

Application Note
4G LTE used to deliver Fixed Wireless Broadband Services
10 Gigabit Wireless Networks



About Wireless Excellence

Founded in 1996 and with headquarters in Oxford UK, Wireless Excellence Limited is a leading designer and supplier of outdoor and indoor Broadband Wireless communication products.

With a complete range of solutions including Radio, Microwave, Millimeter-Wave, Free Space Optics, WiFi and 4G/5G/LTE, customers in over 80 countries have chosen Wireless Excellence as the "one stop shop" solution of choice for dependable wireless networking.

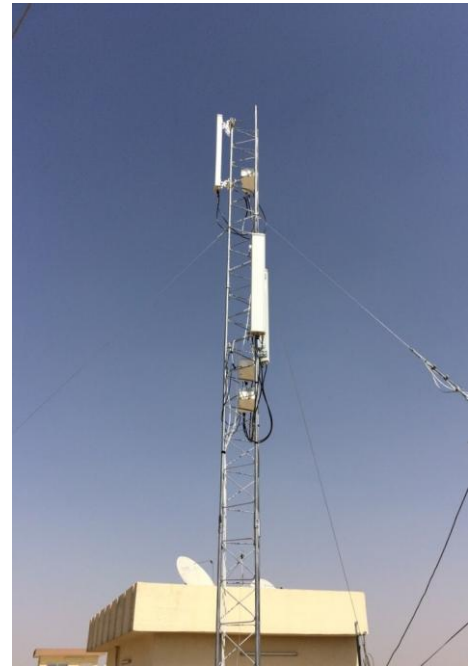
CableFree 4G LTE used to deliver Fixed Wireless Broadband Services

The underlying technology of LTE can be used for fixed as well as mobile customers to offer Fixed Wireless Broadband to rural, suburban and urban customers, using outdoor or desktop CPE devices. 4G was launched as LTE with 3GPP Release 8 onwards. The latest version in shipping products is Release 13 (LTE Advanced Pro). Later releases offer greater feature set as well as higher capacities (256 QAM modulation, 4x4 MIMO, Carrier Aggregation, and more) and upgradable up to 5G.

Example: LTE-Advanced Tower for Fixed LTE 4G service

One or more LTE towers are installed in a region to give Internet access to fixed subscribers. Customers within several km of the tower can have a CPE installed (indoor or outdoor) to receive internet access. An example here in the Middle East:

“Fixed” refers to the use of permanently installed outdoor CPEs as opposed to mobile handsets. These outdoor CPEs are typically mounted on building walls, rooftops or poles to get Line of Sight (LOS) or near-LOS to the nearest LTE tower. The CPE has an internal high gain directional antenna which gives longer range/capacity capability than the small omnidirectional antenna of a mobile handset..



Wireless Safe Cities

CableFree wireless Safe City solutions connect Fixed, Temporary and Mobile CCTV cameras to enhance safety for Public, Services and First Responders. Using CableFree’s Safe City Wireless solutions users can provide real-time connections to:

- CCTV cameras
- Police Cars
- Port & Customs Authorities
- Emergency Responders
- Buses
- Trains
- Mass Transit Systems

Wireless Technologies and Architecture

Unique amongst Wireless vendors, CableFree offers a complete range of options including

- Millimeter Wave up to 10Gbps & 40Gbps
- Microwave up to 6Gbps
- Point to Point (P2P) and Point to Multipoint (P2MP) MIMO Radio
- FSO for dense city areas
- LTE Base Station & CPEs for Mobility
- Carrier WiFi options

These technologies can be combined to give a complete Safe City network including 10Gbps up to 40Gbps resilient backbones, distribution, Ring, Mesh and Star topologies including Point to Multipoint connection to cameras sites.

Safe City Camera Technology and Options

All types of CCTV cameras can be connected using CableFree radios: Fixed, Dome, Mobile, Pan/Tilt, Day/Night vision. Standard, High or Ultra-High Resolution CCTV camera types are fully supported to meet diverse requirements around a city. Cameras can be mounted on new structures or added to existing street furniture such as lamp posts or mobile/telecom masts.

Connect fixed or mobile locations

A CableFree Safe City Wireless solution can connect any of:

- Fixed CCTV cameras to centralised monitoring facilities
- Mobile or temporary cameras to core infrastructure
- Perimeter security systems
- Multi-Gigabit wireless data links between buildings and core infrastructure
- Moving vehicles to centralised monitoring stations using CableFree Mobility.

Secure & Reliable high capacity wireless technology

All CableFree Safe City Wireless solutions are Scalable and Future-proof and use the latest generation wireless technologies. Using the latest wireless technology, solutions can be made ultra-secure to avoid leakage of sensitive data.

Wireless networks can be designed to be self-healing and avoid single-point-of-failure to ensure maximum uptime and availability

Create Resilient, Self-Healing City Wireless Networks.

Ensure your network is Cost-effective solutions with Low CAPEX and Rapid Return on Investment.

A CableFree Safe City solution offers the following features and benefits:

- High performance: 10 Gigabit Ethernet (10Gbps) capacity using MMW, 1 Gbps using FSO, and Microwave, 550Mbps using Radio, and 1 Gbps+ using LTE-A
- Rapid Installation: 15 minutes deployable on tripods, 3 hours permanent installation
- Highly reliable: 99.999% availability achievable
- License-Free Operation: No fees to pay on license free band
- No monthly rental fee: Low maintenance solution
- Diverse Technology Options: Complete range of FSO, Broadband Radio, Microwave, MMW, WiFi
- Fully Manageable: Advanced software tools
- Resilient solutions: 1+1 and N+1 Hybrid resilient link options
- Highly Secure: Proven inherently secure technologies
- Moveable asset: Low Total-Cost-of-Ownership (TCO)
- Safe & environmentally friendly: Low disruption during installation

For Further Information

We have over 20 years experience with fixed wireless and deployments in over 80 countries. Contact our team of experts for free advice on creating Wireless Safe City networks for your application. We offer free advice and additional design consultancy services.

For More Information on CableFree Safe City Applications, please Contact Us and our team will be delighted to advise on a precise solution to match your exact requirements.

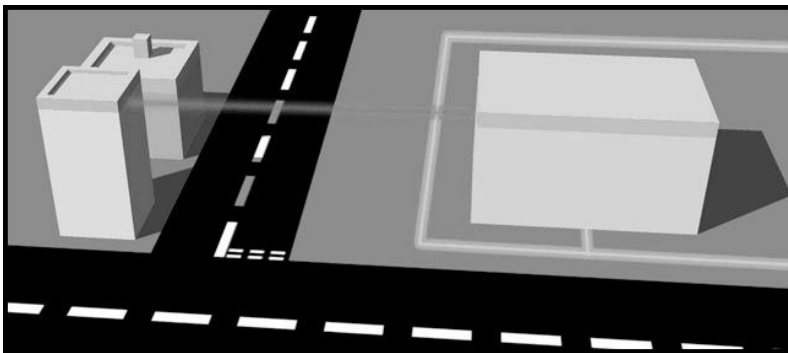
Safe City Solutions Using Wireless Technologies

A CableFree wireless solution offers the following features and benefits:

High Performance	10Gbps-40Gbps using MMW, Gigabit Ethernet (1.25Gbps) using FSO and Microwave, 550Mbps using Radio, 600Mbps LTE
Rapid installation:	3 hours achievable, 15 minutes temporary
Highly reliable:	99.999% availability achievable
License-free Operation:	No fees to pay on license free bands
No monthly rental fee:	Low maintenance solution
Diverse technology options:	Complete range of FSO, Broadband Radio, Microwave, MMW, WiFi
Fully manageable:	Advanced software tools
Resilient solutions:	1+1 Hybrid FSO+RF resilient link options
Highly Secure:	Proven inherently secure technologies
Low Total-Cost-of-Ownership (TCO):	Moveable asset
Safe & Environmentally friendly:	Low disruption during installation

CableFree products are field-proven, with thousands of deployments in over 80 countries since 1997. Excellence in performance and reliability are not sacrificed in providing highly competitive priced solutions together with a comprehensive range of support services.

Application Diagram



CableFree Wireless links are deployed on rooftop or tower locations between buildings or sites.

Network connections (Gigabit or 10Gbps Ethernet, E1/T1, video, voice) connect to the wireless units which can be mounted on tripods, rooftops, towers, poles or behind windows.

For permanent installation a site survey is recommended before installation, to determine suitable mounting points, location of cable runs etc. Installation involves physically mounting the equipment, aligning it, connecting data and power circuits and commissioning.

Recommended Products

CableFree MW	Licensed Microwave links up to 6Gbps, range up to 100km
CableFree MMW	60/70GHz Millimeter Wave links up to 10Gbps, range up to 10km
CableFree AC-MIMO	P2P and P2MP Radio links up to 550Mbps, range up to 40km
CableFree LTE-A	P2MP Coverage around cities up to 600Mbps, range up to 20km
CableFree Gigabit FSO	FSO Gigabit Ethernet up to 2km

For More Information

Please contact Wireless Excellence Ltd for information on the complete range of CableFree products and services

T: +44 (0)870 495 9169
E: sales@cablefree.net
W: www.cablefree.net

Wireless Excellence Limited
The Oxford Science Park,
G6, Magdalen Centre
Robert Robinson Avenue,
Oxford OX4 4GA