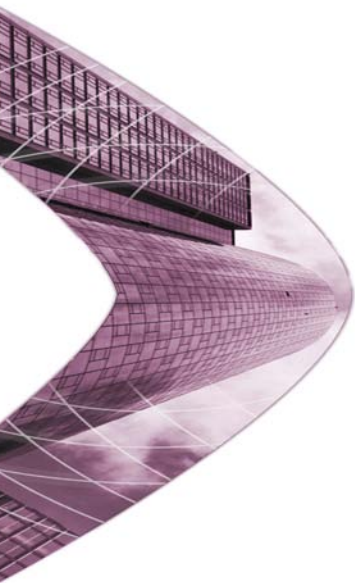


Telecomunicații pentru asigurarea unui transport pe șină modern

5 mai 2009
Hotel Pullman - Bucuresti



endless possibilities . . .

- AFL & Avitec merged in August 2007
- Largest European manufacturer of coverage systems
- 30 years of history in the field of providing wireless coverage solutions
- A global base of customers
- 300 employees worldwide
- HQ in UK and main R&D centre in Sweden



seamless coverage...

High in quality, dynamic in leadership

- First RF repeater in the world
- First EDGE repeater in the world
- First TETRA repeater in the world
- First GSM-R repeater project in the world

Axell Wireless provides products and solutions for technologies ranging from FM TO 3G and beyond.

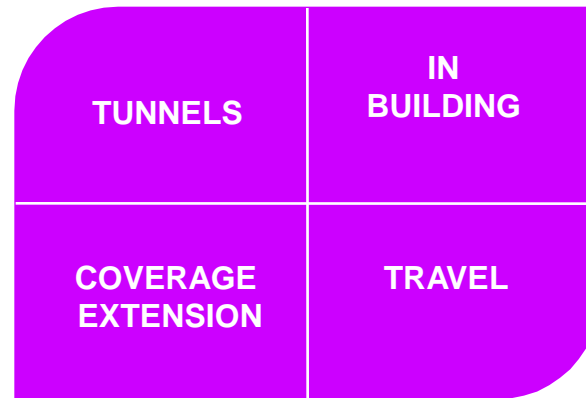


CUSTOM DESIGNED PRODUCTS

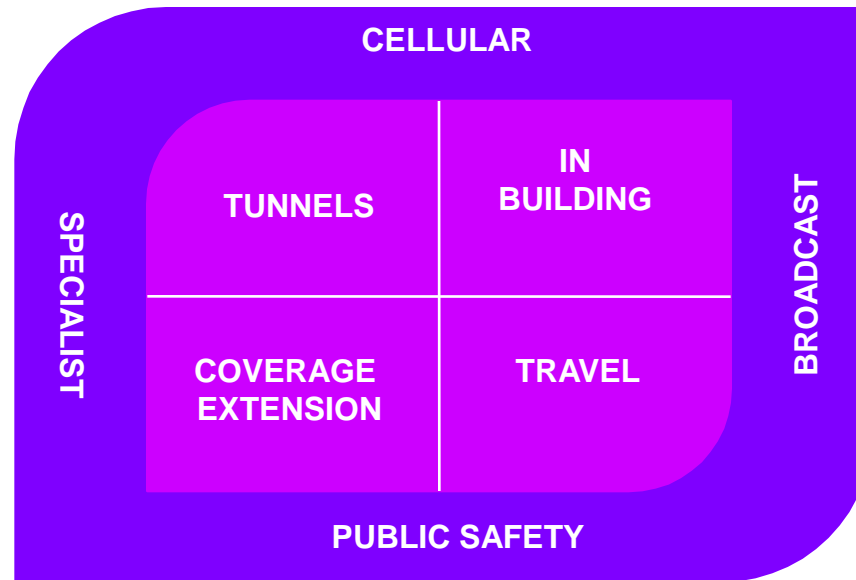
STANDARD PRODUCTS



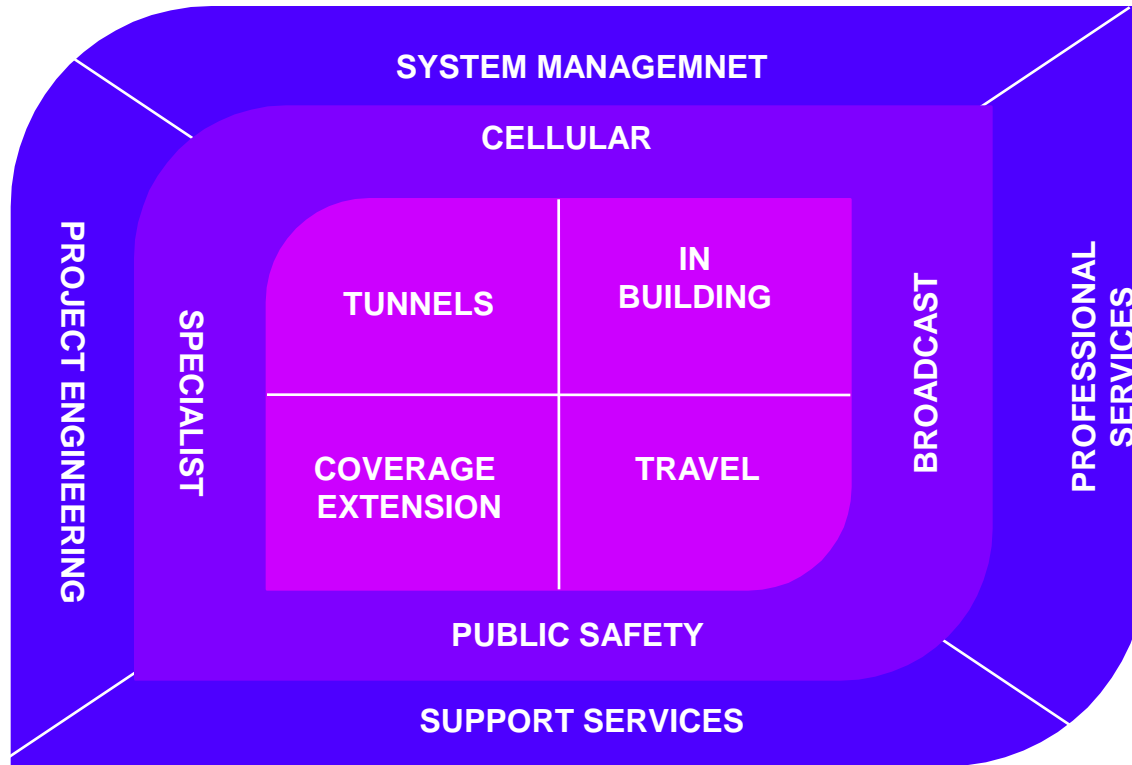
Our Solutions Model



Our Solutions Model

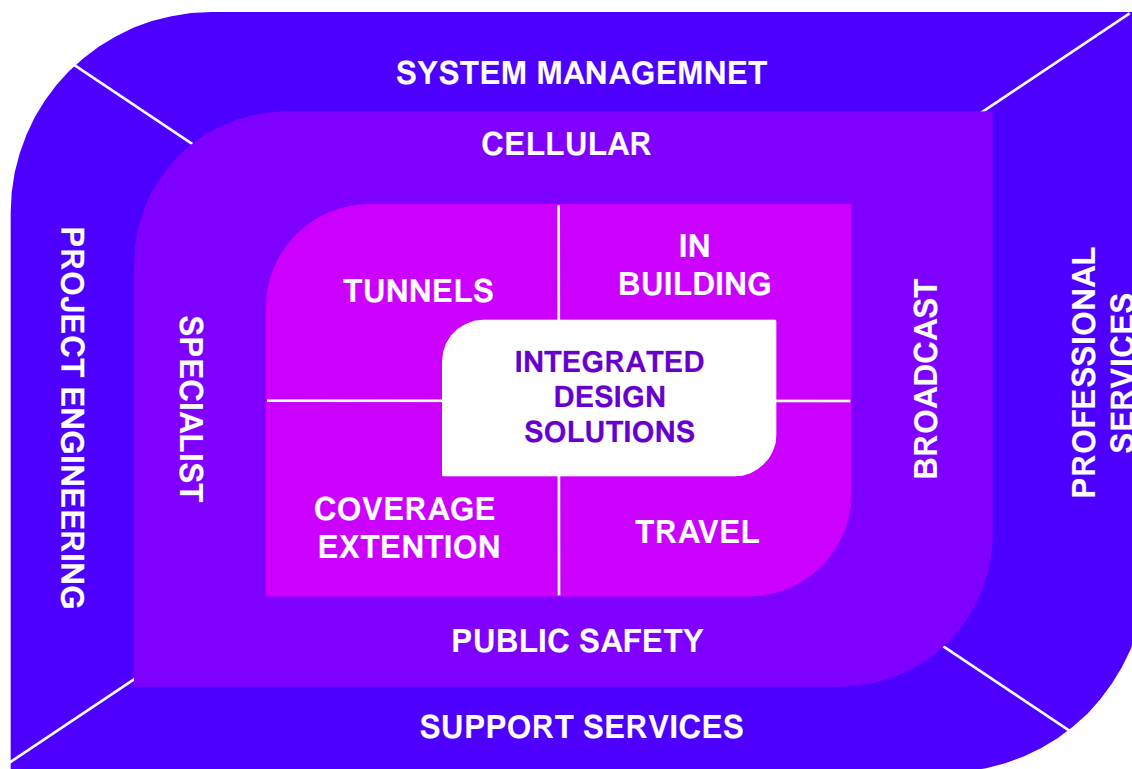


Our Solutions Model



Endless, Seamless Wireless For All Major Coverage Applications

Our Solutions Model



Endless, Seamless Wireless For All Major Coverage Applications
Both From Standard & Customised Solutions

Tunnel references



Railways (GSM-R/TETRA/GSM/UMTS)

- Channel Tunnel Rail Link
- Swedish Railway tunnels
- Norwegian Railway tunnels
- UK Railway tunnels
- Czech Railway tunnels
- Spanish Railway tunnels

Road Tunnels (TETRA/GSM/UMTS/UHF)

- Spain
- France
- Greece
- Portugal
- UK
- Sweden
- Norway
- Italy
- Austria
- Belgium
- Iceland
- Ireland

Railway requirements

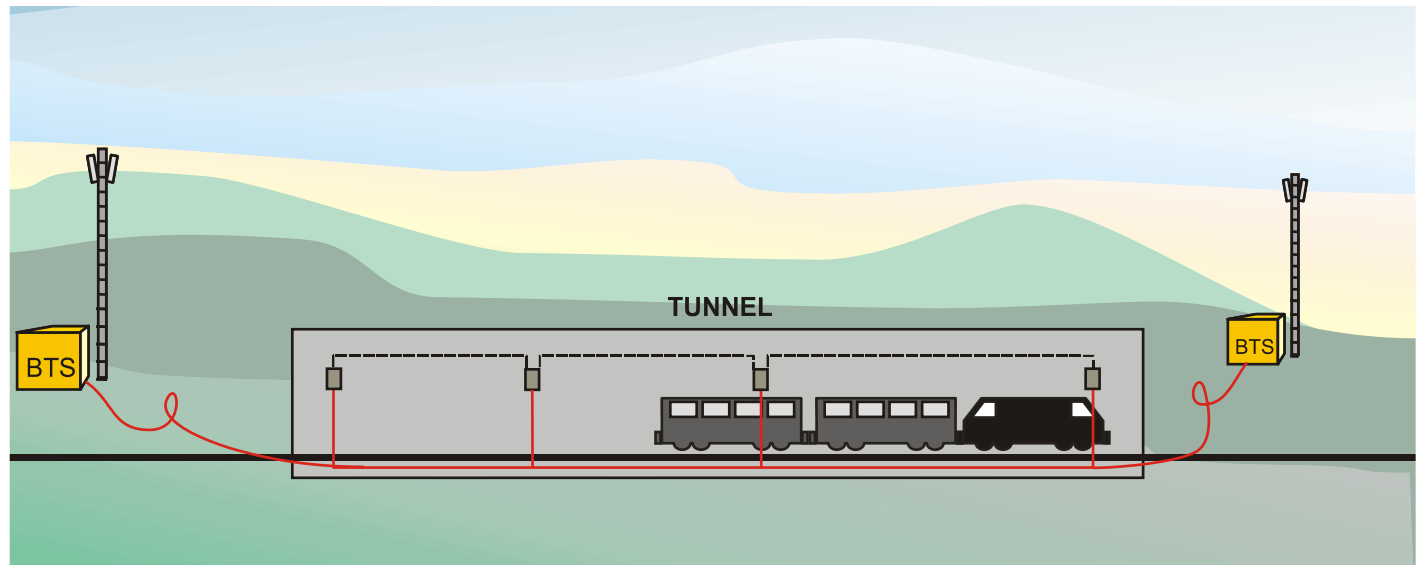
- First GSM-R rollouts
- Sweden (Siemens)
- Germany (Nortel)

Railway requirements

Why GSM-R?

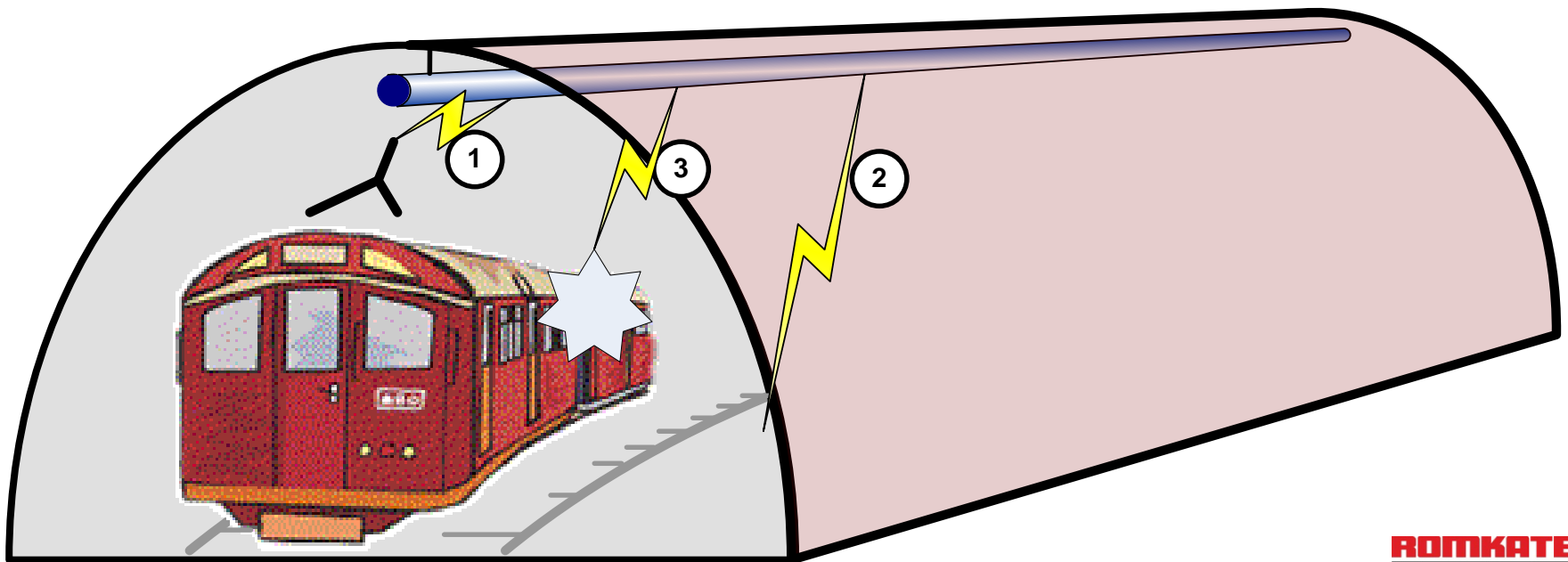
- Increased train speed
- Border crossing trains
- International Roaming
- Shunting radio
- Track maintenance radio
- Passanger information

SYSTEM OVERVIEW FIBEROPTIC FED SYSTEM

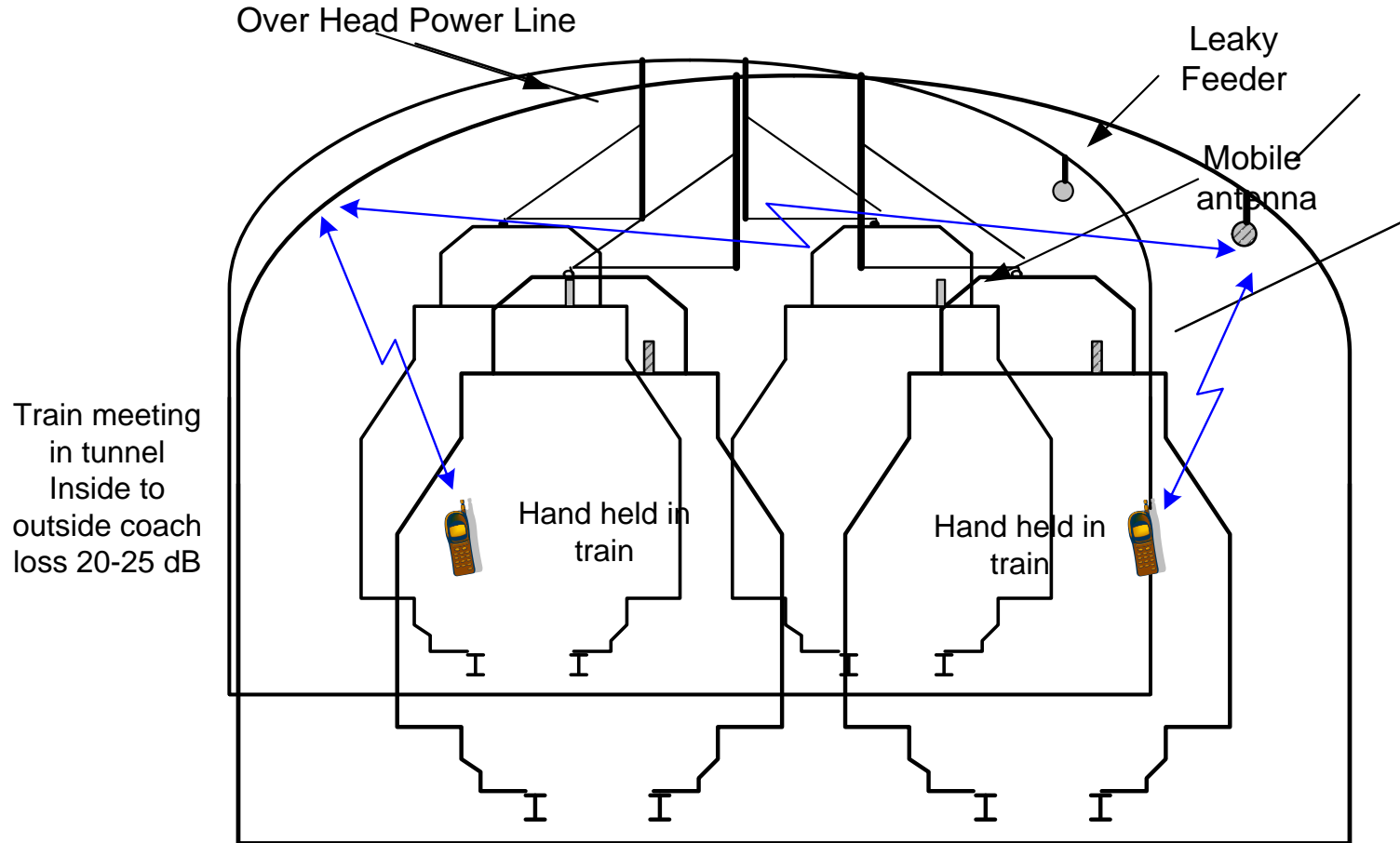


Propagation Loss from Cable to terminal

1. Driver communication via roof mount antenna
2. Emergency service coverage at tunnel level
3. In train communication



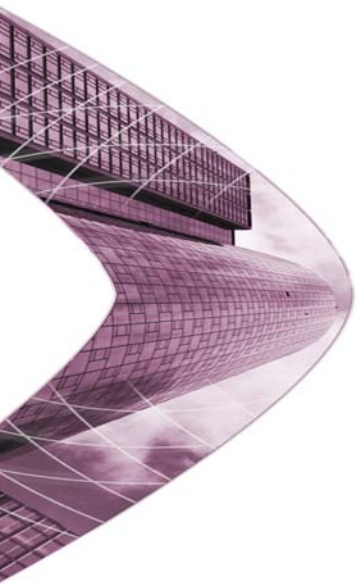
Design considerations – leaky cable



Fiber fed GSM-R repeater solution

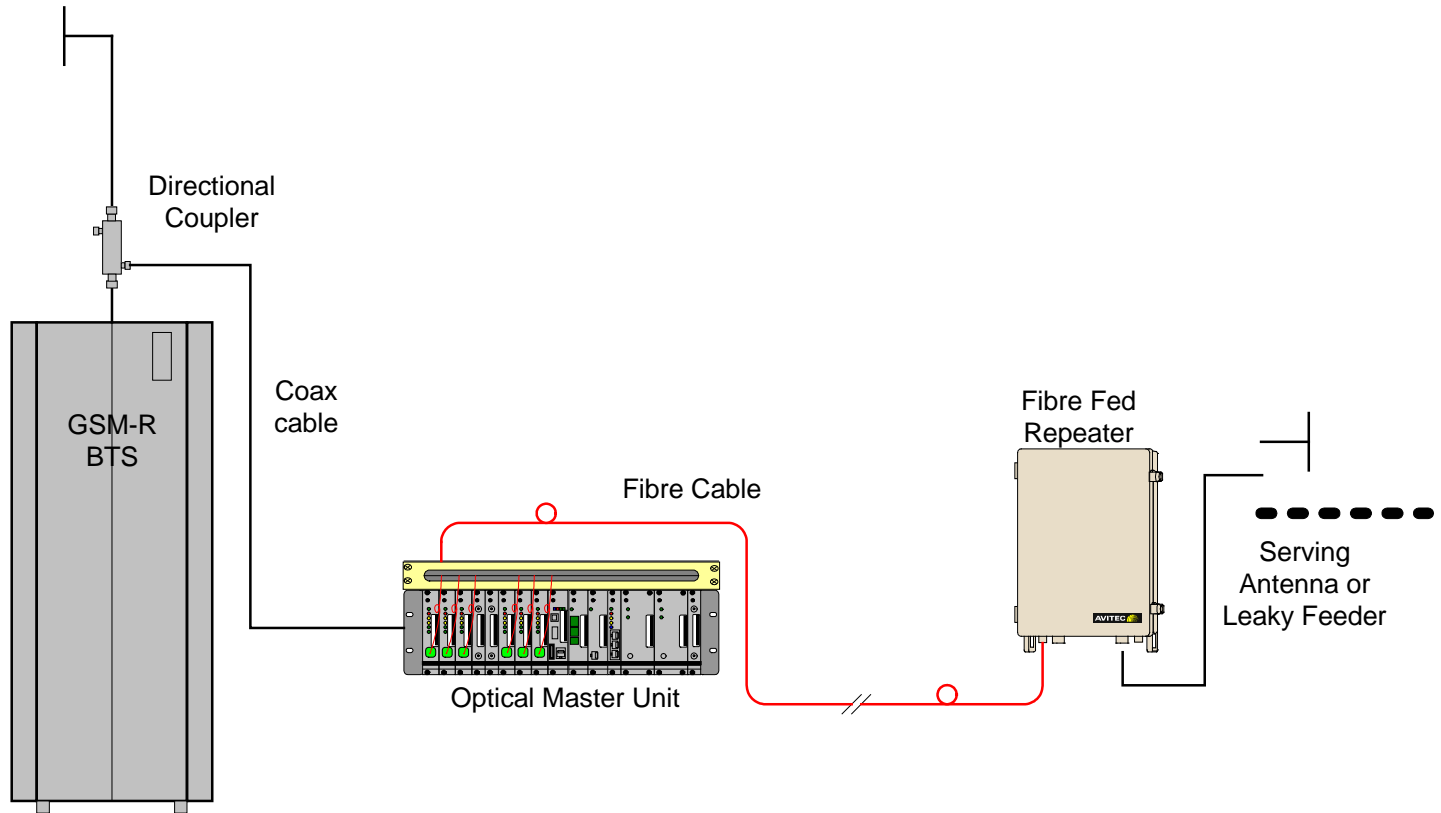
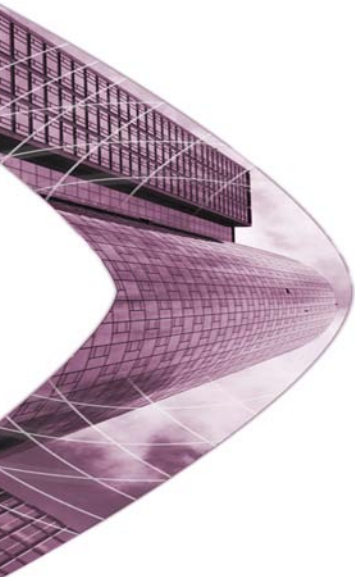
CSF922-R - Channel Selective Fibre optic fed GSM-R Repeater

OMU - Optical Master Unit



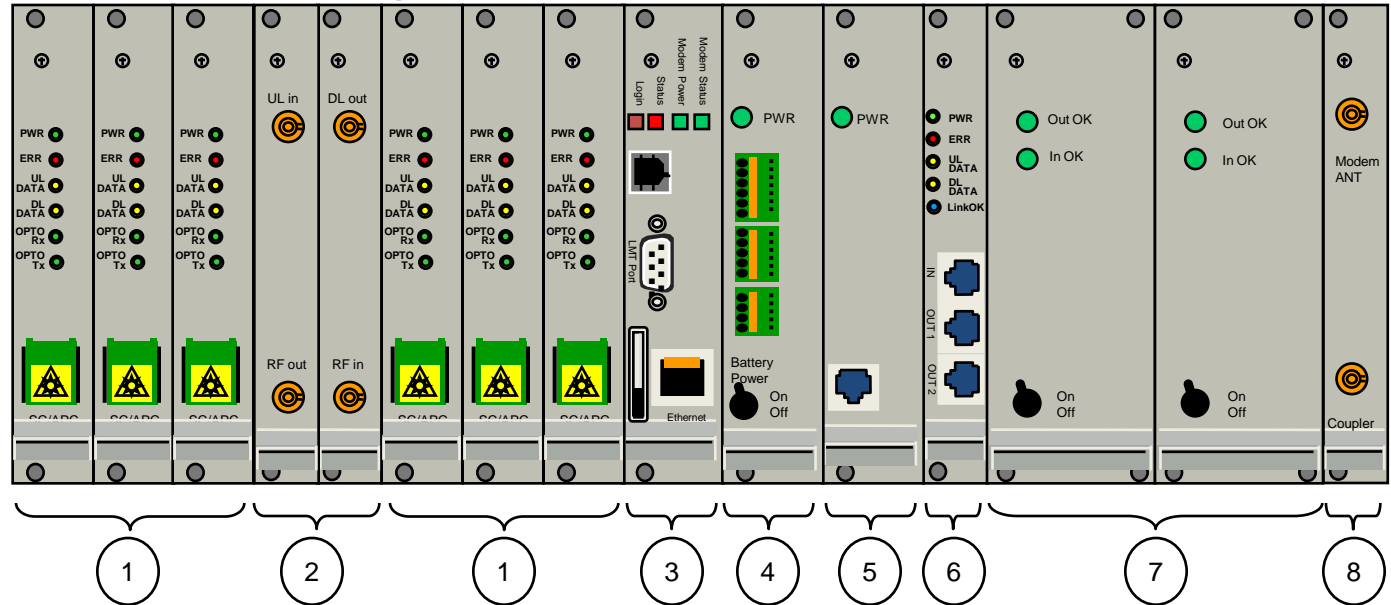
Development of products Reliability easy maintenance

SYSTEM OVERVIEW



SYSTEM OVERVIEW

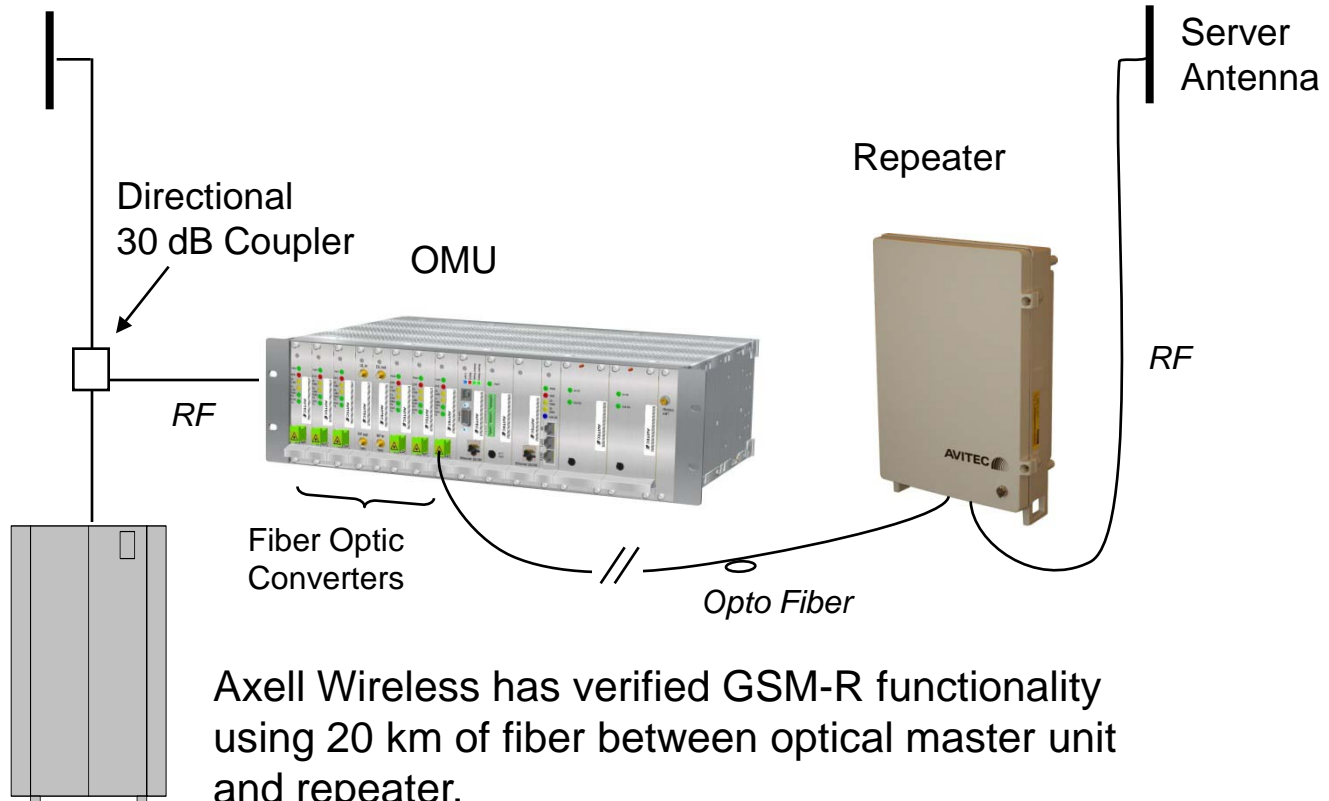
The Optical Master Unit, OMU



1. Fibre Optic Converters (1 to 6 pcs)
2. RF Access Modules
3. Control Module
4. External Alarm and Battery Module
5. Modem Unit
6. Rack Communication Board
7. Power Supply A and B (B is optional)
8. Modem Antenna Connection

System Overview

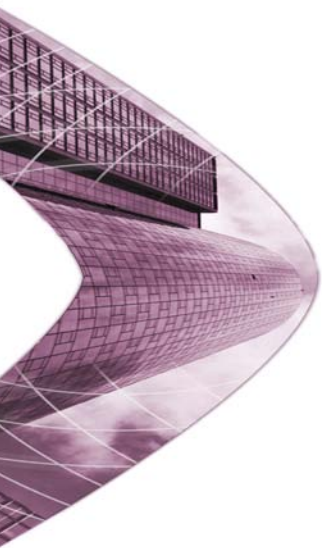
Optical Master Unit and Fiber fed Repeaters



Axell Wireless has verified GSM-R functionality using 20 km of fiber between optical master unit and repeater.

Automatic optical gain setting and repetitive checking.

The OnBoard Repeater



Reasons for Investment

- High demands from passengers
- Higher signal levels and better signal quality in car saves batteries and improves communication
- Compensation for attenuation needed

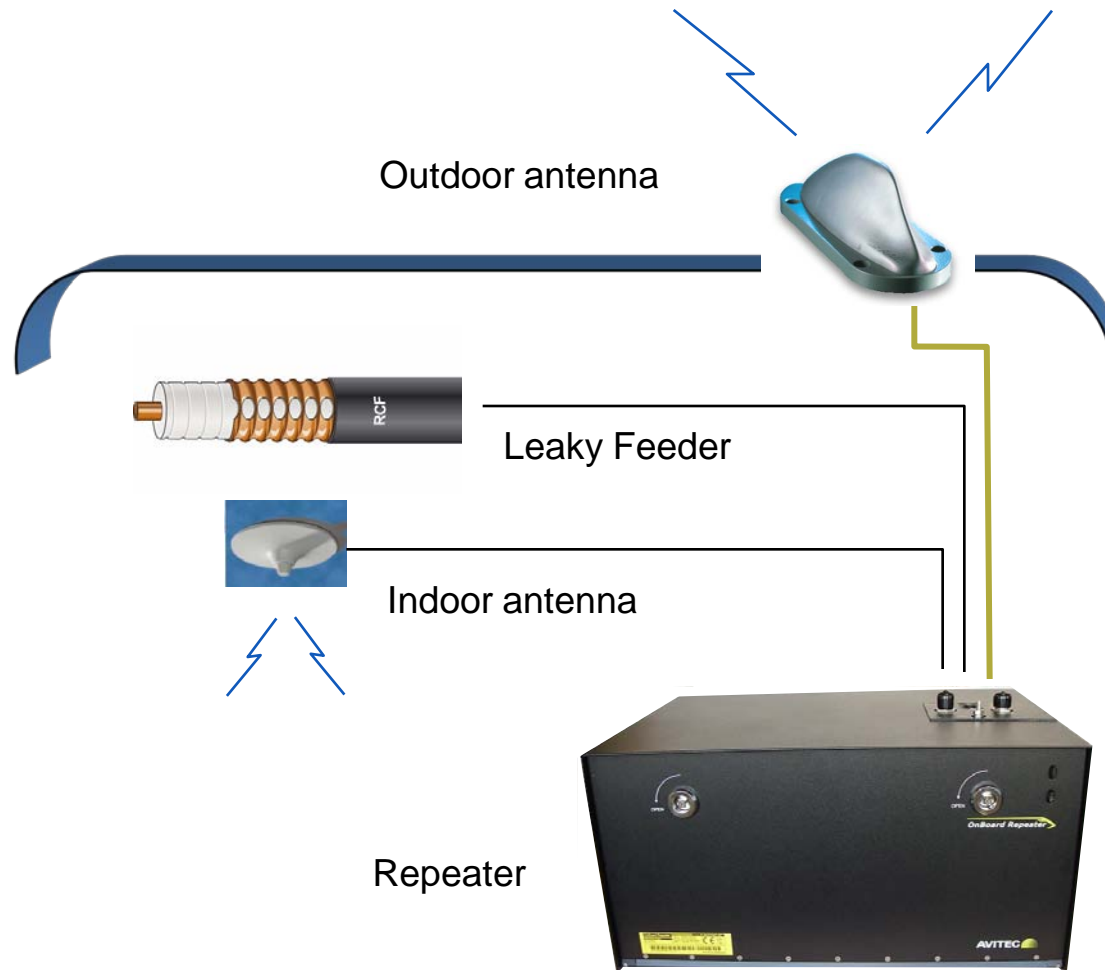
OnBoard Coverage Solution

- Repeater designed for transportation vehicles such as trains, ferries and buses
- Eliminates the shielding effect of walls and windows
- Band selective RF modules allows for operation on moving vehicles

Modular and Flexible

- The modular structure offers multi band coverage. The repeater can be configured to fit the coverage need. Multi operator cooperation is supported
- The repeater is light and small
- Installation includes one donor antenna and a leaky cable, alternatively one or two server antennas
- The repeater is inexpensive to maintain. There is no need for regular maintenance. Faulty modules can be easily swapped.
- There is a choice of local or remote supervision

Coverage Installation



X2000 (X2)



X2000



1st class carriage in X2 train



The repeater is mounted on a baggage shelf.

All cabling comes down from the roof above the repeater.

The repeater is covered by specifically designed cover.

X40

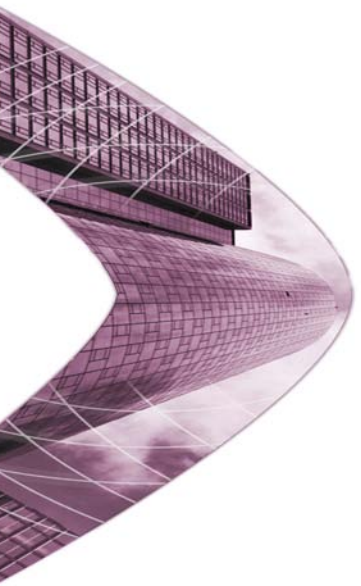


Installation in X40 Train



Conclusions

- Major player with significant experience in providing GSM-R repeater solutions
- Historical relationships with major turn-key suppliers/integrators
- Axell Wireless has the expertise and experience to support these major players in regard to design and project management.
- 20 km fibre link verified
- Development of products Reliability easy maintenance



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Va multumesc pentru atentie,