

# Technology & Innovation

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CAPITAL  
MARKETS  
DAY 2021

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# Key messages

## Review

We delivered our CMD 2018 promises including the DT 'Superior Production Model' (All IP Migration, Agile IT Transformation, Integrated Network Leadership).

**Going forward, we evolve to an experience-obsessed tech player:**

**01 Automation, cloudification & disaggregation**  
We will move towards a high degree of automation. Hyperscaler-like, yet telco-grade

**02 Digitalization & SW/data capabilities**  
We will continue digitalizing the full stack and continue to enhance the software/data capabilities of our employees

**03 Continued network leadership**  
Our integrated network leadership will continue to deliver clear business benefits

**04 Green – Energy efficiency**  
To support DT's ambitious climate targets, we will double energy efficiency in network production

**05 Experience obsession**  
Experience-obsessed, focused innovation and new products will leverage our superior networks

# Review 2017–2021



# IP Migration with customer experience and cost benefits

Superior Production Model 1/3 – All IP Migration 100% at DT, with radically simplified BNG architecture in GER



All numbers YE 2020



# IT Transformation with huge impact on speed, stability and cost

## Superior Production Model 2/3 – Agile IT Transformation

### 2017

- ! Time-to-market: **18 months**
- ! Share of flexible delivery: **0%**
- ! Share of agile working: **< 5%**
- ! Improvable IT stability
- ! IT spend above benchmark-level
- ! Tightly coupled **legacy** IT

Example GER

### YE 2020: Industry leading IT

- Time-to-market: **3.5 months**
- Share of flexible delivery: **70.5%**
- Share of agile working: **80%**
- Operational stability almost doubled<sup>1</sup>
- Reduced IT spend<sup>2</sup>: **-€0.2 bn**
- IT **modernization**, decoupling and selective greenfields

Example GER



+


Secure operations &  
Resilience during Covid-19


<sup>1</sup> Index for business impact from 252 (2017) to 132 (2020)    <sup>2</sup> YE 2017 vs. plan for YE 2021e


# Integrated Network Leadership with clear competitive advantage

## Superior Production Model 3/3 – Integrated Network Leadership

### Integrated network leadership


 Best in mobile  
Connect Test (01/2021)


 **SEHR GUT**  
MOBILFUNK-  
NETZTEST  
Deutsche Telekom  
April 1/2021


 **Bestes  
5G-Netz**  
CHIP 01/2021  
Umschlagpa-Tests seit 1978

Best in 5G  
Chip Test (01/2021)

Network quality perception  
**+23pp**  
vs. best competitor<sup>1</sup>

 T-Mobile  
Netherlands

 **B&T  
20 in 20  
TEST**  
umlaur

 World's best mobile network  
Umlaut (10/2020)

**#1 in 8/10** markets  
based on network TRI\*M<sup>2</sup>

### Mobile network leadership

  **OPENSIGNAL**  
Winner 5G & LTE  
(01/2021)

TMUS delivering  
5G leadership (02/2021)

 **OOKLA**  
SPEEDTEST

Perception as “the 5G company”  
**+120%**  
since Q3/2019

Our clear competitive  
advantage



Brand worth  
**> \$50 bn**










**#1** in DAX30  
reputational ranking<sup>3</sup>

<sup>1</sup> Source of data: Kantar Image and Advertisement Monitor for German footprint (2020), % of participants that attribute statements to a brand

<sup>2</sup> AT, CZ, GR, HR, HU, ME, MK, NL, PL, SK (2020)

<sup>3</sup> Dr. Doebelin Society for Economic Research 2021

# CMD 2018 commitments: We delivered!

	Ambition level	Achievements 2020	2017–2021e
<b>Technology leadership</b>	<ul style="list-style-type: none"> <li>Gigabit rollout                             <ul style="list-style-type: none"> <li>Ramping up to 2 mn HH p.a. in GER by 2021e</li> <li>0.75 mn HH p.a. in EU<sup>1</sup> by 2021e</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>approx. 1.2 mn HH in 2021e (0.5 mn in Q4)</li> <li>1.4 mn HH in 2021e</li> </ul>	<ul style="list-style-type: none"> <li></li> <li></li> </ul>
	<ul style="list-style-type: none"> <li>Mobile network leadership &amp; leading in CX                             <ul style="list-style-type: none"> <li>99% outdoor LTE coverage in GER by 2020</li> <li>99% outdoor LTE coverage in EU by 2021e</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>99% in 2020</li> <li>98% in 2021e</li> </ul>	<ul style="list-style-type: none"> <li></li> <li></li> </ul>
	<ul style="list-style-type: none"> <li>5G innovation leadership</li> </ul>	<ul style="list-style-type: none"> <li>First European 5G network in Austria (2019), DSS pioneer (2020), Connect 5G Innovation Award (2021)</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
<b>Value transformation</b>	<ul style="list-style-type: none"> <li>IT spend reduction of €0.2 bn in 2021e</li> </ul>	<ul style="list-style-type: none"> <li>€0.2 bn reduction achieved by 2021e</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
	<ul style="list-style-type: none"> <li>IT delivery time down to 6 months in 2021e</li> </ul>	<ul style="list-style-type: none"> <li>Down to 3.5 months already in 2020</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
	<ul style="list-style-type: none"> <li>IP migration completed in 2020</li> </ul>	<ul style="list-style-type: none"> <li>Completed across the entire footprint in 2020</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>

<sup>1</sup> FTTH/B & Docsis 3.1; AT, CZ, GR, HR, HU, ME, MK, PL, SK (excl. RO & PL)



# Strategy 2021–2024



# We evolve towards an experience-obsessed tech player

**FROM** a reliable network builder & operator

## Superior Production Model

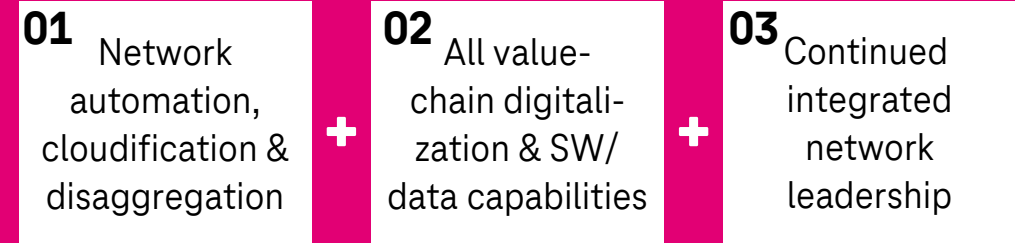


## Capabilities built so far

- ✓ Global skill-based organization implemented
- ✓ DevOps in place in NT & IT
- ✓ First successes in radical automation, disaggregation & software integration

**TO** an experience-obsessed tech player

## Tech player



## 04 Green

Path to carbon neutrality<sup>1</sup> – Energy efficient

## 05 Experience-obsessed

Best connectivity experience	Seamless interplay at home	Beyond the core
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<sup>1</sup> CO<sub>2</sub> neutral scope 1&2 in 2025, scope 3 in 2040, addressed in RfPs with high priority

# Network automation proven and ready to scale

## PROVEN

Hyperscaler like & telco grade voice operations

- 18** months from idea to product
- 90** days from SW to rollout
- 14** day bug fix
- Many** nightshifts required

in GER (2021)

We are live with 1 mn customers

Voice production platform

- Fully automated
- Open
- Multi-vendor
- Cloudified

## SCALING



**All voice customers**  
on one automation platform by 2024e



At least  
**50% of data customers**  
on one platform by 2024e

# Automated network planning proven and ready to scale

## PROVEN

### AI driven FTTH rollout planning

25

- Manual processes
- Complex hand-overs with municipalities



5 days average planning time

- Fully automated, AI based planning processes
- Digitized municipal applications

in GER (2021)

### Deployed for 75% of new areas

Reduction of working hours by up to 75% in structural planning



## SCALING



Contributes to **-25% unit cost** vs. 2020 by 2024e<sup>1</sup>



Enables ramping **> 2.5 mn** HH p.a. to achieve **10 mn** FTTH HH passed until 2024e

<sup>1</sup> Planning effort is one out of many factors reducing unit costs

# Network disaggregation will increase choice and efficiency

## PROVEN

### Mobile access – “ORAN”

Cornerstones laid down by

- OTIC test and integration lab (Europe’s 1<sup>st</sup>)
- Open fronthaul requirements binding in RfPs

Implementation with **ORAN town** in real network

### Fixed access – “Access 4.0”

- Evolving BNG
- Edge-cloud based fixed broadband access live and in production (World’s 1<sup>st</sup>)

### Capabilities built so far

**350** experts for  
NW integration,  
NW operations &  
NW management

**20** agile squads

**New** way of working

## SCALING



Diverse ecosystem with increasing  
competition leading to more  
choice and efficiency

e.g. **10–20%**  
efficiency in RAN as planned by 2024e

Example GER

# Digitalization capabilities proven and ready to scale

Two examples...

## PROVEN

### Easy Fiber ordering (Gigabit Geschäftssystem)

Cloud-based, fully digital platform to order, provision and configure Fiber products instantly and in any channel

7 cumbersome » 2 Delightful customer interactions

### Award-winning bot (Frag Magenta)

Digital assistant for personalized 24/7 service automation



Few bot interactions » > 2mn Issues already solved  
37% Solution quota

## SCALING

  
**Complete Fiber rollout**  
channeled and processed via the platform  
by 2022

  
Leveraging  
**AI in all customer service interactions**  
by 2025

# We accelerate digitalization with future-proof IT

## YE 2020: Industry leading IT

Example GER

- ✓ Time-to-market: **3.5 months**
- ✓ Share of flexible delivery: **70.5%**
- ✓ Share of agile working: **80%**
- ✓ Operational stability almost doubled
- ✓ IT modernization, decoupling and selective greenfields
- ✓ IT spend reduced<sup>2</sup> by **€0.2 bn**
- ✓ Share of cloudified production: **8% in IT**

## 2024e: World class IT

Example GER

- Time-to-market: **2 months**
- Share of flexible delivery: **80%**
- Share of agile working: **100%**
- Further improved IT stability<sup>1</sup>
- Massive increase of microservices & APIs
- IT spend further reduced<sup>3</sup> by **> €0.2 bn**
- Share of cloudified production: **80% in IT** ≈55% in NT<sup>4</sup>

NEW

<sup>1</sup> Index for Business impact should be < 100 by 2024e   <sup>2</sup> YE 2017 vs. YE 2021e   <sup>3</sup> YE 2020 vs. YE 2024e   <sup>4</sup> In core network; GER: 67% & EU: 42% in 2024e

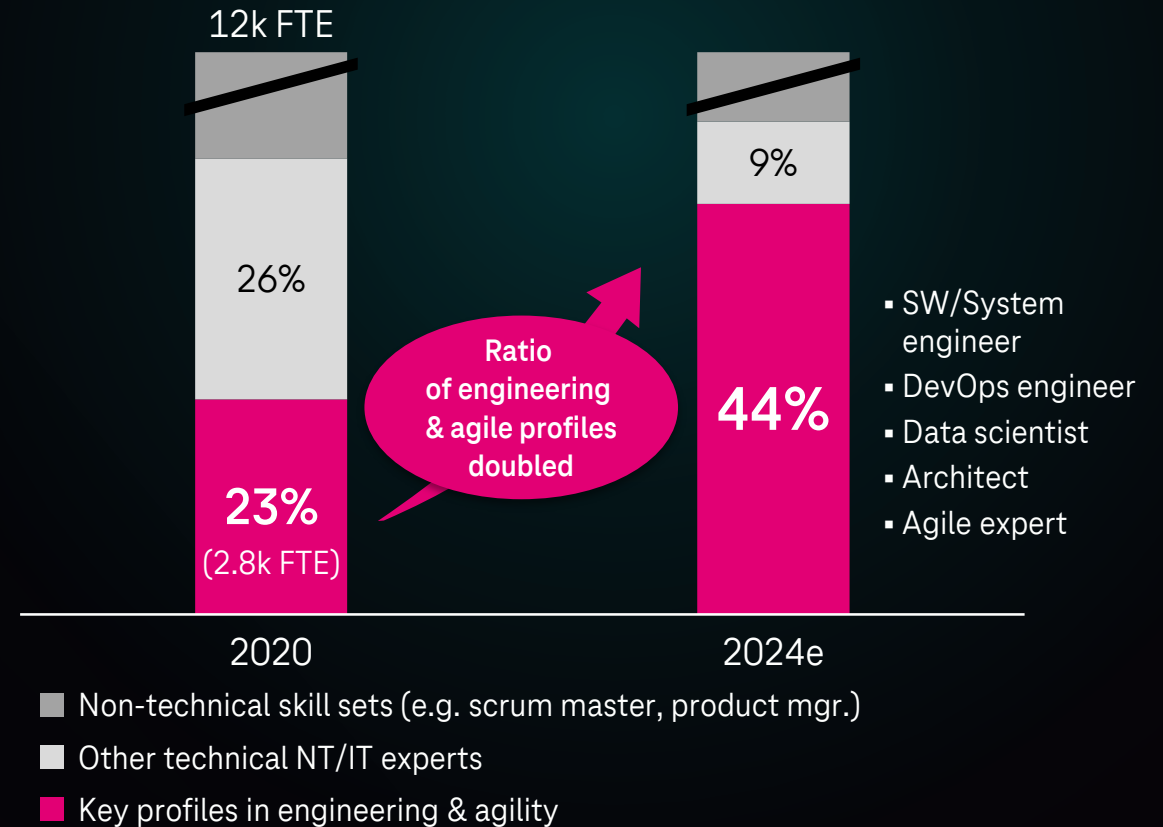
# We are driving skill and cultural transformation

## Modern chapter tribe setup in board area Technology & Innovation



## Scale proven skill transformation in tech & innovation area

Quota of relevant skills, %





# We will remain the network experience leader

Q1 2021

## 5G Leadership in GER, EU<sup>1</sup> & US

based on superior (PoP) coverage



80% PoP coverage



18% PoP coverage



90% PoP coverage

## Commitment to Fiber in GER<sup>2</sup> & EU<sup>3</sup>

2.3 mn HH

6.1 mn HH

## Toolbox of best combinations (own & orchestrated)

≈500k customers on 4G hybrid solution +  
customer trial for 4G/5G indoor repeater<sup>4</sup>

≈200k customers on 4G hybrid solution

2024e



≈97% PoP coverage

10 mn HH



> 75% PoP coverage

≈10 mn HH



97% PoP coverage (2022e)

- Leverage 5G for superior seamless performance in- and outdoors

## Hybrid routers & indoor repeater

- Orchestrate best customer experience across own- and third-party networks where required<sup>5</sup>

<sup>1</sup> AT, CZ, GR, HR, HU, ME, MK, NL, PL, SK (excl. RO) <sup>2</sup> Incl. cooperation <sup>3</sup> AT, CZ, GR, HR, HU, ME, MK, NL, SK (excl. RO & PL); FTTH/B & Docsis 3.1

<sup>4</sup> Tech-JV with SKT from South Korea

<sup>5</sup> E.g. broadband satellite for IoT and rural coverage & mmWave FWA for selected broadband use cases

# We are convinced by the comprehensive benefits of 5G

## Higher Capex efficiency

-40% Capex per Mbps for top speeds by 2024e

## 3G Shutdown

in combination with 5G increasing energy efficiency

## Fixed wireless access

mainly in US and partially in EU



## 5G Leadership in GER, EU & US

## Up & cross selling in B2C

e.g. grow number of German customers on L/XL tariffs by factor 1.5–2.0x by 2024e

## B2B differentiation

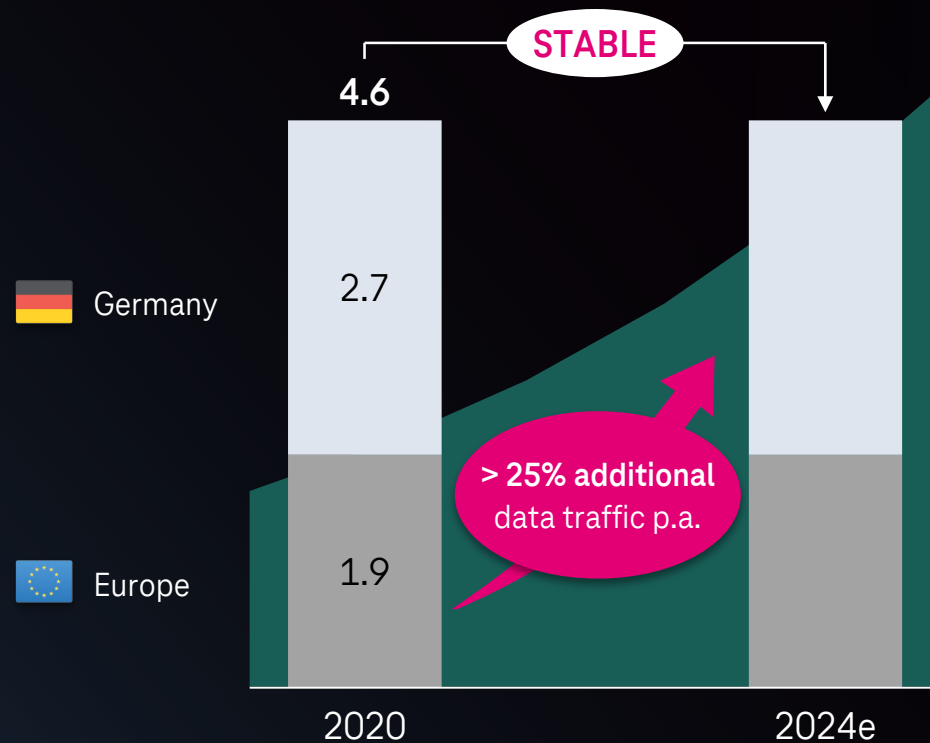
Industrial connectivity, edge cloud, IoT & new 5G SA core with QoS and slicing

Cumulating in campus networks: > €100 mn revenue until 2024e

# We will double energy efficiency to offset volume explosion

## Long-term stable energy consumption...

Energy consumption per region, mn MWh



## ... with efficiency levers offsetting volume increases

- We will retire legacy platforms<sup>1</sup> to counterbalance other trends such as rise in data traffic, network densification & rollout of more active network components
- In addition, efficiency from...
  - Network measures, including site sharing & AI steering
  - Copper to Fiber migration
  - Energy efficient data centers, on- and nearshore
  - In addition, innovation in packaging, materials, and decentral energy production



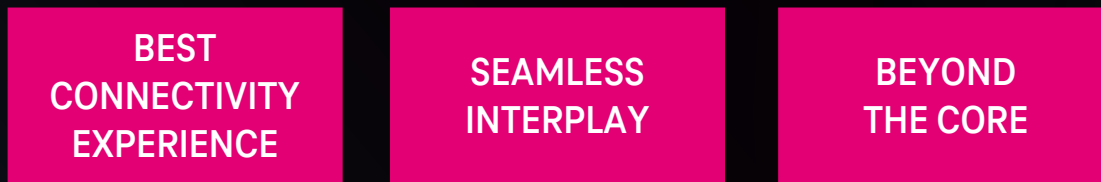
**Double overall energy efficiency**  
by 2024e

<sup>1</sup> Like PSTN or SDH

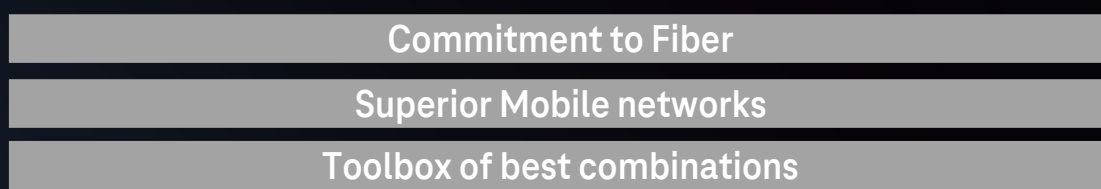
# Delightful home experiences built on best networks

## Products & Innovation

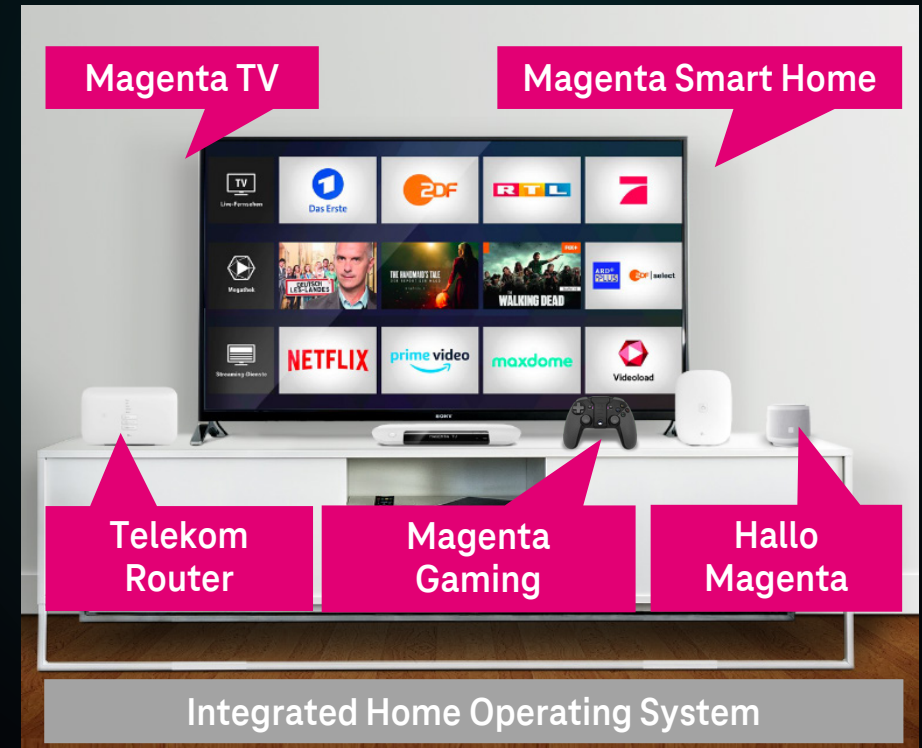
### 3 Experiences



### 3 Enablers



## Unprecedented “Magenta Moments”



# We scale experience innovation across our footprint

## Customer expectations

### BEST CONNECTIVITY EXPERIENCE

Stable & fast connection everywhere at home  
– like at the curb

### SEAMLESS INTERPLAY

Simple & seamless onboarding, upgrading and operating of new devices  
– OTT like

### BEYOND THE CORE

Home experiences with friends and family  
– all voice enabled

## PROVEN

**> 1 mn routers with automated self-installation**  
based on a new RouterOS logic with decoupled HW & SW, and massive leverage of data for CX optimization, and predictive maintenance

**New HomeOS (API-first orchestration layer) launched** e.g. with **200k engaged customers on Smart Home in 2021e**

**> 100k smart speakers sold, plus nearly 100k users via TV app/remote control in 2021e**

## SCALING



**75% of DT router base**  
by 2024e



**90% of DT customer base**  
enabled by 2024e



**All DT services voice enabled** by 2024e

# Midterm ambition level



# Midterm ambition level

	Midterm ambition level	Year
<b>Technology leadership</b>	▪ Commitment to Fiber rollout	
	▪ GER: 10 mn HH passed	▪ 2024e
	▪ EU: ≈10 mn HH passed	▪ 2024e <sup>1</sup>
	▪ 5G PoP coverage & network leadership	
	▪ GER: ≈97%	▪ 2024e
	▪ EU: > 75%	▪ 2024e
	▪ Further enhancing 5G innovation leadership & consumer experience	▪ 2024e <sup>2</sup>
<b>Value transformation</b>	▪ IT spend reduction: > €0.2 bn	▪ 2020–2024e
	▪ Time-to-market: 2.0 months	▪ 2024e
	▪ Agile share of development: 100%	▪ 2024e
	▪ Increase degree of cloudified production	
	▪ NT: GER 67%; EU 42%	▪ 2024e
	▪ IT: 80%	▪ 2024e
	▪ Adj. indirect cost AL reduction (GER/GHS): €0.7 bn	▪ 2020–2024e
	▪ Technology energy consumption (GER & EU): stable	▪ 2020–2024e

<sup>1</sup> AT, CZ, GR, HR, HU, ME, MK, SK (excl. RO & PL; FTTH/B & Docsis 3.1)    <sup>2</sup> AT, CZ, GR, HR, HU, ME, MK, PL, SK (excl. RO)