



NMHH

**National Media and Infocommunications
Authority • Hungary**

Péter Vári

Deputy director general

Hungarian frequency tender

22. November 2016.

- main types of award currently used (auctions, beauty contests, hybrids...)
- current trends and best practice in relation to auctions
- promoting efficient use of spectrum and meeting policy objectives (competition, coverage etc.)
- suitability of current and future spectrum to meet demand for mobile broadband



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Nemzeti Média- és Hírközlési Hatóság

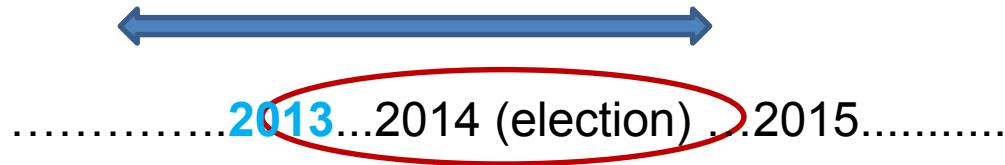
Design of the procedure



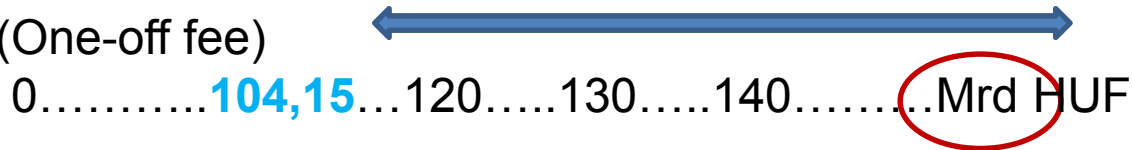
Independent but closely interconnected parameters of the concept of the award:

1. Object (technical parameters)

2. Timing



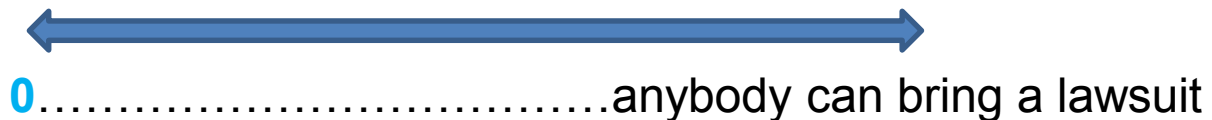
3. Fees (One-off fee)



4. Period of the validity



5. Legal Risk



6. Obligations (coverage, min data rate, quality, etc.)



	800 MHz	900 MHz	1800 MHz	2100 MHz	2600 MHz
<i>0. frequency band</i>	790–862 MHz	880-915 / 925-960 MHz	1710–1785 / 1805–1880 MHz	1900–1920 MHz 1920–1980 / 2110–2170 MHz	2500–2690 MHz
<i>available spectrum (MHz)</i>	12¹+60 (12 / 2 x 30)	70 (2 x 35)	150 (2 x 75)	20²+120 (2 x 60)	190 (50 / 2x70)
<i>EU regulation</i>	RSPP ³ 2010/267/ EU	RSPP 2009/766/ EK	RSPP 2009/766/ EK	2012/688/ EU	RSPP 2008/477/ EC
<i>0. possible award spectrum (MHz)</i>	60 (2 x 30)	70 (2x35)	30 150	20 120	190
<i>1. the selection procedure</i>	auction/ tender				
<i>2. base block size</i>	5 MHz	5 MHz	5 MHz	5 MHz	5 MHz
<i>3. territory</i>	country wide				
<i>4. usage</i>	electronic communications services				
<i>5. minimum data rate</i>	no regulation				
<i>6. time duration of licences</i>	9-15 year harmonization to 800 MHz				
<i>7. secondary trading</i>	possible (full, partial)				
<i>8. technology</i>	technology neutral, WAPEX				
	BEM	GSM, UMTS, LTE, WIMAX	UMTS/ BEM ⁴		BEM

¹ RSPP: 72 MHz; CEPT report, RSC document: 60

² 20 MHz TDD 1900–1920 MHz the harmonization is underway (CEPT preparation)

³ 243/2012/ EU

⁴ regulation modification underway

to utilise spectrum assets in an efficient manner generating social welfare, considering social aspects to the greatest possible extent

enhance competition

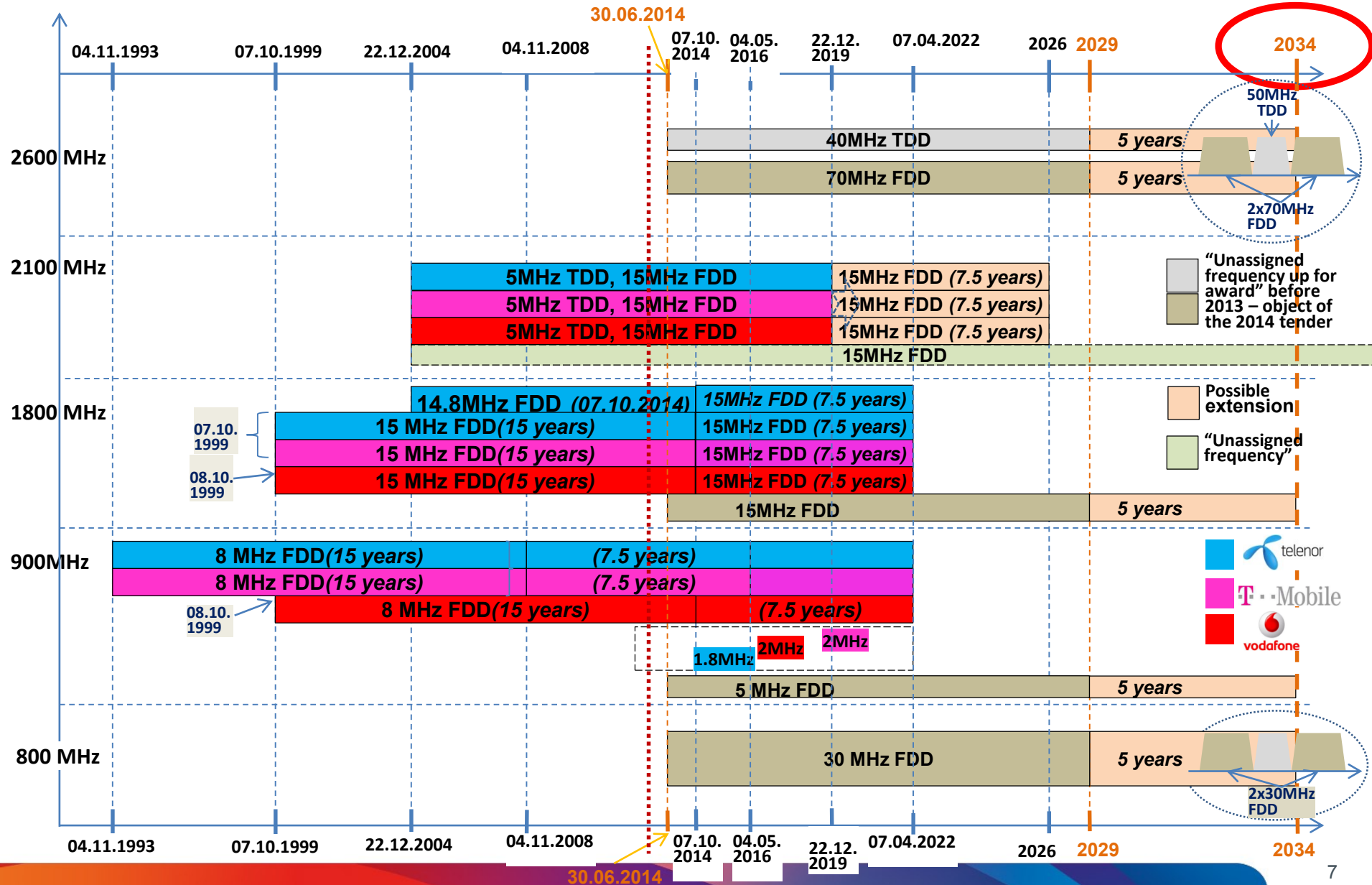
foster, encourage and support the extension of broadband wireless coverage in Hungary;

foster, encourage and support to enhance broadband penetration in order to allow Hungary to meet the European Digital Agenda targets (100% minimum-speed broadband coverage, the entire European Union to be covered by broadband above 30 Mbps by 2020, 50 percent of European households to subscribe to broadband above 100 Mbps by 2020).

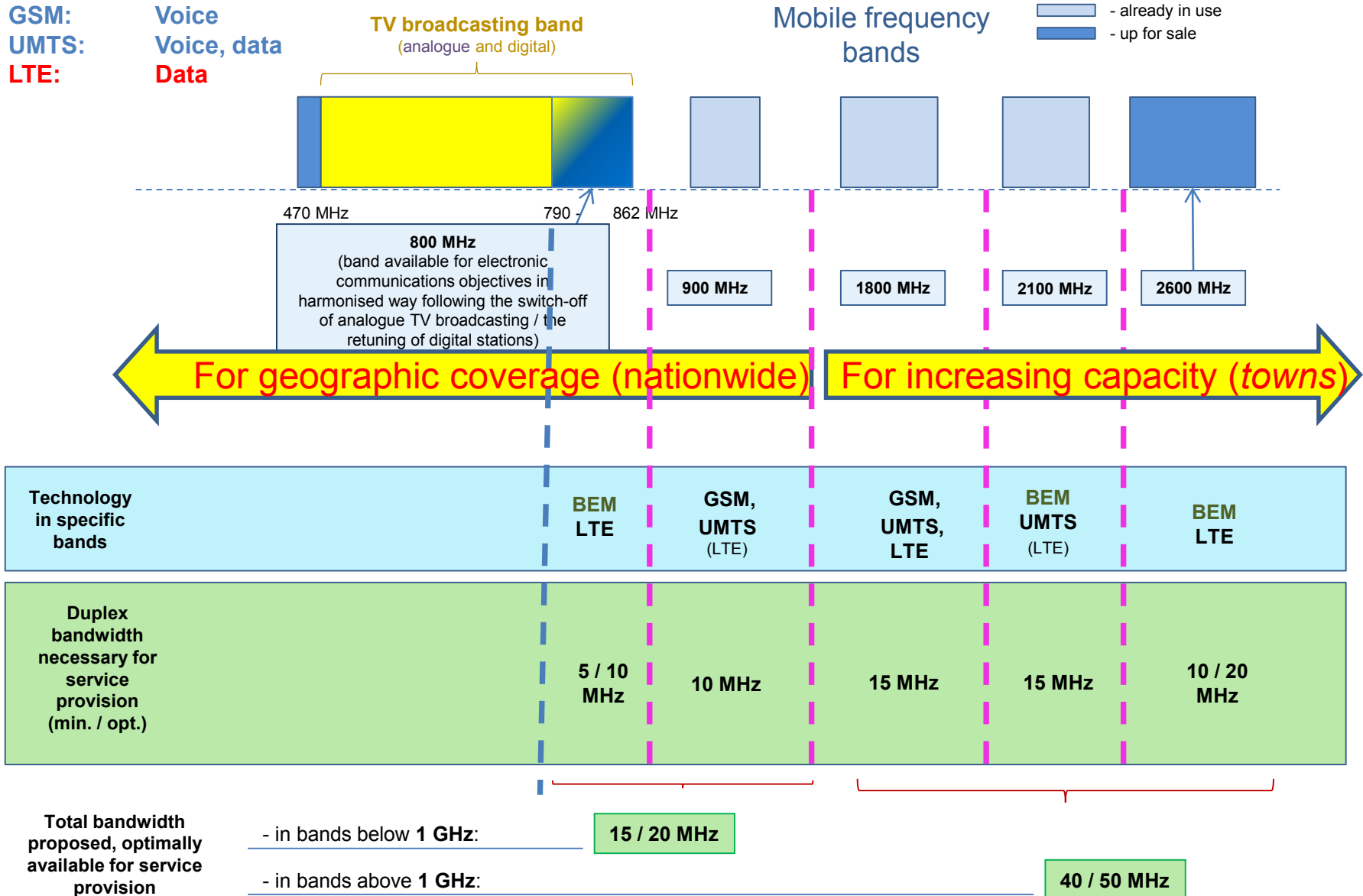
support and foster the deployment of broadband internet coverage in rural areas currently lacking broadband and to ensure the access to it to the greatest extent possible

correlate to RSPB full utilisation of the 800 MHz, 900 MHz, 1800 MHz and 2600 MHz bands

to achieve sufficient state revenues from the sale of spectrum licences within the context of responsible management of national assets

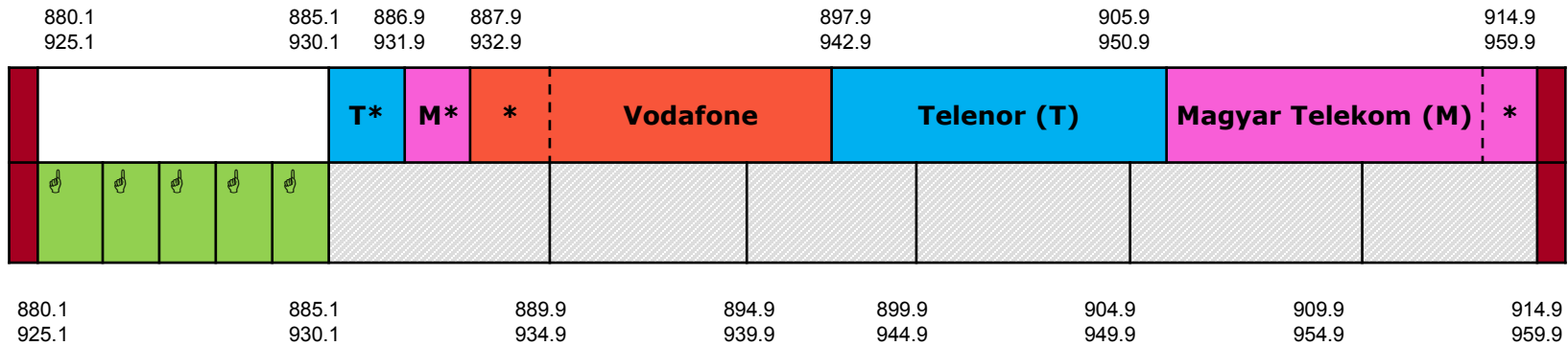


Mobile bands and technologies



880-880.1
925-925.1

914.9-915
959.9-960

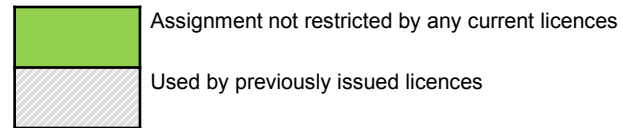
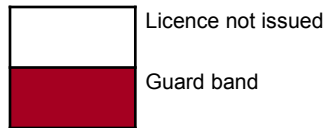


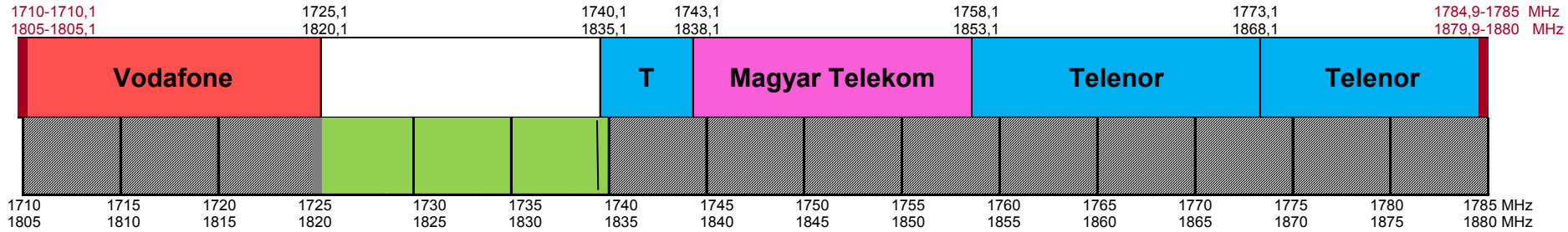
880-880.1
925-925.1

914.9-915
959.9-960

* EGSM

👉 basic blocks of 1 MHz





Legend



Licence not issued

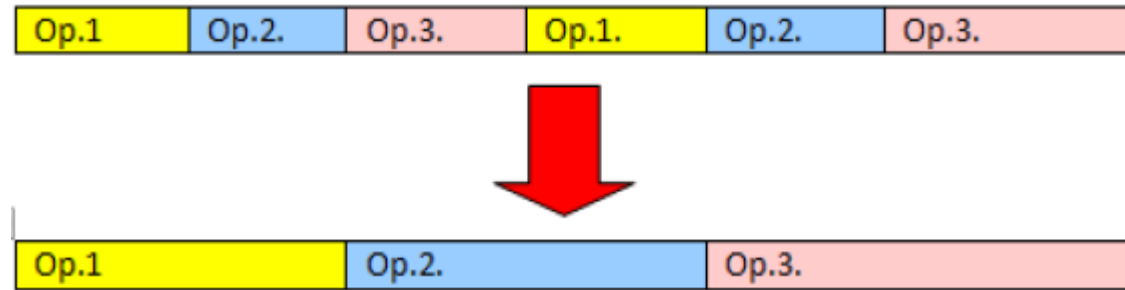
Guard band



Assignment not restricted by any current licences

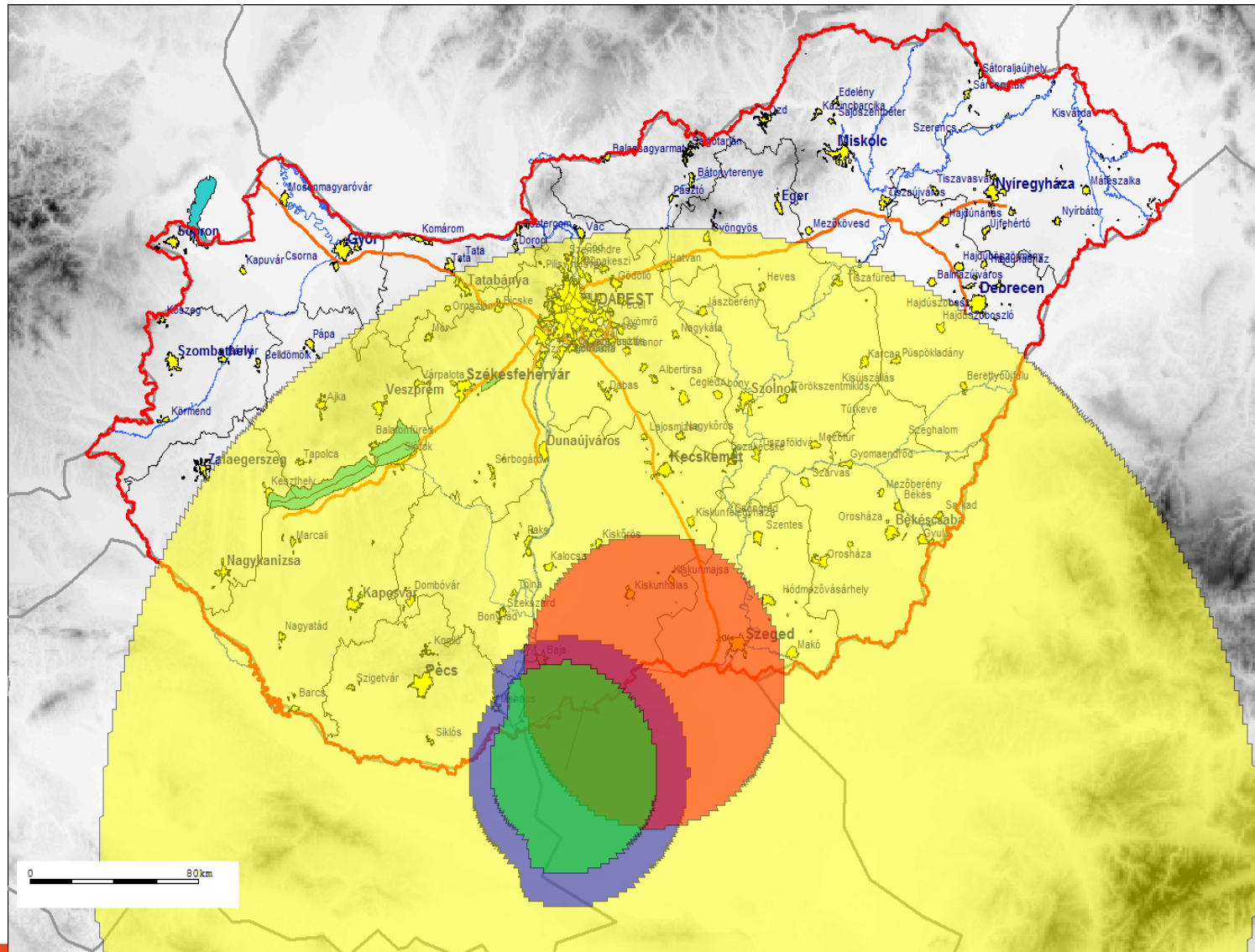
Used by previously issued licences

- to eliminate the fragmentation in both bands => reshuffling



- to minimize the total cost of operators
 - to minimize the outage of operating networks
 - to minimize the transition period
- to implement the new EU directive => to introduce the new technology (LTE) => refarming

Impact of analogue Serbian TV stations (Chanel 61, 66)



Band	Object (MHz)	A	B	C	D	E	F	G	H	I
800 MHz	6x2x5	2x2x5	2x2x5	2x2x5						
900 MHz	5x2x1	2x2x1	2x2x1	1x2x1						
1800 MHz	3x2x5				1x2x5	1x2x5	1x2x5			
2600 MHz	14x2x5 8x5	6x2x5	4x2x5	5x5 TDD				4x2x5	3x5 TDD	
26 GHz	2x2x28									2x2x28
total	392 MHz	84 MHz	64 MHz	22 MHz 25 TDD	10 MHz	10 MHz	10 MHz	40 MHz	15 TDD	112 MHz

Roll-out obligation

- Geographic
- Population

The national coverage requirement can be met using any of the frequency bands obtained.

The winning applicant can achieve coverage of at least 15% of population the using any of the existing frequencies.

60 month

- coverage of at least 96% of the population and at least 90% of national geographic coverage

10 year

- population coverage of at least 99%

Objective: foster coverage at white areas



No excessive burden



Flexibility in network planning



Tender obligation and offer

Phase 1 (12 months)

Package C

- coverage across the municipal boundaries of localities listed in Appendix 1 44 localities with populations between 1,000 – 6,000 residents

Package A, B

- coverage within the municipal boundaries of 25 % of the localities listed in Appendixes 1 and 2 and specified by the licensee
- additional 25 % of localities listed in Appendixes 1 and 2 and specified by the licensee, coverage shall be ensured within 12 months following the shutdown of television broadcasting networks of neighbouring countries

44+70 localities with populations between 1,000 – 6,000 residents

Phase 2 (30/36 month)

Package A, B, C

- coverage within all localities with populations between 1,000-6,000 residents

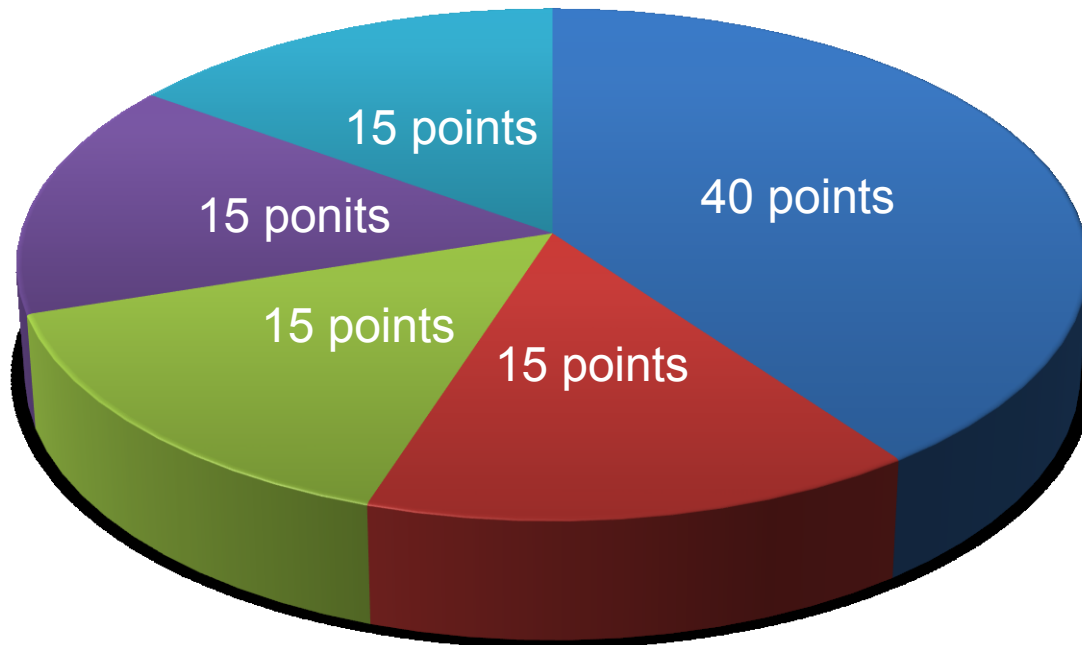


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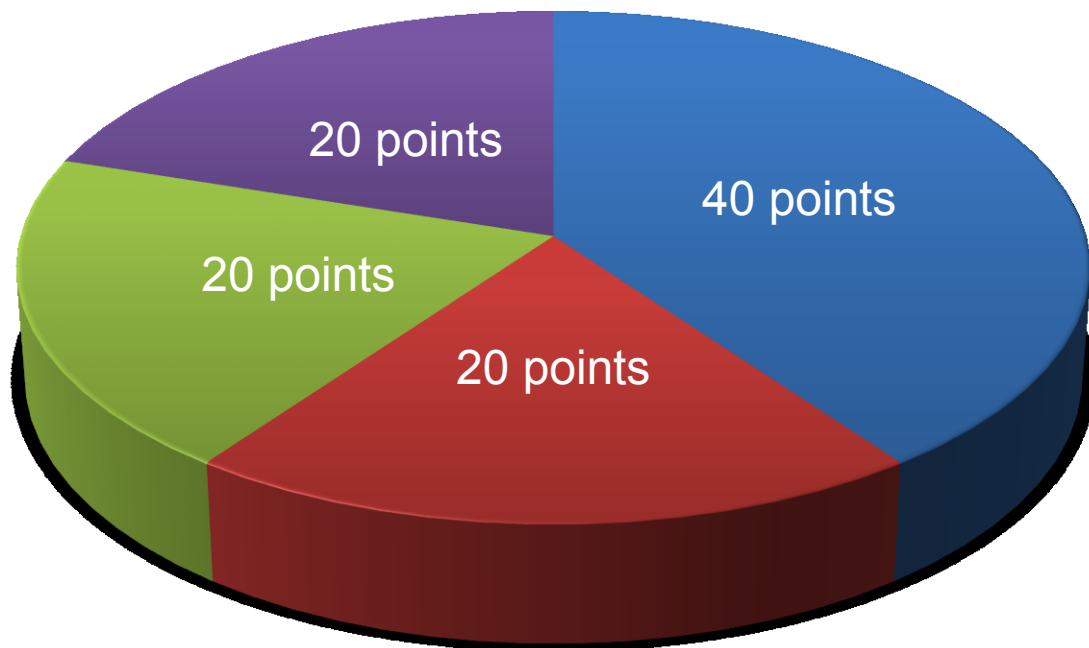
Evaluation criteria and weighting

Maximum 100 points



- offered price
- Number of localities with less than 1,000 inhabitants in the Phase 1 - 800 MHz
- Number of localities with less than 1,000 inhabitants Phase 2 - 800 MHz
- Commitment to deploy national coverage earlier than the prescribed deadlines - 800 MHz
- The date of placing the 2600 MHz frequency band into use not later than 4 years

Maximum 100 points



- offered price
- Number of localities with less than 1,000 inhabitants in the Phase 1 - 800 MHz
- Number of localities with less than 1,000 inhabitants Phase 2 - 800 MHz
- The date of placing the 2600 MHz frequency band into use not later than 4 years

Band	Outdoor			Indoor		
	GSM (RxLev)	UMTS (RSCP)	LTE (RSRP)	GSM (RxLev)	UMTS (RSCP)	LTE (RSRP)
800 MHz	-	-96 dBm	-110 dBm	-	-86 dBm	-100 dBm
900 MHz	-93 dBm	-96 dBm	-110 dBm	-81 dBm	-84 dBm	-98 dBm
1800 MHz	-93 dBm	-96 dBm	-110 dBm	-73 dBm	-76 dBm	-90 dBm
2600 MHz	-	-96 dBm	-110 dBm	-	-74 dBm	-88 dBm

Remarks:

- Signal levels were defined taking into account ETSI TR 102 581.

Abbreviations:

- RxLev (Received Signal Level): reception level of the BCCH – Broadcast Channel;
- RSCP (Received Signal Code Power): Pilot (reference) channel level measured after decoding;
- RSRP (Reference Signal Received Power): Received performance of the reference carrier.

For purposes of assessing network roll-out, the Authority shall conduct

- path registration tests and stationary measurements on a randomised basis,
- checking parameters of network coverage and determining whether prescribed levels are being met.
- the Authority shall enter all measurements and pertaining statistical calculations in a protocol

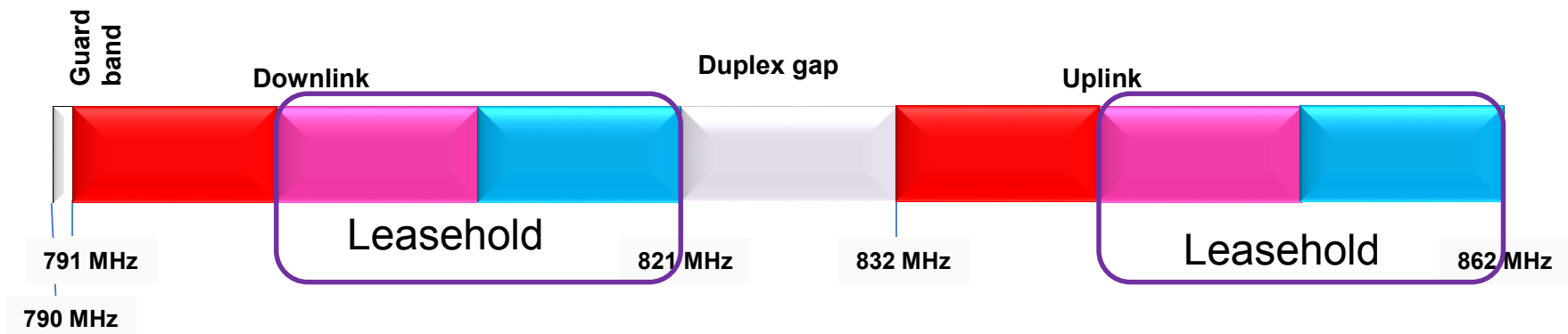


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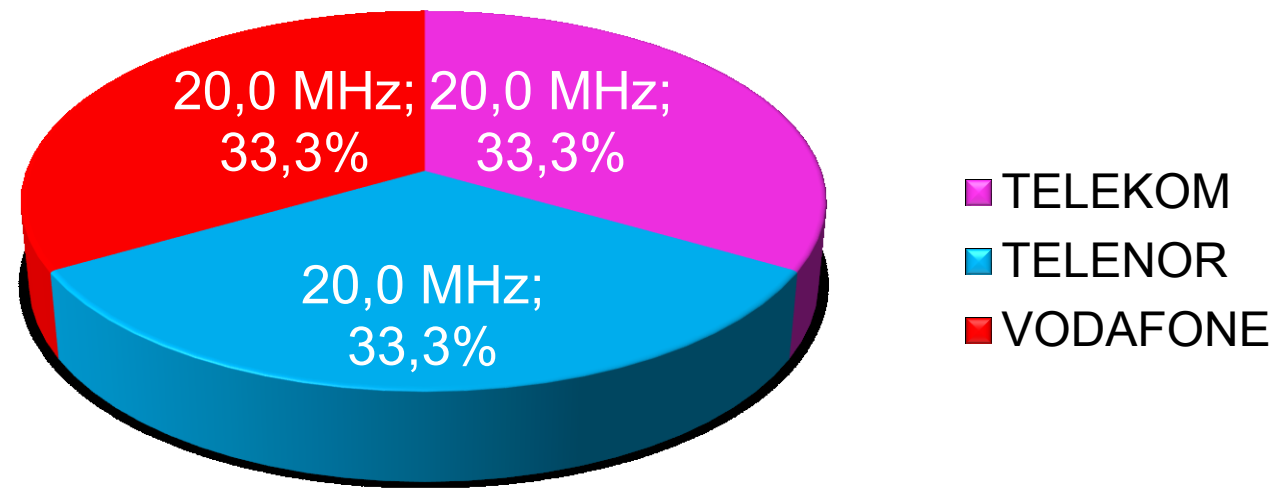
Nemzeti Média- és Hírközlési Hatóság

Results

	Telekom			Telenor			Vodafone		
	Offer (No)	% of all localities		Offer (No)	% of all localities		Offer (No)	% of all localities	
Covered localities below 1000 residences within 12 month	675	38,01%		350	19,71%		1100	61,94%	
		90,71%			67,57%			81,64%	
Covered localities below 1000 residences within 30/36 month	936	52,70%		850	47,86%		350	19,71%	

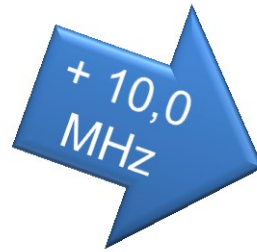
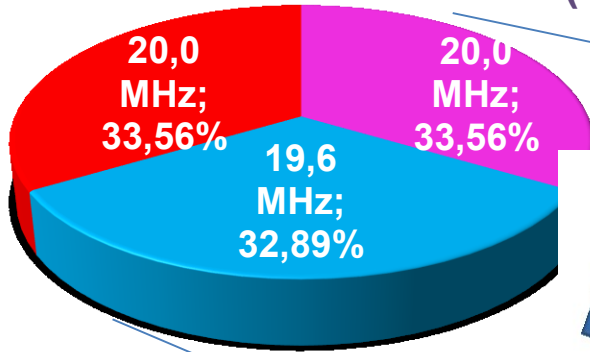


Obtained

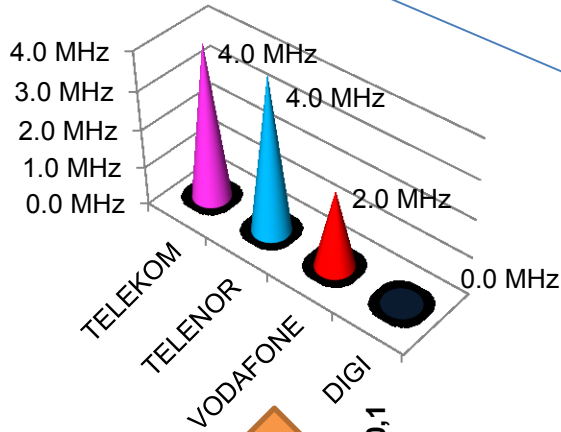
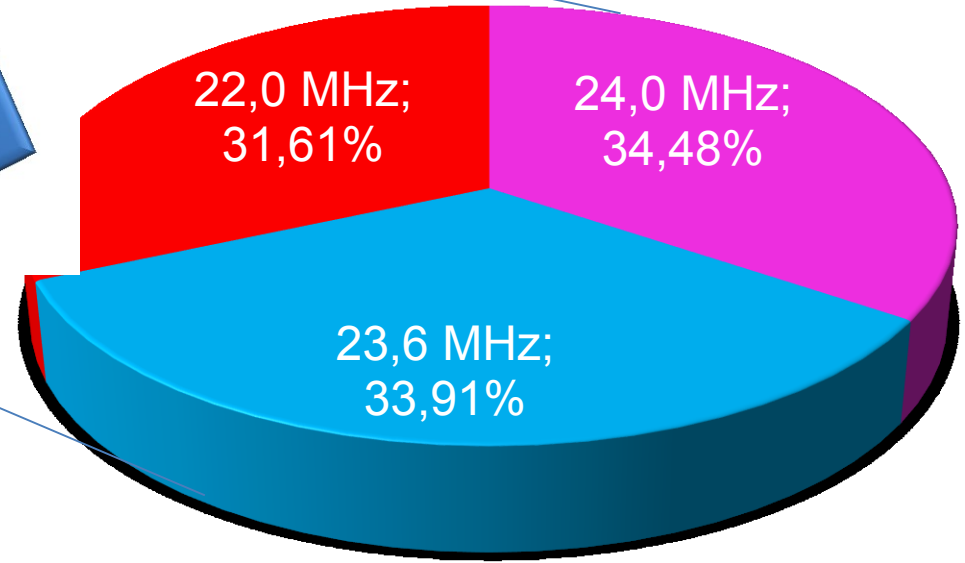




Before the tender (2014)

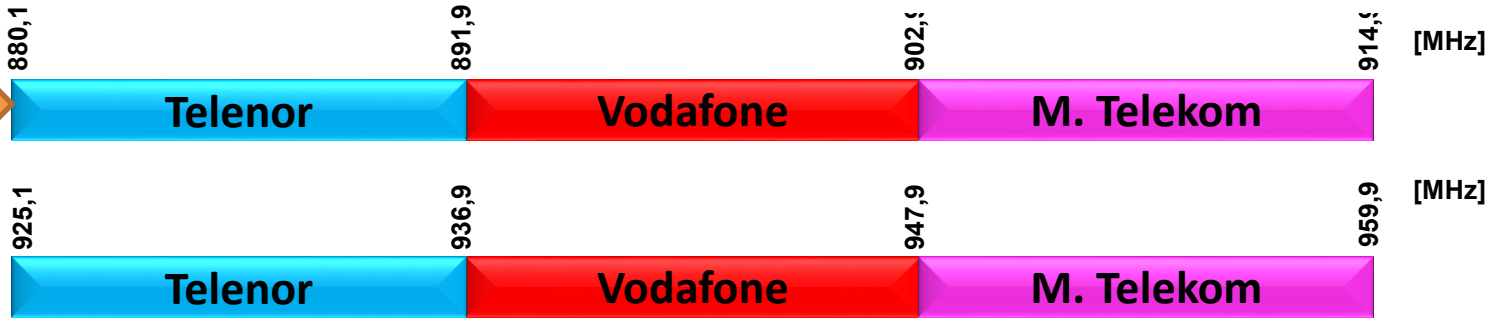


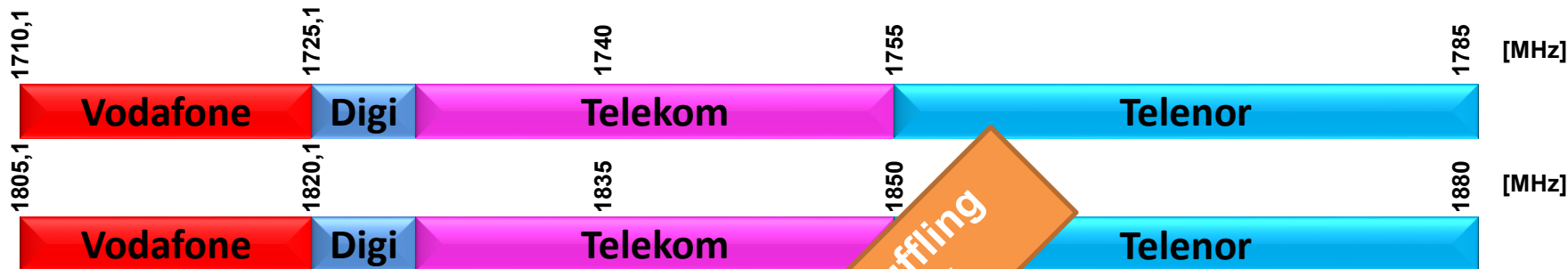
After the tender



- TELEKOM
- TELENOR
- VODAFONE
- DIGI

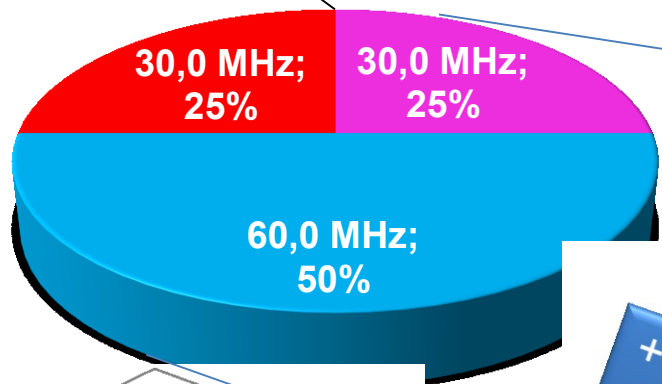
reshuffling
2015



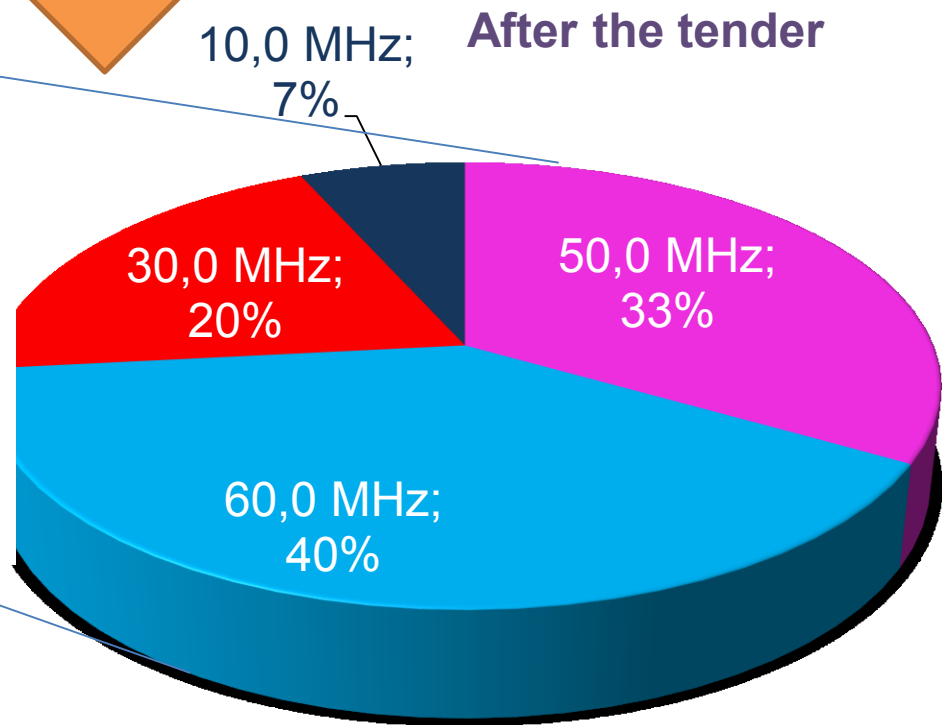


reshuffling
2014

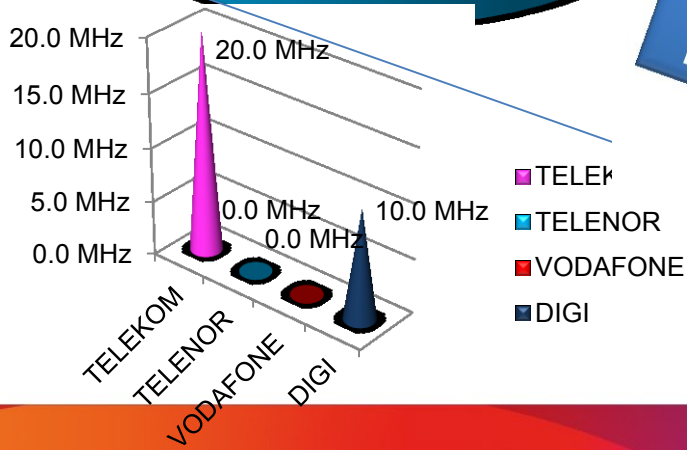
Before the tender (2014)

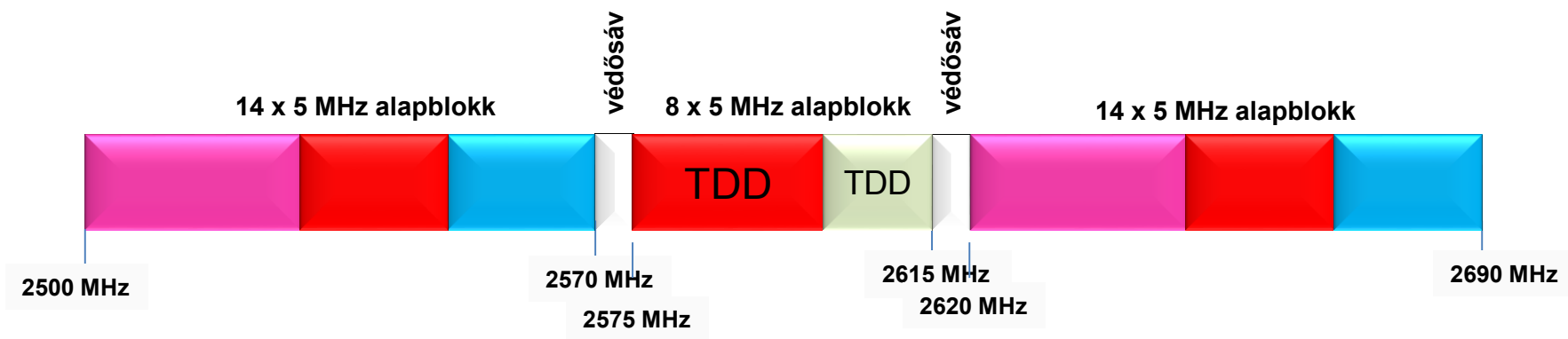


After the tender

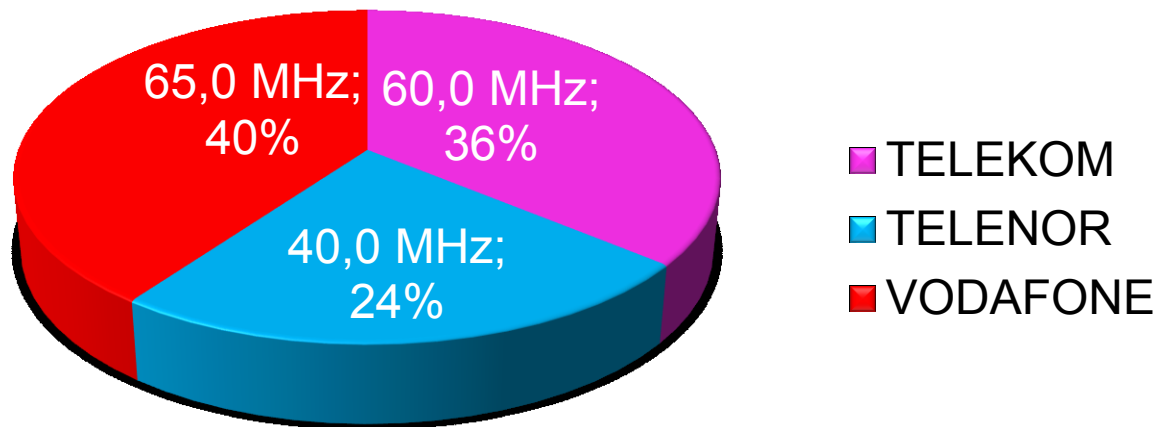


+ 30,0 MHz





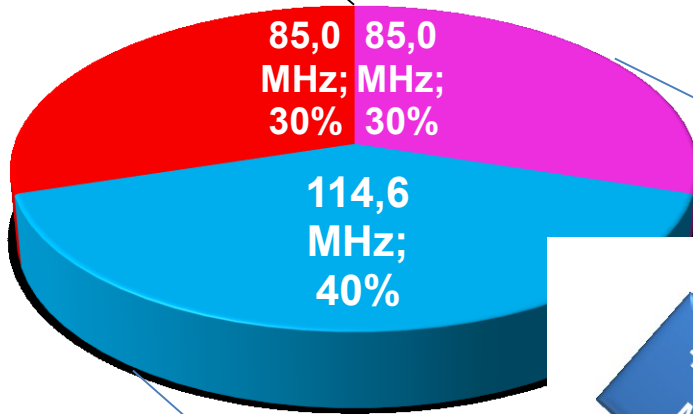
Obtained





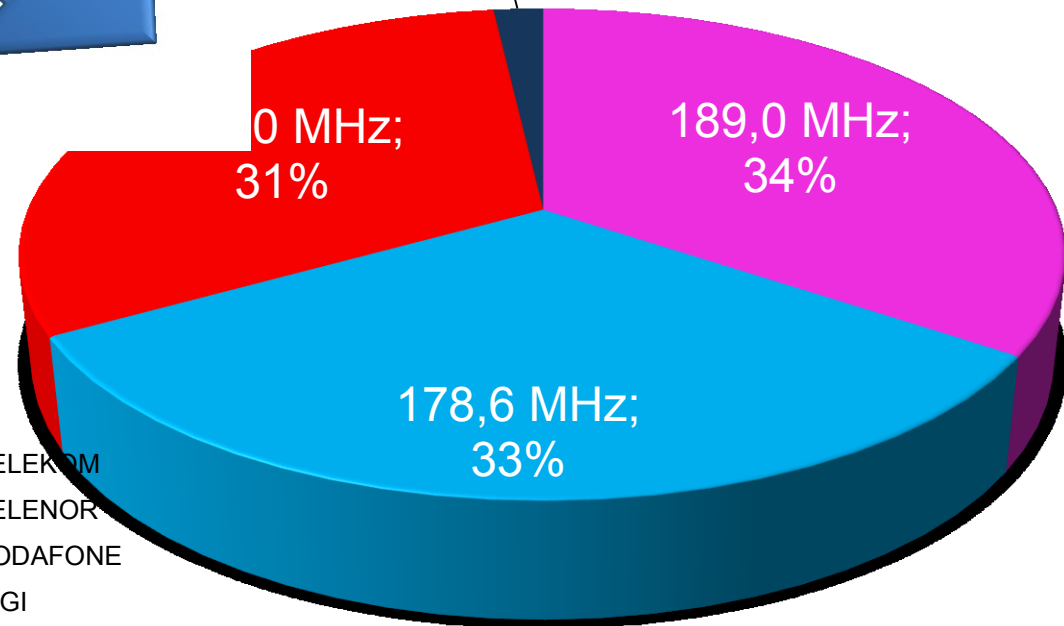
Used spectrum by MNO's for MFCN

0% Before the tender

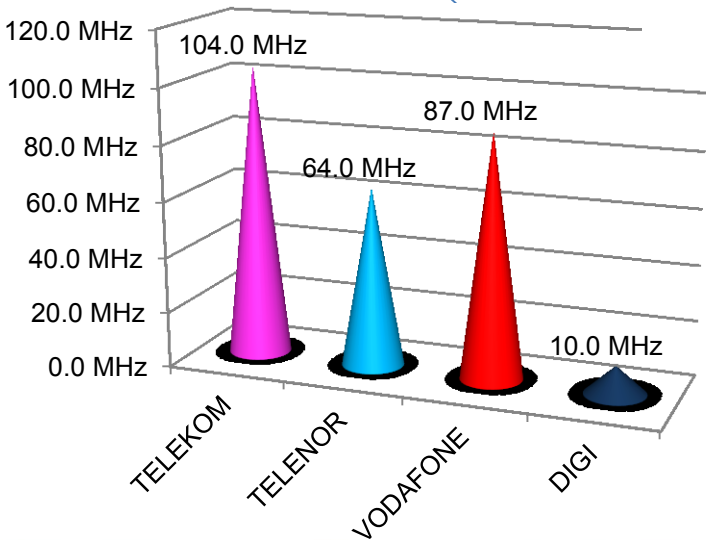


With the result of the tender

10,0 MHz; 2%



Result



**Thank you for your
attention**