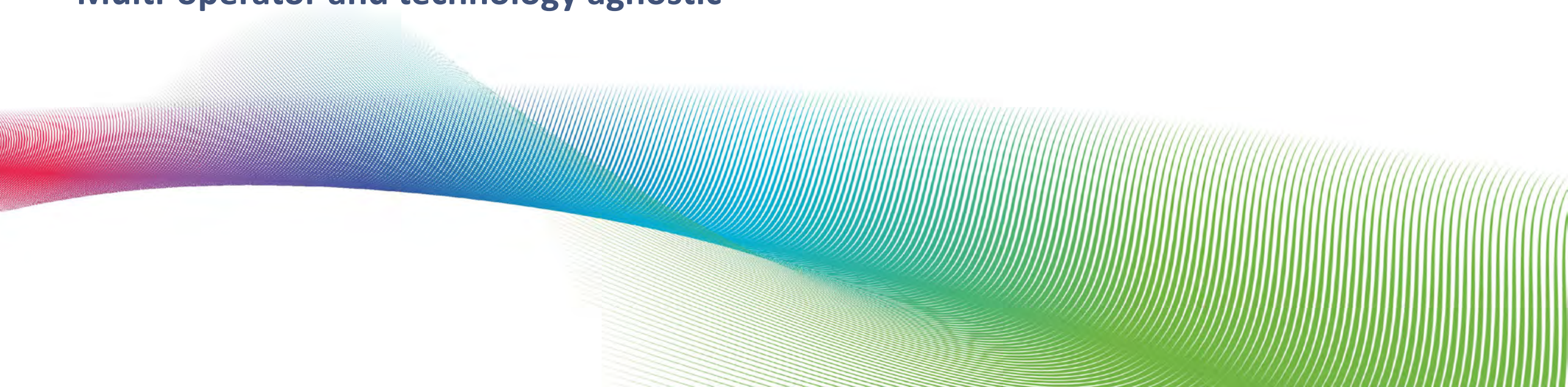


Architectural evolution to support real customer needs

Multi-operator and technology agnostic



We make digital infrastructure simple
Indoors and outdoors, via rooftops and at street level



Small Cell

Workspace



- 3G + 4G small cells
- Deployed throughout 700,000 square feet of coworking space
- 18 buildings
- Supporting over 100,000 voice calls and 700GB of data per month

Digital DAS

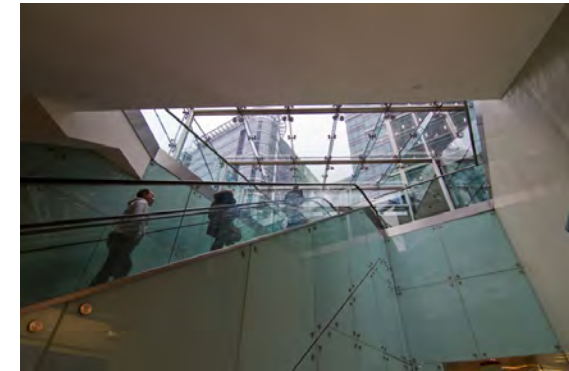
22 Bishopsgate



- As large as a container ship perched on its end, it's London's biggest office building and the second tallest in the city
- 4G DAS with 421 access points
- All four MNOs connected

Neutral Host

Multiple customer sites



- Helped VM02 make the first calls using JOTS in summer 2021
- We're now in full roll out mode with them and have connected four customer sites using the specification so far
- Meanwhile we've delivered a successful trial with another operator

Meanwhile our customers are broadening



Premium customers

Now looking for greener design



- Shared radio solutions reduces
 - Customer costs
 - Power consumption

Society

Connectivity demands i.e. City of London



- First truly neutral host small cell network (designed with all MNOs)
- Shared backhaul and radio
- Dark fibre...could lead to C-RAN with a JOTs approach

Industry

Mobile ecosystem collaboration



- Specifically helping to deliver cutting edge mobile private network configurations

Mobile Private Network Architecture innovation drivers



Vertical	Type	Tech	Bands	B/W (MHz)	License Type	In/Outdoor
Leisure	Commercial	4G	B7	2x20	LAL	Out
5G Testbed	Testbed	5G NSA+SA 5G SA NB-IoT	B7 + n78 n7 B3	2x20 + 100 40 2x3	2x Innovation Innovation SAL	In Out In
5G Testbed	Testbed	5G NSA	B7 + n78	2x20 + 100	2x Innovation	In
5G Testbed	Testbed	5G NSA	B7 + n78 indoor / n77 outdoor	2x20 + 140/100	2x Innovation	In + Out
Transport	PoC	5G SA	n77	20	SAL	In
Leisure	PoC	5G SA	n77	100	SAL	Out
Manufacturing	Commercial	4G	B7	2x20	MNO	In + Out



In more detail

We built the UK's first standalone mobile private network for a 5G accelerator programme



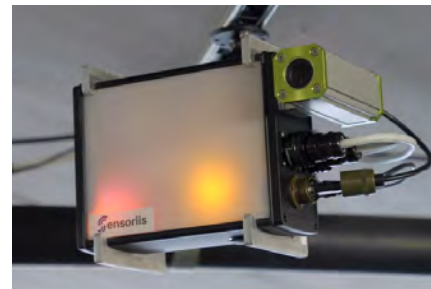
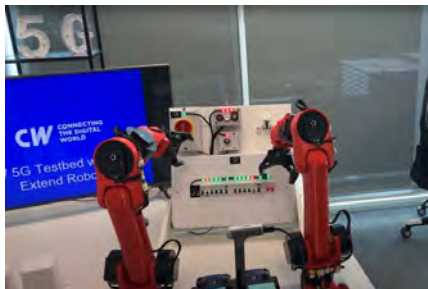
Supporting industry-leading innovation

- Accelerator set to enable 5G enterprise IoT use cases for 3 years
- There was a lot of interest in being able to use the testbed.
 - Six companies have taken part in the first two accelerators.
 - And all have seen positive research and development results, including new feature development and significant cost savings.



"Freshwave have been incredibly valuable and professional in helping **Cambridge Wireless** to design and build our 5G testbed with our partners. During Covid they have gone out of their way in communicating very proactively and knowledgeably. Delivering a state of the art 5G private testbed and network."

Abhi Naha
COO



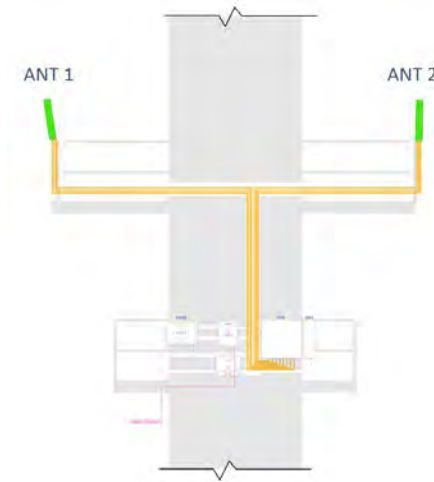
In more detail

We helped design and deliver the UK's first multi-site mobile private network

Supporting industrial workplaces with MPN through a white-labelled neutral host approach

A mobile network operator engaged us as the system integrator for a 4G private networks at two factories. The network covers indoor and outdoor areas.

- 2300/2600 MHz band – tens of radio units across two sites.
- Indoor and outdoor coverage design and installations provided by us across two sites 4 million sq ft and 1.6 million sq ft respectively.
- Based on indoor to outdoor and outdoor to indoor testing.
- Nokia did the core design and we did the coverage design and installation.
- Delivering the connectivity needed for handheld devices for a range of applications including IoT, robotics, automation and even health & safety drones.
- Upgradeable to 5G when ready.



High level radio units to traditional passive macro antenna infrastructure for wide area outdoor coverage.

Complimented by indoor pico-cell architecture.

In more detail

Designed and delivered another first of its kind stand alone 5G mobile private network



Supporting transport engineering advancement

- As a proof of concept project at St Pancras Station, we've designed and deployed an end-to-end complete 5G-SA network. It's on the UK's dedicated spectrum band for enterprise 5G: 3800-4200 MHz range (n77). Vendor partners include Athonet and CableFree.
- The network supports a HoloLens based application and resulting information (explained in an earlier presentation today), helping make the move to predictive maintenance and away from routine or reactive costs.

"Innovation is at the heart of what we do at HS1. We are proud to have carried out this successful trial of technology which has the potential to improve people's experiences of the railways. This trial clearly showcases how Digital Twins can help us achieve our ultimate goal of running a world-beating railway, reducing delays and improving our carbon footprint."

Dyan Crowther

CEO



And finally, our award-winning holiday park FWA MPN architecture



- In a UK first, we shared spectrum with Vodafone to provide private LTE for Wi-Fi backhaul from caravans.
- The solution for each park consists of a server with local LTE core (EPC) connected to 5-15 small cells (depending on park size, terrain etc.).
- We've designed solutions for 7 parks so far, and to date 4 have been fully deployed and are under our managed service.

"With our parks busier than ever due to the staycation boom, it's great to be welcoming so many owners and guests. We're pleased to be able to offer those staying at Erigmore and Thurston Manor Leisure Parks this exciting new broadband connectivity and we've received great feedback on it from holidaymakers already. People have been streaming, gaming, and working remotely, with no hitches to their connectivity. We're looking forward to introducing it to our other parks in the future, with installation currently underway at our Pease Bay Leisure Park."

Bev Dixon
COO



Excellence in Commercial Deployment by an Alternative Service Provider





FreshWave

You've got network

in The Freshwave Group

 @freshwavegroup

freshwavegroup.com

With adaptable architecture

- ✓ Use both mobile network operator and Ofcom licenced spectrum.
- ✓ Provide the right level of RF power (low, mid or high) depending on need.
- ✓ So customers can support unlimited devices, SIM cards and applications, while we supply and maintain the network hardware as part of the managed service.

