

CONNECTIVITY

# CONNECT RURAL GSM NETWORKS FAST AND COST-EFFECTIVELY



DATA

# TAILORED BACKHAUL SOLUTIONS TO CONNECT MOBILE NETWORKS IN REMOTE LOCATIONS

**MOBILE COMMUNICATIONS ARE DRAMATICALLY EXPANDING IN SUB-SAHARAN AFRICA. IN REMOTE RURAL AREAS, HOWEVER, WHERE OVER HALF THE POPULATION LIVES, THEY REMAIN UNDER-DEVELOPED.**

In extensive geographical regions, terrestrial infrastructure requires heavy investment over several years to link unconnected communities. This is not financially realistic for low ARPU sites.

After years of double-digit growth, mobile operators are starting to face a major slowdown in revenues as urban and suburban markets reach saturation. At the same time, however, there is increasing pressure from government bodies to include national network coverage in GSM licences, and ensure universal service coverage to entire populations.

As a result, mobile network operators must now provide almost 100% coverage of countries, expanding both voice and data capabilities into previously unconnected rural areas. Sites must be self-sufficient and energy-independent.

With a lack of terrestrial infrastructure, this puts network operators under incredible pressure to deliver the widest possible reach.

## RURAL CONNECTIVITY GENERATES REVENUES

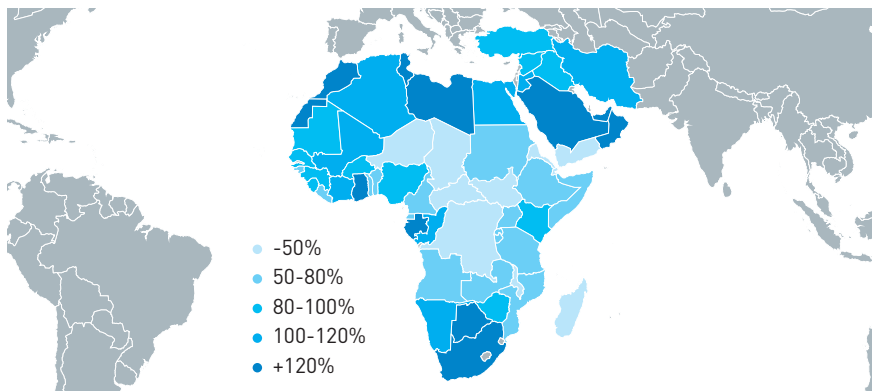
Whilst most African cities enjoy 3G and 4G connectivity, mobile coverage does not exist in many rural areas. There are also huge disparities in mobile density per country, with the number of SIM cards per capita ranging from 37% in Democratic Republic of Congo to 170% in South Africa.<sup>(1)</sup>

The population of Africa and the Middle East is growing fast, and

expected to reach more than 1.5 billion people by 2021<sup>(1)</sup>. This young population, in 2016 half the population were under the age of 20, are technology-friendly, and with the increasing availability of smartphones which are affordable for a large percentage of the population, and innovative solutions such as mobile payments, the demand for mobile connectivity continues to increase.

Network deployment is often considered uneconomical in areas with lower population density, due to low ARPU and the prohibitive costs of macro site infrastructure and terrestrial backhaul connectivity.

## MOBILE DENSITY IN AFRICA AND THE MIDDLE EAST IN 2016<sup>(1)</sup>



<sup>1</sup>Idate 2017  
Digiworld Yearbook for Africa and the Middle East



# DATA

## CONNECTING RURAL COMMUNITIES

With micro site infrastructure, however, where satellite backhauling enables extensive geographic coverage, and solar energy powers sites, deployment of rural communications networks is very viable.

Reducing the digital divide provides opportunities for mobile network operators, governments and rural populations to develop services, revenues and structure society. Furthering economic development, mobile connectivity enables basic day-to-day requirements for faster and easier communication and trade, and facilitates electronic payments. It also brings health services, education, government services and entertainment to benefit entire populations within countries.

### BACKHAULING RURAL GSM NETWORKS VIA SATELLITE

**Satellites are flexible, scalable, cost-effective and offer unlimited reach**

Their wide, cross-regional coverage areas enable all the sites of a network to be connected within the same satellite footprint.

Unlike fibre, which only allows dedicated point-to-point links, satellite enables shared dynamic point-to-multipoint links ensuring bandwidth usage is optimised. It can be shared amongst all sites depending on requirements, and increased or decreased any time on demand.

These flexible networks enable micro sites to be deployed rapidly as network and business demands evolve, for a seamlessly optimised service.

“ **Shared dynamic point-to-multipoint links optimise bandwidth usage** ”

Remote sites which are not sufficiently profitable can be redeployed to a new location. And those which are very profitable can be upgraded to macro sites with terrestrial backhaul, and the micro site infrastructure quickly and cost-effectively redeployed.

### EUTELSAT'S RURAL CONNECTIVITY SOLUTIONS

**Enhanced turnkey solutions via satellite extend 2G, 3G and 4G connectivity to rural areas**

With comprehensive, turnkey solutions, Eutelsat combines extensive satellite coverage with expertise in deploying telecom infrastructure, including building, providing electrical power and maintaining towers for mobile telephony networks.

Covering the entire communication chain, irrespective of the location of the various sites, the fully managed solution includes the satellite link, management of the satellite network, and roll-out and maintenance of the micro remote site - both passive and active infrastructures, including satellite backhaul.

Optimised for rural connectivity, the solution has been developed in partnership with a well-established GSM infrastructure integrator in Africa and regional teleport operators, giving you immediate access to our satellites from almost any geographic location worldwide.

### THE BENEFIT FOR NETWORK OPERATORS

**Extending services to communities beyond the reach of terrestrial networks**

Ensuring connectivity for rural communities, satellites provide universal coverage, enabling network operators to extend their service area regardless of the availability and quality of the terrestrial infrastructure.

Delivering a consistent high-quality service across a wide region, operators can meet universal service obligations to connect entire populations.

“ **A consistent high-quality service across wide regions enables operators to meet universal service obligations** ”

The low maintenance, energy-independent solutions are solar powered and environmentally-friendly, and are designed for 72 hours autonomy at remote stations. This eliminates the cost and logistics of refuelling equipment and the associated security issues.

With Eutelsat's turnkey solution, mobile network operators can focus on their core business, managing the traffic on their network, while Eutelsat and partners manage the rural backhaul network.

# DATA FULLY-MANAGED TURNKEY SOLUTION

## CONNECTING RURAL NETWORKS

Rural GSM networks include low-traffic IP-Base Stations along with low-cost mast, fencing and solar panel, for total autonomy in terms of energy and very low Capex.

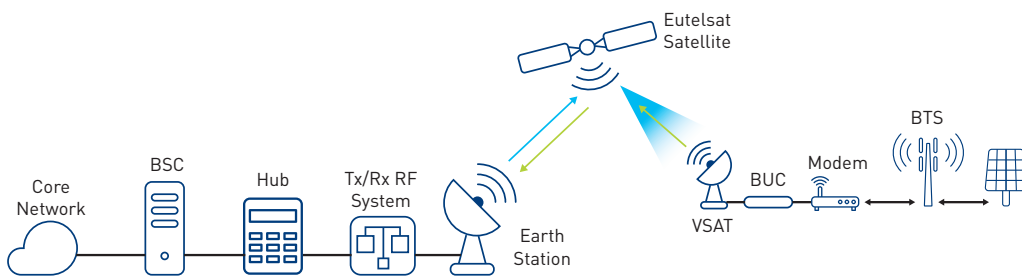
For example, in 2G networks, the Base Station Controller is connected to the remote Base Transceiver Stations by satellite

Rural IP Base Stations with low power consumption use solar energy to minimize remote site costs.

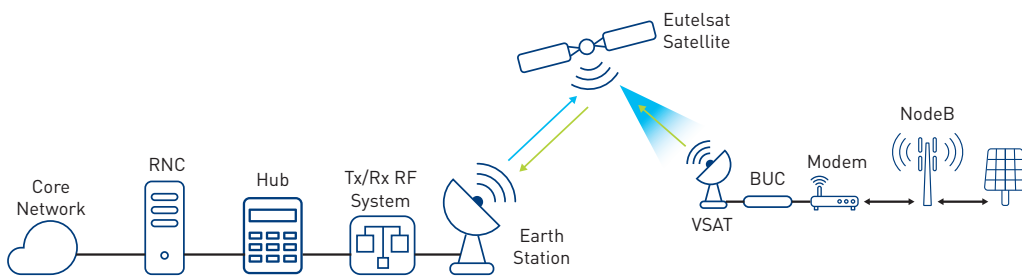
C or Ku-band satellite capacity can be used to combine high-traffic Base Stations with low traffic rural connectivity. This combined network uses a single hub for all Base Stations, reducing Capex. It also reduces the energy consumption of remote terminals.

## HOW DOES IT WORK?

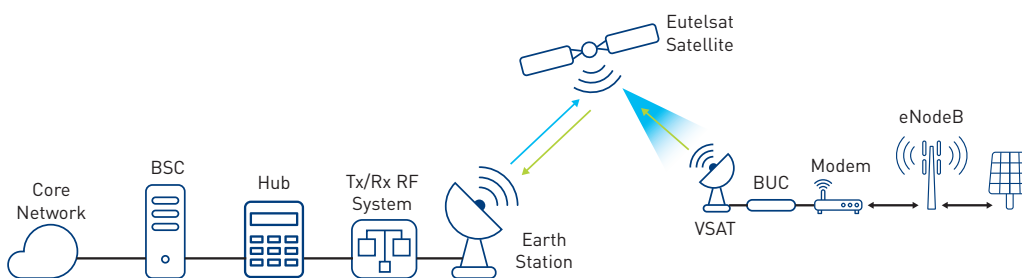
### 2G NETWORKS



### 3G NETWORKS



### 4G NETWORKS



# DATA FULLY-MANAGED TURNKEY SOLUTION

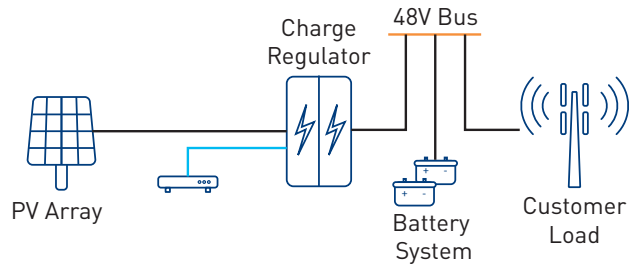
## EXAMPLE OF ENERGY INDEPENDENT SOLUTIONS

### Renewable energy

- 100% solar powered
- Long lifetime components
- More than 12 years' experience, 600 sites installed

### Reliable power

- 24 VDC or - 48 VDC
- 3 days autonomy sizing
- 24/7 monitoring
- Close to ZERO Opex solution



## EXAMPLE OF QUICK DEPLOY ANTENNAS

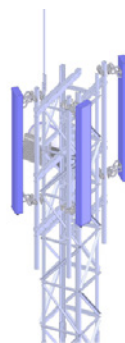
### 4 legged mast, 30m , 160 km/h

- Hot galvanized steel
- Fencing
- Footprint 10m x 10m
- Recessed depth - 1,50m: without concrete
- Suitable for rural requirements
  - + Photovoltaic support from 2.5 to 5.6 KW peak
  - + Omnidirectional or sectorial antennas (1.5m/15dBi max)
  - + Easy logistic & fast installation
  - + ZERO Opex Solution



### Antenna options for rural coverage

- 2x Omnidirectional: 9 dBi
- Sectorial up to 15 dBi / 65° Horizontal aperture, 1.5m
- Abiso IP Compact RAN Base station
  - + 2 TRX integrated (Up to 2/2/2 in site TRX cluster)
  - + GSM900 or GSM1800
  - + Low power consumption (32w 1x5wTRX, to 84w 2x10w TRX)
  - + TRX Integrated iPCU (Reduced latency for Data)
  - + GPRS CS1-4, EDGE MCS1-9
  - + BTS power saving
  - + Best-in-class satellite bandwidth optimisation

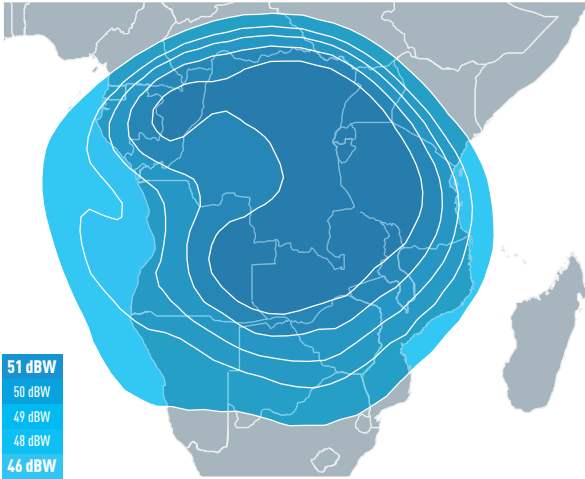




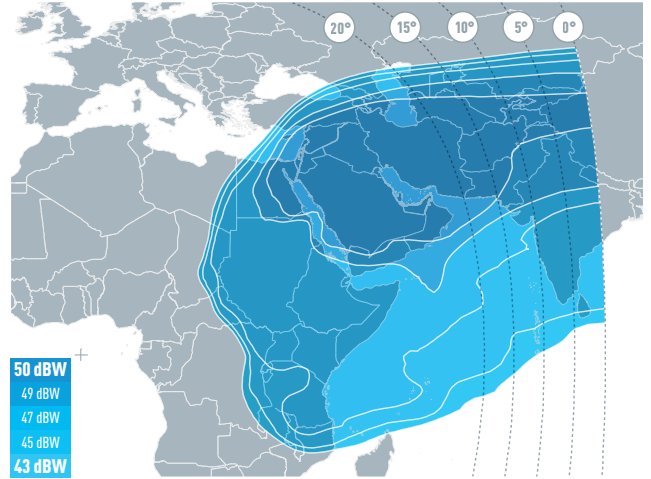
VIDEO

# POWERFUL CROSS-REGIONAL COVERAGE

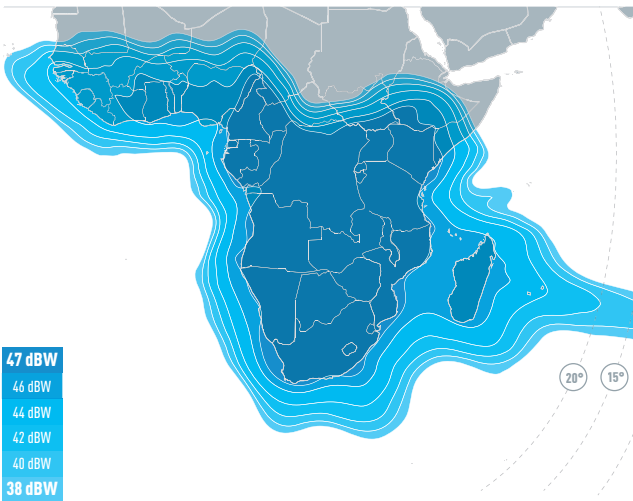
## REGIONAL SPECIFIC COVERAGES



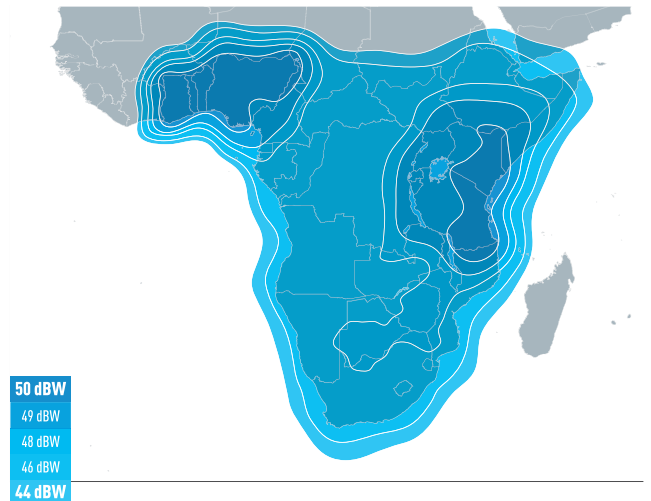
EUTELSAT 3B Steerable downlink



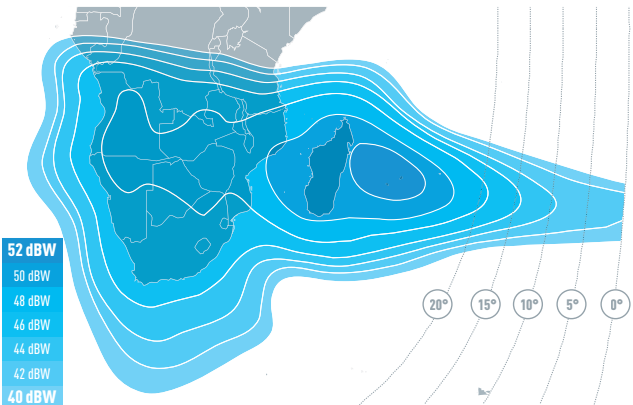
EUTELSAT 3B Eastern downlink



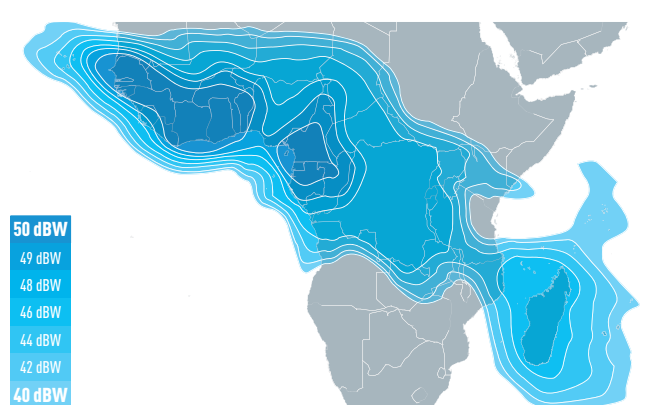
EUTELSAT 7B Africa downlink



EUTELSAT 7C Predicted downlink

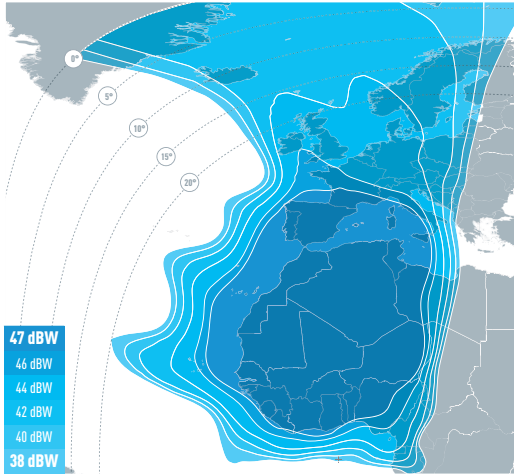


EUTELSAT 10A Africa downlink

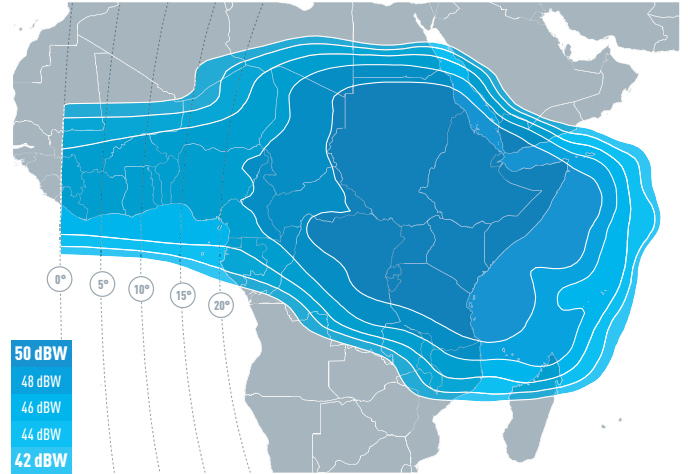


EUTELSAT 16A Africa downlink

VIDEO  
**POWERFUL CROSS-REGIONAL COVERAGE**

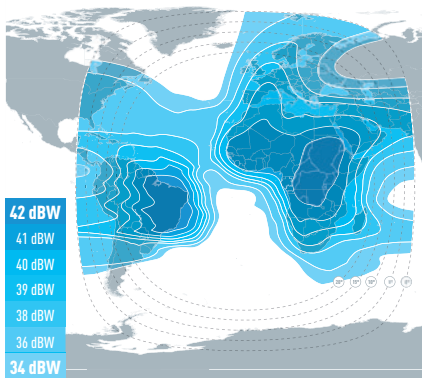


EUTELSAT 21B Western downlink

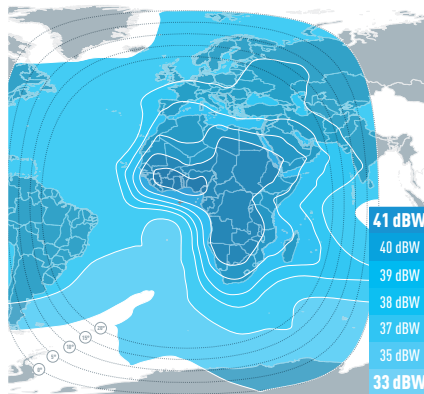


EUTELSAT 70B Africa downlink

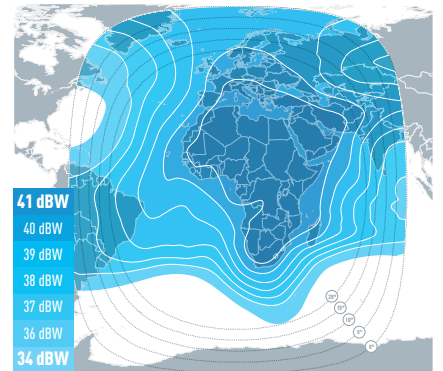
**PAN-AFRICAN COVERAGES**



EUTELSAT 8 West B C-band downlink



EUTELSAT 3B C-band downlink



EUTELSAT 10A C-band downlink

**Eutelsat** is one of the world's leading and most experienced operators of communications satellites. Our extensive network of high-performance satellites, located between 133° West and 174° East, provides capacity to clients that include broadcasters and broadcasting associations, pay-TV operators, video, data and Internet service providers, enterprises and government agencies.

Eutelsat's satellites provide ubiquitous coverage of Europe, the Middle East, Africa, Asia-Pacific and the Americas, enabling video, data, broadband and government communications to be established irrespective of a user's location.

Headquartered in Paris, with offices and teleports around the globe, Eutelsat represents a workforce of 1,000 men and women from 46 countries who are experts in their fields and work with clients to deliver the highest quality of service.

What can we do for you? Please visit  
[www.eutelsat.com/enquiries](http://www.eutelsat.com/enquiries)