

## ADSL POTS Splitter

### ATF036FR

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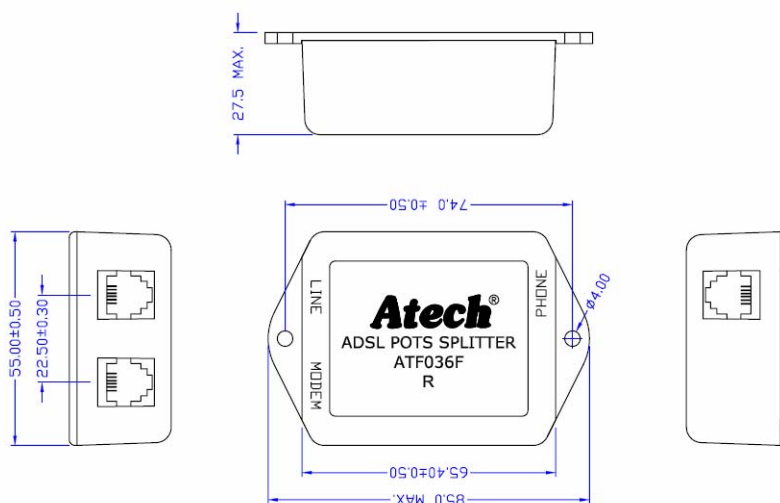
## 1 Introduction

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 (handset, fax, voice-band, 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

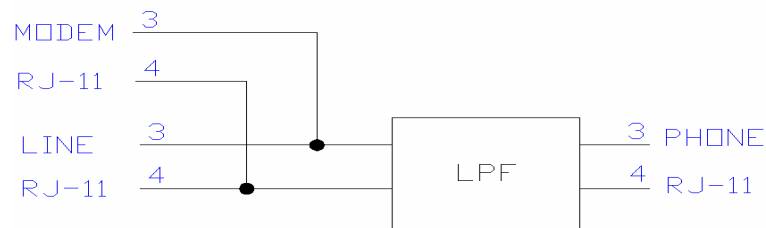
CO-POTS:	Central office plain old telephone service.
R-POTS:	A remote plain old telephone service.
xDSL:	Digital subscriber line (including ADSL, HDSL, SDSL, VDSL)
ATU-R:	ATU at the remote terminal

## 3 Dimension



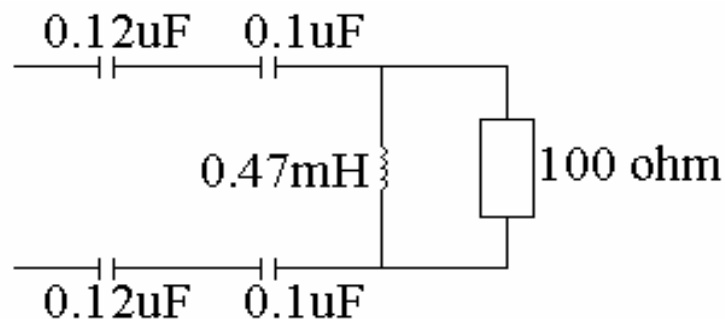
## 4 Technical requirement

### 4.1 Schematic



### 4.2 ZHP defined

To facilitate resting of the POTS splitter independently of the actual modem or specific vendor, one ZHP-r is defined in below figure to allow proper termination of the xDSL port during voice band testing. The ZHP-r is valid only for voice band frequencies.



## 5 Electrical characteristics

### 5.1 DC characteristics

This section contains the DC specifications, such as the loop DC current, the ringing, the TIP-to-RING DC voltage, the loop DC resistance, the isolation resistance. All requirements must be met in the presence of all POTS loop currents ranging from 0 to 100mA.

## 5.1.1 Loop DC current

The POTS splitter should ensure normal operation for loop DC currents ranging from 0 to 100mA.

## 5.1.2 Ringing

The POTS splitter should accept the following ringing signals.

Ringing frequency: 20-30Hz

Ringing AC: maximum 103Vrms

## 5.1.3 TIP-to-RING DC voltage

The POTS splitter should accept POTS tip-to-ring DC voltages of 0 to minus 60V.

## 5.1.4 DC resistance

The tip-to-ring DC resistance, or at the POTS interface with the ATU-R interface shorted, shall be less than or equal to 25OHM.

## 5.1.5 Isolation resistance

The DC resistance from tip-to-ground and ring-to-ground at the POTS interface with the ATU-R interface opened, shall be greater than or equal to 10MOHM.

## 5.2 AC characteristics

The section contains the AC specifications of the voice band, such as the insertion loss, the attenuation variation, the delay distortion, the return loss, the longitudinal balance and the termination, and methods for measuring them. In addition it contains specifications and measurement methods for the out band and the ADSL band.

## 5.2.1 Insertion loss

For the test loops and using the test set-up shown in Figure I, the insertion loss from the source to the termination shall be measured with and without the splitter/ZHP-r combination inserted.

The increase in insertion loss at 1KHz on the test loops, due to the addition of the splitter/ZHP-r, shall be less than specified in Table I.

Description	Loss (1KHZ)
TELE port to LINE port	<0.3dB

Table I

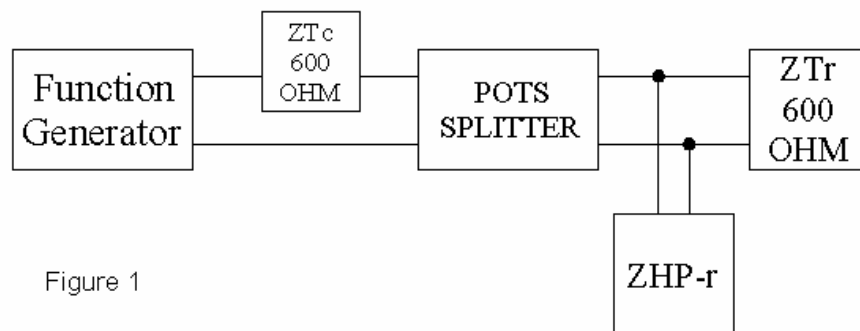


Figure 1

## 5.2.2 Attenuation distortion in voice-band

The variation of insertion loss with frequency shall be measured using the test set up in Figure I. The defined ZHP-r will be attached to the xDSL port of the splitter. If the splitter is an internal part of the ATU, then the modem remains attached as the xDSL load. The increase in attenuation distortion, relative to the 1KHz insertion loss, caused by the POTS splitter with the ZHP-r (or modem) load, shall be less than that specified in Table II.

Description	Loss (Note) 200Hz-4.0KHz
TELE PORT TO LINE PORT	+/-1dB

**Table II**

### 5.2.3 Delay distortion

The delay distortion of the POTS splitter shall be measured using Figure I. The increase in delay distortion caused by the POTS splitter in the test loops shall be less than specified in Table III.

Description	Delay Distortion 200 – 4000Hz
TELE PORT TO LINE PORT	200uS

**Table III**

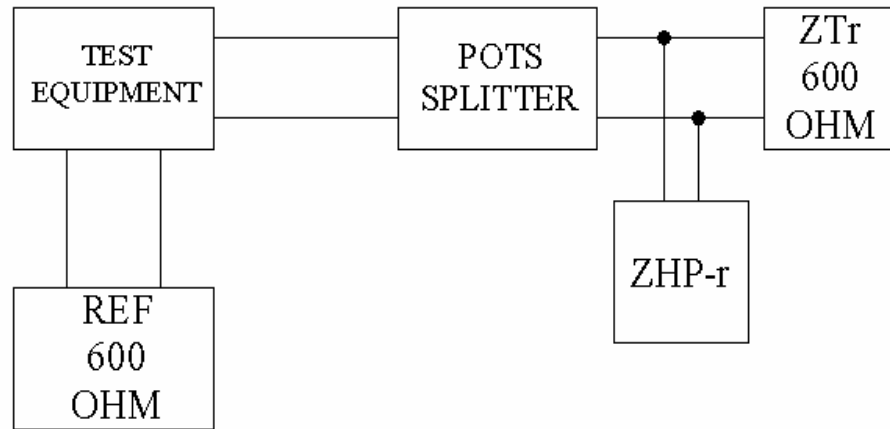
### 5.2.4 Return loss

The Figure II defines the test configuration and the values of the test components that shall be used for impedance measurements in the voice band for the POTS splitter units. The return loss of each splitter under the specified conditions shall be as follows Table IV:

Description	300Hz – 500Hz	500Hz- 2000Hz	2000Hz- 3400Hz
TELE port to LINE port	14dB	18dB	14dB
LINE port to TELE port	14dB	18dB	14dB

**Table IV**

## PHONE PORT



## LINE PORT

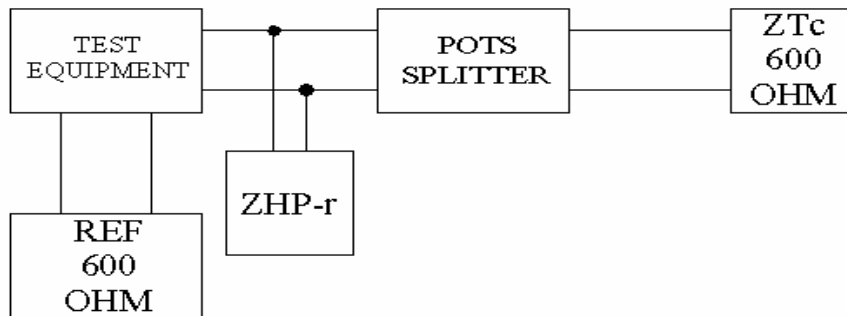


Figure II

### 5.2.5 Longitudinal balance

This method shall be used to test a POTS splitter when it is treated as a separate entity. The longitudinal balance of the POTS splitter (without loops), measured in either direction between the POTS and line port, as a two port device. The xDSL port shall be open. Because of the maintenance signatures, the applied longitudinal voltage shall be maximum 3Vp-p. The balance shall be greater than 40dB for frequencies between 15Hz-50Hz with a straight line level, 46dB for 50-600Hz of frequencies and 52dB for 600-3400Hz of frequencies.

Figure III show the test setup for the external remote POTS splitter.

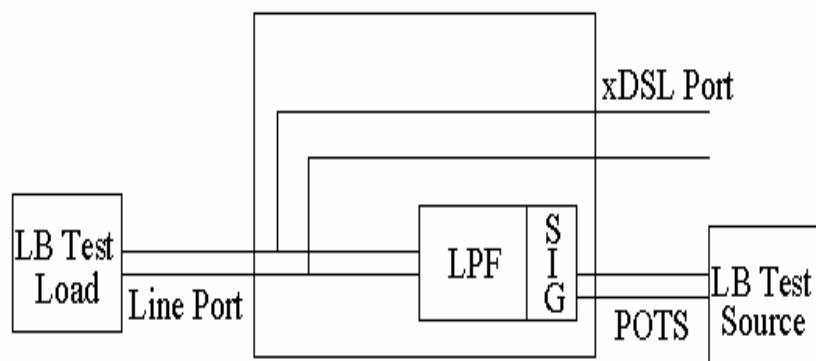


Figure III

#### 5.2.6 ADSL band attenuation

The insertion loss of the low-pass filter and ZHP-r measured as shown in Figure IV shall be greater than 55 dB from 26K to 2.2MHz.

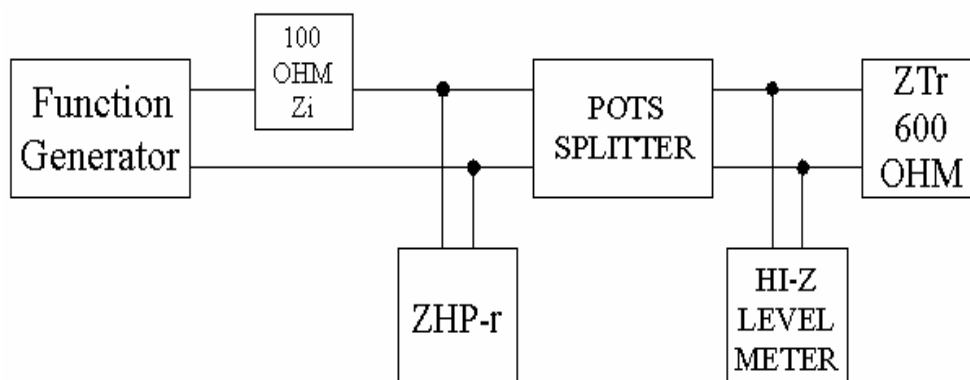


Figure IV



## 6 Environmental conditions:

Operating Temperature: 0 ~ 70°C

Storage Temperature: -25 ~ 75°C

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

## 7 Reference

ITU K.21	Resistibility of subscribers terminal to over-voltage and over-currents
ITU K.20	Resistibility of telecommunication switching equipment to over-voltages and over-currents.
ANSI T1.413	Network and customer installation interface
ITU-T G.992.5	Asymmetric Digital Subscriber Line (ADSL) transceivers – Extended bandwidth ADSL2 (ADSL2+)
ETS 300 001	Attachment to public switched telephone network