ADSL : Asymmetric Digital Subscriber Line

POTS SPLITTER

- **Introduction.**

The purpose of the loss-pass filter 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 voiceband service, the low-pass filters provide protection from ADSL signal which may impact through nonlinear or other effects remote devices (handset, fax, voiceband modem, etc) and central office operation. This filtering should be performed while maintaining the quality of the end-to-end - that is, between the POTS and PSTN interfaces of voiceband connection.

- **POTS Splitter Function Location**

Two POTS Splitter functions are defined. One for the Remote (R) end and one for the Central Office (CO) end. The function can be implemented either internally to the ATU modem or externally.
In the diagrams of the external CO POTS Splitters the capacitors are shown as 0.12uF. These capacitors are for DC blocking. They work in concert with the input to the modem's HPF function and are to be included in the input impedance calculation of the modem. This point is not available for inspection when the CO Splitter function is provided internally to the modem and therefore the capacitors do not appear explicitly. The DC blocking function is however provided in the normal HPF function.
In a case where some or all of the HPF function is incorporated in the external CO Splitter the 0.12uF capacitors do not appear since the DC blocking will be included in the HPf function. Incorporating some or all of the HPF in the CO POTS splitter is for further study.
- Frequencies Used in Testing
Two bands of frequencies are used for testing. Testing is not performed between 4-30 kHz but it is expected that the LPF will be well behaved in this area (i.e. the amplitude response is monotonically decreasing from 4 to 16 kHz)

* Voiceband frequencies are from 0-4 kHz
* ADSL Band frequencies are from 30-1104 kHz

All external POTS splitters with LPF or LPF/HPF included shall meet specifications between 30 and 1104 kHz.
Not all integral modem designs are intended to occupy the full spectrum between 30 and 1104 kHz. In each implementation, testing may be perform -ed only on the utilized frequency band. The band of frequencies used in testing each modem shall be explicitly stated by the vendor in literature and in each test report.

- **C/O splitter (central office)**

It is, based on the standardization of ITU-T G.992.1, separating the DSL and POTS frequencies is allow to be simultaneous a voice channel and high-speed DSL data on the same twisted pair free from the voice and data signals interfering with mutually.
The simultaneous access to ADSL(Adaptive Digital Subscriber Line) or MVL(Multiple Virtual Lines) and POTS(Plain Old Telephone Service) requires the installation of a POTS splitter in the central office.
The CO POTS splitter can function separating the voice and data signal transmitted together and sending DSL data to the DSLAM.

- **R/T splitter (remote side**): **CPE**

It is, based on the standardization of TI.413-1998, designed to be used at the customer premises demarcation point and provide separation of the DSL signals from the voiceband at a single location.

The endpoint of DSL and telephone can be working simultaneously over the same pair of copper wire when a POTS splitter is using at both ends of the local loop in the customer premises. Copper pairs go to the customer premises from the central office .The function can be implemented either internally to the to the ATU modem or externally.

- In-Line Filter (micro filter)

It is, based on ITU-T G.992.2, a device for In-Line connection between the network and a voice grade terminal used to protect high frequencies from entering the terminal and to protect the high frequency equipment from impedance charges of the voice grade terminal.

Splitterless deployment of Digital Subscriber Line(DSL) requires the shared use of in-premises network wiring by POTS and broadband xDSL devices. In many situations, there may be interactions that can degrade POTS and broadband performance like as the following :

☆ Reduction of the desired DSL signal amplitude due to low off-hook and/or on-hook POTS device impedance within the DSL band.

☆Nonlinear impedance of POTS devices causing translation ofn the DSL signal energy to undesired frequency bands though intermodulation distortion (IMD) products.

☆Ingress of DSL signals into POTS devices causing audible POTS interference through nonlinear interactions inside the POTS device.

☆DSL band impedance differences when POTS devices are on-hook or off-hook.

☆Un-terminated wire stubs can cause deep nulls in the in-premises Phoneline network frequency band. These nulls can impair the operation on an inpremises Phoneline network.

Various digital data over voice system require the signal isolation of the voice grade premises equipment from the telephone inside wiring in the premises. Premises wiring is being used for access to broadband networks, connection of high-speed data within the premises and access to services such as the internet.

Standardization if the In-Line filter benefits the users and providers of data services and voice services by aiding the interoperation and performance of these services.

The differences between an In-Line filter and a POTS splitter are defined by the placement of the filter more than the function.

The DSL signals are contained on separate wiring from the POTS splitter into the premises, but In-Line filter is designed to be placed "in-line" with each voice grade terminal between the wall and the equipment, additionally distributed at each voice grade terminal.

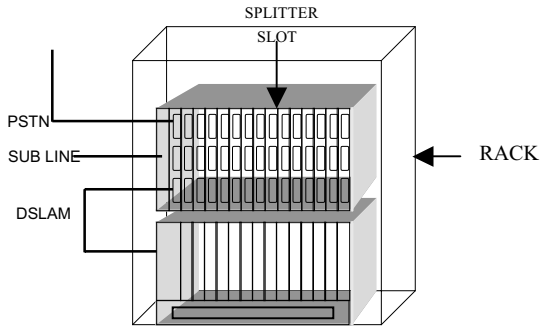
The In-Line filter is used to protect voiceband premises equipment from the high frequencies of digital data over voice services in the 25KHz to 10MHz range. POTS filter allows the DSL voice traffic to stay together on the In-house wiring and travel to every phone jack in the resistance.

In-Line filter is using for with the following services ;

- POTS & Voiceband data	0-4KHz
- ADSL	25 to 1104KHz
- RDSL	25 to 1104KHz
- In-premises Phoneline Networks	5.5MHz to 10 MHz

ADSL SPLITTER & INLINE FILTER INSTALLATION

POTS Splitter (CO Application)



CO Splitter Installation Procedure ;

1.Finding out the cables you need.

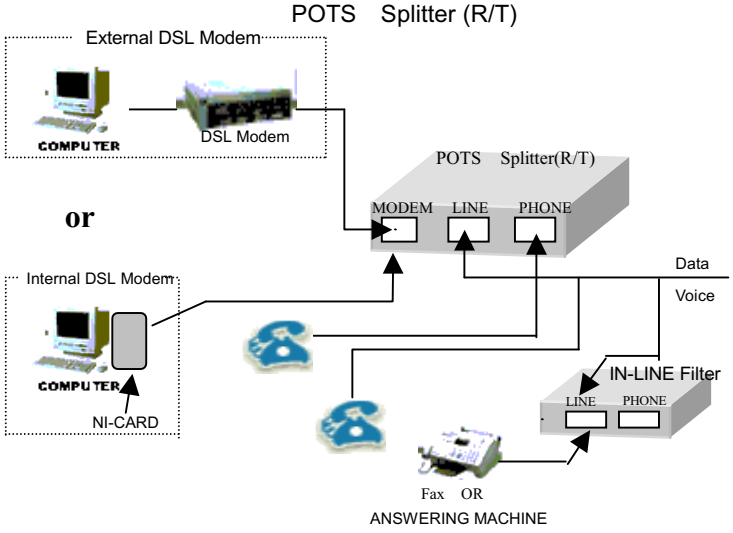
2.Getting the installation location and checking the package contents.

3.Installing the POTS splitter rack.

4.Mounting the POTS splitter card(s) into the rack.

5.Connecting the cable from the POTS splitter card connectors to the DSLAM, sub line, and PSTN switch.

POTS Splitter (R/T)



POTS Splitter Installation Procedure ;

@Pots R/T splitter

1. Plug the end of cable into the pots splitter jack labeled PHONE. Plug the other end into the jack of telephone.

2. Plug the end of cable into the pots splitter jack labeled MODEM. Plug the other end into the jack of DSL modem.

3. Plug the end of cable into the line from local loop.

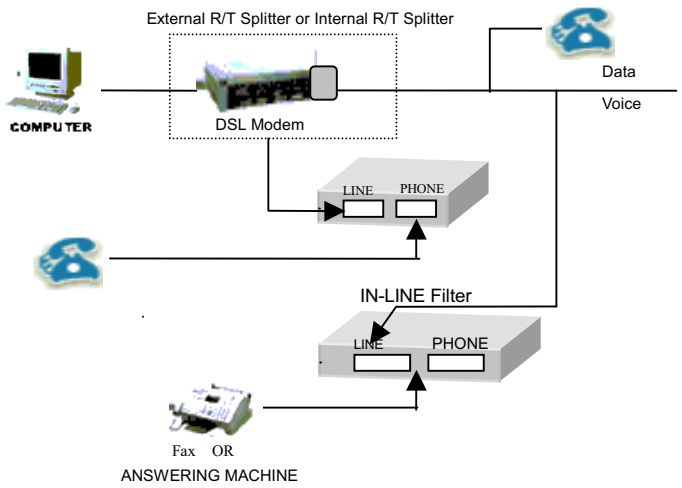
@In case of installation for additional devices

(You need a provision of In-Line filter)

1. Plug the end of cable into the In-Line filter jack labeled LINE. Plug the other end into the jack of line from local loop.

2. Plug the end of cable into the In-Line filter jack labeled PHONE. Plug the other end into the jack of fax, answering machine or the other devices.

POTS Splitter(In-Line Filter)



In-Line Filter(micro filter) Installation Procedure ;

* It is available for both of external and internal R/T splitters.

1.Plug the end of cable into the In-Line filter jack labeled PHONE. Plug the other end into the jack of telephone.

2.Plug the end of cable into the In-Line filter jack labeled LINE. Plug the other end into the jack of DSL modem(or inside the computer).

@ In case of installation for additional devices

(Supply the In-Line filter added)

1. Plug the end of cable into the In-Line filter jack labeled PHONE. Plug the other end into the jack of fax, answering machine or the other devices.

2. Plug the end of cable into the In-Line jack labeled LINE. Plug the other end into the line from local loop.