



Wholesale broadband access regulation in France, Germany, The Netherlands, Portugal and Spain

Cullen International

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EXECUTIVE SUMMARY

This study compares the approaches to wholesale broadband access regulation taken by national regulatory authorities (NRAs) in five European countries – France, Germany, the Netherlands, Portugal and Spain – in the context of different regulatory objectives, market structures and technological choices.

Market context and main drivers for competition

France, Portugal and Spain focused from the early stage of next generation access (NGA) deployment on stimulating FTTH infrastructure-based competition. In these countries duct access was ultimately pursued as the main remedy under the significant market power (SMP) regime, which was complemented with symmetric obligations for in-building wiring. While maintaining regulated wholesale access to the legacy copper network, the NRAs in these countries refrained from extensive access regulation of the incumbents' NGA networks.

In contrast, Germany and the Netherlands initially placed greater focus on promoting service-based competition through regulated access to the incumbent NGA networks.

In Germany access regulation was centred around FTTC/VDSL with sub-loop unbundling (SLU) as a key remedy, which however had to be reassessed in the view of vectoring deployment. SLU still maintains its significance as the key physical access remedy in rural areas where alternative network operators (ANOs) have been enabled to implement own vectoring deployments. In urban areas with vectoring controlled by the incumbent, SLU has now been largely replaced with active bitstream access products.

In the Netherlands, the regulatory approach has been ultimately shaped by its oligopolistic market structure with two nationwide NGA infrastructures – the incumbent FTTx network and the major cable network.

DSL is still the most widely used broadband technology in France and Germany. However, only in Germany NGA deployment has been driven by copper network upgrade to VDSL vectoring, whereas in France all NGA deployments are based on FTTH. In the Netherlands, NGA take-up is characterised by the strong presence of three competing technologies: FTTC and FTTH by the incumbent operator and DOCSIS 3.0 by the major cable operator. Spain stands out among the five countries as the market where FTTH is now the prevailing broadband technology, whereas in Portugal FTTH faces strong competition from cable. Cable networks are present in all five countries, but their role has been particularly significant in the Netherlands and Portugal.

In France, the incumbent now faces strong competition from three major nationwide alternative operators investing in own FTTH networks. In Germany, alternative operators still mainly rely on the regulated access to the incumbent's network. However there has been growing competition from cable networks now covering two thirds of households and from smaller regional FTTH networks. In the Netherlands, the fixed broadband market shaped by the two competing nationwide infrastructures of the incumbent and its cable rival, has recently seen an increase in new entrants deploying FTTH in rural areas that often rely on a wholesale-only business model. In Portugal, infrastructure-based competition among private operators complemented by public investments in rural areas constitute the two main drivers for the NGA roll-out. In Spain, infrastructure competition started from an early stage, with three nationwide vertically integrated operators competing with the incumbent, especially in urban areas.

Regulatory approach to wholesale broadband/NGA access regulation

Summary of the main regulatory approach to NGA access (Cullen International)

Country	Main NGA type	Main regulatory approach to NGA access
France	FTTH and cable	SMP obligations: <ul style="list-style-type: none"> access to ducts and poles at cost-oriented prices Symmetric regime: <ul style="list-style-type: none"> access to fibre terminating segment
Germany	FTTC and cable	SMP obligations: <ul style="list-style-type: none"> Regional IP bitstream subject to ex post price control only Layer 2 BSA at cost-oriented prices Long-term discounts scheme ('contingent model') permitted
The Netherlands	FTTC, FTTH and cable	SMP obligations: <ul style="list-style-type: none"> Fibre unbundling for FTTH with a multi-year price cap VULA for FTTC at commercially agreed prices
Portugal	FTTH and cable	SMP obligations: <ul style="list-style-type: none"> access to ducts and poles at cost-oriented prices no regulated access to FTTH Symmetric regime: <ul style="list-style-type: none"> access to ducts and poles
Spain	FTTH and cable	SMP obligations: <ul style="list-style-type: none"> access to ducts and poles at cost-oriented prices no regulated access to FTTH until 2016 since 2016 regulated access to VULA and BSA over FTTH only in non-competitive areas Symmetric regime: <ul style="list-style-type: none"> access to fibre terminating segment (in-building fibre)

Elements of equivalence and non-discrimination

As far as the equivalence model is concerned, in France a stricter form of non-discrimination based on equivalence of inputs (EoI) has been applied in connection with the duct access obligations imposed on the SMP operator. Recently, the EoI regime has been also extended as part of symmetric access regulation that applies to all operators deploying fibre. This reflects the continued regulatory focus on infrastructure-based competition, whereas wholesale access to the legacy copper network of the SMP operator is provided under less strict equivalence of output (EoO) regime. A mix of EoI and EoO is also applied in the Netherlands and Portugal. In the Netherlands, EoO applies to the regulated wholesale products provided by the incumbent over copper and FTTC infrastructure, whereas EoI is imposed for FTTH. In Germany and Spain, equivalence regimes are based on EoO, although have been reinforced with certain EoI characteristics.

As the regulated SMP operators in these countries continue operating as vertically integrated entities, this study has a special focus on the mechanisms applied by the NRAs

to detect potential discriminatory behaviour and enhance transparency with respect to the delivery and quality of the SMP operator's regulated wholesale access products in the relevant markets¹. In particular, the following aspects have been assessed in connection with the regulatory obligations imposed in the wholesale local access market (M3a) and wholesale central access market (M3b) that are presented as three benchmarking tables in Annex I-III:

- Annex I – Service Level Agreements (SLAs) and Service Level Guarantees (SLGs).
- Annex II – Key Performance Indicators (KPIs).
- Annex III – Technically Replicability Test (TRT).

In all five countries, NRAs have imposed an obligation to report KPIs that measure the level of performance in the provision of the relevant wholesale services and compliance with the SLAs. In France, Germany and for most of the regulated services also in Spain, the KPIs are reported on monthly basis, whereas in the Netherlands and Portugal – on quarterly basis. There are however differences between countries in terms of transparency requirements. In France, the KPIs are published by the SMP operator on a publicly available website, in Portugal and Spain on a website that is only accessible by wholesale customers, while in Germany and the Netherlands the KPIs reported to the regulator are made available to wholesale customers on request. In addition, in France and Germany there is a requirement to report separately internal and external KPIs that enables a comparison between the quality of service the vertically integrated operator supplies to itself and the quality of service it provides to third-party access seekers. Following the most recent analysis of the broadband markets, in France this obligation has been now extended to apply to vertically integrated operators under the symmetric fibre access regulation.

¹ When referring to the NRA analysis of broadband markets, this study focuses on two markets broadly defined in the 2014 version of the [European Commission recommendation on the relevant markets](#) as the wholesale local access market (M3a) and the wholesale central access market (M3b).

I. FRANCE

A. Market context

According to the French regulator ARCEP's broadband observatory, the number of very high-speed broadband subscribers has almost reached the number of high-speed ones. ARCEP differentiates between:

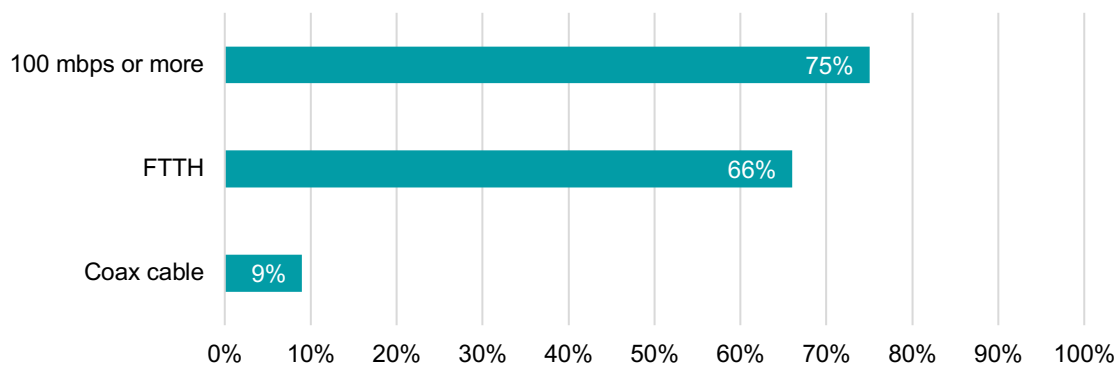
- very high-speed broadband connections: = or >30 Mbps based on FTTH, cable and FTTC; and
- high-speed broadband connections: <30 Mbps, mainly over copper.

Broadband connections in France, Q2 2020²

Very high-speed (≥ 30 Mbps downlink rate)	High-speed	Total broadband connections
42%	58%	30.05m
12.63m	17.42m	

The majority of very-high speed broadband subscriptions are based on FTTH. The number of very-high speed broadband subscriptions over coax cable has slightly decreased over the last two years³.

Distribution of very high-speed subscriptions: FTTH is the main technology to provide broadband subscriptions with at least 100 Mbps downlink rate



When it comes to fibre rollout, Orange, the incumbent, is the leading operator with 13.18m of FTTH lines deployed, representing 63% of total FTTH deployment. SFR Group is the second operator, with 2.57m of lines⁴.

The coaxial cable network is mainly available in the main metropolitan areas of France. It belongs to SFR Group which also deploys a FTTH network.

² 2Q 2020, ARCEP [broadband observatory](#)

³ 2Q 2020, ARCEP [broadband observatory, dataset](#)

⁴ Ibid

B. Main drivers for competition

Competition is mainly based on the deployment of own broadband infrastructure. Due to the average length of copper local loops, the upgrade of the incumbent legacy copper network was not seen as a viable solution for an NGA network. For this reason, a twofold regulatory framework was put in place to foster the deployment of FTTH throughout the country back in 2009 (further explained in the Regulatory approach section below).

Infrastructure competition in France is driven by four major national players:

- Orange, the incumbent operator with a nation-wide copper access network. It also leads FTTH deployments in France, covering 46% of households.
- SFR, part of Altice Group, is Orange's main competitor. It is the main wholesale customer using wholesale access to Orange's copper network. It also owns a coaxial cable network in urban areas and has been deploying own FTTH network.
- Free (Iliad) and Bouygues Telecom (Bouygues Group) are smaller national players, mainly competing based on wholesale access to Orange's copper network. They also have own fibre deployments, but at a lower scale.

In 2019, Orange had the largest retail market share for broadband services provided to residential users: between 40 and 45% of the total subscribers. SFR and Free had between 20 and 25% of the market each⁵.

The majority of copper wholesale access is based on local loop unbundling (around 90%, excluding self-supply by Orange). Wholesale access over copper provided to access seekers represented around 40% of all access solutions (taking copper, fibre and coax cable into account and including self-supply in the scope)⁶.

For businesses services, 75% of access was provided over copper. Orange had a market share between 35 and 40% for copper products. SFR had a market share between 20 and 25%. For services over fibre, both Orange and SFR had a market share of around 25-30% each⁷.

C. Regulatory approach to wholesale broadband/NGA access regulation

The twofold regulatory approach introduced in France back in 2009 is facilitating the deployment of fibre by imposing:

- an SMP obligation on Orange to provide access to its civil engineering infrastructure (ducts and poles) at cost-oriented prices, to facilitate deployment of fibre throughout France by any operator; and
- a symmetric obligation on all operators deploying fibre inside buildings to meet reasonable access requests to the terminating part of their network. Access is to be provided at a specific location between the end user premises (basement) and the optical distribution frame. Exact location depends on the density of population. The access tariffs must be set based on the principle of non-discrimination, objectivity, relevance and efficiency.

If the regulation of access to fibre had been symmetric since its creation (same access rules for all network operators), ARCEP introduced asymmetric wholesale obligations on Orange to promote the development of FTTH services for businesses in 2017. These obligations consist in offering the same wholesale passive fibre access product for the residential market, but with additional guarantees (premium SLAs).

⁵ 2019 - ARCEP [consultation](#) on assessment of the current cycle and outlook for the next market analysis cycle of the high-speed broadband access market

⁶ Ibid

⁷ Ibid

Fibre rollout is gradually taking place in the country based on two geographically differentiated approaches:

- **For large cities and mid-dense areas**, deployment is led by private initiatives, either from network operators own commercial deployment (large cities) or following binding commitments (mid-dense areas), but without public funding. The binding commitments format for mid-dense areas was put in place in 2018 to ensure that operators announcing deployment in some mid-dense area would effectively deploy.
- **In rural areas**, where private initiatives would not be economically viable, networks are deployed based on public initiatives. Regional or local authorities initiate calls for tender to select one operator in charge of deploying fibre on their territory based on a public service delegation. Deployment is financed with state aid from local authorities and specific funding by the French government.

D. Elements of equivalence and non-discrimination

Orange is a vertically integrated operator, providing both retail and wholesale services. There is not any form of separation applied to its structure. Wholesale operations are dealt with by Orange Wholesale France, a specific division inside Orange⁸. It deals with sales and purchase of fixed and mobile wholesale services for Orange Group in France. This division has its own director.

Until 14 December 2020 non-discrimination obligations imposed on Orange following the analysis of M3a and M3b/2014 were based on EoO. EoI was imposed only for access to ducts⁹. For EoO, ARCEP monitored whether access seekers benefited from a quality of service comparable to Orange Retail through the monthly publication of KPIs. ARCEP explained that KPI results reveal that the quality of service observed for Orange Retail is, in many cases, lower than that of access seekers¹⁰.

EoO also applied to the symmetric fibre access obligation imposed on all operators deploying fibre inside buildings¹¹.

In 2017 ARCEP questioned on the need to introduce stronger non-discrimination obligations on Orange as it was becoming the leading operator in fibre deployment.

Although smaller operators requested immediate introduction of EoI, ARCEP maintained the EoO approach in its final decision, taking into account Orange's commitments to strengthen technical and operational processes for the access to its fibre network¹². Orange committed to improve FTTH information systems and processes to guarantee equal treatment between third party network operators and Orange's retail services.

In 2019, after monitoring how Orange implemented its commitments, ARCEP approved¹³ Orange's improvements in particular on the eligibility processes, customer premises identification tools and ordering platforms.

On 15 December 2020, ARCEP adopted new decisions on the fixed broadband markets¹⁴. As more vertically integrated operators are active on the fibre market, ARCEP strengthened the non-discrimination obligation imposed on all infrastructure operators (symmetric regime) as regards the access to information.

EoI becomes the rule to access information systems, and for technical and operational processes. Nevertheless, the authority allows for derogation if strict application of EoI would generate excessive costs due to the development of specific tools or internal reorganisation.

⁸ Orange Wholesale [website](#)

⁹ ARCEP's [decision](#) on M3a/2014 of Dec. 2017

¹⁰ Draft decision on M3a/2014 of Oct. 2020, notified to the EU Commission on 2 Nov. 2020, p. 114

¹¹ ARCEP's [decision 2015-0776](#), p. 18

¹² ARCEP's [decision](#) on M3a/2014 of Dec. 2017, pp. 150-153

¹³ ARCEP [assessment](#) in January 2019; ARCEP [assessment](#) in June 2019

¹⁴ ARCEP [decisions](#) for M3a, M3b, M4/2004, a newly defined market for physical infrastructure access, and some amendments to the symmetric obligations for access to fibre

ARCEP did not impose on Orange specific non-discrimination obligation for access to fibre under the SMP regime. Instead, the regulator will make sure Orange implements its commitments to improve technical and operational processes, as it had committed to.

The regulator introduced one exception though: an EoI treatment applied to some extent in the provision of passive access over fibre for the business services with a 4-hour service guarantee.

In the newly defined market for physical infrastructure access, covering ducts and poles suitable for the deployment of fibre and masts, Orange must provide non-discriminatory access to its infrastructure, based on EoI, except if the infrastructure is used to deploy backhaul networks, where it is sufficient to ensure that the wholesale conditions are comparable to those provided by Orange for its own operations.

II. GERMANY

A. Market context

The main NGA networks in Germany are the upgraded copper network (FTTC) of the incumbent operator Telekom Deutschland and cable networks (hybrid fibre-coaxial, HFC). Germany has only minor FTTH/FTTB deployments.

Fixed broadband networks (Cullen International)

Copper	Telekom has largely completed the upgrade of its network to an all-IP network based on FTTC with VDSL2 vectoring. A further upgrade to Vplus (marketed as “supervectoring”) is ongoing. At the end of 2019, 84.1% of German households had coverage with ≥50 Mbps over xDSL, 69.6% with ≥100 Mbps and 45% with ≥200 Mbps.
Cable	About two thirds of German households are passed by cable networks, which are almost completely upgraded to at least DOCSIS 3.0, with upgrades to DOCSIS 3.1 ongoing. 62.9% of households were covered with ≥400 Mbps over cable networks at the end of 2019 and 37.8% with ≥1 Gbps.
FTTH/FTTB	The association VATM estimates that alternative operators (typically local or regional utilities) will cover 7.6% of German households with FTTH/FTTB by the end of 2020 and Telekom will cover 4.9%. Several stakeholders have announced plans to make significant investments into FTTH, such as Deutsche Glasfaser and new joint ventures of Telekom with EWE (utilities) and Telefónica with Allianz (insurance).

The German federal government and the 16 federal states have been offering various forms of public funding to increase broadband coverage in underserved (typically rural) areas.

These state aid programmes were mainly based on the federal government’s target to cover 100% of households (HH) with at least 50 Mbps. This requirement could be fulfilled with any NGA technology, even with Telekom’s original rollout of FTTC+VDSL without vectoring.

A recent €12bn state aid programme, which has just been approved by the European Commission, will support the deployment of gigabit broadband speeds in areas not yet covered by 500 Mbps (download) or 200 Mbps (symmetric).

Retail fixed broadband market (Cullen International based on BNetzA)

Copper	72% of retail fixed broadband subscribers, of which: <ul style="list-style-type: none"> • 39% are subscribers of Telekom; and • 33% are subscribers of an alternative operator which uses Telekom’s wholesale services like regulated local loop unbundling (decreasing), regulated bitstream (increasing) or unregulated resale
Cable	24% of retail fixed broadband subscribers
FTTH/FTTB	4% of retail fixed broadband subscribers

As far as speed is concerned, about 40% of end users use a broadband product with an advertised speed of 30 to 100 Mbps, 35% use products slower than 30 Mbps and 25% products faster than 100 Mbps.

B. Main drivers for competition

In Germany, service-based competition builds on a large number of operators that buy regulated services from Telekom. In addition, Germany has significant infrastructure-based competition, in particular driven by

- cable networks (that cover about two thirds of households); and
- a small but increasing coverage of FTTH/FTTB networks.

The main operators in the fixed broadband market are Telekom (FTTC + VDSL and some FTTH), Vodafone (now with cable networks in all 16 federal states), Telefónica Germany (buying IP bitstream from Telekom) and 1&1 (buying layer 2 bitstream from Telekom).

There are also many smaller operators such as Deutsche Glasfaser and EWE deploying fibre as well as NetCologne, M-Net or TeleColumbus for cable. Many smaller operators were established by local or regional utilities.

By far the largest cable network operator is Vodafone, which acquired Kabel Deutschland (with networks in 13 federal states) in 2013 and Unitymedia (active in the other three federal states) in 2019 and now covers around 59% of German households.

The dynamic infrastructure competitive environment is well illustrated by the different industry associations operating in the telecoms sector:

- The association **BREKO** assembles around 360 members with own networks based on different technologies such as FTTH/B, local loop unbundling in Telekom's network or cable.
- **BUGLAS** association represented by only those that build FTTH/B and has some 160 members.
- **ANGA** has more than 200 members, mostly cable networks.
- Another alternative operators' association is **VATM** but its members do not necessarily deploy own infrastructure.

C. Regulatory approach to wholesale broadband/NGA access regulation

The German regulator was established in 1998 as regulatory authority for telecoms and post (RegTP) and later also became responsible for energy and railways. Since 2005 it is known as Federal Network Agency (**BNetzA**). **Bundeskartellamt** is the German competition authority.

BNetzA conducts market analyses in several steps, deciding first on market definition and significant market power (SMP) and in a separate decision on regulatory obligations.

The decision on regulatory obligations usually defines the remedies in only one or two pages. Details are regulated in separate procedures to approve reference offers and procedures that set wholesale prices. These procedures do not follow the same time cycles as the market analyses.

The current regulation of markets 3a and 3b/2014 takes account of Telekom's migration to an all-IP network based on VDSL2 vectoring. Two major decisions of BNetzA from **August 2013** and **September 2016** defined rules that allowed Telekom (and under certain conditions also other operators) to deploy vectoring but required the provision of a new layer 2 bitstream product.

Telekom developed the product Layer 2 Bitstream Access (L2-BSA), which became operational at the end of 2016 with some final decisions on reference offer and wholesale prices in July 2017.

Most access seekers are now using the so-called contingent model. This model allows discounts on the monthly fees for operators that commit to buying a larger contingent of L2-BSA and/or IP-BSA access lines over a period of eight years by making an upfront payment. Telekom introduced the contingent model in 2012 in parallel to its network upgrade to FTTC+VDSL2 vectoring, which is now completed. The contingent model gave access seekers an incentive to migrate their customer base from the legacy network to Telekom's new network, in particular to migrate from physically unbundled local loops to the new bitstream product L2-BSA (with local handover) or to IP-BSA (with regional/national handover).

A new round of market analyses is ongoing and will change the delineation of markets 3a and 3b/2014. L2-BSA will in future be treated as a substitute to other forms of local access in market 3a/2014, no longer as a sub-market of market 3b/2014.

Regulation of Telekom Deutschland's main fixed wholesale products (Cullen International)

Wholesale access service	Last round of market analyses	Ongoing market analyses	Price control imposed in last market analyses	Reference offer
Local loop unbundling (physical access)	M3a/2014 Nationwide	M3a/2014 Nationwide	Cost orientation (LRIC) based on detailed cost model	Comprehensive review from 2015 to July 2020

Wholesale access service	Last round of market analyses	Ongoing market analyses	Price control imposed in last market analyses	Reference offer
KVz-AP (layer 2 bitstream with handover at the street cabinet)				
Layer 2 Bitstream Access (L2-BSA) with handover at 897 broadband network gateway (BNG) locations	Sub-market of market 3b/2014 Nationwide	Market 3a/2014 Nationwide	Cost orientation based on LRIC + 15%	First version finalised in 2016/2017, small amendment in 2019
IP Bitstream Access (IP-BSA) with handover at originally 73 and in future 11 points, or at a single point	Sub-market of market 3b/2014 20 cities competitive and deregulated	Market 3b/2014 Proposed: all cities >60,000 inhabitants competitive and to be deregulated	Ex post price control BNetzA would only intervene in case of abusive pricing	Comprehensive review pending since 2016
Wholesale Internet Access	Not regulated	Not regulated	Not regulated	Not regulated

BNetzA has largely completed the steps of market definition and SMP assignment and will now have to decide on the remedies to be imposed on Telekom in the two markets, in particular to what extent Telekom's FTTH network will be regulated.

In July 2019, BNetzA published [key points](#) on the planned new remedies in market 3a/2014.

According to this document, BNetzA would largely maintain the detailed regulation of Telekom's copper network but would only impose a lightweight set of remedies for the FTTH network, maybe only with obligations of non-discrimination and transparency.

The current regulation theoretically obliges Telekom to provide access to its FTTH network, but this has never been enforced in practice. There is no fibre unbundling in Germany, no L2-BSA over FTTH and the regulated IP-BSA reference offer does not include FTTH.

Telekom and Telefónica announced in October 2020 to extend their commercial agreement to FTTH, which will allow Telefónica to buy IP-BSA over FTTH. The agreement should become operational in spring 2021. Telekom announced to offer such access also to other interested operators. It remains to be seen whether other operators like 1&1 and Vodafone will be satisfied by that voluntary offer or will ask BNetzA for some regulatory intervention.

Cable networks have never been regulated by BNetzA but Vodafone committed in merger control proceedings to offer bitstream services to Telefónica and the cable network operator TeleColumbus (which covers about 6% of households) recently signed a commercial agreement with Telefónica. Both bitstream services will become operational in the near future.

Regulation of access to passive infrastructure is largely based on symmetric obligations. Germany transposed the Broadband Cost Reduction Directive as a chapter of its Telecommunications Act. Based on these rules, BNetzA settles many local disputes between operators or between operators and infrastructure owners.

D. Elements of equivalence and non-discrimination

There is no separation of the incumbent operator. Telekom Deutschland is vertically integrated and provides all fixed and mobile services of Deutsche Telekom group in Germany. The internal organisation of Telekom Deutschland has never been an issue of telecoms regulation.

Most of BNetzA decisions that imposed regulatory obligations after conducting a market analysis also imposed a non-discrimination obligation. However, the wording of these obligations is usually very short.

The decisions on markets [3a](#) and [3b/2014](#) which are currently in force say that contractual agreements on access must be "based on objective rules, comprehensible, and must provide equivalent access that can be compared, in terms of functionality and price, at least to the form of

access that [Telekom] grants itself – even though it could be based on different systems and procedures”. The agreements must also meet the principles of equality of opportunities and equity.

The abovementioned two decisions also oblige Telekom to provide monthly KPIs on ordering procedures, provision of service, service quality (including faults), fault repair times and migration from one regulated wholesale access service to another. However, BNetzA did not specify the KPIs in detail but only says that they must allow to verify whether Telekom complies to the non-discrimination obligation. Telekom is not obliged to publish the KPIs but only makes them available to BNetzA and access seekers.

BNetzA has never imposed non-discrimination based on EoI and always found EoO sufficient. BNetzA’s document of July 2019 on future remedies in market 3a/2014 does not propose to change this with regard to Telekom’s copper network but raises the question whether future regulation of Telekom’s FTTH network should be based on EoO or EoI.

In practice, the existing regulation of Telekom’s reference offers for access to the copper network has resulted in changes that have become very close to EoI.

This is the result of active participation of alternative operators and their associations in the lengthy procedures to approve new reference offers. BNetzA conducts several rounds of consultations and public hearings before approving a new reference offer.

Two important tools for non-discrimination (Cullen International)

PreOrder interface (operational since Nov. 2020)	<ul style="list-style-type: none"> • Gives alternative operators’ call centres the same real-time access to Telekom’s operational databases that Telekom’s own call centre has. • It shows the different products that are available at a given address, whether a field engineer visit would be necessary to activate a given product and the available time slots of field engineers. • Alternative call centres may reserve a time slot already during the contact with the end user.
L2-BSA product	<ul style="list-style-type: none"> • Gives access seekers largely the same technical possibilities to define retail products as Telekom uses for its own products. • Transports Ethernet frames with four different classes of quality of service. • Handover at the same 897 BNG locations where Telekom configures its retail products.

With regard to price control, BNetzA has always relied more on bottom-up cost models and on own analysis of Telekom’s top-down cost accounting data than on economic replicability tests (ERTs).

There are detailed descriptions of the [cost models](#) (developed by WIK) but there is no similarly formalised ERT.

Wholesale prices for local loop unbundling are regulated in much detail based on BNetzA’s established cost model for the access network.

When BNetzA regulated the prices of L2-BSA for the first time, it used LRIC from the bottom-up cost model but allowed to add up to 15%. BNetzA then conducted several price squeeze tests (comparing L2-BSA to flagship retail products) and margin squeeze tests (comparing L2-BSA to other wholesale products) but those tests did not require any further adjustment of prices.

Generally, price squeeze or margin squeeze of broadband offers has not been an issue in German regulatory practice. Telekom does not use aggressive pricing for its mass-market retail broadband products. BNetzA intervened only in a few narrowly defined cases. For example, BNetzA required amendments to Telekom’s first VDSL “contingent model” discount scheme in 2012 due to margin squeeze between that discount scheme and the regulated wholesale prices.

III. THE NETHERLANDS

A. Market context

The Netherlands is a small, densely populated country. Almost all households (94%) subscribe to a fixed broadband service. The vast majority of broadband lines (>90%) have speeds above 30 Mbps and almost half (47%) have speeds above 100 Mbps ([ACM Telecommonitor 3Q 2020](#)).

KPN, the incumbent operator, and VodafoneZiggo, a cable operator, each have about 45% of the retail broadband market. The final 10% is served by T-Mobile, who [acquired](#) the Dutch subsidiary of Tele2 in 2019, and a number of small local cable and fibre operators ([ACM Telecommonitor 3Q 2020](#)).

Fixed broadband networks (Cullen International)¹⁵

Copper	One third of fixed broadband connections is based on copper, almost 90% of those are FTTC.
FTTH	One fifth of fixed broadband connections is based on FTTH.
Cable	Just under half of fixed broadband connections is based on cable (HFC with DOCSIS 3.1).

KPN deploys a combination of FTTC and FTTH which cover 56% and 33% of households respectively ([KPN Quarterly Report 3Q 2020](#)). These networks are mainly deployed in urban and suburban areas and the footprints largely overlap.

Cable operator VodafoneZiggo, owned by Liberty Global, covers 98% of households with DOCSIS 3.1 ([Liberty Global](#)).

B. Main drivers for competition

Competition in the retail broadband market is mainly driven by infrastructure competition between KPN, with FTTH and FTTC, and VodafoneZiggo, with cable. Both operators are vertically integrated and are present all over the country.

KPN [acquired](#) sole control of Reggefiber in 2014, a joint venture investing in local fibre access typically offering fibre connections in one city or one municipality. Reggefiber was a subsidiary of Reggeborgh, a Dutch real estate developer. Reggeborgh used it to connect its new developments, mainly multi-dwelling buildings in urban and suburban areas, with fibre.

That same year, UPC Netherlands merged with Ziggo to form the largest Dutch cable operator with a national footprint. In 2017, Vodafone Netherlands created a joint venture with Ziggo to form VodafoneZiggo, offering fixed and mobile broadband services ([VodafoneZiggo](#)). This resulted in two operators, KPN and VodafoneZiggo, offering fixed and mobile broadband services all over the Netherlands with their own infrastructure.

In some local areas, small operators compete with both KPN and VodafoneZiggo. The largest of these is Delta. It is vertically integrated and operates both a cable and a fibre network in some areas of the Netherlands ([Delta NL](#)).

Several of these small local operators work under a wholesale-only model and rely on third party ISPs to offer internet services over their networks.

T-Mobile and other ISPs rely on wholesale access provided by KPN, on both regulated and commercial basis.

About 40% of wholesale access is based on regulated unbundling (over copper or fibre) and 60% of wholesale access is based on commercial virtual unbundling (VULA) or bitstream. VULA and bitstream are both part of the same commercial wholesale broadband reference offer ([KPN](#)).

¹⁵ [ACM Telecommonitor 3Q 2020](#)

C. Regulatory approach to wholesale broadband/NGA access regulation

The current regulator ACM, the authority for consumers and markets, was formed in 2013 by merging the consumer protection authority, the competition authority and the telecoms NRA OPTA.

Historically, OPTA/ACM has prioritised local loop unbundling as a means to stimulate infrastructure competition. The main wholesale buyer was Tele2, now part of T-Mobile.

KPN has always offered wholesale broadband access (WBA, bitstream) on commercial basis.

In its market analysis of 2018, ACM concluded that there is a risk that KPN and VodafoneZiggo have joint dominance in the retail broadband market and imposed remedies on both operators in the wholesale market (ACM).

However, this decision was **annulled** by the Dutch trade and industry appeals tribunal in March 2020. The court rejected ACM's analysis, concluding that it had not sufficiently justified that VodafoneZiggo and KPN have the ability and incentive for tacit collusion, neither in the retail or in the wholesale market.

With this annulment, the previous round of market analysis remains in force, where market 3b has been deregulated since May 2012 and market 3a has just KPN designated as having SMP.

Overview of regulated wholesale products (Cullen International)

Relevant market	SMP operator	Copper and FTTC	FTTH
M3a/2014	KPN	LLU VULA	Fibre unbundling (ODF access)
M3b/2014	-	-	-

In practice, VULA is part of the commercial wholesale broadband offer (bitstream) and is available over copper, FTTC and FTTH. ACM can step in and set regulated prices if a commercial agreement cannot be reached.

Most wholesale buyers of LLU, like T-Mobile (Tele2), are migrating their installed base to VULA in order to upgrade their broadband offers to higher speeds.

D. Elements of equivalence and non-discrimination

The incumbent operator KPN is vertically integrated. KPN has an internal wholesale division with careful management of information flows (Chinese walls). VodafoneZiggo, the cable operator, does not offer wholesale access to its network.

KPN is subject to non-discrimination obligation based on EoO and EoI (Cullen International)

Wholesale product	Equivalence model	Services
Over copper and FTTC	EoO	<ul style="list-style-type: none"> availability of services and networks (both guaranteed and achieved availability needs to be the same for internal deliveries and for external wholesale deliveries) planned maintenance (announcement, duration and frequency of planned interruptions as well as whether these happen during working hours or outside working hours) repair of faults and disturbances (response time, repair time) process of ordering and delivery (response time, delivery time, conditions, access to operational support systems, support for planning of service activations and client visits) new or changed services (KPN cannot offer a new or changed retail service without first announcing and making available a corresponding wholesale service at least two months in advance) sharing of information (change of tariffs, new IT developments, change of conditions in delivery or repair, change of service descriptions).
Over FTTH	EoI	

KPN must include SLAs and SLGs in its reference offers. The parameters of both SLAs and SLGs were agreed between KPN and market players. The regulator can impose changes to either of these upon request of market players as part of a dispute resolution.

Every quarter, KPN must send a report of its performance to the regulator and to market players. These KPI reports are not public. The regulator can see all reports. Market players only see KPN's performance for themselves and for the market as a whole.

Access seekers have the option to themselves install or repair lines for their customers. Only certified engineers can enter KPN's technical buildings to perform works. These works are not included in the performance reports.

A price squeeze test applies based on an equally efficient operator (EEO) efficiency standard. Before the launch of a retail broadband offer, KPN must internally perform a price squeeze test. KPN does not need an explicit approval to launch a retail offer. Every quarter, KPN must send a report to ACM, who may investigate in case of doubts or complaints. These reports are not public and only accessible by the regulator, not by market players.

Neither a technical replicability test (TRT), nor an economic replicability test (ERT) is imposed. In its decision, ACM stated that applying an ERT, as prescribed by the Commission recommendation on costing methodologies and non-discrimination, would limit KPN's pricing flexibility and have a negative impact on KPN's business case.

Wholesale prices for LLU over copper are regulated with a price cap that is set at the cost-oriented prices established in 2011 adjusted for inflation. This is to avoid a significant increase in the cost-oriented copper price as a result of the migration to fibre, when a largely unchanged cost basis would be allocated to fewer lines.

Wholesale prices for VULA over FTTC are unregulated. Shortly before ACM adopted its market analysis, KPN agreed with market players on a reference offer for VULA with commercial prices. In case of complaints, the regulator will step in and may set cost-oriented prices.

Wholesale prices for fibre unbundling (ODF access) are subject to a multi-year price cap. The caps allow KPN to obtain a reasonable return on investment. This reasonable return includes a risk premium on top of the regulated weighed average cost of capital (WACC). Every year, the regulator analyses the internal rate of return (IRR) of a discounted cash flow (DCF) model based on KPN's business model. If the IRR is higher than the reasonable return, wholesale prices will be adjusted to compensate. A lower-than-expected IRR remains at the risk of KPN, it cannot increase wholesale prices to compensate. The DCF model and its analysis are not public.

Examples of ACM's interventions to enforce the non-discrimination obligation (Cullen International)

Date	Fine	Conduct
2015	€2m	ACM fined KPN for not offering the same backhaul options for subloop unbundling in wholesale as it offers to its own retail division.
2013	€1m	ACM fined KPN for not making a wholesale service available to market players in time before launching a new retail service.
2010	€10m	ACM fined KPN for illicit discounts to business users in framework contracts that would also apply to services based on regulated inputs, without offering a corresponding wholesale tariff that would allow competitors to replicate these framework contracts.

IV. PORTUGAL

A. Market context

In Portugal, FTTH and cable (HFC with DOCSIS 3.1) are the main NGA technologies providing high-speed broadband connectivity (at least 30 Mbps transmission speed) to households.

Take-up of broadband of at least 30 Mbps in 2019 stood at 61.4% of households, above the European Union (EU) average of 48.7%, while take-up of broadband of at least 100 Mbps was 56%, well above the EU average of 26%.

ANACOM [report](#) of 3Q 2020 on NGA fixed high-speed networks and services shows that the total coverage of high-speed networks reached 87%

NGA technology	Coverage % HH
FTTH	83% The number of households covered with FTTH reached 5.3m, a 7.3% increase compared to 3Q2019.
Cable (HFC with DOCSIS 3.1)	59.4% The number of households covered with cable reached 3.8m, a 0.1% increase compared to 3Q2019.
Total high-speed networks (FTTH + cable)	87% ANACOM estimates that around 5.5m households were wired with at least one high-speed network by the end of 3Q2020, a 4.2% increase compared to 3Q2019.

Historically, NGA availability in Portugal has been increasing at both national and rural level in the last five years. According to the latest European Commission's [study](#) on broadband coverage, in 2019 Portugal stood slightly below (94.9%) the EU average for fixed broadband¹⁶ (97.1%) as well as below (83%) the EU average for NGA broadband¹⁷ national level (85.8%). However, Portugal surpassed the EU average broadband coverage in rural areas for both the abovementioned categories.

In 2009, the government launched five public tenders for the deployment and operation of next generation broadband networks in five rural areas not served by NGA networks. The tenders were technology neutral, requiring that each final client would be able to obtain download speed of at least 40Mbps. The winning bidders were DSTelecom in Alentejo, Algarve and in the North region, as well as Viatel (Fibrogloba was the company set up by Viatel for this purpose) in the Centre region, Azores and Madeira.

Following the abovementioned public tenders, the government further pursued its policy to promote deployment of NGA networks through a [national broadband strategy](#) adopted in 2012 and updated in 2015 with the action plan [Portugal Digital](#).

B. Main drivers for competition

Public investment and infrastructure-based competition among private operators are the two main drivers for the upgrade of basic broadband networks in NGA ones (FTTH and cable).

As far as public investment is concerned, the government promoted NGA networks deployment in Portugal through state aid.

As mentioned above, according to the action plan Portugal Digital, the government set the goals to reach a coverage of at least 30 Mbps for 100% of the population and a coverage of at least 100 Mbps for 50% of all households by the end of 2020.

¹⁶ Overall fixed broadband coverage includes all the main fixed-line broadband access technologies, excluding satellite. Combination of DSL (including VDSL and VDSL2 Vectoring), cable modem DOCSIS 3.0 (including DOCSIS 3.1), FTTP and FWA.

¹⁷ NGA coverage includes fixed-line broadband access technologies capable of achieving download speeds meeting the Digital Agenda objective of at least 30 Mbps coverage. Combination of VDSL (including VDSL2 Vectoring), DOCSIS 3.0 (including DOCSIS 3.1) and FTTP.

Although there are no specific regulatory obligations applicable to NGA networks, the telecoms regulator (ANACOM) focused on boosting infrastructure-based competition by enforcing:

- duct and pole access obligations;
- NGA coverage subsidies and investment commitments (e.g., subsidies in rural areas and joint investment between operators);
- a [set of provisions](#) aimed at ensuring open access to infrastructure (e.g., piping networks, masts, ducts, etc.) capable of housing electronic communications networks (already deployed and/or under construction); and
- the set-up of the [Suitable Infrastructure Information System](#) to assure the provision of information relative to the infrastructures suited for the accommodation of electronic communication networks.

The consolidation of NGA in Portugal started in 2013 with the merger between the cable operator ZON and Optimus, which led to the establishment of NOS. The subsequent decrease of the incumbent operator (MEO) market shares benefited its two biggest competitors NOS and Vodafone, which constitute the other two nationwide vertically integrated network operators.

ANACOM [reported](#) that the abovementioned three operators had significant broadband access market shares in Portugal at the end of the first half of 2020. Specifically, MEO had the highest share of residential accesses (38.8%), followed by NOS (37.7%) and Vodafone (19.3%).

C. Regulatory approach to wholesale broadband/NGA access regulation

Historically, the regulatory approach to NGA access regulation was focused only on regulating access to passive infrastructure such as ducts, poles and in-building wiring. The regulatory framework for access to passive infrastructure has been defined by two sets of regulation, symmetric and asymmetric.

In the context of market analysis procedures (asymmetric regulation), ANACOM required MEO (former Portugal Telecom), the SMP operator, to publish a reference offer for access to its ducts and poles infrastructure. In parallel, a Decree-Law no. 123/2009 introduced a set of provisions aimed to ensure an open access to present and future passive infrastructures that are suitable for the accommodation of electronic communications networks (symmetric regulation).

Furthermore, ANACOM has never applied asymmetric SMP regulation of MEO's fibre network and wholesale central access to its copper network has been progressively deregulated in more competitive areas since 2009.

In the context of the latest analysis of fixed broadband markets, ANACOM approved the [final decision](#) on market 3a/2014 and market 3b/2014 in March 2017. These decisions maintained MEO's designation as having SMP in both markets.

In market 3a/2014, ANACOM decided to maintain on MEO the obligations of local loop unbundling for copper¹⁸ as well as access to ducts and poles.¹⁹ In addition, MEO is subject to the obligation of providing access to dark fibre whenever there is no space in existing poles or ducts. The offer of dark fibre may be included in existing reference offers on access to ducts and poles or constitute an autonomous reference offer.

ANACOM did not impose an access obligation on MEO's fibre network neither in competitive nor in non-competitive areas (e.g., rural areas). By adopting this approach, ANACOM did not follow the Commission's Recommendation of November 2016 requiring the imposition of a wholesale obligation for MEO to provide local unbundling and bitstream access over fibre in non-competitive areas. Nevertheless, the regulator stated that it would continue to monitor the FTTH market evolution, with a special focus on non-competitive areas, and possibly assess it in a new market review.

As far as market 3b/2014, ANACOM concluded, similarly to its previous analysis, that the existence of various competitive conditions at retail level in different geographic areas justified the definition of two sub-national markets (non-competitive and competitive areas).

¹⁸ offered by MEO through the [Reference Unbundling Offer \(ORALL\)](#)

¹⁹ offered by MEO through the [Reference Conduit Access Offer \(ORAC\)](#) and the [Reference Pole Access Offer \(ORAP\)](#)

Thus, the regulator designated MEO has SMP operator in non-competitive areas where it decided to impose an obligation for copper accesses. ANACOM decided not to impose on MEO an obligation to access fibre in market 3b/2014, following the decision already taken for market 3a/2014.

An area is deemed competitive and with no remedies imposed on operators if:

- there are at least two ANOs, as well as MEO, and each ANO has more than 50% NGA coverage (NGA meaning fibre and cable DOCSIS 3.0); or
- there is one ANO with more than 50% NGA coverage and MEO's retail market share in the parish is below 50%.

For both markets, ANACOM imposed further transparency and cost-oriented pricing obligations in order to prevent potential competition problems, such as excessive prices or discriminatory practices.

D. Elements of equivalence and non-discrimination

MEO is a vertically integrated operator, providing both retail and wholesale services. There is no form of separation applied to its structure. The operator uses its own infrastructure and network to provide retail access services, as well as support for other electronic communications services of the group.

As far as market 3a/2014 is concerned, MEO is subject to a non-discrimination obligation regarding access to LLU and SLU and auxiliary facilities. ANACOM imposed:

- EoI for duct and pole access; and
- EoO for LLU and dark fibre.

When implementing the abovementioned equivalence models, MEO shall ensure that technical replicability, effective implementation of SLAs, compensation and KPIs in the main regulated wholesale services is implemented "*not later than six months as of the imposition of the EoI obligation*".²⁰

In addition, MEO shall include the SLAs and the compensation for non-compliance with the service quality levels effectively ensured in the provision of wholesale services and shall also publish the KPIs related to dark fibre provision. For the dark fibre offer, MEO shall apply the principles set out in ANACOM [decision](#) of 11 March 2009 on the publication of the QoS performance indicators. It should be stressed that, within the scope of this decision, to each SLA shall correspond a KPI. Furthermore, in the definition of SLAs, MEO shall also take into consideration the principles adopted in ANACOM [decision](#) of 28 March 2012 on the procedures to be followed in the assessment of the service quality of the regulated wholesale offers.

In market 3b/2014, ANACOM imposed non-discrimination obligations following EoO on MEO. The key elements are to:

- implement EoO in the provision of wholesale broadband access services;
- ensure technical replicability in the wholesale central access services provided at a fixed location (for major consumer products);
- assure two months' notice before MEO can change wholesale offers on its own initiative (in the case of non-significant changes with no direct impact on retail offers, this period shall be of one month); and
- launch retail offers subject to the existence of equivalent wholesale offers.

²⁰ i.e. not later than six months as of the date of notification of ANACOM's final decision.

V. SPAIN

A. Market context

In Spain, NGA technologies are based on FTTH and cable (HFC with DOCSIS 3.1). FTTH is the prevailing NGA technology in terms of coverage. In June 2020, the incumbent FTTH network covered 95% of real estate (RE) units out of 25m RE in total, including both homes and retail premises. Cable, instead, covered 48.9% homes in June 2019 according to the [Ministry for Digital Transformation](#).

In terms of take-up, FTTH plays also the main role. Close to 70% of total residential broadband lines in 1Q 2020 (8.93m out of 12.7m lines) were FTTH lines, compared to 1.8m cable residential subscriptions in the same quarter ([CNMC data](#)).

Historically, FTTH coverage and take-up have followed a consistently ascending trend, while cable coverage and subscriptions remained relatively stable ([CNMC data](#)).

Public aid played a big role for rural FTTH deployment by progressively reducing the coverage gap in rural areas versus urban areas. The nationwide [PEBA](#) broadband aid scheme launched in 2013 granted public aid for the deployment of very high-speed broadband networks capable of providing speeds of 300 Mbps (the speed limit was increased in 2020 from 100 Mbps) in white and grey areas. From 2013 to 2019 PEBA granted €478.9m in public aid (the majority of selected projects being FTTH networks). An envelope of €400m is available for the period 2020-2022. The goal is to extend NGA coverage at 300 Mbps to 100% population centres and 95% of the Spanish population by 2021.

B. Main drivers for competition

Spain focused on NGA infrastructure competition from an early stage. The incumbent (Telefónica) competes with other three nationwide vertically integrated network operators (Orange, Vodafone and MasMóvil). These four operators compete in retail broadband services largely using their own NGA network, especially in urban areas.

Telefónica accelerated its FTTH (GPON) network roll out from 2014. At the time, Orange and Vodafone lacked a similar NGA footage and had no regulated wholesale access to Telefónica's fibre. This led to different acquisitions and consolidation in the market:

- In 2014 Vodafone acquired ONO, the largest cable operator in Spain with a cable network in several regions.
- In May 2015 Orange acquired Jazztel, an alternative operator which had deployed 3.67m FTTH RE units.
- In July 2015, Orange sold 700,000-800,000 of Jazztel's FTTH RE units to MasMóvil. This was not a commercial operation, but an action required to meet the conditions imposed by the European Commission on Orange to approve its previous Jazztel acquisition. In the view of the Commission, this sale enabled MasMóvil (fourth nationwide player) to compete effectively in fixed internet access.

All four operators have intensively deployed their NGA. According to CNMC, Telefónica had 24m FTTH installed accesses, Orange 15m FTTH accesses, Vodafone 11.2m accesses (7.5m of which on cable), and MasMóvil 8.3m FTTH accesses in 1Q 2020.

As far as the wholesale broadband market is concerned, Telefónica had a 80.2% share (3.4m out of 4.3m wholesale broadband lines in total) in 1Q 2020²¹. Alternative operators make use of Telefónica's regulated wholesale broadband services (full LLU connections are progressively decreasing to the benefit of VULA and the bitstream access service NEBA over FTTH lines).

As a result of infrastructure competition, commercial co-investment and sharing agreements among network operators are of significant importance in the Spanish wholesale market. Telefónica can also freely enter into such commercial wholesale fibre access agreements without prior approval from

²¹ This figure does not include self-provision and does not show geographic differentiation based on infrastructure competition.

CNMC. Nonetheless, the operator must notify such agreements to the regulator and respect non-discrimination obligations.

Telefónica has already subscribed bilateral non-exclusive agreements with Vodafone and Orange respectively in 2017 and 2018, granting these operators access to its FTTH network at “*competitive prices*”. Such agreements provided access to these alternative operators also in *municipalities where Telefónica has no fibre access obligation*, in exchange for minimum purchase commitments.

Alternative network operators have also signed (i) FTTH access and (ii) build and share agreements (e.g., MasMóvil and Orange). These are commercial agreements, concluded *inter alia*, and not subject to regulation.

There is no significant competition from wholesale-only operators in the fixed market. Pentacom, a joint venture approved by the European Commission in March 2020, is the sole wholesale-only fixed operator that exists in Spain.

Taking into consideration the retail broadband market, competition shows Telefonica having a national 38.3% market share (34.92% if we only consider residential lines) in 1Q 2020 (CNMC).²²

Telefónica’s closest competitors at the retail level are convergent nationwide operators Orange, Vodafone and MasMóvil. Telefónica and these three operators accounted for the vast majority (94.4%) of the retail fixed broadband market in 1Q 2020 (CNMC). Retail competition is based on convergent bundles offered nationwide, with no geographic price differentiation. Convergent (fixed-mobile) bundles have grown from 68% in 1H 2015 to almost 100% of the broadband market in 2020.

C. Regulatory approach to wholesale broadband/NGA access regulation

Spain’s independent telecoms regulator, CNMC, was set up in 2013 as a converged regulator supervising several sectors and acting also as national competition authority. Until 2013 the telecoms regulator was CMT.

Infrastructure competition based on NGA in Spain translated into wholesale broadband access markets being partly deregulated.

Under CNMC’s [decision](#) of 24 February 2016 on the analysis of markets 3a and 3b/2014 Telefónica has no regulatory obligation to offer FTTH wholesale services in 66 municipalities (representing 35% of the Spanish population) and no obligation to offer bitstream access (over copper or fibre) in 758 competitive switches (or 58.4% copper pairs).

Overview of regulated active and passive products (Cullen International)

Relevant market	SMP operator	Copper	Fibre
M3a/2014	Telefónica	Access to passive civil infrastructure	
	Telefónica	LLU	VULA (Local NEBA) (except in 66 municipalities)
M3b.1 /2014 (758 competitive switches)	-	-	-
M3b.2/2014	Telefónica	Bitstream access NEBA	Bitstream access NEBA (except in 66 municipalities)

Prior to CNMC’s 2016 [decision](#), access to Telefónica’s FTTH network was totally unregulated. The previous Spanish telecoms regulator (CMT) considered that regulation should focus on infrastructure competition, and only address the bottlenecks that could hinder such alternative NGA deployment. This meant regulating access to Telefónica’s ducts and access to in-building wire of the first-to-building operator.

²² This percentage of Telefónica retail market share at national level does not show the geographic differentiation of competition depending on the area.

Since 2009, Telefónica must grant regulated access to its passive infrastructure at cost-oriented prices. The first reference offer for passive infrastructure access dates from November 2009. CMT and later CNMC intervened regularly to review the offer, clarify its scope, and solve disputes. Regulated ducts access has been used widely by alternative operators to deploy their own NGA networks.

Also, in February 2009, CMT imposed a symmetric obligation on the first-to-building operator to grant access to in-building fibre at commercially agreed prices, subject to its intervention in case of dispute. Operators concluded agreements (the first of which signed by Telefónica and Jazztel in 2012) to deploy FTTH and share in-building fibre. CMT intervened to solve several disputes.

D. Elements of equivalence and non-discrimination

There is no separation of the incumbent operator, Telefónica is vertically integrated.

Telefónica is subject to a non-discrimination obligation in markets 3a and 3b/2014, regarding access to passive infrastructure, LLU, Local NEBA (VULA) and bitstream NEBA.

Non-discrimination is based on EoO. CNMC declared that although Local NEBA and NEBA “do not meet the features of a strict EoI, they are close to such characteristics”.

The key elements of the non-discrimination obligation imposed on Telefónica are:

- Conclude in writing any agreement with third parties, its own subsidiaries and other Telefónica group companies and notify them to CNMC within 10 days.
- Periodically notify CNMC, and make available to ANOs, the KPIs defined by the regulator for wholesale services and equivalent internal services.
- Include SLAs and SLGs for relevant services in reference offers approved by the regulator.
- Provide information to ANOs of the same quality and at the same time as to its own internal divisions on its wholesale web services system, including the actual and planned (within 3 months) coverage of Telefónica’s FTTH network in switches where the regulated service is available. CNMC has intervened to modify Telefónica’s regulated web services system to ensure that “equivalent” coverage information is provided to ANOs as is available to Telefónica’s retail divisions (e.g., CNMC [decision](#) of 30 March 2017).
- Technical replicability test (TRT) of all retail broadband offers, and economic replicability test (ERT) of flagship offers.

Price control obligations are also imposed on different services

Passive infrastructure access	LLU	Local NEBA (VULA)	NEBA copper	NEBA FTTH
Cost orientation	Cost orientation	ERT	Cost orientation	ERT

For copper, in addition to cost orientation obligations, CNMC performs a pre-launch ERT on Telefónica’s retail flagship copper offers.

Fibre products are only subject to an [economic replicability test](#) (ERT) performed ex ante on a catalogue of flagship offers (CNMC reviews the test parameters and updates the list of flagship offers every six months). The ERT is based on an EEO efficiency standard.

To determine Telefónica’s retail costs under the fibre ERT and allow CNMC to enforce the non-discrimination obligation, Telefónica must implement a regulated cost accounting system, and keep separated accounts for its wholesale fibre services. Separate accounts must ensure that access provided to Telefónica’s business divisions, subsidiaries and group companies is equivalent to that provided to third parties and “show the absence of cross-subsidisation between regulated services and other activities”.

The decision approving the ERT imposed additional information obligations on Telefónica. This operator must notify to CNMC monthly the clients subscribing to its retail broadband offers and

promotions, NEBA and Local NEBA lines and income, and any access lines and income from commercial wholesale fibre services offered to third parties (per concept and operator). Any wholesale discounts must be reported separately.

CNMC has intervened to enforce the non-discrimination obligation. Examples of this enforcement action are:

- In July 2017, CNMC [fined](#) Telefónica €3m for discriminating against competitors during and after a strike of Telefónica's contracted technicians in 2015.
- In 2019, CNMC [fined](#) Telefónica €3m for using FTTH optical distribution frames (ODFs) that it had previously designated as not available for competitors.
- In 2019, CNMC [fined](#) Telefónica €6m for applying longer provisioning and fault repair timers when providing regulated wholesale bitstream access service NEBA than it did when providing equivalent services to its own retail arm.
- In 2020, CNMC [fined](#) Telefónica €400,000 for infringing its information obligations under the fibre ERT.

CNMC has consulted interested parties until 19 December 2020 on the [proposed](#) review of its 2016 analysis of markets 3a and 3b.

The current proposal (which is subject to modifications and has not been notified to the European Commission yet):

- Does not change the regulatory approach to wholesale broadband/NGA access regulation described in this report.
- Increases geographic deregulation based on a new delimitation of sub-national markets (both in markets 3a and 3b) that takes account of lively NGA infrastructure competition. It is therefore proposed that in 592 municipalities (representing 67% of the Spanish population) Telefónica would not be under a regulatory obligation to offer FTTH wholesale services or bitstream access over copper.
- Maintains the elements of equivalence and non-discrimination described in this report.

ANNEXES

Annex I - Service Level Agreements (SLAs) and Service Level Guarantees (SLGs)

As part of ensuring effective non-discrimination, the SMP operator may be required to implement specific SLAs whereby it is required to provide access to the regulated wholesale services with a specified level of quality. SLGs form an integral part of SLAs and specify the level of compensation payable by the SMP operator if it provides wholesale services with a quality inferior to that specified in the SLA.

Country	SLAs imposed as part of SMP obligations? In Market 3a and/or 3b/2014?	For which specific products and for which activities	Procedures for setting/reviewing the specific SLA values?	SLGs (compensation obligations) corresponding to SLAs imposed?
France	Yes M3a and M3b in 2020 Also under ARCEP's decision on symmetric fibre access regime from 8 Dec. 2020.	Access to ducts, LLU, access to fibre under M3a (i.e. provision of business services) and BSA <ul style="list-style-type: none"> • delivery • fault repair • recovery timers • availability rates • migration 	Set by NRA decision	Yes
Germany	Yes M3a and M3b/2014 However, SLAs are not imposed by the market analysis procedures. The market analysis decisions require Telekom Deutschland to publish reference offers for the regulated wholesale products. The reference offers need approval in separate lengthy procedures (see third column), and in those procedures BNetzA also requires SLAs and SLGs.	The main regulated reference offers cover: <ul style="list-style-type: none"> • local loop unbundling of the copper loop (including sub-loop unbundling at the street cabinet and access to in-building copper loops) and KVz-AP (VULA at the street cabinet) • Layer 2 Bitstream Access (L2-BSA) with handover at the 899 broadband network gateway (BNG) locations • IP Bitstream Access (IP-BSA) with handover at (currently around 66) regional locations. <p>There is no reference offer for fibre LLU or for bitstream over FTTH.</p> <p>The reference offers foresee deadlines and penalties for delivery (or for particular steps of the</p>	The specific rules are part of the reference offers, which need approval in separate procedures. These procedures normally take several years and include several rounds of consultation with ANOs. BNetzA typically adopts two formal decisions. The first decision asks the SMP operator to change certain parts of the text, without defining the new wording. After another round of consultation with ANOs, the second and final decision mandates a certain wording for remaining disputed parts of the reference offer.	Yes See first and third column on the procedure. The reference offers foresee penalties in particular for delayed delivery and delayed fault repair.

Country	SLAs imposed as part of SMP obligations? In Market 3a and/or 3b/2014?	For which specific products and for which activities	Procedures for setting/reviewing the specific SLA values?	SLGs (compensation obligations) corresponding to SLAs imposed?
		<p>ordering procedure) and for fault repair.</p> <p>BNetzA also mandated that Telekom offers optional express fault repair for an additional fee.</p> <p>The new PreOrder interface (available from 1 Nov. 2020) gives access seekers the same access to information that Telekom's own call centre has. In particular, access seekers can see the available products for a given address and the possible dates and time slots for visits by a field engineer. The interface allows access seekers' call centres to reserve a time slot already during the call with the end user.</p>		
The Netherlands	<p>Yes</p> <p>M3a/2014, as part of access and non-discrimination obligations</p> <p>ACM decision of 17 Dec. 2015 (the more recent decision of Sep. 2018 was annulled, Flash)</p>	<p>Imposed for all access products that are regulated in M3a/2014: fibre and copper unbundling and VULA.</p> <p>SLAs must cover:</p> <ul style="list-style-type: none"> • access to electronic ordering system (opening and response times) • delivery • fault repair migration 	<p>Agreed between KPN and market players.</p> <p>ACM can impose changes to the SLAs and SLGs upon request of market players as part of a dispute resolution.</p> <p>KPN's RO of MDF Access Annex SLA Ordering and Provisioning (31 May 2010)</p> <p>Annex SLA Service and Maintenance (30 Aug. 2012)</p> <p>Annex Parameter Schedule (2 June 2017, but applies from 3 Aug. 2017)</p>	<p>Yes</p> <p>KPN was required to define SLGs corresponding to each respective SLA parameter in consultation with market players.</p>

Country	SLAs imposed as part of SMP obligations? In Market 3a and/or 3b/2014?	For which specific products and for which activities	Procedures for setting/reviewing the specific SLA values?	SLGs (compensation obligations) corresponding to SLAs imposed?
Portugal	<p>Yes</p> <p>ANACOM decision of 23 March 2017 (which did not amend the draft decision approved by ANACOM in June 2016, notified to the EC in July 2016) designated MEO as having SMP on M3a and M3b. ANACOM decided that MEO should include SLA and compensation for non-compliance and publish the KPI for the dark fibre offer (5.203-5.207, 5.55 of the final decision).</p> <p>In addition, in the definition of SLAs, MEO shall also take into consideration the principles adopted in the decision of 28 March 2012, on the procedures to be followed in the assessment of the service quality of the regulated wholesale offers (5.213 of ANACOM decision of 23 March 2017).</p>	LLU - Access for MEO's dark fiber	No	Yes
Spain	<p>Yes</p> <p>M3a and M3b/2014</p> <p>CNMC decision of 26 Feb. 2014 (latest round of analysis for these two markets)</p>	<p>For copper LLU, BSA (both copper and fibre), VULA and duct access. Fibre LLU is not available in Spain. SLAs cover the following activities:</p> <ul style="list-style-type: none"> • information • provisioning (includes migrations) • fault repair • availability of the web-based provisioning and information system 	<p>By CNMC decision</p> <p>CNMC decisions on market analyses define SLA remedies at a high level. Detailed SLAs (and the corresponding SLGs) are included in Telefónica's reference offers approved by the NRA (CNMC) for the relevant regulated services (generally in a specific Annex):</p> <ul style="list-style-type: none"> • Annex I of the LLU reference offer (OBA) • Annex III of the NEBA (BSA) reference offer • Annex II of the VULA (NEBA Local) reference offer • Annex 3 of the duct access reference offer (MARCo) <p>Process for approving reference offers: Telefónica submits a</p>	Yes (in the same way as SLAs, generally SLAs and SLGs are included in a same Annex to reference offers).

Country	SLAs imposed as part of SMP obligations? In Market 3a and/or 3b/2014?	For which specific products and for which activities	Procedures for setting/reviewing the specific SLA values?	SLGs (compensation obligations) corresponding to SLAs imposed?
			<p>proposal and ANOs are consulted before CNMC adopts a decision. CNMC may review SLAs in existing reference offers ex officio or upon request of Telefónica or ANOs. There is no specific periodicity for such review.</p>	

Annex II - Key performance indicators M3a and 3b/2014

The table provides details of KPI obligations that NRAs imposed on SMP operator as a remedy, if any, on the market 3a/2014 and/or market 3b/2014 in the latest market review. In addition, the table shows if there are separate internal and external KPIs published to help measure any differences between the QoS for wholesale inputs that the incumbent provides to its own downstream retail business compared with the QoS it provides for wholesale inputs to other ANOs.

Country	KPIs imposed as part of non-discrimination/transparency obligations on M3a and/or M3b/2014?	For which specific products?	Reporting and publication procedures	Separate reporting of internal and external KPIs?	Procedures for setting/reviewing the specific KPI values
France	Yes M3a and M3b in 2020 Also under ARCEP's decision on symmetric fibre access regime from 8 Dec. 2020 (annex III).	<ul style="list-style-type: none"> • delivery • service compliance • fault repair • recovery timers • availability of IT tools to place orders, to signal faults or to handle any exchange between parties 	Reporting Monthly reporting Publication Publicly available on Orange's website Copper LLU and BSA Access to ducts	Yes	Based on ARCEP's decisions
Germany	Yes Imposed in M3a/2014 (BNetzA decision 1 Sep. 2016) and market 3b/2015 (BNetzA decision 28 Oct. 2015), with the same wording used in both decisions. New market analysis procedures are pending for both markets.	Imposed for all access products that are regulated in markets 3a and 3b/2014. In practice this is relevant in particular for local loop unbundling at the MDF, sub-loop unbundling at the street cabinet, KVz-AP (VULA at the street cabinet), L2-BSA (VULA at the broadband network gateway) and IP-BSA (IP bitstream with handover at regional points). According to the wording of the regulatory orders, the KPIs must cover: <ul style="list-style-type: none"> • ordering process • service provision • service quality, including faults • fault repair times 	Reporting KPIs must be provided on a monthly basis to BNetzA and to wholesale access seekers that request it. Publication No	Yes Telekom must calculate the KPIs for internal and external service provision in such a way that it allows to monitor whether Telekom fulfils the imposed non-discrimination obligation.	No particular procedure The obligation to provide KPIs was imposed by the normal market analysis procedure. BNetzA did not impose details. The text in the regulatory orders is only one long sentence, providing the information cited in columns two to four of this table.

Country	KPIs imposed as part of non-discrimination/transparency obligations on M3a and/or M3b/2014?	For which specific products?	Reporting and publication procedures	Separate reporting of internal and external KPIs?	Procedures for setting/reviewing the specific KPI values
		<ul style="list-style-type: none"> migration between different regulated wholesale products (except one-time mass migrations) 			
The Netherlands	Yes M3a/2014, as part of the access obligation ACM decision of 17 Dec. 2015 (the more recent decision of Sep. 2018 was annulled, Flash)	Imposed for all access products that are regulated in M3a/2014: fibre and copper unbundling and VULA. SLAs must cover: <ul style="list-style-type: none"> access to electronic ordering system (opening and response times) delivery fault repair migration 	Reporting Quarterly reports to access seekers and ACM. These reports are not public. Access seekers see performance for themselves and for the market as a whole. Publication No	No	No review process ACM can act upon complaint as part of a dispute resolution procedure.
Portugal	Yes ANACOM decision of 23 March 2017 on M3a and M3b	Imposed for all regulated wholesale access services based on copper and for dark fibre access. MEO was required to add SLA and compensation for non-compliance and publish the KPI for the dark fibre offer (5.203-5.207, 5.213-5.217 5.55 of ANACOM decision of 23 March 2017).	Reporting Quarterly reporting Publication Currently, the information on KPIs addressed to the wholesale customers and to ANACOM is available on an Extranet (a password-protected wholesale customer website). ANACOM will assess the need and suitability of this publication (5.215 of ANACOM decision of 23 March 2017). If ANACOM deems it necessary, it may require that the indicators provided by MEO should be audited by an independent entity (5.217 of ANACOM decision of 23 March 2017).	No	No specific reviewing procedures In case the review carried out on KPIs proves that the obligation of non-discrimination is not being adequately ensured, ANACOM may review in detail the provision of the affected wholesale services and may also identify and impose measures to ensure the effective compliance with the obligation of non-discrimination and with the agreed service quality levels (5.216 of ANACOM decision of 23 March 2017).
Spain	Yes In M3a and M3b/2014 CNMC decision of 24 Feb. 2016 (pg. 113-115, 199-200,	For copper LLU, BSA (NEBA over both copper and fibre) VULA (NEBA Local) and	Reporting KPIs for LLU, NEBA and VULA must be notified to CNMC monthly (the KPI	No KPIs are the same for external and Telefónica's equivalent	By decision of the NRA (CNMC). There is no specific periodicity or timing for such a decision on KPIs.

Country	KPIs imposed as part of non-discrimination/ transparency obligations on M3a and/or M3b/2014?	For which specific products?	Reporting and publication procedures	Separate reporting of internal and external KPIs?	Procedures for setting/reviewing the specific KPI values
	<p>Annex 2 (3), Annex 3 (3), Annex 4 (3) and Annex 5 (3))</p> <p>The specific KPIs for LLU and BSA were first set by a CNMC/CMT decision of Sep. 2006 and reviewed by CNMC decision of 1 Dec. 2015 (Annexes 7 and 8). They were extended to VULA by the 2016 market analysis decision.</p> <p>KPIs for access to passive infrastructure were defined by CNMC decision of 19 Nov. 2009 approving the first Telefónica's duct access offer and are included in Annex 3 of Telefónica's reference offer MARCo.</p>	<p>access to passive infrastructure.</p> <p>KPIs cover provisioning and fault repair activities.</p> <p>For duct access, KPIs also include information requests for and the feasibility response sent by Telefónica prior to the sharing request.</p>	<p>"<i>provisioning in time and without incidents</i>" is notified bi-monthly). Duct access KPIs must be notified quarterly.</p> <p>Publication</p> <p>KPIs must be available to ANOs through Telefónica's web-based wholesale provisioning system. The information is not published/available to the public at large. KPIs are not audited by an independent third party, but CNMC has direct access to Telefónica's web-based information and provisioning systems.</p> <p>Also, CNMC/CMT decision of 22 May 2008 imposed obligations on Telefónica regarding the formalisation of internal protocols for equivalent activities in connection with Telefónica's retail services, and the automatic inclusion of traceable and non-manipulated information in the web-based system. CNMC's decision of 24 Feb. 2016 confirmed that this obligation continues to apply.</p>	<p>self-provided services (as defined by CNMC). However, for duct access, CNMC could not identify equivalent self-provided services for all the activities covered by the KPIs.</p>	<p>All applicable KPIs were defined long before CNMC's 2016 decision on the latest round of analyses of M3a and M3b. The decision confirmed their continued application until CNMC adopts a new decision on KPIs (no date set, timing undecided).</p>

Annex III - Technical replicability test M3a and 3b/2014

Independently of the exact equivalence concept imposed by the NRA, i.e. EoI or EoO, where the NRA decides that a non-discrimination obligation is appropriate, proportionate and objectively justified, it is important for a level playing field to ensure that alternative access seekers can technically replicate the retail offer of the SMP operator on the basis of the regulated wholesale input they receive. This table provides details of technical replicability tests (TRT) that the NRAs imposed on the SMP operators as a remedy, if any, on the market 3a/2014 and/or market 3b/2014 in the latest market review.

Country	TRT imposed in M3a and M3b/2014?	For which retail products	To be carried out by the SMP operator or NRA?	To be carried out before or after product launch?
France	Yes M3a and M3b in 2020	Generic obligation: prior to launch of a new retail offer based on a regulated wholesale offer and relying on a new technical functionality (see p.116) For bundles: ensure access to each of the necessary wholesale elements to replicate the bundle. All elements to be provided in a coordinated way to avoid long interruption in case of switching.	SMP operator	Generic obligation: one month before commercial launch, results of test presented to ARCEP. ARCEP can also run an ex-post control of wholesale services available to ensure compliance with the obligation of technical reproducibility.
Germany	No The remedies imposed in M3a/2014 (BNetzA decision 1 Sep. 2016) and M3b/2015 (BNetzA decision 28 Oct. 2015) do not impose a TRT but only a general non-discrimination obligation. Telekom Deutschland must offer to wholesale access seekers at least the same functionality that it offers to its own retail business. However, the procedures to approve new reference wholesale offers cover very detailed technical questions. For example, the procedures to approve reference offers for the new products KVz-AP (VULA with handover at the street cabinet) and L2-BSA (VULA with handover at the 899 broadband network gateway (BNG) locations) focussed on details like the payload size (MTU) of Ethernet frames. The L2-BSA product provides access at the same points (BNGs) where Telekom's NGN differentiates retail products, and it provides the same technical features (Ethernet with four different QoS classes) as Telekom uses for its own retail services.	Not applicable	Not applicable	Not applicable

Country	TRT imposed in M3a and M3b/2014?	For which retail products	To be carried out by the SMP operator or NRA?	To be carried out before or after product launch?
The Netherlands	No	Not applicable	Not applicable	Not applicable
Portugal	In its decision of 23 March 2017 ANACOM established that the planning to be carried out by MEO should ensure the existence of technical replicability and the effective implementation of SLA, compensation and KPIs in the main regulated wholesale services, namely copper loop access and dark fibre access (5.201 and 5.202 of the decision).	LLU - copper loop access and dark fibre access	SMP operator	The planning to be carried out by MEO is deemed to ensure that technical replicability and effective implementation of SLAs, compensation and KPIs in the main regulated wholesale services shall be implemented "not later than six months as of the imposition of the Eol obligation" (i.e. not later than six months as of the date of notification of the final decision) (5.201 of ANACOM decision of 23 March 2017).
Spain	Yes M3a and M3b/2014 CNMC decision of 26 Feb. 2014	All Telefónica's residential fibre and copper offers and bundles with indefinite duration The scope of the technical replicability test is broader than the economic replicability test (ERT) . The ERT only applies to flagship residential copper and fibre offers identified by CNMC and updated bi-annually.	SMP operator But CNMC approval of an amended reference offer is necessary If Telefónica intends to market a retail offer with technical parameters not included in its relevant reference offers, it must present to CNMC a proposed modification of the offer/s to guarantee technical replicability. The new offer(s) must be approved by CNMC.	Pre-launch All Telefónica's residential fibre and copper offers and bundles with indefinite duration must be notified to CNMC one month in advance of marketing but this notice period is unrelated to the TRT. For the TRT there is no specified notice period. Telefónica must notify CNMC before marketing a non-technically replicable offer and propose the necessary amendments to its reference offers. The notification must include a calendar of events until the amended wholesale service is effectively available (including approval by CNMC). There is no specified timing for CNMC to analyse the proposed amendments. The retail offer cannot be marketed until at least one month from the "effective availability of wholesale inputs allowing technical replicability". E.g. Telefónica intended to launch new FTTH offers at 100 and 600 Mbps and, in Jan. 2018 notified CNMC a proposed modification of its VULA and NEBA offers to guarantee technical replicability of the new speeds. CNMC approved the proposed modification of these reference offers in April 2018.

Country	TRT imposed in M3a and M3b/2014?	For which retail products	To be carried out by the SMP operator or NRA?	To be carried out before or after product launch?
				Wholesale guidelines with additional information (including the date of effective availability of the new wholesale inputs) were sent to operators following CNMC's approval, and the retail offers could not be marketed until one month from the new profiles being available.