



New Sites Fibre Lift Line Trial Case Study

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New Sites National Programme
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openreach

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1.0 Executive Summary

Aligned to our strategy to roll out 'Ultrafast Full Fibre' broadband to 25 million homes and businesses by December 2026 and the subsequent switching off of our old copper based network ([click here for more information](#)), the Openreach New Sites organisation published a briefing in November 2021 announcing that from 15th November 2021 any site contracting with us for FTTP will no longer be offered additional Copper for the sole purpose of service lines ([click here to view the briefing](#)). This change is centered on the basis that any new analogue service lines installed today have limited life span requiring migration to All-IP (Fibre) in the future. This paper has been compiled to share specific technical guidance on connecting fibre lift lines.

In 2019 the Lift and Escalator Industry Association (LEIA) published a briefing highlighting that the switchover from traditional copper telephone lines to fibre lines using voice over internet protocol (VOIP) has the potential to seriously disrupt the operation of lift alarms connected to the Public Switch Telephone Network ("land lines") - along with guidance on potential measures to overcome the impacts of the UKs migration to a full fibre network.

[\(Lift-Owner-News-Planned-Upgrading-of-Telecom-networks.pdf \(leia.co.uk\), November 2019\)](#)

A common key requirement for Copper is the emergency telephone line for lifts and owing to the UKs national evolution to a full fibre network leading to the subsequent Copper switch off, Openreach has been working collaboratively with KONE, one of the global leaders in the lift and escalator industry, Avire - manufacturer of the 'Memcom' which is one of the UK's leading universal lift emergency auto-diallers, the Developer - Galliard Homes, and Communications Providers (CPs) - SKY Connect and The Cloud Network, to conduct the UKs first live publicised trials of connecting a fibre circuit to serve both Analogue and Digital Lift type technologies.

The purpose of the trial has been to test a working lift line over FTTP for both a digital and analogue lift application, to demonstrate fibre lift line connectivity solutions to replace traditional Copper lift lines.

This paper encapsulates the details of the FTTP trial for an analogue lift application that successfully concluded on 30th May 2022 and a digital lift application trial that successfully concluded on 8th July 2022.

The objectives of the lift trials were to:

1. Identify a secure accessible location to house both the Openreach and CP apparatus.
2. Connect both an analogue and digital KONE lift type directly to a digital fibre telecoms network circuit.
3. Trigger the lift alarm to automatically dial and initiate 2-way communication using the lift Speaker and verify the lifts unique identification details and location with the KONE Emergency Rescue Call Centre (Voice Over Internet Protocol - VoIP).
4. Connect to the analogue KONE lift remotely, initiate configuration commands via DTMF tones, initiate a remote download of information from the KONE lift and ensure that programmed automatic routine calls take place.
5. To test objectives 2 to 4 (above) in simulated full power outage scenarios.
6. To test objectives 2 to 5 (above) using the universal intermediary Avire 'Memcom' auto-dialler instead of the KONE auto-dialler on the analogue lift type.

Note: Bullet numbers 4 and 6 above were not required for digital type lifts as they do not use DTMF Tones.

1.1 Analogue Lift Trials Executive Summary

The above objectives were successfully met, and the trials therefore deemed a success, admittedly KONE encountered some early issues with analogue DTMF tone signal conversions not working with The Cloud Networks equipment although these were successfully overcome with Sky Connects equipment. The Cloud Network continue to pursue an analogue solution.

The purpose of the analogue lift trial was to test and demonstrate that an FTTP based solution could still work with an analogue lift installation in scenarios where Developers may continue to install analogue lifts, despite Openreach's advice to only install digital lifts. Any new lifts provided by KONE are digital and will therefore naturally work with fibre without the need for any signal conversions (as long as they are of a native IP implementation i.e., do not use DTMF signalling tones).

In addition, KONE have existing upgrade solutions in place for their analogue lifts, 1. Upgrade to GSM based connectivity or 2. Upgrading the existing analogue lift equipment to a digital platform ensuring that existing analogue lift owners are not left stranded in a full fibre world. We understand that other analogue equipment vendors also have similar solutions in place.

This trial has successfully demonstrated that by using an ATA adaptor to convert digital signals to analogue signals existing analogue equipment can operate adequately, although this may require some configuration and/or potential software changes by the analogue equipment vendors and/or CPs.

To ensure business continuity we strongly recommend that Developers immediately engage with their analogue equipment vendors and CPs to ensure that solutions are in place for their existing analogue equipment. Vendors and industry suppliers are welcome to spend time in our test laboratories and this can be achieved by contacting the Openreach All-IP team for support - All-ip@openreach.co.uk.

To prevent future challenges - for any new Developments we recommend that Developers ensure that only Digital equipment is procured from their vendors as analogue is Copper based and will gradually disappear over the foreseeable future as the country rapidly moves towards a full fibre digital telecommunications infrastructure.

1.2 Digital Lifts Trials Executive Summary

The above objectives (Bullet numbers 1 to 3 and 5) were achieved and the trial therefore a success, The purpose of the digital lift trial was to, on behalf of Galliard Homes verify that new digital lifts provided by KONE proficiently work with digital fibre connectivity which was supplied by The Cloud Network (CP) without the need for any signal conversions.

2.0 Service Lines Summary

Some service lines use equipment which still relies on traditional analogue signal and/or the DC voltage carried over the Copper network. Openreach has been engaged with industry over the past few years to ensure that Communication/Service Providers (CPs) and the suppliers in these industries are prepared to move to an All-IP network. There are plenty of support resources for industry available on the Openreach website - [Click here to view these resources](#).

The Openreach network ends at the Optical Network Termination (ONT), any service line solution that connects to the Openreach network is the responsibility of the CP and the supplier of any equipment to solution. Openreach is unable to provide network solutions beyond our ONT, or to configure any customer equipment, but any CP or industry supplier can reach out to the Openreach All-IP team for support here - All-ip@openreach.co.uk.

Another consideration will need to be local power contingency. Two years ago, OFCOM mandated that any local power backup for special lines should move to the CP to provide. Local power backup means the service line will continue to work, for a period, in the event of a power outage. Traditional Copper networks provide a DC voltage from the exchange which has its own power contingency; hence this has been one of the key industry concerns with moving to an All-IP network. Following the OFCOM decision, Openreach stopped providing Battery Backup Units (BBUs) to all its FTTP installs. It is now down to the CP to provide a local Universal Power Supply (UPS) which will need to provide power contingency for both the CP equipment (router/switch) and the Openreach ONT.

3.0 Openreach New Sites Fibre Lift Lines Trial

3.1 Trial Overview, Approach & Objectives

A common key requirement for Copper is the emergency telephone line for lifts and owing to the UK's national evolution to a full fibre network leading to the subsequent Copper switch off, Openreach has been working collaboratively with KONE, one of the global leaders in the lift and escalator industry, Avire - manufacturer of the 'Memcom' which is one of the UK's leading universal lift emergency auto-diallers, the Developer - Galliard Homes, and Communications Providers (CPs) - SKY Connect and The Cloud Network, to conduct the UK's first live publicised trials of connecting a fibre circuit to serve both Analogue and Digital Lift types.

The purpose of the trial has been to test a working lift line over FTTP for both a digital and analogue lift application, to demonstrate fibre lift line connectivity solutions to replace traditional Copper lift lines.

This paper encapsulates the details of the FTTP trial for an analogue lift application that successfully concluded on 30th May 2022 and a digital lift application that successfully concluded on 8th July 2022.

The objectives of the lift trials were to:

- Objective 1. Identify a secure accessible location to house both the Openreach and CP apparatus.
- Objective 2. Connect both an analogue and digital KONE lift type directly to a digital fibre telecoms network circuit.
- Objective 3. Trigger the lift alarm to automatically dial and initiate 2-way communication

- using the lift Speaker and verify the lifts unique identification details and location with the KONE Emergency Rescue Call Centre (Voice Over Internet Protocol - VoIP).

Objective 4. Connect to the analogue KONE lift remotely, initiate configuration commands via DTMF tones, initiate a remote download of information from the KONE lift and ensure that programmed automatic routine calls take place.

Objective 5. To test objectives 2 to 4 (above) in simulated full power outage scenarios.

Objective 6. To test objectives 2 to 5 (above) using the universal intermediary Avire - 'Memcom' auto dialler instead of the KONE auto-dialler on the analogue lift type.

Note: Bullet numbers 4 and 6 above were not required for digital type lifts as they do not use DTMF Tones.

3.2 Trial Objectives Summaries & Outcomes

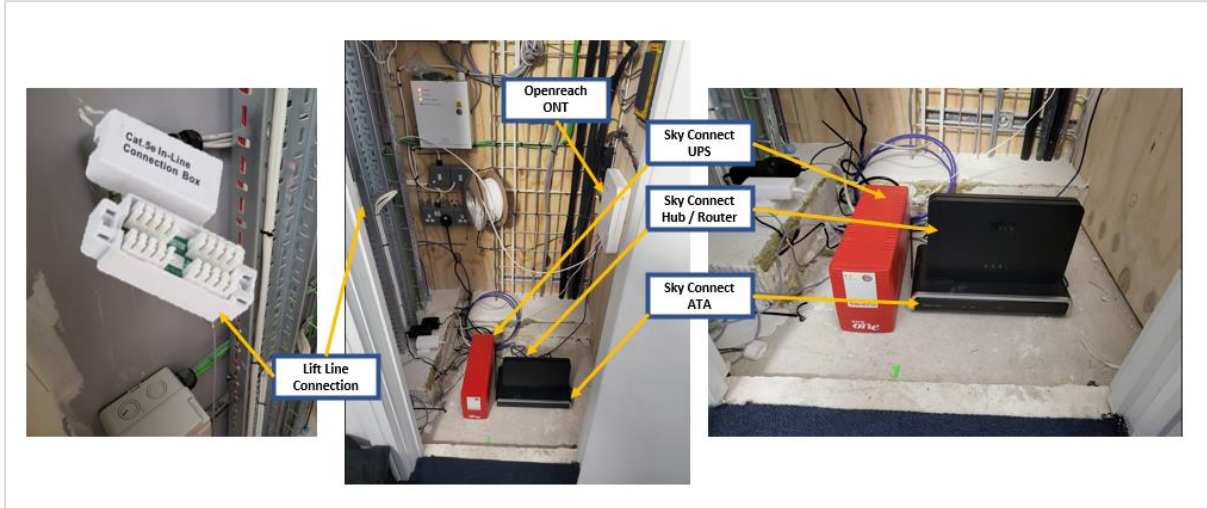
This section covers a detailed summary of each of the 6 trial objectives listed in the previous section focusing on what actions were taken and the outcome of each.

3.2.1 Objective 1: Identify a secure accessible location to house both the Openreach and CP apparatus.

Lifts designed to carry passengers include an emergency alarm facility to safeguard any individual that may become stranded in a lift, alerting the Lift Manufacturers emergency call Centre to provide urgent support and rescue. This facility is dependent on the communications line serving the lift, a safe location is therefore required to prevent access to the Openreach and CP apparatus ensuring that unauthorised 3rd parties cannot tamper with the equipment connecting the lift to the communications line.

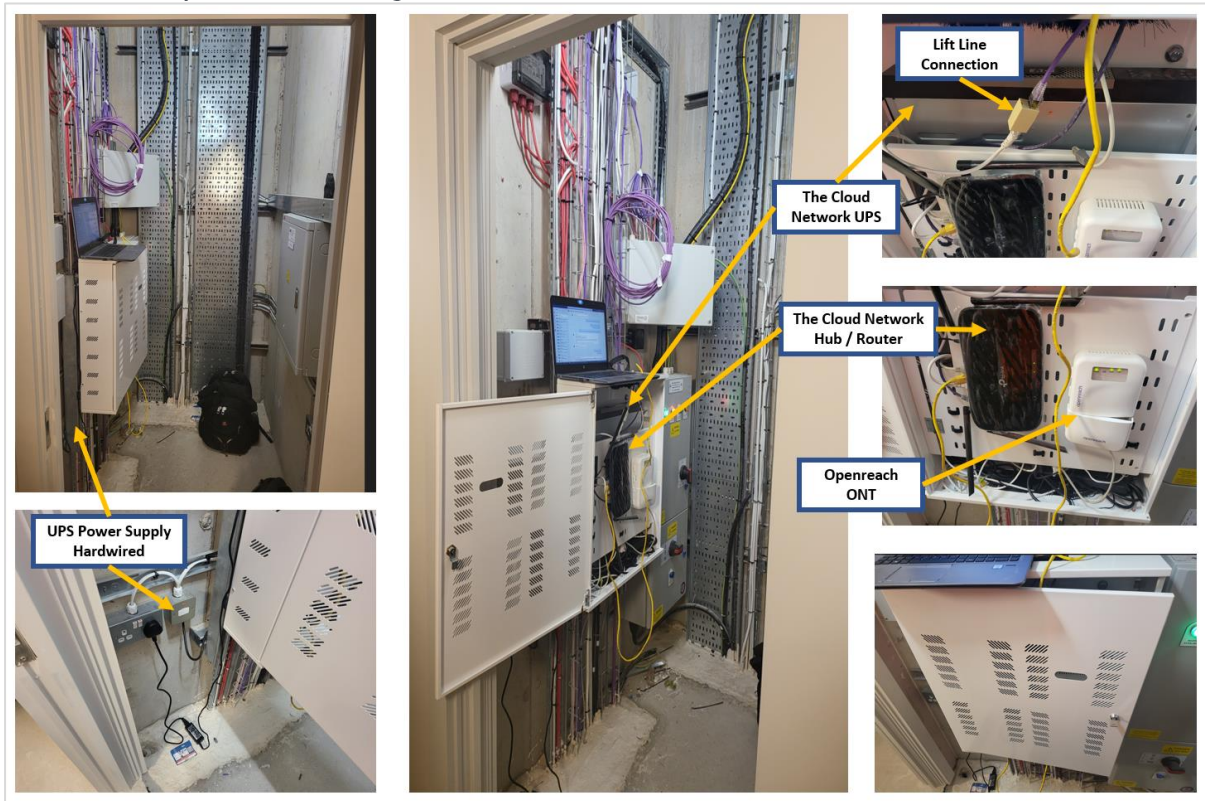
In the initial analogue trial, it was agreed that the Openreach and Sky Connect (CP) equipment would be situated in a lockable riser cupboard with keys being securely stored by the on-site concierge team. (See illustration 1.)

Illustration 1. Galliard Homes secure riser cupboard analogue lift installation.



Further consideration of an additional lockable enclosure was reviewed to provide a more secure and aesthetically pleasing setup although it was agreed that for the purposes of the analogue trial this would be not required. Galliard Homes pursued a lockable enclosure that was manufactured by Connectix Cabling Solutions and used in the digital lift trial ensuring that the enclosure met the minimum requirements of the Openreach ONT specification e.g., ambient temperature within the enclosure (See illustration 2.) In addition, the equipment location should be easily accessible enabling equipment providers to access their equipment in the event of failure or maintenance requirements.

Illustration 2. Galliard Homes secure riser cupboard analogue lift installation with a lockable enclosure manufactured by Connectix Cabling Solutions.



3.2.2 Objective 2.1: Connect the 'Analogue Lift' to a digital fibre telecommunications network circuit.

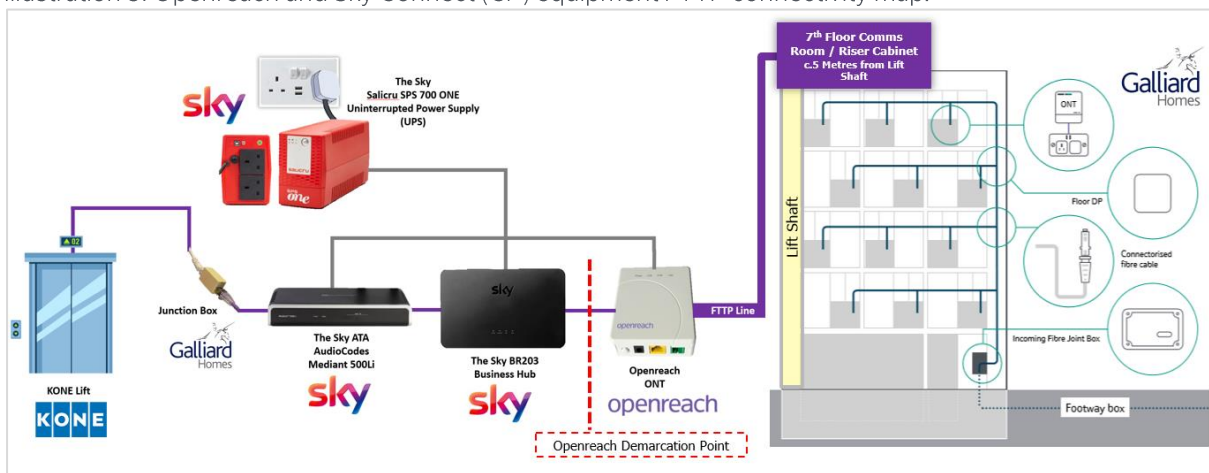
Analogue lifts operate on traditional analogue Copper line signal and FTTP lines use a digital signal. An Analogue Telephone Adaptor (ATA) is therefore required to convert the digital fibre line signal to an analogue signal. An ATA is a device for connecting traditional analogue telephones and similar customer-premises devices to a digital telephone system or a voice over IP (VoIP) telephony network. Either an ATA that is built into the CP Router or a standalone ATA can be used. It should be noted that the ATA should support all 16 DTMF Tones although this can vary dependent on a vendor's software and or configuration of their equipment i.e., several may use only the traditional 12 DTMF tones – DTMF is explained further in section 3.2.5.

For the purposes of this trial the external AudioCodes Mediant 500Li ATA was used owing to its capability to support all 16 DTMF Tones.

Openreach successfully delivered an FTTP circuit and fitted the ONT to the Galliard Homes trial site, Galliard Homes then placed an FTTP order with their CP (Sky Connect) who provided the FTTP service. The CP then connected their router to the Openreach ONT and supplied an ATA to connect from their router to the lift equipment.

The CP router and tests verified a fully functioning FTTP circuit. In addition, Sky Connect (CP) provided a Salicru SPS 700 ONE Uninterrupted Power Supply (UPS) to support continued power to both the Openreach ONT and their equipment for a period of 2 hours in a power outage scenario. (See illustration 3.)

Illustration 3. Openreach and Sky Connect (CP) equipment FTTP connectivity map.



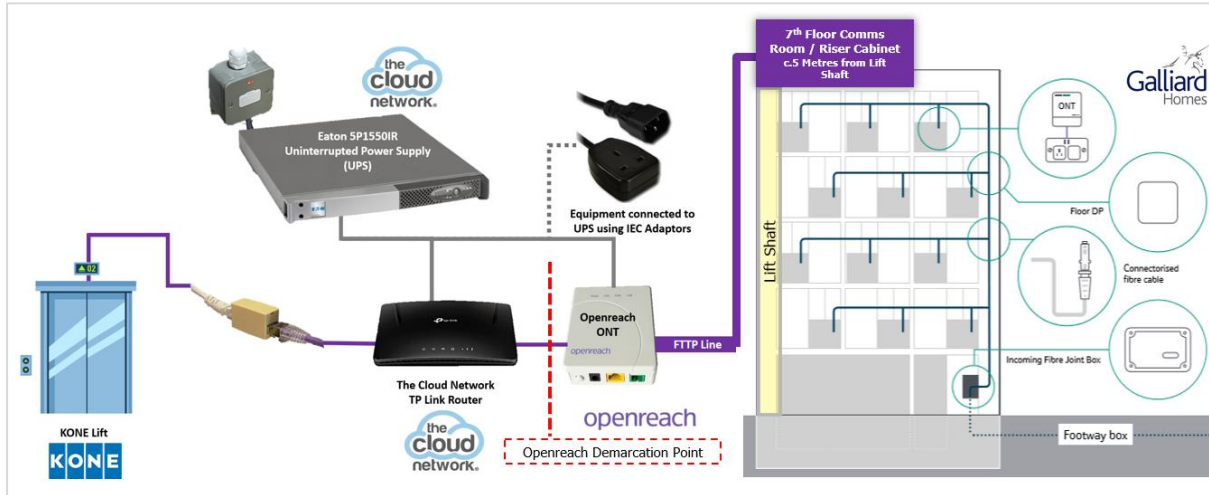
3.2.3 Objective 2.2: Connect the 'Digital Lift' to a digital fibre telecommunications network circuit.

The purpose of the digital lift trial was to, on behalf of Galliard Homes verify that new digital lifts provided by KONE proficiently work with fibre connectivity which was supplied by The Cloud Network (CP) without the need for any signal conversions.

Openreach successfully delivered an FTTP circuit and fitted the ONT to the Galliard Homes trial site, Galliard Homes then placed an FTTP order with their CP (The Cloud Network) who provided the FTTP service. The CP then connected their router to the Openreach ONT and then connected their router to the lift equipment.

The CP router and tests verified a fully functioning FTTP circuit. In addition, The Cloud Network (CP) provided the Eaton 5P1550IR Uninterrupted Power Supply (UPS) to support continued power to both the Openreach ONT and their equipment for a period of 2 hours in a power outage scenario. (See illustration 4.)

Illustration 4. Openreach and The Cloud Network (CP) equipment FTTP connectivity map.



3.2.4 Objective 3: Trigger the lift alarm to automatically dial and initiate 2-way communication using the lift Speaker and verify the lifts unique identification details and location with the KONE Emergency Rescue Call Centre (Voice Over Internet Protocol - VoIP).

In compliance with The Lifts Regulations 2016: Great Britain– Schedule 1 Essential Health and Safety Requirements: Cars must be fitted with two-way means of communication allowing permanent contact with a rescue service.

(Source: <https://www.gov.uk/government/publications/lifts-regulations-2016/lifts-regulations-2016-great-britain>, 2022)

In 2019 the Lift and Escalator Industry Association (LEIA) published a briefing highlighting that the switchover from traditional copper telephone lines to fibre lines using voice over internet protocol (VOIP) has the potential to seriously disrupt the operation of lift alarms connected to the Public Switch Telephone Network ("land lines") - along with guidance on potential measures to overcome the impacts of the UK's migration to a full fibre network.

([Lift-Owner-News-Planned-Upgrading-of-Telecom-networks.pdf \(leia.co.uk\)](#), November 2019)

Like all lift manufacturers and aligned to regulation, KONE lifts have a built-in lift alarm button and speaker that connects to an auto-dialler to initiate communication with their Emergency Rescue Call Centre in the event of an individual becoming trapped in a lift.

The KONE lift alarm was pressed and auto dialled the KONE Emergency Call Centre, and we were able to communicate clearly with the KONE representative over the speaker built into the lift. In addition, the KONE representative was able to confirm the lift serial number and the lift location successfully meeting the objectives of this test over an FTTP line. This

- test was conducted several times in all trials verifying repeat success of 2-way communication via VoIP based technology.

3.2.5 Objective 4: Connect to the analogue KONE lift remotely, initiate configuration commands via DTMF tones, initiate a remote download of information from the KONE lift and ensure that programmed automatic routine calls take place.

Like several lift vendors, KONE require the capability to connect to their lifts remotely to enable them to configure, update their lift equipment and download information off site.

Traditional Copper analogue lines support DTMF (Dual tone multi-frequency) signalling tones to be sent from one device to another. There are typically 12 tones that most people are aware of i.e., 1 to 9, 0, * and #, additionally there are another 4 i.e., A, B, C and D resulting in a total of 16 tones. These tones provide the protocols required to enable programming of KONE's analogue lifts remotely.

Digital Fibre lines normally only support native IP implementations and do not naturally support DTMF signalling tones.

To convert the digital fibre line signal to an analogue signal enabling DTMF signalling tones an external AudioCodes Mediant 500Li ATA was used owing to its capability to support all 16 DTMF Tones.

KONE were able to remotely connect to the analogue lift, initiate configuration commands via DTMF tones enabling them to clear the lifts programme and reprogram, initiate downloads of information and program automatic routine calls to successfully take place verifying all 16 DTMF tone responses and full remote capability.

It should be noted that early in the trials some issues were encountered with the KONE remote configurations due to a reliance on SMS technology, this was however overcome by KONE making a software change to bypass SMS usage as ATAs do not support SMS technology.

Note: Digital lifts do not have any reliance on DTMF tones and were not included in this test as KONE were able to successfully meet their remote objectives with digital lifts using IoT technology.

3.2.6 Objective 5: To test objectives 2 to 4 (above) in simulated full power outage scenarios.

Calls made over broadband using VoIP-based technology will not function in a power cut, as the broadband equipment at the premises requires mains power to work. As a result, calls will only be possible if additional protection measures are put in place.

Following public consultation in October 2018 Ofcom regulated that Communication Providers must meet the obligation to ensure uninterrupted access to emergency organisations during a power outage for those customers using VoIP technology. Providers should have at least one solution available that enables access to emergency organisations for a minimum of one hour in the event of a power outage in the premises.

(Source: https://www.ofcom.org.uk/data/assets/pdf_file/0016/123118/guidance-emergency-access-power-cut.pdf, October 2018)

In addition, The Lifts Regulations 2016 – Schedule 1 Essential Health and Safety Requirements states that the means of two-way means of communication allowing permanent contact with a rescue service must be designed and constructed so as to function even without the normal power supply. Their period of operation should be long enough to allow normal operation of the rescue procedure.

(Source: <https://www.gov.uk/government/publications/lifts-regulations-2016/lifts-regulations-2016-great-britain>, 2022)

Sky Connect (CP) therefore provided a Salicru SPS 700 ONE Uninterrupted Power Supply (UPS) and The Cloud Network (CP) provided an Eaton 5P1550IR Uninterrupted Power Supply (UPS) with IEC adaptor connections to support continued power to both the Openreach ONT and their equipment for a period of 2 hours in a power outage scenario. (See illustrations 3 & 4)

Our trial encompassed testing objectives 2 to 4 in a simulated power outage scenario by pulling the power plug on the UPS device which continued to provide power and to the equipment without any loss of power for over 1.5 hours.

3.2.7 Objective 6: To test objectives 2 to 5 (above) using the universal intermediary Avire 'Memcom' auto-dialler instead of the KONE auto-dialler on the analogue lift type.

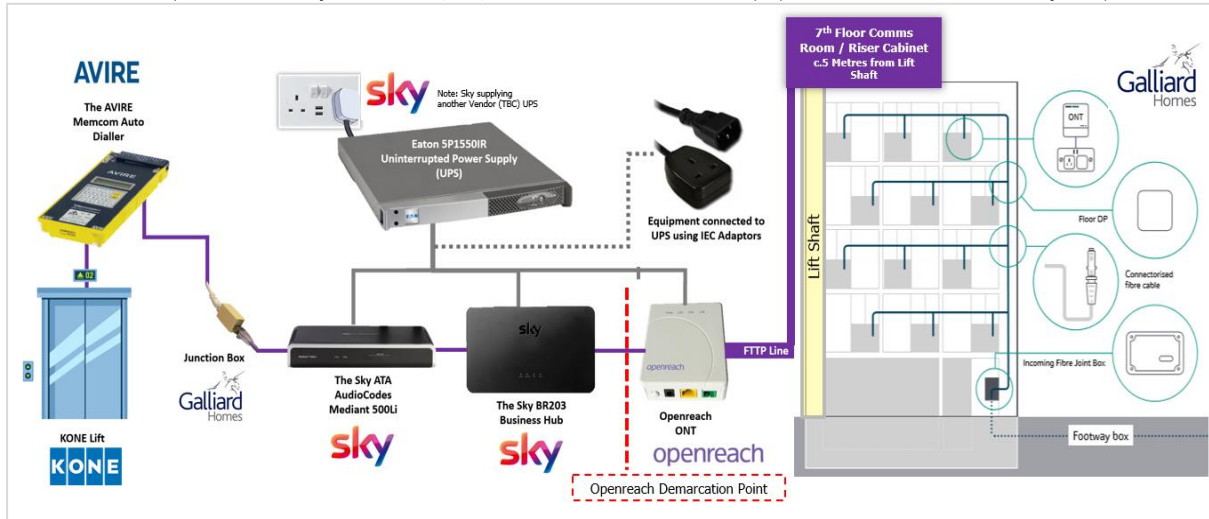
According to the Elevator World Global Statistics Report published in 2020 there are now 303k lifts in the UK. It is evident that there are several other Lift vendors in the UK and when assuming that most of the current lift landscape in the UK are still analogue type lifts leaves a large volume of lifts not tested in the original KONE analogue lift trials.

([The Elevator World 2020 Global Statistics Report: A Comprehensive List of Industry Numbers \(Digital\)](#), 2020)

To therefore support an industry wide solution the analogue lift trials were also conducted in collaboration with Avire - manufacturer of the 'Memcom' which is one of the UK's leading universal lift emergency auto diallers.

The 'Memcom' was used instead of the KONE built-in auto-dialler, and all the aforementioned test objectives were also successfully achieved, verifying a solution that could be used by all lift vendors subject to successful testing with their analogue lifts (see illustration 5).

Illustration 5. Openreach, Sky Connect (CP) and Avire 'Memcom' equipment FTTP connectivity map.



In summary in this test Openreach successfully delivered an FTTP circuit and fitted the ONT to the Galliard Homes trial site, Galliard Homes then placed an FTTP order with their CP (Sky Connect) who provided the FTTP service. The CP then connected their router to the Openreach ONT and supplied an ATA to connect from their router to the Avire 'Memcom' auto-dialler which then connected to the analogue lift equipment (by passing the KONE built-in auto-dialler).

The CP router and tests verified a fully functioning FTTP circuit. In addition, Sky Connect (CP) provided a Salicru SPS 700 ONE Uninterrupted Power Supply (UPS) to support continued power to both the Openreach ONT and their equipment for a period of 2 hours in a power outage scenario which was also tested with the 'Memcom' auto-dialler connected. (See illustration 5.)

Note: The 'Memcom' is also capable of usage on a GSM telecom connection.

4.0 Recommendations

The purpose of the analogue lift trial was to test and demonstrate that an FTTP based solution could still work with an analogue lift installation in scenarios where Developers may continue to install analogue lifts, despite Openreach's advice to only install digital lifts. Any new lifts provided by KONE are digital and will therefore naturally work with fibre without the need for any signal conversions (as long as they are of a native IP implementation i.e., do not use DTMF signalling tones).

The analogue lift trial has been deemed a success as the trial objectives have been achieved. This trial has successfully demonstrated that by using an ATA adaptor to convert digital signals to analogue signals existing analogue equipment can operate adequately, although this may require some configuration and/or potential software changes by the analogue equipment vendors and/or CPs.

KONE have a couple of existing upgrade solutions in place for their analogue lifts, 1. Upgrade to GSM based connectivity or 2. Upgrading the existing analogue lift equipment to a digital platform ensuring that existing analogue lift owners are not left stranded in a full fibre world. We understand that other analogue vendors also have similar solutions in place.

To ensure business continuity we strongly recommend that Developers immediately engage with their analogue vendors and CPs to ensure that solutions are in place for their existing analogue equipment. Vendors and industry supplier are welcome to spend time in our test laboratories and this can be achieved by contacting the Openreach All-IP team for support - All-ip@openreach.co.uk.

To prevent future challenges - for any new Developments we recommend that Developers ensure that only Digital devices are procured from their vendors as analogue is Copper based and will gradually disappear over the future as the country rapidly moves towards a full fibre digital telecommunications infrastructure.

In addition, to protect the ONT, router/ATA and UPS from any unauthorised third-party access which could potentially prevent the lift emergency telephone line from operating correctly, it is recommended that the equipment is housed within a secure enclosure. Our trial partner Connectix has developed a bespoke enclosure that can accommodate the telecoms equipment and can be wall mounted in any suitable location.

The digital lift trial has also been deemed a success as the trial objectives have been achieved.

Other considerations will need to be local power contingency. Two years ago, OFCOM mandated that any local power backup for special lines should move to the CP to provide. Local power backup means the service line will continue to work, for a period, in the event

- of a power outage. Traditional Copper networks provide a DC voltage from the exchange which has its own power contingency; hence this has been one of the key industry concerns with moving to an All-IP network. Following the OFCOM decision, Openreach stopped providing Battery Backup Units (BBUs) to all its FTTP installs. It is now down to the CP to provide a local Universal Power Supply (UPS) which will need to provide power contingency for both the CP equipment (router/switch) and the Openreach ONT.