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Project 2016 (BK1-11/003)

Demand identification proceedings
– Presentation of scenarios –

Berlin, 9 November 2012



Federal government's broadband strategy:

- Target: 50 Mbit/s for 75% of the population by 2014 – nationwide coverage by 2018
- Mobile alongside wire-based rollout as the second pillar with which to reach this target



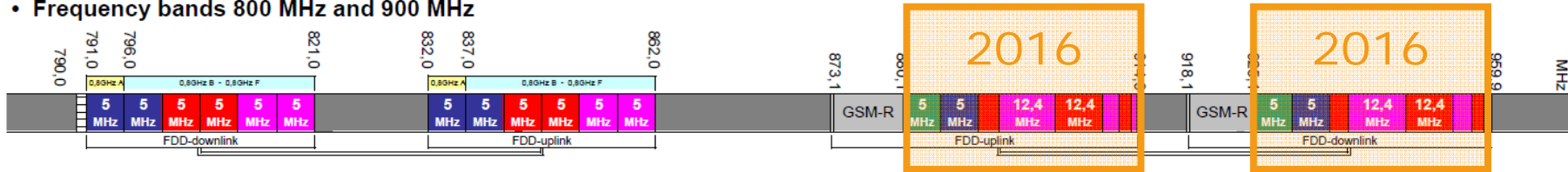
- 31 December 2016: Expiry of the GSM licences (frequency assignments at 900 MHz / 1800 MHz)

- Factors for consideration:
 - Timely decision
 - Open, transparent and non-discriminatory proceedings
 - Consensual solution involving the interested public
 - Political aims

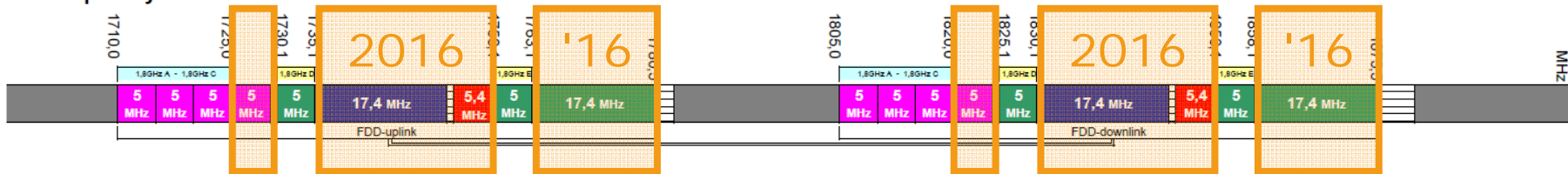
Mobile spectrum



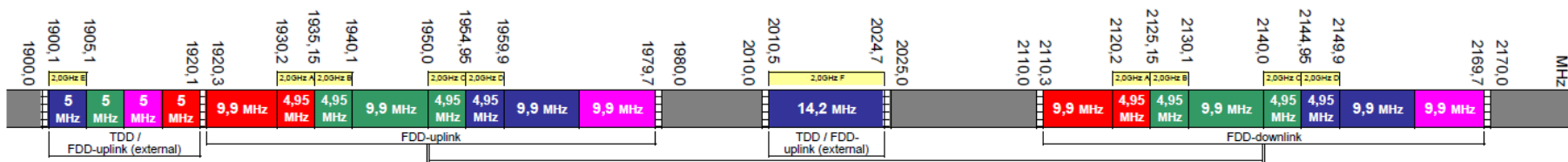
- Frequency bands 800 MHz and 900 MHz



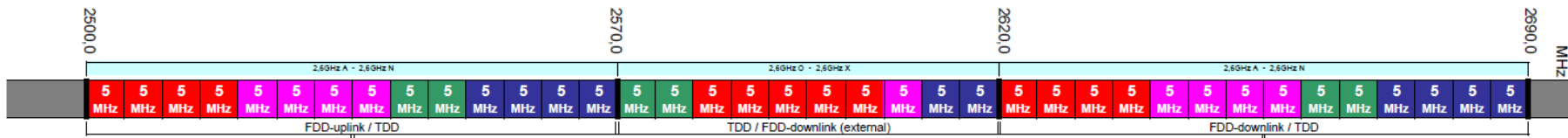
- Frequency band 1.8 GHz



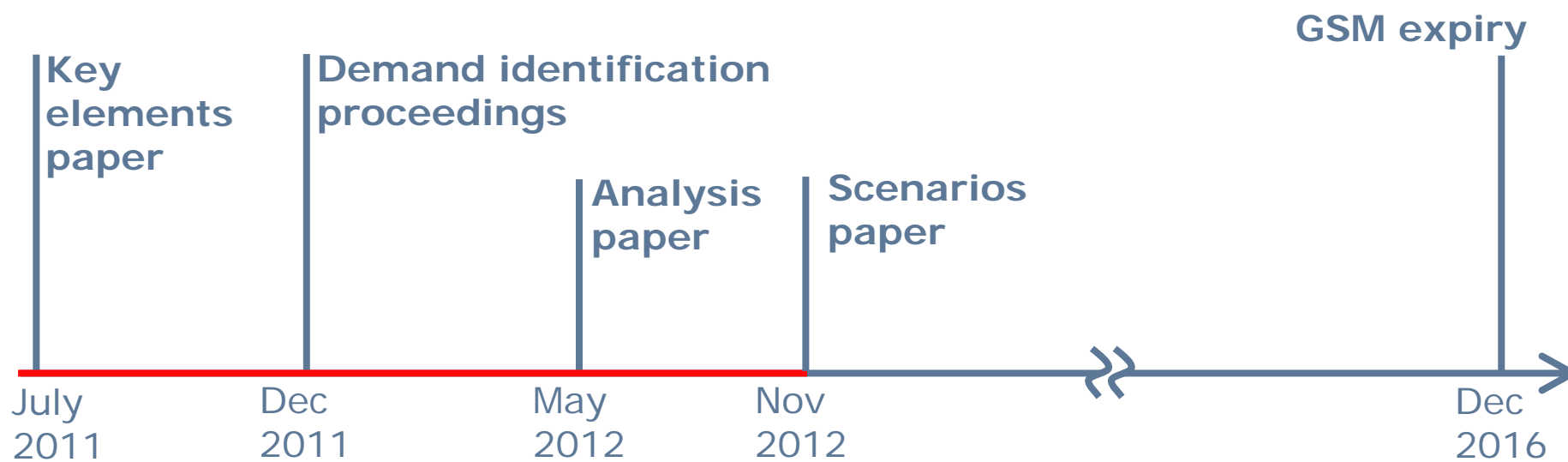
- Frequency band 2.0 GHz



- Frequency band 2.6 GHz



Timeline



Outcome of demand identification



Frequency band	Available spectrum	Total notified requirements
900 MHz	2 x 35 MHz	approx 2 x 55 MHz
1800 MHz	2 x 50 MHz	approx 2 x 80 MHz

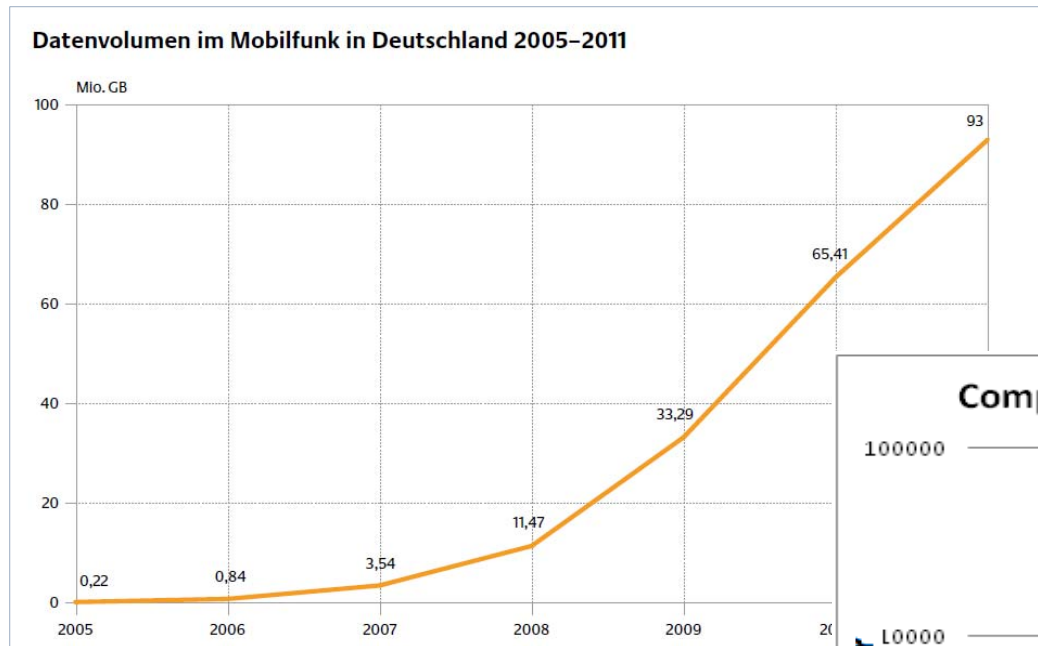
- Demand greater than supply
- And: It is not just the arithmetic that has to be considered but market, technological and international trends, too



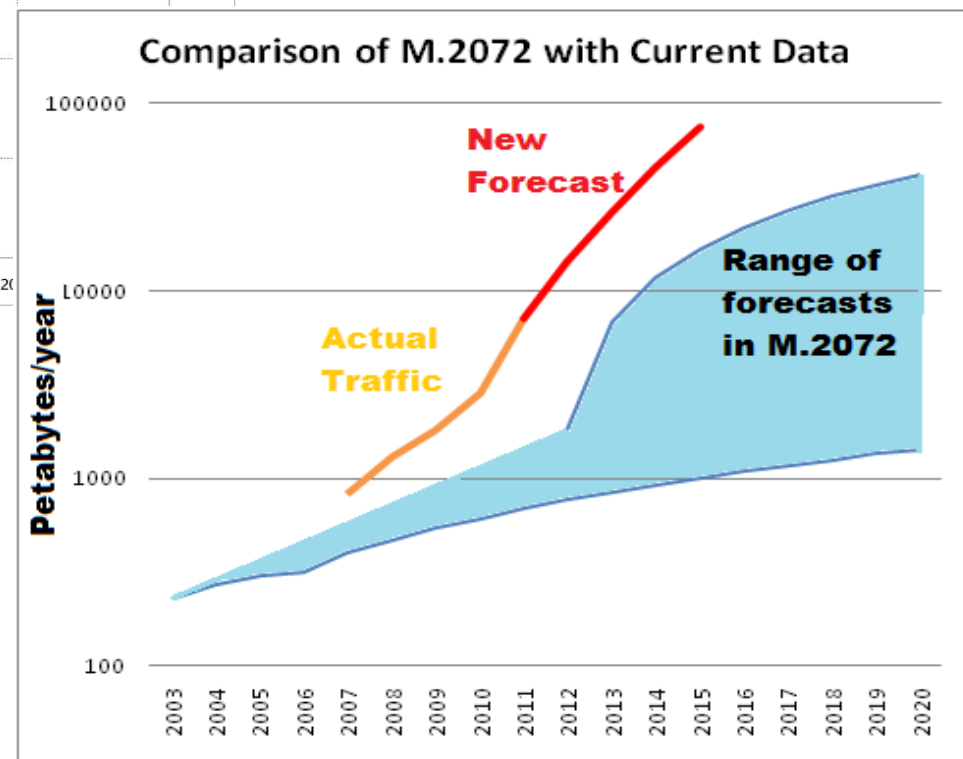
Market trends:

- Brisk sales of mobile broadband devices (eg smartphones, tablet PCs)
- Spread of new services (eg cloud and machine to machine applications, e-health, e-government)
- Dynamic subscriber growth
- More data traffic per subscriber (eg video-on-demand, high definition applications, social networks)

Mobile data traffic



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Annual Report 2011



End of 2011 forecast
ITU Report M.2243

compared with
2006 forecast
(ITU Report M.2072)





Technological trends:

- Progressive development of mobile standards (HSPA, LTE, LTE-Advanced)
- Increasingly dense network as a result of small cells (macrocells, picocells, femtocells)

Consequence:

- Consideration of the bands from 450 MHz to 3.8 GHz not in isolation, but together



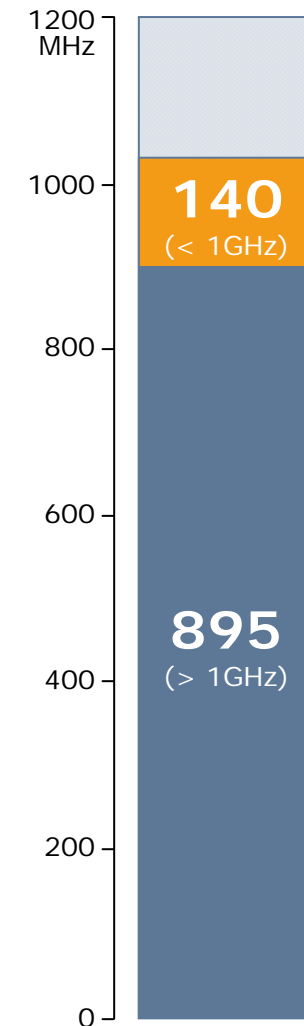
- Commission's digital agenda: Broadband coverage for all EU citizens by 2020
- Identification of **at least 1200 MHz** spectrum for wireless access by 2015 in the Radio Spectrum Policy Programme (RSPP)

Wireless access in Germany



Band	Range	Entry in Frequency plan	Volume (rounded)
450 MHz	450 - 455.74 MHz	224028	2 x 5 MHz
	460 - 465.74 MHz	224064	
800 MHz	791 - 821 MHz	226002	2 x 30 MHz
	832 - 862 MHz	226003	
900 MHz	880 - 890 MHz	227011	2 x 35 MHz
	890 - 915 MHz	228001	
	925 - 960 MHz	228005	
1800 MHz	1710 - 1785 MHz	267001	2 x 75 MHz
	1805 - 1880 MHz	267006	
2 GHz	1900 - 1920 MHz	267008	2 x 60 MHz 1 x 20 MHz 1 x 15 MHz
	1920 - 1930 MHz	267009	
	1930 - 1980 MHz	268001	
	2010 - 2025 MHz	270001	
	2110 - 2120 MHz	272001	
	2120 - 2170 MHz	273001	
2.6 GHz	2500 - 2520 MHz	282001	2 x 70 MHz 1 x 50 MHz
	2520 - 2655 MHz	283001	
	2655 - 2670 MHz	284001	
	2670 - 2690 MHz	285001	
3.5 GHz	3400 - 3475 MHz	292006	200 MHz
	3475 - 3600 MHz	293003	
3.7 GHz	3600 - 3800 MHz	294003	200 MHz
Total spectrum:			1035 MHz

Overview





World Radiocommunication Conference (WRC) 2012:

- Resolution 233: general identification of new spectrum for IMT/LTE as required
 - eg so-called L-band
 - other frequency bands

- Resolution 232: allocation of the band 694 to 790 MHz for mobile use on a co-primary basis (effective immediately after WRC-15)



- Allocation of the band 694 - 790 MHz for mobile on a co-primary basis
 - Effective immediately after WRC-15
 - Lower band edge not yet determined

- Activities for all frequency bands being undertaken by
 - ITU-R Joint Task Group 4-5-6-7
 - CEPT

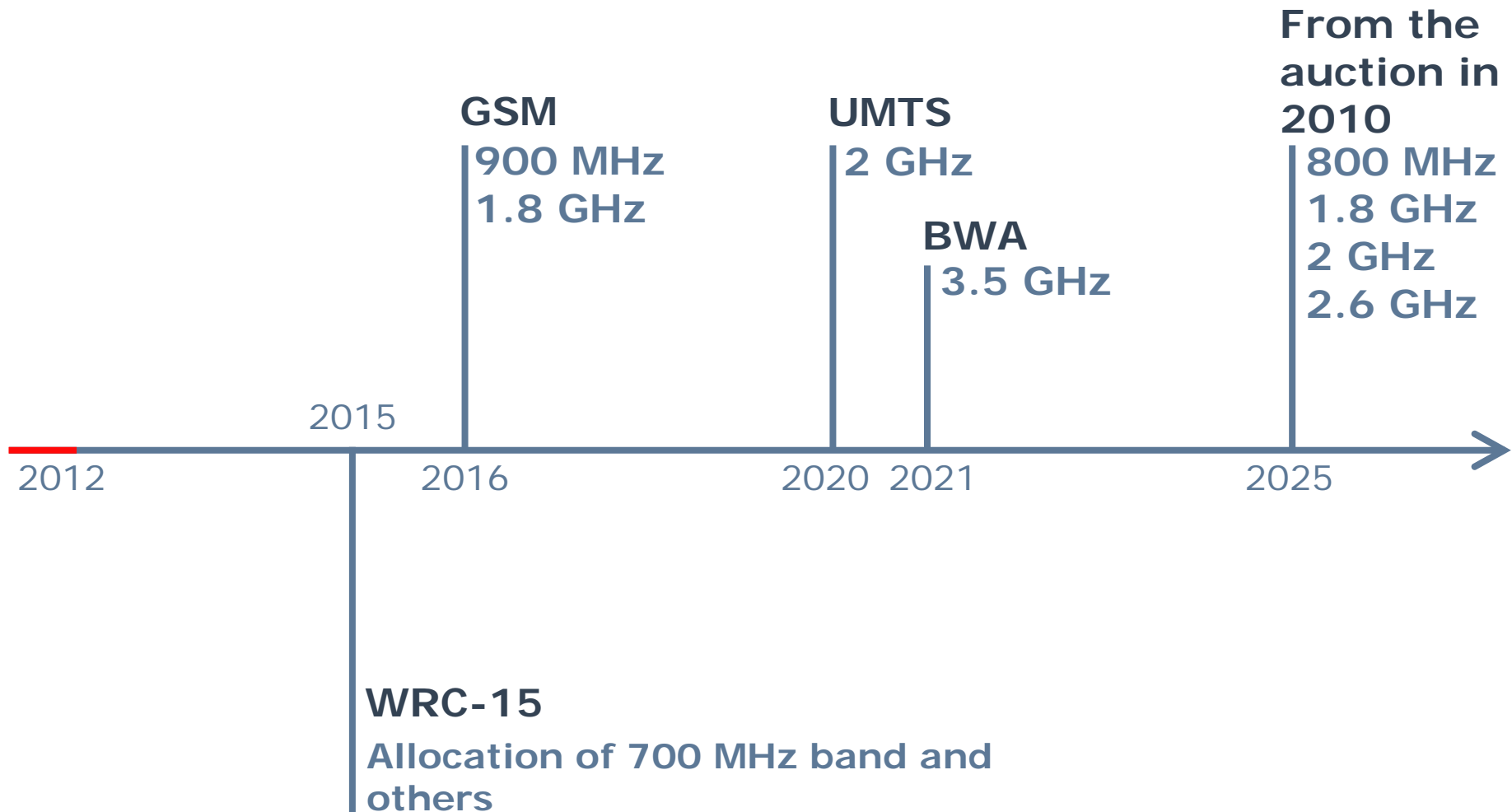
- ITU preparatory report for WRC-15 by March 2015;
European proposals for WRC by April 2015;
WRC-15 in October/November 2015



Conditions for national use of spectrum under discussion internationally for mobile services:

- Timely amendment of the Frequency Band Allocation Ordinance and the Frequency Plan (in agreement with the federal states)
- Timely reconciliation of interests: mobile, broadcasting, wireless microphones, emergency services, Bundeswehr (federal armed forces), PMR

Foreseeable availability





- Scenario 1: Extension
- Scenario 2: Award proceedings for 900/1800 MHz
- Scenario 3: Award proceedings for 900/1800 MHz plus
- Scenario 4: Comprehensive award 2025



- Scenario 1: Extension
- Scenario 2: Award proceedings for 900/1800 MHz
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- Scenario 4: Comprehensive award 2025

Scenario 1



Scenario 1: Extension

- Frequency bands: 900 MHz, 1800 MHz
- Volume of spectrum: 170 MHz
- Use: from 2017

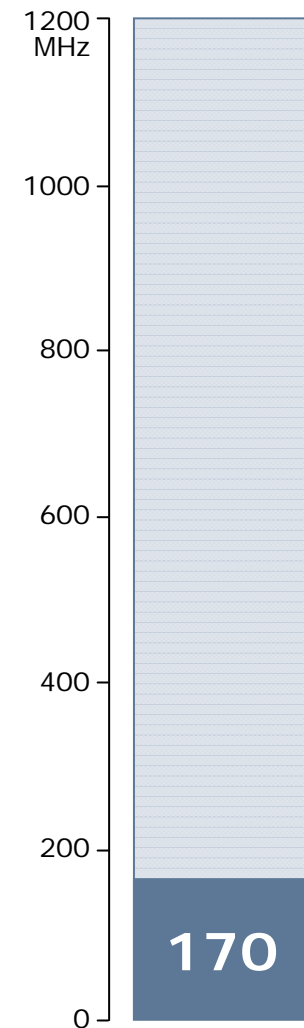
■ Quick decision

■ Legal uncertainty

■ Fragmentation

■ Only minor contribution to broadband strategy

Spectrum





- Scenario 1: Extension

- Scenario 2: Award proceedings for 900/1800 MHz

- Scenario 3: Award proceedings for 900/1800 MHz plus

- Scenario 4: Comprehensive award 2025

Scenario 2



Scenario 2: Award of 900/1800 MHz

- Frequency bands: 900 MHz, 1800 MHz
- Volume of spectrum: 170 MHz
- Use: from 2017

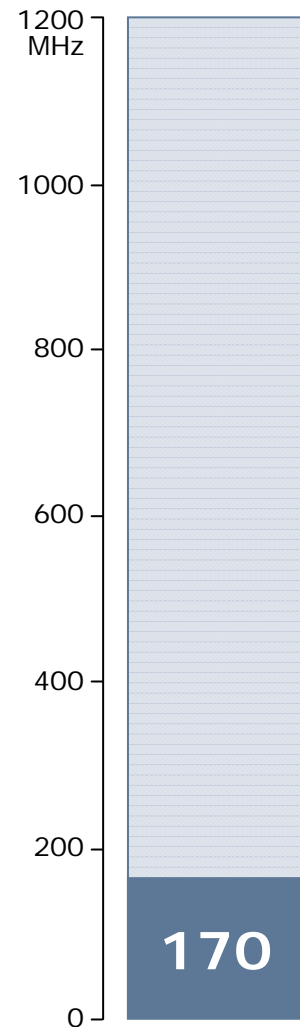
- Open, transparent, non-discriminatory proceedings

- Earliest possible date for newcomers

- Risk of scarcity caused by regulation (special procedural rules, if appropriate)

- Only minor contribution to broadband strategy

Spectrum





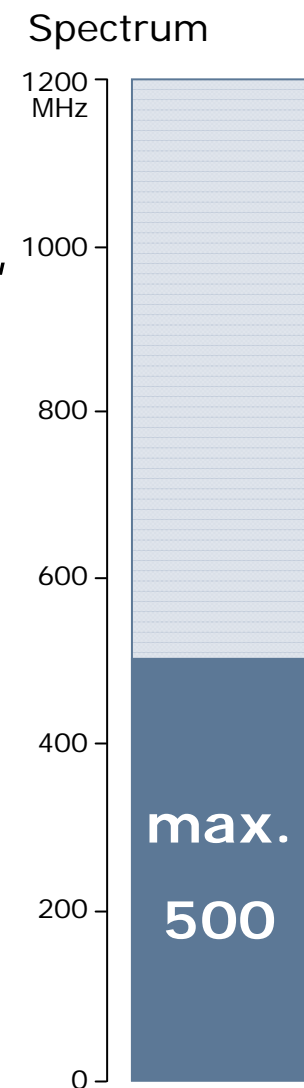
- Scenario 1: Extension
- Scenario 2: Award proceedings for 900/1800 MHz
- Scenario 3: Award proceedings for 900/1800 MHz plus
- Scenario 4: Comprehensive award 2025

Scenario 3 (1)



Scenario 3: Award of 900/1800 MHz plus

- Frequency bands: 900 MHz, 1800 MHz, 2 GHz, 3.5 GHz and possibly: 700 MHz, so-called L-band
- Volume of spectrum: approx 350-500 MHz
- Use: from 2017
- Award could be delayed, depending on harmonisation of the bands currently under consideration internationally for mobile services



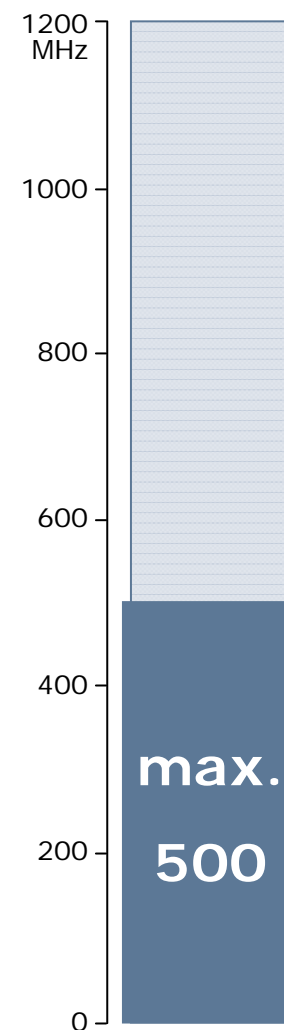
Scenario 3 (2)



Scenario 3: Award of 900/1800 MHz plus

- More spectrum
- Possible date for newcomers
- Planning and investment certainty
- No risk of scarcity caused by regulation
- Available for use at different times
- Problem of competing requirements to be solved

Spectrum





- Scenario 1: Extension
- Scenario 2: Award proceedings for 900/1800 MHz
- Scenario 3: Award proceedings for 900/1800 MHz plus
- Scenario 4: Comprehensive award 2025

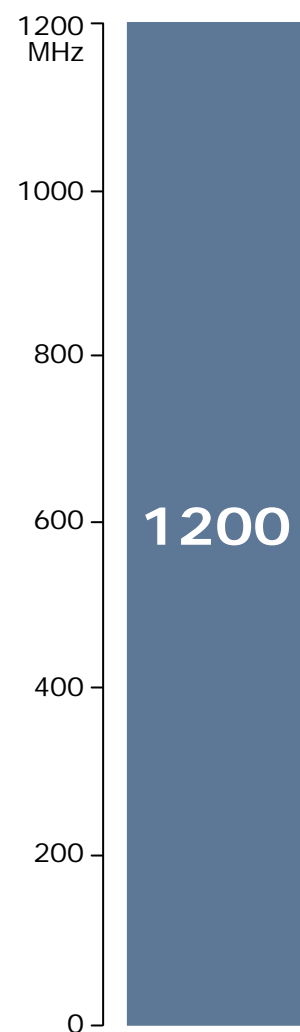
Scenario 4 (1)



Scenario 4: Comprehensive award 2025

- Frequency bands: 450 MHz, 800 MHz, 900 MHz, 1800 MHz, 2 GHz, 2.6 GHz, 3.5 GHz and 700 MHz, the so-called L-band
- Volume of spectrum: up to 1200 MHz
- Use: from 2026
- Aligning the expiry dates of the frequency assignments by means of extension or auction

Spectrum



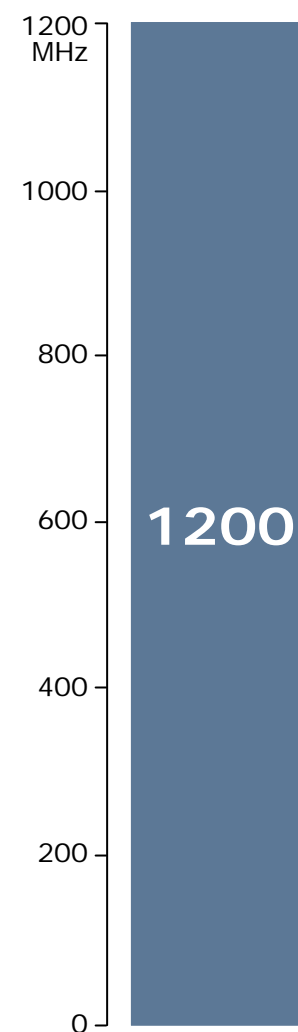
Scenario 4 (2)



Scenario 4: Comprehensive award 2025

- Award not on a "bit by bit" basis
- Freedom of choice for operators and newcomers
- Efficient in terms of proceedings and allocation
- Need to align duration of assignments
- "Closed shop"
- Heavily dependent on the economic cycle

Spectrum





- Scenario 1: Extension
- Scenario 2: Award proceedings for 900/1800 MHz
- Scenario 3: Award proceedings for 900/1800 MHz plus
- Scenario 4: Comprehensive award 2025