMC Screening

(39) EMC Screening Requirements for TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) are shown in below figures.

Parameter	Requirement
Screening effectiveness	Conform Cenelec EN50083-2: Class A

Parameter	Requirement
Screening effectiveness 5 - 300MHz	≥85dB
Screening effectiveness 300 - 470MHz	≥80dB
Screening effectiveness 470 - 950MHz	≥75dB
Screening effectiveness 950 - 1000MHz	≥55dB

Figure 5-5: EMC Screening

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### 5.1.2 AO Device Management by TLN Requirements

#### 5.1.2.1 Concept and purpose

(40)As this document describes the “TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)”, concept and purpose for AO Device Management is not applicable.

#### 5.1.2.2 Device management Functions

(41)As this document describes the “TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)”, device management functions are not applicable.

#### 5.1.2.3 SNMP MIB specifications

(42)As this document describes the “TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)”, SNMP management is not applicable.

#### 5.1.2.4 Reset and Factory Reset specifications

(43)As this document describes the “TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)”, Reset and Factory Reset are not applicable.

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## 5.2 TLN Coax Patchcord Non - Functional Requirements

### 5.2.1 Mechanical Requirements

#### 5.2.1.1 Cable mechanical characteristics

(44) Mechanical Requirements for TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) is shown in below figure.

Parameter	Requirement
Length (connectors included)	2m $\pm$ 5cm
Connectors	F male Cenelec EN50083-4 conform IEC60169-24

Figure 5-6: Cable Mechanical Characteristics

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#### 5.2.1.2 Diagnostic Leds

(45) As this document describes the “TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)”, diagnostic leds are not available.

#### 5.2.1.3 Labels

(46) Following Labels for “*TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)*” must be printed on cable after TELENET-INTERKABEL certification (indelible - letter height 3...5mm);

- g. “TELENET - INTERKABEL”
- h. Vendor name
- i. Product type

(47) Coax patch cords should be used widespread between TLN and AO connections; so AO WO must strictly comply with all TLN requirements.

#### 5.2.1.4 Connectors

(48) The connectors of “*TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)*” are F male (straight) to F male (straight) 2m.

(49) The connectors of “*TLN coax patch cord for connection AO Docsis CPE (modem) to NIU (F male to F male 59U 2m)*” must withstand a pulling force of 20 kg.

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## 6 Environmental Requirements

### 6.1 Packaging

(50)The Applicable Requirements about packaging can be found on TLN\_WRO\_TA\_A\_S\_PAAA - Specification and Certification TV Wall Outlet.

### 6.2 RoHS and WEEE compliancy

(51)The Applicable Requirements about RoHS and WEEE compliancy can be found on TLN\_WRO\_TA\_A\_S\_PAAA - Specification and Certification TV Wall Outlet.

### 6.3 EU CoC compliancy

(52)The Applicable Requirements about EU CoC compliancy can be found on TLN\_WRO\_TA\_A\_S\_PAAA - Specification and Certification TV Wall Outlet.

## 7 Safety Requirements

### 7.1 Surge and Lightening protection

(53)The Applicable Requirements about surge and lightning protection can be found on TLN\_WRO\_TA\_A\_S\_PAAA - Specification and Certification TV Wall Outlet.

### 7.2 Temperature and Humidity

(54)The Applicable Requirements about temperature and humidity can be found on TLN\_WRO\_TA\_A\_S\_PAAA - Specification and Certification TV Wall Outlet.

### 7.3 Fire resistance

(55)The Applicable Requirements about fire resistance can be found on TLN-WRO-TA-A-S-PAAA - Specification and Certification TV Wall Outlet.

## 8 EU Consumer Goods label Requirements

### 8.1 CE - mark

(56)The Applicable Requirements about CE - mark can be found on TLN-WRO-TA-A-S-PAAA - Specification and Certification TV Wall Outlet.

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## 11.1 Certification for the TLN coax patchcord

### 11.2 Introduction

(57)The tests will cover all of the requirements specified by TLN in this specification document.

### 11.3 Test score card

CONFORMANCE TEST SCORE CARD					
Conformance Test Score Card Number	TLN-WRO-TA-TSC-S-PAAB				
Test Identification					
Test Execution Date					
Test Run Type	Full / Reduced (without OOS cases)				
Device / Equipment / Interface Name					
Device / Equipment / Interface Type / Class					
AO Device / Equipment / Interface Identification					
Software Version					
Tested by					
Overall Result Status	Pass / Fail				
Applicability	Select 1 or more : ROTV / ROBB / AIDTV				
CONFORMANCE TEST ITEM LIST					
Test Cases Summary	FORMAT	IN SCOPE	MAN	PASS/FAIL	REM
<b>3(..5).1 TLN Coax Patchcord Functional Requirements part of TELENET-INTERKABEL certification</b>	HO		"Y/N"	"P/F"	(*xy)
3(..5).1.1. RF Requirements			Y		
3(..5).1.2. AO Device Management by TLN Requirements	NA				
<b>3(..5).2 TLN Coax Patchcord Non-Functional Requirements part of TELENET-INTERKABEL certification</b>	HO				
3(..5).2.1. Mechanical Requirements			Y		
<b>6. Environmental Requirements</b>			Y		
<b>7. Safety Requirements</b>			Y		
<b>8. EU Consumer Goods Label Requirements</b>			Y		
<b>Remarks</b>					
(*xy) : "Remark explanation comes here"					

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