

## ADSL Over POTS Splitter

### ATF053B1R

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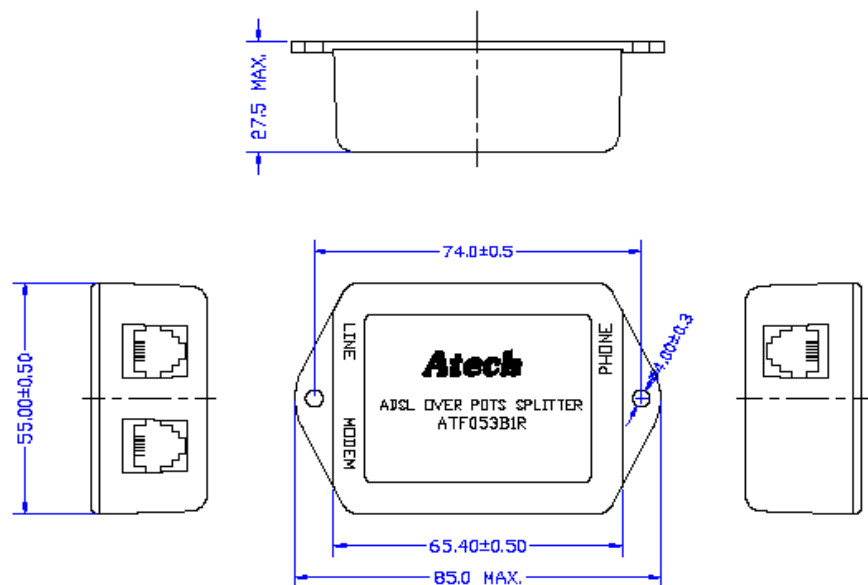
## 1 Introduction

The purpose of the POTS splitter is twofold. For ADSL signals, protection from the high-frequency transients and impedance effects that occur during POTS operation – ringing transients, ring trip transients, and OFF hook transients and impedance changes – is provided. For POTS voice-band service, the low-pass filters provide protection from ADSL signals which may impact, through non-linear or other effects, remote devices ( fax, modem, etc.) and central office operation. The filtering should be performed while maintaining the quality of the end-to-end voice-band connection (i.e. between the POTS and PSTN interfaces).

## 2 Definitions in alphabetical order of nouns

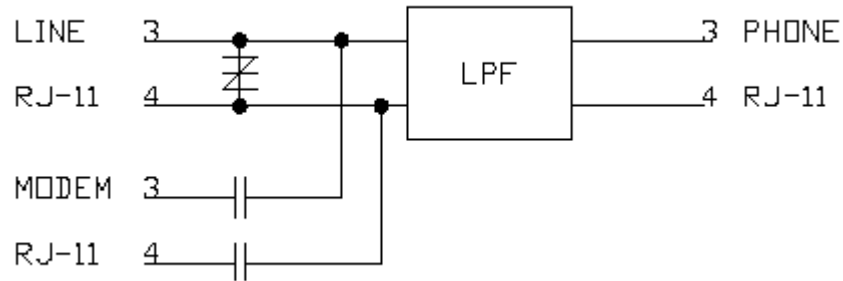
|          |                                                            |
|----------|------------------------------------------------------------|
| CO-POTS: | Central office plain old telephone service.                |
| R-POTS:  | Remote plain old telephone service.                        |
| xDSL:    | Digital Subscriber Line (including ADSL, HDSL, SDSL, VDSL) |
| ATU-C:   | ADSL transceiver unit central                              |

## 3 Dimension



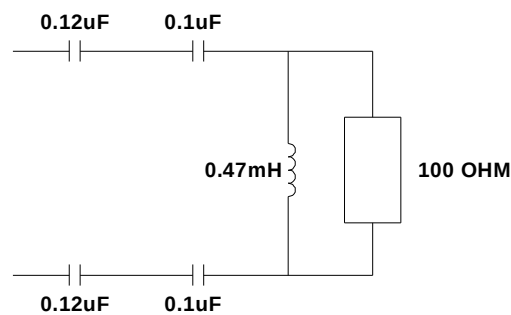
## 4 Technical requirement

### 4.1 Schematic

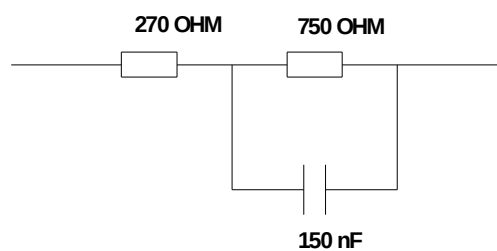


### 4.2 Terminating Impedances

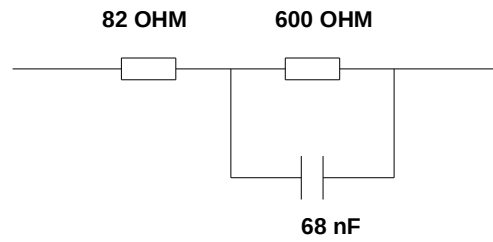
#### 4.2.1 $Z_{DSL}$



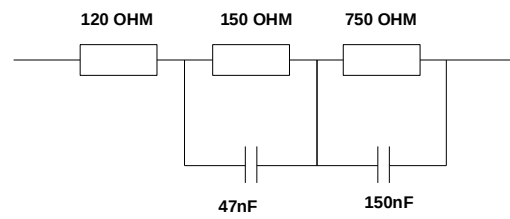
#### 4.2.2 $Z_R$ is the European harmonized complex impedance.



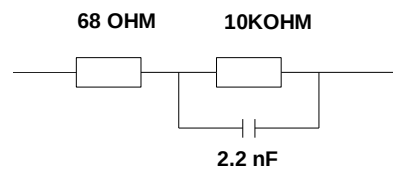
#### 4.2.3 $Z_{SL}$ is an impedance used to simulate a short line terminated in 600OHM.



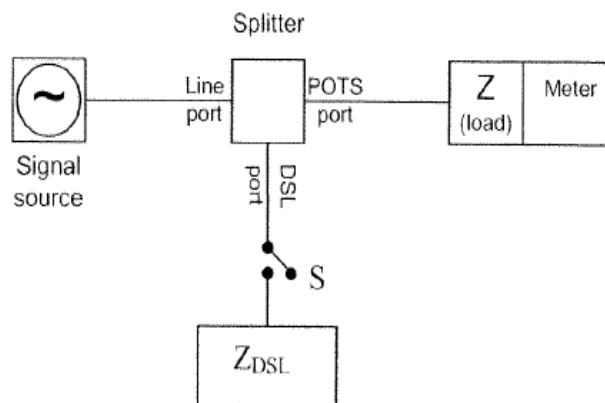
## 4.2.4 $Z_{RHF}$



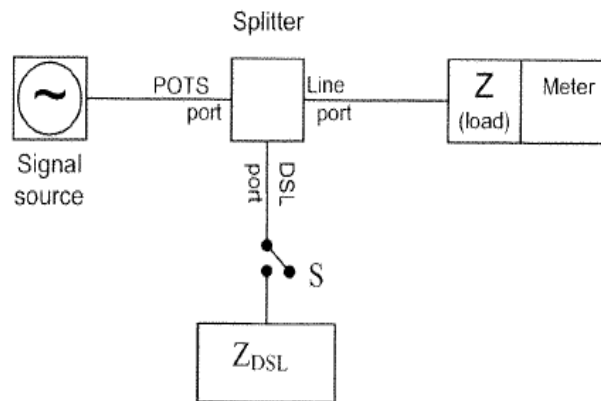
## 4.2.5 $Z_{onHI}$



## 4.3 General transmission test setup



From LINE to POTS



From POTS to LINE

## 5 Electrical characteristics

### 5.1 DC characteristics

#### 5.1.1 DC resistance to earth

The DC resistance between each terminal (TIP or RING) of the splitter and earth, when tested with 100VDC, shall not be less than 20M OHM.

#### 5.1.2 DC insulation resistance between TIP and RING

When tested with 100V DC, shall not be less than 5M OHM.

### 5.2 AC characteristics

#### 5.2.1 Insertion loss

The insertion loss of one splitter in the pass band shall be less than 1KHz.

#### 5.2.2 Insertion loss distortion

The absolute difference between the insertion loss at any frequency in the range 200Hz to 4KHz and the insertion loss at 1KHz shall be less than 1dB.

## 5.2.3 Return Loss

### 5.2.3.1 Return Loss testing at the POTS port.

Requirements see Table 1.

| Test # | Value of $Z_1$ | Frequency range  | Minimum Return Loss |
|--------|----------------|------------------|---------------------|
| Test 1 | $Z_{SL}$       | 300Hz to 3400Hz  | 12dB                |
| Test 2 | $Z_{SL}$       | 3400Hz to 4000Hz | 8dB                 |
| Test 3 | $Z_R$          | 300Hz to 3400Hz  | 12dB                |
| Test 4 | $Z_R$          | 3400Hz to 4000Hz | 8dB                 |

**Table 1**

### 5.2.3.2 Return Loss testing at the Line port.

Requirements see Table 1.

## 5.2.4 Unbalance about earth

| Frequency range  | Value of R | Min. Unbalance value |
|------------------|------------|----------------------|
| 50Hz to 600Hz    | 300OHM     | 40dB                 |
| 600Hz to 3400Hz  | 300OHM     | 46dB                 |
| 3400Hz to 4000Hz | 300OHM     | 40dB                 |
| 4KHz to 30KHz    | 50OHM      | 40dB                 |
| 30KHz to 1104KHz | 50OHM      | 50dB                 |
| 1104KHz to 5MHz  | 50OHM      | 30dB                 |

**Table 2**

Requirements see Table 2.

## 5.3 ADSL band requirements

### 5.3.1 On-hook isolation between DSL and POTS

| Frequency range   | Minimum value |
|-------------------|---------------|
| 32KHz to 350KHz   | 34dB          |
| 350KHz to 2208KHz | 55dB          |

The test setup is given as below:

- Impedance of the Line port =  $Z_{RHF}$
- Impedance of the POTS port =  $Z_{ONHI}$
- Impedance of the DSL port =  $Z_{DSL}$
- Level of the test signal = -6,0dBV emf.

In this case the isolation is defined as  $20\log(V1/V2)$  where V1 is the source emf and V2 is the voltage appearing across the load.

### 5.3.2 Off-hook isolation between DSL and POTS

| Frequency range   | Minimum value |
|-------------------|---------------|
| 32KHz to 138KHz   | 45dB          |
| 138KHz to 2208KHz | 55dB          |

The test setup is given as below:

- Impedance of the Line port =  $Z_{RHF}$
- Impedance of the POTS port =  $Z_{RHF}$
- Impedance of the DSL port =  $Z_{DSL}$
- Level of the test signal = -6,0dBV emf.

## 6 Environmental conditions:

Operating Temperature: 0 ~ 70°C

Storage Temperature: -25 ~ 75°C

Relative Humidity: up to 85% for 0 ~ 35°C

## 7 Reference

ETSI TS 101 952-1-1 V1.2.1

ITU K.21: Resistibility of subscribers terminal to over-voltage and over-currents.

ITU K.20: Resistibility of telecommunication switching equipment to over-voltage and over-currents.