

# TLN WRO Specification type Document

< Specification and Certification Coax Patchcord >



# telenet

Document Housekeeping

Document Category and type

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| 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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## Table of Contents

|         |  |    |
|---------|--|----|
| 1       | Abstract .....   | 6  |
| 2       | TLN Coax Patchcord Functional Description .....  | 7  |
| 3       | TLN coax patch cord for AO STB/TV to WO (IEC male (straight) to IEC female (angled) 2.5m) ...  | 8  |
| 3.1     | TLN COAX PATCHCORD FUNCTIONAL REQUIREMENTS.....  | 8  |
| 3.1.1   | <i>RF Requirements</i> .....   | 8  |
| 3.1.1.1 | Insertion Loss.....  | 8  |
| 3.1.1.2 | Return Loss .....  | 8  |
| 3.1.1.3 | Attenuation.....   | 8  |
| 3.1.1.4 | Impedance .....  | 8  |
| 3.1.1.5 | EMC Screening.....   | 8  |
| 3.1.2   | <i>AO Device Management by TLN Requirements</i> .....  | 9  |
| 3.1.2.1 | Concept and purpose.....   | 9  |
| 3.1.2.2 | Device management Functions .....  | 9  |
| 3.1.2.3 | SNMP MIB specifications .....  | 9  |
| 3.1.2.4 | Reset and Factory Reset specifications .....   | 9  |
| 3.2     | TLN COAX PATCHCORD NON - FUNCTIONAL REQUIREMENTS.....  | 10 |
| 3.2.1   | <i>Mechanical Requirements</i> .....   | 10 |
| 3.2.1.1 | Cable mechanical characteristics .....   | 10 |
| 3.2.1.2 | Diagnostic Leds .....  | 10 |
| 3.2.1.3 | Labels .....   | 10 |
| 3.2.1.4 | Connectors.....  | 10 |
| 4       | TLN coax patch cord for AO STB/TV to WO (IEC male (straight) to IEC female (straight) 1.5m).11 |    |
| 4.1     | TLN COAX PATCHCORD FUNCTIONAL REQUIREMENTS.....  | 11 |
| 4.1.1   | <i>RF Requirements</i> .....   | 11 |
| 4.1.1.1 | Insertion Loss.....  | 11 |
| 4.1.1.2 | Return Loss .....  | 11 |
| 4.1.1.3 | Attenuation.....   | 11 |
| 4.1.1.4 | Impedance .....  | 11 |
| 4.1.1.5 | EMC Screening.....   | 11 |
| 4.1.2   | <i>AO Device Management by TLN Requirements</i> .....  | 12 |
| 4.1.2.1 | Concept and purpose.....   | 12 |
| 4.1.2.2 | Device management Functions .....  | 12 |
| 4.1.2.3 | SNMP MIB specifications .....  | 12 |
| 4.1.2.4 | Reset and Factory Reset specifications .....   | 12 |
| 4.2     | TLN COAX PATCHCORD NON - FUNCTIONAL REQUIREMENTS.....  | 13 |
| 4.2.1   | <i>Mechanical Requirements</i> .....   | 13 |
| 4.2.1.1 | Cable mechanical characteristics .....   | 13 |
| 4.2.1.2 | Diagnostic Leds .....  | 13 |
| 4.2.1.3 | Labels .....   | 13 |
| 4.2.1.4 | Connectors.....  | 13 |
| 5       | TLN coax patch cord for AO Docsis CPE (modem) to NIU (F male to F male 59U 2m) .....           | 14 |
| 5.1     | TLN COAX PATCHCORD FUNCTIONAL REQUIREMENTS.....  | 14 |
| 5.1.1   | <i>RF Requirements</i> .....   | 14 |
| 5.1.1.1 | Insertion Loss.....  | 14 |
| 5.1.1.2 | Return Loss .....  | 14 |
| 5.1.1.3 | Attenuation.....   | 14 |
| 5.1.1.4 | Impedance .....  | 14 |
| 5.1.1.5 | EMC Screening.....   | 14 |
| 5.1.2   | <i>AO Device Management by TLN Requirements</i> .....  | 15 |
| 5.1.2.1 | Concept and purpose.....   | 15 |
| 5.1.2.2 | Device management Functions .....  | 15 |
| 5.1.2.3 | SNMP MIB specifications .....  | 15 |
| 5.1.2.4 | Reset and Factory Reset specifications .....   | 15 |
| 5.2     | TLN COAX PATCHCORD NON - FUNCTIONAL REQUIREMENTS.....  | 16 |
| 5.2.1   | <i>Mechanical Requirements</i> .....   | 16 |
| 5.2.1.1 | Cable mechanical characteristics .....   | 16 |
| 5.2.1.2 | Diagnostic Leds .....  | 16 |

|         |   |    |
|---------|---|----|
| 5.2.1.3 | Labels .....                                  | 16 |
| 5.2.1.4 | Connectors.....                               | 16 |
| 6       | Environmental Requirements .....              | 17 |
| 6.1     | PACKAGING .....                               | 17 |
| 6.2     | ROHS AND WEEE COMPLIANCY .....                | 17 |
| 6.3     | EU CoC COMPLIANCY .....                       | 17 |
| 7       | Safety Requirements .....                     | 17 |
| 7.1     | SURGE AND LIGHTENING PROTECTION .....         | 17 |
| 7.2     | TEMPERATURE AND HUMIDITY.....                 | 17 |
| 7.3     | FIRE RESISTANCE .....                         | 17 |
| 8       | EU Consumer Goods label Requirements .....    | 17 |
| 8.1     | CE - MARK .....                               | 17 |
| 11.1    | Certification for the TLN coax patchcord..... | 18 |
| 11.2    | INTRODUCTION .....                            | 18 |
| 11.3    | TEST SCORE CARD .....                         | 18 |

## Table of Figures

|             |  |    |
|-------------|--|----|
| Figure 3-1: | Insertion Loss .....                   | 8  |
| Figure 3-2: | Return Loss.....                       | 8  |
| Figure 3-3: | Attenuation .....                      | 8  |
| Figure 3-4: | Impedance .....                        | 8  |
| Figure 3-5: | EMC Screening .....                    | 9  |
| Figure 3-6: | Cable Mechanical Characteristics ..... | 10 |
| Figure 4-1: | Insertion Loss .....                   | 11 |
| Figure 4-2: | Return Loss.....                       | 11 |
| Figure 4-4: | Impedance .....                        | 11 |
| Figure 4-5: | EMC screening .....                    | 12 |
| Figure 4-6: | Cable Mechanical Characteristics ..... | 13 |
| Figure 5-1: | Insertion Loss .....                   | 14 |
| Figure 5-2: | Return Loss.....                       | 14 |
| Figure 5-3: | Attenuation .....                      | 14 |
| Figure 5-4: | Impedance .....                        | 14 |
| Figure 5-5: | EMC Screening .....                    | 15 |
| Figure 5-6: | Cable Mechanical Characteristics ..... | 16 |

## List of Appendixes

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

A reference to an appendix is in this document highlighted with grey background.

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

## Restricted information

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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](#).

## **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 (Docsis, 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.

### **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

##### **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

##### **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

##### **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

##### **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    | $\geq 85\text{dB}$ |
| Screening effectiveness 300 - 470MHz  | $\geq 80\text{dB}$ |
| Screening effectiveness 470 - 950MHz  | $\geq 75\text{dB}$ |
| Screening effectiveness 950 - 1000MHz | $\geq 55\text{dB}$ |

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

#### 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);

- a. “TELENET - INTERKABEL”
- b. Vendor name
- c. 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).

## 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

##### 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

##### 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    | $\geq 85\text{dB}$ |
| Screening effectiveness 300 - 470MHz  | $\geq 80\text{dB}$ |
| Screening effectiveness 470 - 950MHz  | $\geq 75\text{dB}$ |
| Screening effectiveness 950 - 1000MHz | $\geq 55\text{dB}$ |

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.

## 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

#### 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).

## 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

##### 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

##### 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

##### 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 | 75 $\Omega$ |

Figure 5-4: Impedance

##### 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    | $\geq 85\text{dB}$ |
| Screening effectiveness 300 - 470MHz  | $\geq 80\text{dB}$ |
| Screening effectiveness 470 - 950MHz  | $\geq 75\text{dB}$ |
| Screening effectiveness 950 - 1000MHz | $\geq 55\text{dB}$ |

Figure 5-5: EMC Screening

### 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.

## 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

#### 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.



## **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.

## 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   |
|   |  |          | "Y/N" | "P/F"     | (*xy) |
| <b>3(..5).1 TLN Coax Patchcord Functional Requirements part of TELENET-INTERKABEL certification</b>     | <b>HO</b>                              |          |       |           |       |
| 3(..5).1.1. RF Requirements   |  |          | Y     |           |       |
| 3(..5).1.2. AO Device Management by TLN Requirements  | <b>NA</b>                              |          |       |           |       |
| <b>3(..5).2 TLN Coax Patchcord Non-Functional Requirements part of TELENET-INTERKABEL certification</b> | <b>HO</b>                              |          |       |           |       |
| 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"   |  |          |       |           |       |