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| <b>Case study #</b>      | 1.8                                                                                                                          |
| <b>Title</b>             | Medium-wave AM radio interference, PMR (private mobile radio) radio interference                                             |
| <b>Type of trouble</b>   | Acoustic interference due to demodulation of the RF at semiconductor junctions within the telephone.                         |
| <b>Source of trouble</b> | Either a local AM radio transmitter in the MW band, or a private mobile radio transmitter, e.g. from a taxi service.         |
| <b>System affected</b>   | Customer's equipment.                                                                                                        |
| <b>Location</b>          | Radio station, outdoors.                                                                                                     |
| <b>Keywords</b>          | Immunity, emission LF broadcasting, HF broadcasting, amateur radio, citizen band transceiver, common mode chokes, filtering. |
| <b>Version date</b>      | 2004-01-01                                                                                                                   |

#### System configuration

A normal PSTN telephone line, generally with (even a small amount, 50-100 m) aerial cable entering the customer premises. (All underground routes tend not to suffer from this type of interference.) Proximity to radio transmitting sites, such as the offices of taxi companies, citizen's band radio or MW AM stations make telecommunications installations particularly vulnerable. The higher the power, the greater the influencing distance. Not all customers on a road are necessarily affected as the coupling depends both on the orientation of the cable with respect to the transmitter and on the equipment the customer is using. Some terminal equipment is more susceptible than others to RF imbalance effects.

#### Search techniques

The detection of such problems is fairly simple: the telephone engineer simply listens to the line and recognizes the noise originates in a radio transmission.

#### Mitigation method/Results/Conclusion

Generally, if the transmitter is being used in agreement with its transmission licence, there is nothing that can be done to solve the problem at source.

The fitting of small common mode chokes to the incoming access network cable will normally solve the problem. It is important to mitigate the interference as soon as possible, i.e., just before the network termination, such that all cables within the premises are protected from the interference by one filter. There are currently many thousands of these filters fitted to customers' lines working successfully.

Any filter used should be suitable for the transmission of DSL services. If they are not correctly designed, they will introduce too much loss for such services.

#### References

Rec. ITU-T K.37; Annexes A and B.