ROAD TUNNELS
Road tunnels vary widely in their construction and layout so it is necessary to have a flexible approach to the design of systems to provide communications within them. Axell Wireless provides systems using standard equipment uniquely configured to provide the required quality of coverage for each individual tunnel. Axell Wireless has the proven expertise and experience to design and implement the optimum solution for various types of road tunnels and communication systems required.

One of the simplest RF coverage system solutions is for a short tunnel. In this case an existing service in the area outside the tunnel is to be extended to provide seamless coverage inside. A repeater provides coverage extension into the tunnel without the need for any modifications to the existing system. Signals from the existing service are taken ‘off air’ using a repeater connected to an antenna outside the tunnel. The repeater amplifies the off air signal to a level suitable for retransmission through the tunnel using either directional antennas, or a suitable radiating cable.

For longer road tunnels, we offer a reliable solution with fibre fed repeaters designed specifically with tunnel coverage in mind. The repeaters are connected to the base stations or off-air repeaters via an optical master unit which converts the RF signal from the base station to an optical signal which is then transmitted to the repeater via a fibre-optic cable. The repeaters can be installed up to 20 km away from the base station.

PRODUCT RANGE AVAILABLE

With over 30 years of experience in RF systems Axell Wireless has built an unparalleled range of products capable of providing tunnel coverage. Road tunnel systems are available for technologies including:

- AM Radio
- FM Radio
- DAB Radio
- UMTS
- VHF Low Band (4m)
- VHF High Band (2m)
- UHF (70cm)
- DVB-H
- TETRA
- GSM900
- GSM1800
- GSM1900

Through careful selection of radiating cable many of these systems carry several of these technologies simultaneously meaning less cable installation, more efficient planning and ease of maintenance as all alarm reporting is on one system. As a public safety measure an Audio Break-In facility can be included for AM, FM & DAB to enable emergency messages to interrupt the normal radio transmission. Specialist RF combining techniques, designed and manufactured by Axell Wireless, are used to combine the signals to a common port for connection to the radiating cable or antennas.
Multi Band Solutions
Axell Wireless is able to combine the above technologies to provide dedicated systems to reduce overall installation costs for our customers. Combinations of the following bands is possible: VHF low Band (4m), VHF High Band (2m), UHF (70cm), Tetra, GSM900, GSM1800 & UMTS all on the same leaky feeder cable. This means less cable installation, less planning and easier to maintain as all alarm reporting is on one system.

The MBF (Multi-Band Fibre fed) repeater provides GSM900, GSM 1800, UMTS and DVB-H coverage from one and the same unit, thus minimising installation, power supply and maintenance costs. The unit makes use of convection cooling which further increases the MTBF and reliability of the system as a whole.

REFERENCES

- Spain/France, Somport Tunnel 7 km Road Tunnel VHF/UHF F/O Amplifier System
- England, Blackwall Tunnel 3 km Road Tunnel VHF/UHF Combiners and Amplifier Systems
- England, Limehouse Tunnel 1.5 km Road Tunnel VHF/UHF & GSM900/GSM1800
- Norway, E18 Tunnels 7 km Road Tunnels VHF/UHF Combiners and F/O Amplifier Systems
- Road Tunnels - Belgium 30 km Road Tunnels VHF/UHF/GSM900 and 1800 Amplifier Systems
- Switzerland, Gothard Tunnel 17 km Road Tunnel VHF/UHF Combiner and F/O Amplifier Systems
- Switzerland, Milchbuck Tunnel 4 km Road Tunnel VHF/UHF Combiner and F/O Amplifier Systems
- France, French Road Tunnel 7 km Road Tunnel BTS and Fibre Optic Repeaters, TETRA
- Greece, Greek Road Tunnels TETRA, VHF
- Norway Road Tunnels FM/VHF