GSMA



MNOs and Private Networks

Vivo and Vale S.A. combine on LTE solution for mining

Who:

Vivo (Telefonica Brazil) and Vale S.A.

What:

Development of private 4G LTE network for Vale's mining operations in Brazil that will connect autonomous mining rigs and site vehicles to enhance efficiency and safety of operations. Development of multiple networks to cover different locations. Provision of MBB connectivity provided throughout the local area for company functions and to local communities.

Spectrum:

Licensed spectrum in 2.1 GHz, 2.3 GHz and 700 MHz is being used to provide LTE connectivity, narrowband IoT and low-power CAT M technology. The spectrum is implemented using four dedicated base stations.

Client requirement:

Vale S.A. required a new network to deliver connectivity for autonomous equipment operations at its mining facilities. The use of autonomous vehicles enhances efficiency but also has a safety aspect by removing employees from high-risk locations. The deal between Vale and Vivo marked the first of its kind in Brazil. The network is designed to optimise the autonomous equipment, requiring data transfer over wide areas. Autonomous drilling rigs are already operational with autonomous trucks to begin operating soon without drivers in the cabin. On top of the autonomous vehicle applications, the network can be used for monitoring including for dam monitoring instruments. LTE mobile broadband will be offered on the sites both privately to staff and publicly to the local community in these underserved areas.

The project will initially be rolled out in one mine in Carajás, Brazil, but will be rolled out to other locations with expanded needs. The main features supported by the network will be:

- Autonomous transport – reduced risks and increased efficiency.
- Autonomous drilling – reduced risk exposure and enhanced precision.
- Predictive maintenance in mine machines (smart sensors) – increased efficiency, risk reduction and cost reduction
- Public 4G network coverage (700km2), within Vale operations but also supporting connectivity in local communities and enabling digital inclusion

The project will deliver connectivity in six different municipalities in Brazil.

GSMA

Solution:

The project consists of providing Vale with end-to-end LTE connectivity access, compatible with all network elements and the IP solution at Vale's industrial facilities in the mining areas. The solution will cover the critical mining infrastructure and non-critical traffic to transmit Vale's services. Traffic can be executed directly from end-point devices to LTE eNodeBs, without the need to deploy any intermediate elements between them.

Vivo's solution provided the reliability, security and flexibity that were required by Vale. Its flexibility allows use of the network for different purposes other than the vehicle connectivity, allowing data, voice and video connectivity also. A legacy WiMAX network will be retired by the new functionality.

The autonomous rigs and vehicles bring gains in operational efficiency and sustainability by increasing the useful life of equipment by around 15% and reducing fuel consumption and maintenance costs by approximately 10%.

The solution includes dedicated RAN and core networks, tailored to meet Vale's technical requirements. The deal includes delivery of IP routing, the ecosystem of devices/CPEs, the network management system and value-added services.

Solution elements

- Radio access network (RAN)
- Dedicated core network and IP routing
- CPE device ecosystem
- Network management system (NMS);
- Value-added services (VAS)
- PTT / push to talk and PTV/push to video communications
- Installation, operation, monitoring and maintenance services, including spare parts.

© GSMA October 2023

VALE vivo empresas