

Generic Ethernet Access delivered over Fibre to the Premises (GEA-FTTP) at Brownfield sites

Product Proposal Document

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1 Document Description

This document provides the product proposals for the Generic Ethernet Access Fibre to the Premise (GEA-FTTP) Brownfield product to be delivered over a Gigabit PON (GPON) architecture within the UK.

This document is an updated product proposal incorporating input from Communications Providers (CPs) based on their views and requirements shared with Openreach in response to the recent GEA-FTTP Brownfield product proposal consultation and from other feedback through bi-lateral meetings and industry forums.

2 Disclaimer

This document is published for the purposes of providing CPs with Openreach's latest views on the GEA-FTTP Brownfield product proposal and in support of further ongoing dialogue. The contents may be subject to further change as a consequence of ongoing dialogue with stakeholders and further Openreach consideration. It is supplied to you as part of Openreach's wider and ongoing consultation process and is intended for the use of Openreach's CP customers. We request that you use the document for the purposes for which it was made available and do not make it available to a wider audience, including end customers. This wider audience will be informed, if appropriate, in accordance with a communications plan, developed by Openreach.

Certain statements in this presentation are forward-looking and are made in reliance on the safe harbour provisions of the US Private Securities Litigation Reform Act of 1995. Although BT believes that the expectations reflected in these forward-looking statements are reasonable, it can give no assurance that these expectations will prove to have been correct. Because these statements involve risks and uncertainties, actual outcomes may differ materially from those expressed or implied by these forward-looking statements.

Factors that could cause differences between actual outcomes and those implied by the forward-looking statements include, but are not limited to: material adverse changes in economic and financial markets conditions in the markets served by BT; supplier arrangements; future regulatory actions and conditions in BT's operating areas; technological innovations; developments in the convergence of technologies and the anticipated benefits and advantages of new technologies, products and services, including broadband, not being realised.

The proposal for the GEA-FTTP product for 'Brownfield' deployment, including the product features, represents the Openreach view at the time of publication. It does not represent a finalised definition/specification of the GEA-FTTP Brownfield product. That will be dependent on further consultation with stakeholders and assessment of relevant commercial, legal and regulatory considerations, and the ability of Openreach to make a return on its investment. Any developments carried out by a CP based on the contents of this document are entirely at the CP's own risk.

3 Introduction & Background

Following its announcement as part of BT's Super Fast Broadband (SFBB) project in July 2008, Openreach offered initial views on developing a Fibre to the Premises (FTTP) Brownfield product on the 16th April 2009 at the Next Generation Access (NGA) Forum. The formal customer engagement programme on FTTP Brownfield will be continued via the NGA Forum, Trialist Working Groups and other industry and bi-lateral meetings as required. Any future developments which are identified as part of the process will be included on the GEA Product Roadmap.

Openreach considers GEA-FTTP to be a solution for the delivery of Super Fast Fibre Access in certain areas where it is considered a better economic investment than Fibre to the Cabinet (FTTC) or where FTTC is not technically viable. An example of the former could include whole exchange areas or specific PCPs, and for the latter, long lines and EO lines. Such investment will be complementary to investment in FTTC services, and we also aim (in so far as it is possible) to deliver a consistent customer experience across FTTP Brownfield, FTTP New Site and FTTC deployments with regards to the GEA product range, specification, pricing and CP handover.

The Openreach GEA-FTTC portfolio services and products are already seeing strong interest from industry but we do recognise that some customers (CPs) are likely to require further enhancements to the product capabilities. The factors which drive deployment decisions for NGA are very complex and interlinked (see Figure 1). FTTP delivers higher speeds at guaranteed and stable rates. However, the generally more challenging economics of deployment dictate that the demand for investment in FTTP needs to be proven against that of FTTC.

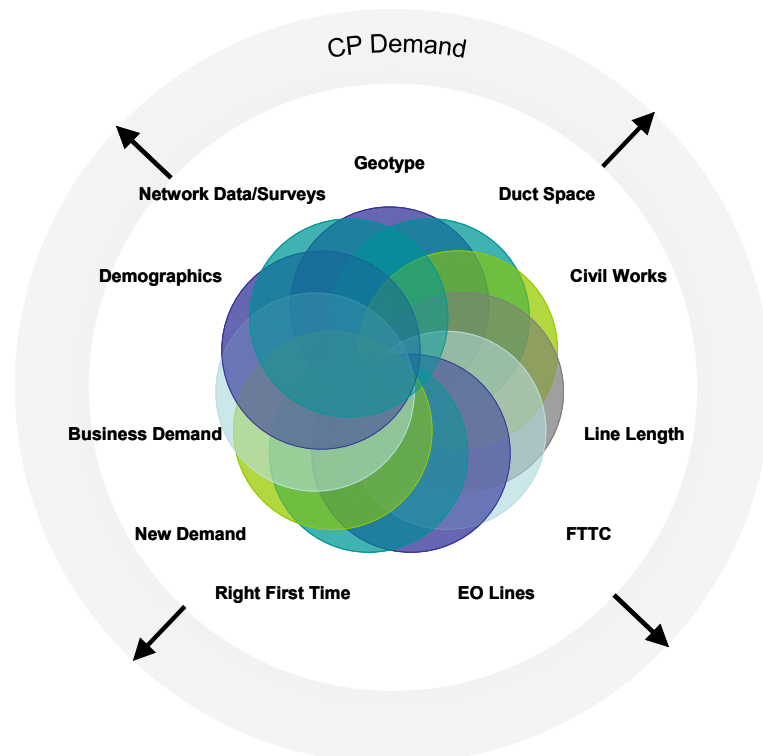


Figure 1 Example Roll-out Factors for GEA-FTTP Brownfield

4 GEA-FTTP Brownfield Product Proposal

4.1 Product Proposal Overview

A new GEA-FTTP Brownfield product is intended to be part of the Openreach Next Generation Access (NGA) portfolio following on from the successful pilot of GEA-FTTP at Ebbsfleet (deployed at a 'New Build' site) and the recently launched pilot of Generic Ethernet Access (GEA) over Fibre to the Cabinet.

Openreach defines Brownfield as being homes where fixed communications infrastructure is already present.

GEA-FTTP Brownfield will be a premium product designed primarily to meet the needs of the consumer market, but will also be of interest to Small and Medium Enterprises (SMEs). Roll-out and interconnection strategy is also intended to be complementary and aligned with wider NGA roll-out.

In addition to technical discussions Openreach is continuing to explore product offerings and commercial arrangements which could support customers moving from an overlay infrastructure to an all fibre connection. Such products could initially support a combined offering of GEA-FTTP and a copper line (WLR or MPF) at the End Users premise, but allow for a managed migration at a time when scalable wholesale voice over fibre services are available. In the meantime all existing services over copper would continue to remain available.

The GEA-FTTP Brownfield product seeks to deliver the same functionality as the GEA New Sites product. A Brownfield transition product is being constructed to allow early deployment of GEA-FTTP ahead of a capability to support a PATS-compliant voice access service - which is the subject of a separate Openreach customer consultation on Voice over NGA (see Section 5 below). When such capability is available for deployment to both New Site and Brownfield premises, the functional, infrastructure and commercial specifications for GEA-FTTP will be fully harmonised.

In our view, an operating model based on an Openreach active product will provide the most efficient cost base and the best customer experience for FTTP deployment. It will allow efficient supporting processes for provisioning, operation and repair to be designed to support an active and equivalent GEA product for the benefit of all downstream CPs and end-users.

The initial deployment of GEA-FTTP Brownfield will be offered on a fibre overlay basis, a transition product will be created such that a single CP can provide a combined PATS voice & Data solution to end users over a copper and FTTP-based infrastructure. Once a wholesale NGA voice access capability is available, the transition product will be withdrawn and standard charges will apply.

Openreach proposes, subject to CP interest:

- An Openreach Trial Phase starting approximately December 2009 to February 2010
- A Customer Trial Phase from March 2010 to May 2010
 - The number of homes passed in the customer trial phase has yet to be confirmed, but we would target areas that could serve up to 40k homes.
 - Deployment in one or two areas during the customer trial
- Early Market Deployment (FTTP only exchange areas)
- Product Launch

4.2 Product Bandwidths

The proposals for GEA-FTTP Brownfield have been simplified to align with GEA-FTTC and include improved upstream bandwidth options:

GEA-FTTP / GEA-FTTC	Downstream Peak	Downstream Prioritised	Upstream Prioritised
FTTP	40M	20M	2M
FTTC	≤40M	≤20M	≤2M
FTTP	40M	20M	10M
FTTC	≤40M	≤20M	≤10M
FTTP only	100M	20M	10M

Note - all rates for GEA-FTTC are 'up to' rates and reflect the innate uncertainty in a DSL delivered service.

4.3 Product Variants and Options

Product options for overlay with WLR and LLU:

- A single charge product (referred to in this document as a ‘transition product’) consistent with stand-alone GEA-FTTP prices to support the provision of GEA-FTTP services alongside copper based voice services, until a scalable wholesale voice over fibre offering is available.
- Openreach can also confirm that it intends to make GEA only products available (without an Openreach provided copper voice product) at Brownfield sites. In future this will also include New Sites.

Openreach will evaluate the following further additional developments:

- features to allow CPs ‘virtual’ control of network service configuration as far as technically possible and rich diagnostic and service monitoring features
- Options to support multicasting capabilities
- A lower bandwidth offering (post launch) intended for premises served by fibre-only (New Site and Brownfield)
- A scalable wholesale voice over fibre, PATS compliant product e.g. Voice over NGA is already subject to a separate Openreach customer consultation.

Openreach is also considering:

- Throughput charging options
- A geographical based charge for the line rental element to reflect local costs
- Commitment charging & volume discounts (post launch application)
- Different downstream options to support specific commercial services

4.4 GEA-FTTP Brownfield Network Architecture

Openreach has assessed the merits of both GPON and Point-to-Point fibre and believes that GPON represents the best solution, balancing the interests of service standards with flexibility, and commercial investment with cost impacts to the product price.

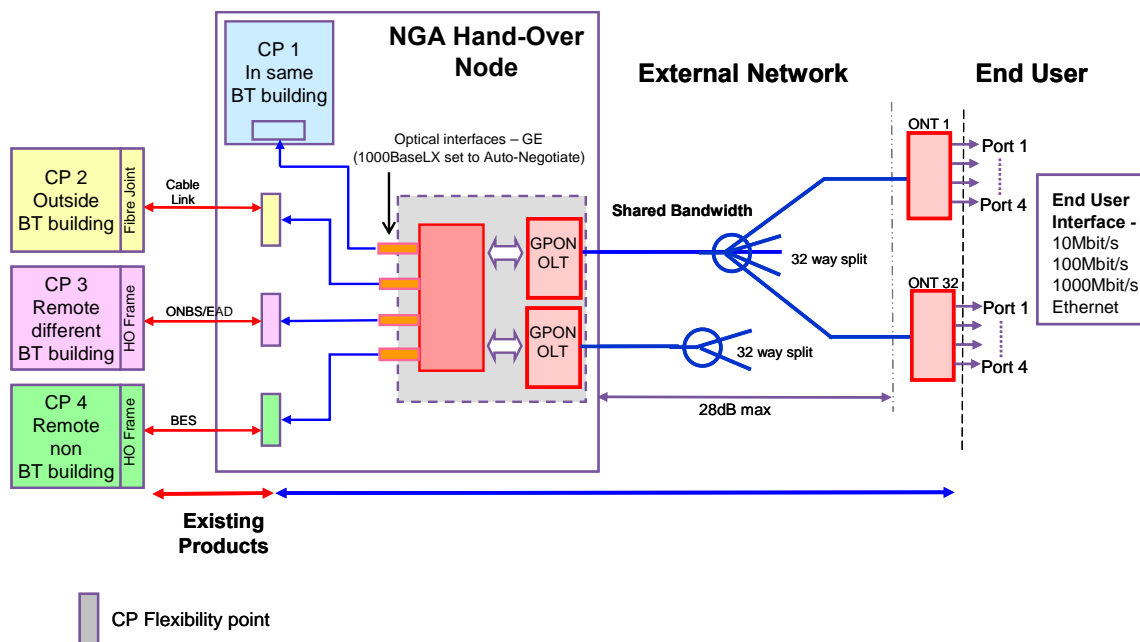


Figure 2 GEA-FTTP Brownfield Network Architecture

In order to support its network architecture approach Openreach is seeking a Variation to the Undertakings to permit the ownership and operation of FTTP related electronics by Openreach.

At this stage Openreach is not planning to offer FTTP related passive products, as there is insufficient clarity both in terms of the product requirements and demand, and significant commercial, operational and technology aspects which are as yet unresolved. We also note that Ofcom will be considering the issue of passive remedies as part of its Wholesale Local Access Market Review expected later this year.

4.5 Handover from Openreach to CPs (Exchange)

NGA Points of Handover are common across all NGA products and no specific change is anticipated for GEA-FTTP Brownfield.

Within each Point of Handover, Openreach will supply Layer 2 Switches (L2S) to terminate the PONs and also for connection to DSLAMs for FTTC. There may be more than one L2S in each Point of Handover. End Users will be connected to a specific L2S. The L2S to be used will be indicated to the CP in an initial line qualification request for the premises.

Commonly, all the GEA-FTTP Brownfield circuits from a specific enabled geographic/catchment area will terminate and handover at a single L2S for CP interconnect, but this is not guaranteed.

In order to interconnect to the GEA-FTTP (and GEA-FTTC) product, a CP needs to purchase a GEA Handover Connectivity to the L2S serving the End User/s.

Connectivity is required between the Openreach equipment and the CP's exchange-located equipment or backhaul presence via the common GEA Handover Connectivity product. Openreach is investigating options to provide additional resilience through use of LAG across ports on separate cards. The GEA Handover Connectivity will be a fibre interface carrying Ethernet at 1Gbit/s. It will carry the traffic from all of the CP's customers who are served within the hand over catchment area. Some CPs may require multiple GEA Handover Connectivity to handle their traffic volume.

There will be no integrated backhaul service beyond the Point of Handover as part of the GEA-FTTP Brownfield product, but CPs would be able to utilise their existing backhaul services or, where required, order new services from their chosen supplier.

Separate GEA Handover Connectivity products are not necessary for consumer NGA products - a GEA Handover Connectivity can take traffic from GEA New sites, GEA-FTTP Brownfield and GEA FTTC.

4.6 Openreach Optical Network Termination Unit (ONT)

The Openreach ONT or 'Active NTE' located at the end-user premises is anticipated to have four Ethernet ports.

The deployment during the customer trial phase will provide a maximum of two data ports per CP on the same ONT and also to consider multiple CPs.

Openreach anticipates that in future one or more CPs might be able to utilise more or all of the four ports designed within the ONT. The proposal for the ONT to be used in the customer trial should include two integrated ATAs in anticipation of a scalable and robust wholesale voice offering becoming available.

The installation of the ONT is anticipated to require a visit by an Openreach engineer for the initial service installation. It will be designed for residential installation and will require mains power supply from the End User. It will have suitable service activity indicators to support visual fault diagnostic processes with the End User. The ONT is proposed to have end-to-end diagnostic capability.

GEA-FTTP in both Brownfield and 'New Site' deployments will utilise common network equipment including the ONT.

4.7 Home networking

Openreach currently installs Network Terminating Equipment (NTE) for other products within 3 metres of where the network cable enters the premises. Openreach will follow this policy during the trial phases for FTTP but will consider the option of home network / wiring solutions beyond this, to be offered to End Users on commercial terms. The location of the building entry point and the 3 metre rule for fibre is an area that we will consider throughout the trial phases for GEA-FTTP, for example consideration of building entry common to other services and power availability.

4.8 Order Management, Systems and Processes

Openreach anticipates that the service fulfilment and assurance processes for both the customer trial and any wider market deployment would be supported by an Equivalence Management Platform (EMP) interface consistent with other Openreach NGA products.

Openreach proposes to offer the full range of service order types consistent with other Openreach products:

- Pro-active and demand driven PON build to a splitter; L2C order driven build from a splitter node to the End User premises
- L2C and T2R Order Management: (amend, slow faults, intermittent faults, hard down faults, transition line, transfer and change of address, customer establishment, cancel report, thresholds / faults, cease)
- Reports and proactive order information (KCI)
- Service Level Agreements: Any Service Level Agreement (SLA) will be consistent with other NGA consumer products where possible and align with the proposed service harmonisation across the Openreach portfolio. Higher availability is anticipated when compared with FTTC but it is expected that the initial L2C lead time to connect a premise will be longer in general for FTTP compared with FTTC, reflecting the additional work necessary to connect in a Brownfield scenario. The SLA targets for fibre delivered services may need to be reviewed in the medium to long term, due to the opportunity of reduced fault rates.
- Dialogue Services for geographical availability, appointing, address matching, pre-validation of ports (port availability), product bandwidth variant availability checker, service test and end-to-end diagnostics for FTTP components.
- Intermediate Agent injection will be considered within the design for the purpose of End User authentication and speed reporting on the line
- Novations

Openreach proposes to offer CPs both portal and B2B EMP interfaces for service provision orders and fault assurance reports.

4.9 Product Futures

The GEA-FTTP Brownfield product seeks to deliver the same functionality as the GEA New Sites product in the medium term, but also to facilitate early deployment of FTTP in Brownfield areas ahead of a scalable wholesale FTTP PATS voice line capability (currently subject to consultation). When this capability is available for deployment to both New Site and Brownfield premises the GEA FTTP functional, infrastructure and commercial specifications will be fully harmonised.

Openreach considers that End Users should continue to have the flexibility to take their primary line, voice and broadband services from the same or different CPs, and the GEA-FTTP product has been specifically designed to support such market scenarios.

However, for circumstances where the Brownfield overlay is intended to enable a customer to migrate to an all fibre service then it is proposed that where the same CP provides both voice and GEA-FTTP Brownfield data services, a transition product will be available. When a wholesale PATS-compliant voice capability over FTTP is available (currently subject to consultation), the transition product will be withdrawn and standard charges will apply to both FTTP-based and copper-based products. Openreach can also confirm that it intends to make available GEA only products i.e. without an Openreach provided copper voice product.

Following a successful customer trial, Openreach proposes that the GEA-FTTP Brownfield product will form the basis of a single NGA offering to support Brownfield and New Sites deployment of GEA services.

5 Voice delivery over NGA

The proposed development of a wholesale voice access solution to support scalable PATS compliant voice services over fibre, and the specification and requirements for such products is currently the subject of a separate Openreach customer consultation. The consultation covers customer requirements for both NGA New Site and Brownfield deployments. The consultation can be found at: <http://www.openreach.co.uk/orpg/news/productbriefings/nga/nga02509.do>

Openreach can confirm that the transition product and/or all other future voice proposals which are being considered do not prevent CPs from providing their own PATS compliant voice services based on the GEA-FTTP data product.

6 Targeted Market Geography and Commercial Sectors

The GEA-FTTP Brownfield product proposed within this document would be considered for deployment to areas with sufficient market demand.

The location of the customer trial will focus on an area where there is sufficient potential to derive positive learning on the operational and the marketing aspects of the Brownfield product.

Openreach agrees that alignment with GEA-FTTC and consideration of demographic and geo-type information is important. The commercial viability will remain a key factor in decisions on which infrastructure should be deployed.

The current GEA-FTTP customer trial proposal is primarily aiming for a mass market product at a mass market price. If strong demand for a business variant with business grade service levels is proven, then Openreach would be pleased to review the price/specification of an additional variant product to meet that need.

Openreach will consider demand driven models including those implemented outside the UK telecommunications market and invite further input from CPs about the models which would be preferred.

Openreach believes that GEA-FTTP Brownfield could be considered for implementation in exchange closure scenarios, offering a future-proofed NGA solution in these scenarios.

Openreach can confirm that there is no exchange closure programme which is being driven by FTTP roll-out, rather FTTP is being considered as a possible solution to exchange closure scenarios - for which there is an accepted industry process. If progressed, the use of FTTP as a replacement for copper will be the subject of a future customer consultation.

Below is a link to the briefing detailing access to the list of closures.

http://www.openreach.co.uk/orpg/news/generalbriefings/downloads/2009/Briefing_GEN017_09.pdf

6.1 Customer trial and Deployment Scope

Openreach proposes that subject to CP interest we would look to start a customer trial for this product in March 2010 with a view to beginning early market deployment in the summer 2010.

The purpose of the GEA-FTTP Brownfield product customer trial is:

- To prove the product experience (to determine the customers overall impression of ordering, receiving and using the product).
- To prove the processes and systems solutions in readiness for the early market deployment.
 - Prove the ability to plan & build an overlay FTTP network using both proactive and reactive demand-led build models.
 - Prove service provision and fault assurance.
- To prove that the CPs involved in the customer trial are able to work with Openreach GEA-FTTP Brownfield processes and systems in conjunction with their own processes and systems in order to manage end-to-end service fulfilment and assurance for the End Users.
- To prove the stability of the GEA-FTTP product network infrastructure in live service and in conjunction with CP network usage/interaction.
- To prove that CPs can construct their own broadband and other IP / data-dependent applications using the GEA-FTTP Brownfield product to supply service to End Users.
- To determine commercial viability of additional deployment beyond the Customer trial phase
 - Prove the costs of network provision for all geo-types and other factors to determine which fall within the required cost envelope.
 - Determine the price points required to make the GEA product a successful overlay product in the market.
 - Establish with participant Customer trial CPs the likely market take-up of the product to plan for a wider national rollout.

All of the above will be subject to any specific limitations of the customer trial site.

6.2 Market Volumes for Customer Trial

Openreach anticipates that during the customer trial that the homes passed will be between 5,000 and 40,000. Further growth of the customer base might be achieved at both the Customer trial site(s) and other sites (to be determined) from there on.

Openreach wishes to understand how best to select areas based upon End User/CP demand for the provision of GEA-FTTP Brownfield. Additionally, Openreach wish to understand if GEA-FTTP might be required to replace an area planned for FTTC rollout.

6.3 Pricing schemes

Openreach is currently engaged in an extensive exercise to develop a consistent pricing structure across a number of NGA deployment activities and Openreach will specifically aim to provide pricing coherent with GEA-FTTC where similar offerings are possible. The resultant pricing will take into account customer trial volumes and different deployment costs across a disparate set of geographies and technologies.

Openreach is offering GEA-FTTP Brownfield as a premium consumer service and will price the product appropriately for a mass market consumer product (the current product does not seek to provide a business specific product).

Openreach aims to publish:

- Range pricing proposal in September 2009
- Indicative prices for all transactional charges early in Q3 2009/10.
- Pilot and launch pricing to follow at a later date.

7 GEA-FTTP Brownfield Development Process and Roll-out

This document has been published to clarify how Openreach will work with CPs in order to encourage maximum co-operation and to establish CPs' preferred level of engagement around the development of the initial GEA-FTTP Brownfield product.

Openreach's objective for GEA-FTTP Brownfield is to develop an efficient and effective product that meets the needs of CPs and their End Users for solutions at appropriate locations. We aim to do this whilst balancing the demands of our business, recovering our costs and making a reasonable financial return on our investments.

A GEA-FTTP Trialist Working Group is being established and any CP wishing to join should contact their Sales and Relationship Manager (SRM). Interested parties will also be invited to participate in full product development of GEA-FTTP Brownfield in readiness for customer trial and help to determine the rollout model.

Such activity will be subject to a mutual agreement covering appropriate levels of non-disclosure and protection of the development and intellectual property as deemed necessary.

This will be subject to a commitment of adequate resource from each party for participation in pre-launch technical trials. Openreach will make available resources to support CPs' end to end internal trials if desired, with appropriate confidentiality.

Commercial model development will form part of the workstreams for the customer trial phase.

During the customer trial phase Openreach will update industry on progress of the customer trial on a regular basis through open forum and will invite further views on detail of the demand-led geographical roll-out model by written submission, which will be followed up in bi-lateral discussions.

Further product and associated information, documentation and details of the process for further engagement will be made available through the NGA Forum, the GEA FTTP Trialist Working Group and Bi-lateral approaches between Openreach and interested CPs.

On completion of the customer trial and after a suitable period of assessment and if necessary further consultation, Openreach will publish the finalised product specification subject to retaining any information considered commercially sensitive.

8 Document Control

Issue No:	Date:	Author / Editor:	Details of Change:
Issue 1.0	15 th May 2009	Chris McEwan	First issue
Issue 2.0	5th August 2009	John Greenstreet / Chris McEwan	Second issue

9 Glossary of Terms

Abbreviation	Full Name
ATA	Analogue Telephone Adapter
B2B	Business to Business
Brownfield	Sites / premises with existing communications network infrastructure (copper or fibre) able to supply service.
BT	British Telecommunications plc
CP	Communications Provider
DSLAM	Digital Subscriber Line Access Multiplexer
EMP	Equivalence Management Platform
EO or EOL	Exchange Only Lines
FTTC	Fibre To The Cabinet
FTTP	Fibre To The Premise
GEA	Generic Ethernet Access
GPON	Gigabit Passive Optical Network
KCI	Keeping Customer Informed
LAG	Link Aggregated Group
L2C	Lead to Cash
L2S	Layer 2 Switches
MPF	Metallic Path Facility
New Sites	Sites without existing communications network infrastructure supplying service. Also referred to as Greenfield.
NGA	Next Generation Access
NTE	Network Termination Equipment
Ofcom	Office of Communications [UK]
OLT	Optical Line Termination
ONT	Optical Network Termination
PATS	Publicly Available Telephone Service

PCP	Primary Connection Point
PON	Passive Optical Network
SFBB	Super Fast Broad Band
SLA	Service Level Agreement
SMPF	Shared Metallic Path Facility
SRM	Sales and Relationship Manager
T2R	Trouble to Repair
WLR	Wholesale Line Rental

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