



**NewStreet**  
Research

# Introducing SpectrumHub

NSR Global Spectrum Database

June 18, 2024

# SpectrumHub

## Upgrading our Spectrum Insights

June 18, 2024

In February, we launched SpectrumHub, our global spectrum database and we are now delighted to upgrade this to **SpectrumHub 2.0**, which includes a suite of major new features:

- Latest global spectrum updates as of June 2024
- 12 more markets introduced with detailed historic pricing analysis
- Detailed analysis looking at spectrum renewal timetables and potential future costs in major markets
- Additional price points from key secondary market transactions in the US
- Detailed spectrum valuations for the US carriers based on actual prices paid and current market value
- Regional details of spectrum holdings and price paid for US and India
- Easier to view breakdown of historic spectrum auction details
- Additional information in spectrum holdings and price sections
- Other bug fixes and improvements

Clients who already have access to SpectrumHub will see these new features in the tool automatically this morning. Clients who would like access to SpectrumHub, please contact us.

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1

## Version 1.0

In February, we launched SpectrumHub 1.0 in the beta version.

We believe this new product provides a genuinely unique insight into the state of play of the global wireless spectrum market.

2

## Version 2.0

Since the launch of SpectrumHub 1.0, we have had a lot of valuable client feedback and made some planned upgrades.

We are delighted to launch **SpectrumHub 2.0** with more detail on more markets, more detailed spectrum valuations (including secondary transactions) and more detailed renewal analysis.

3

## Access & Trial

**SpectrumHub**, which sits outside our regular telecoms subscription, has been available for free during a **trial period until June 30<sup>th</sup>** and after that it will be put behind a **separate paywall**.

4

## Broadband Insights

To complement SpectrumHub as part of our data analytics platform, we launched **Broadband Insights**, a bespoke and interactive map looking at US broadband connectivity.

For clients who haven't yet accessed this product, **please also contact Jose Anguis**.

Like SpectrumHub, this will be put behind a separate paywall shortly.

5

## Next steps

For clients interested in accessing the full database directly, **please contact Jose Anguis**

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T: +1 646 681 4603

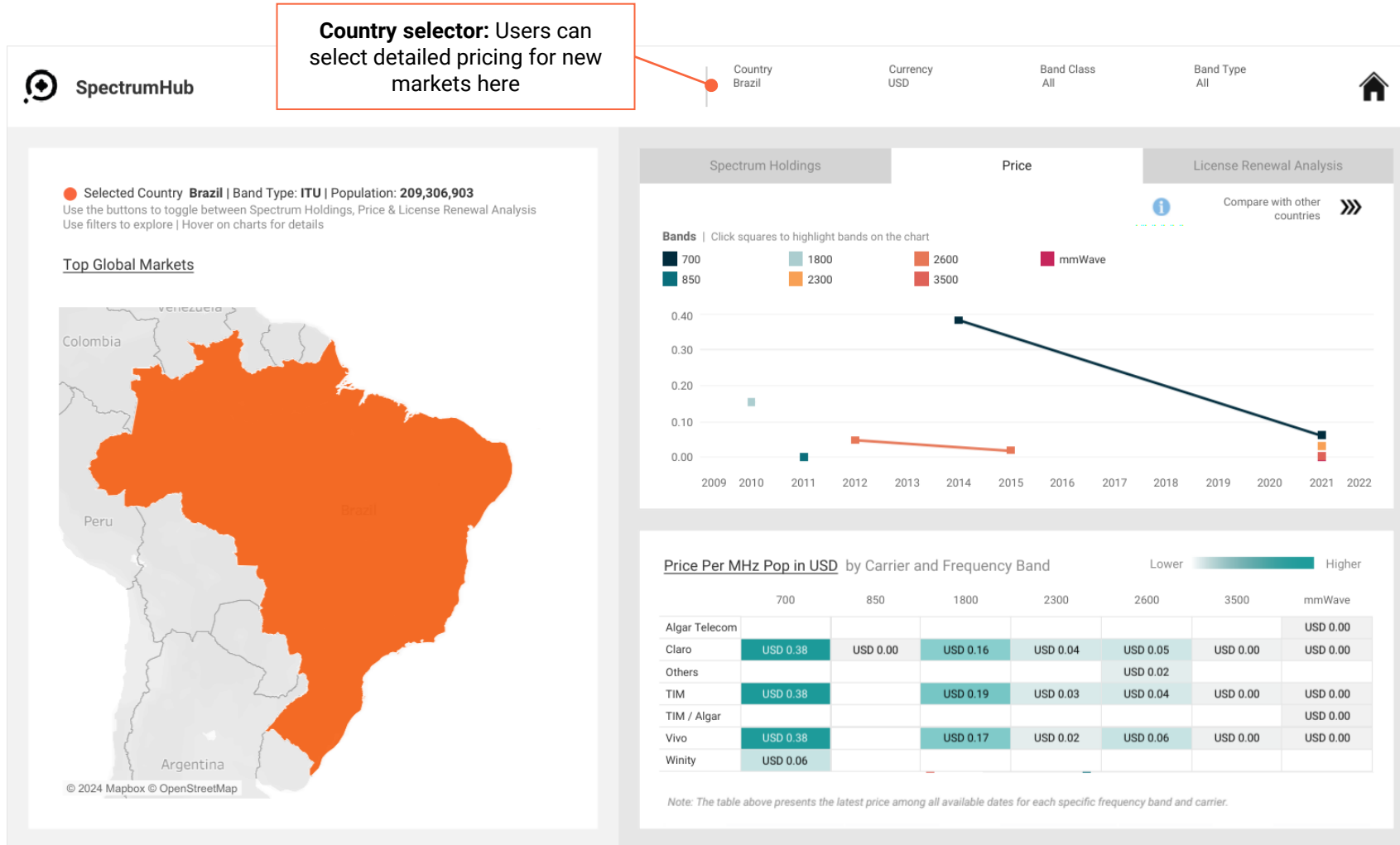


## Introducing SpectrumHub v2.0

## New features: More detailed pricing analysis included for 12 new markets

In SpectrumHub 1.0, we included detailed spectrum pricing analysis by carrier and by band over time for the US, Germany, France, Spain, Italy, the UK and India. In **SpectrumHub 2.0** we now include this for Belgium, Brazil, Colombia, Indonesia, Mexico, Netherlands, Nigeria, Portugal, South Africa, South Korea, Switzerland and Thailand, to overall cover 19 of the markets worldwide where spectrum prices/renewals have been most important.

**Country selector:** Users can select detailed pricing for new markets here



**SpectrumHub** Country: Brazil Currency: USD Band Class: All Band Type: All

Selected Country **Brazil** | Band Type: ITU | Population: 209,306,903  
 Use the buttons to toggle between Spectrum Holdings, Price & License Renewal Analysis  
 Use filters to explore | Hover on charts for details

Top Global Markets

Price

**Bands** | Click squares to highlight bands on the chart

Band	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
700						0.38							0.05	
850			0.01											
1800		0.15												
2300														
2600				0.05			0.02							
3500														
mmWave														

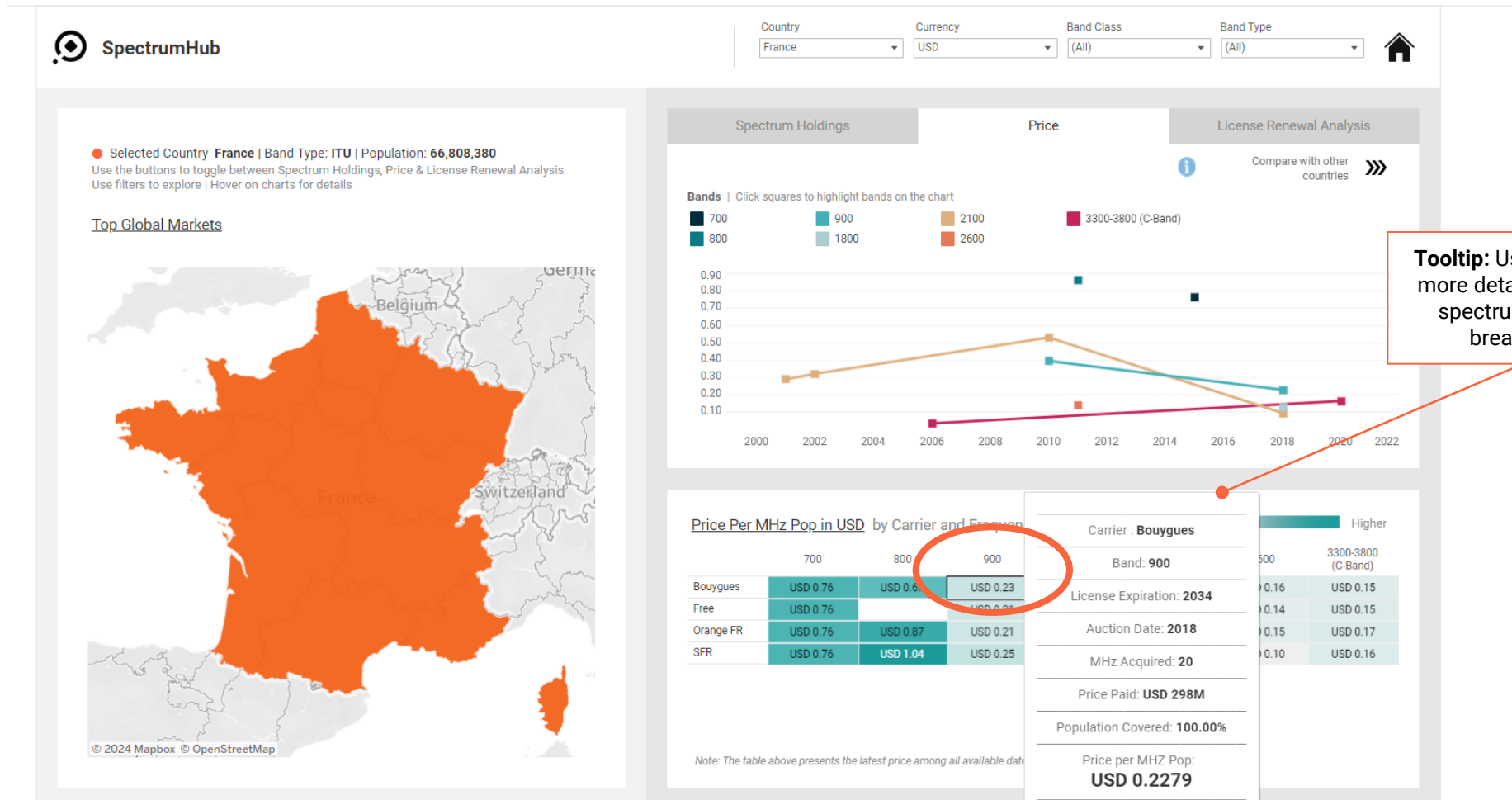
**Price Per MHz Pop in USD** by Carrier and Frequency Band

	700	850	1800	2300	2600	3500	mmWave
Algar Telecom							USD 0.00
Claro	USD 0.38	USD 0.00	USD 0.16	USD 0.04	USD 0.05	USD 0.00	USD 0.00
Others					USD 0.02		
TIM	USD 0.38		USD 0.19	USD 0.03	USD 0.04	USD 0.00	USD 0.00
TIM / Algar							USD 0.00
Vivo	USD 0.38		USD 0.17	USD 0.02	USD 0.06	USD 0.00	USD 0.00
Winity	USD 0.06						

Note: The table above presents the latest price among all available dates for each specific frequency band and carrier.

## New features: Easier snapshot for each historic auction

In the price section for each market in SpectrumHub 2.0, by hovering the mouse over each historic auction, it is far easier to see the details of that specific auction, i.e., the total price paid in that auction, the total MHz, and therefore the implied price in that auction.



**SpectrumHub**

Country: France | Currency: USD | Band Class: (All) | Band Type: (All)

Selected Country: **France** | Band Type: ITU | Population: **66,808,380**  
 Use the buttons to toggle between Spectrum Holdings, Price & License Renewal Analysis  
 Use filters to explore | Hover on charts for details

[Top Global Markets](#)

**Price**

Compare with other countries >>>

**Bands** | Click squares to highlight bands on the chart

- 700
- 800
- 900
- 1800
- 2100
- 2600
- 3300-3800 (C-Band)

**Price Per MHz Pop in USD by Carrier and Frequency**

	700	800	900
Bouygues	USD 0.76	USD 0.61	USD 0.23
Free	USD 0.76	USD 0.87	USD 0.21
Orange FR	USD 0.76	USD 0.87	USD 0.21
SFR	USD 0.76	USD 1.04	USD 0.25

**Carrier: Bouygues**

**Band: 900**

License Expiration: **2034**

Auction Date: **2018**

MHz Acquired: **20**

Price Paid: **USD 298M**

Population Covered: **100.00%**

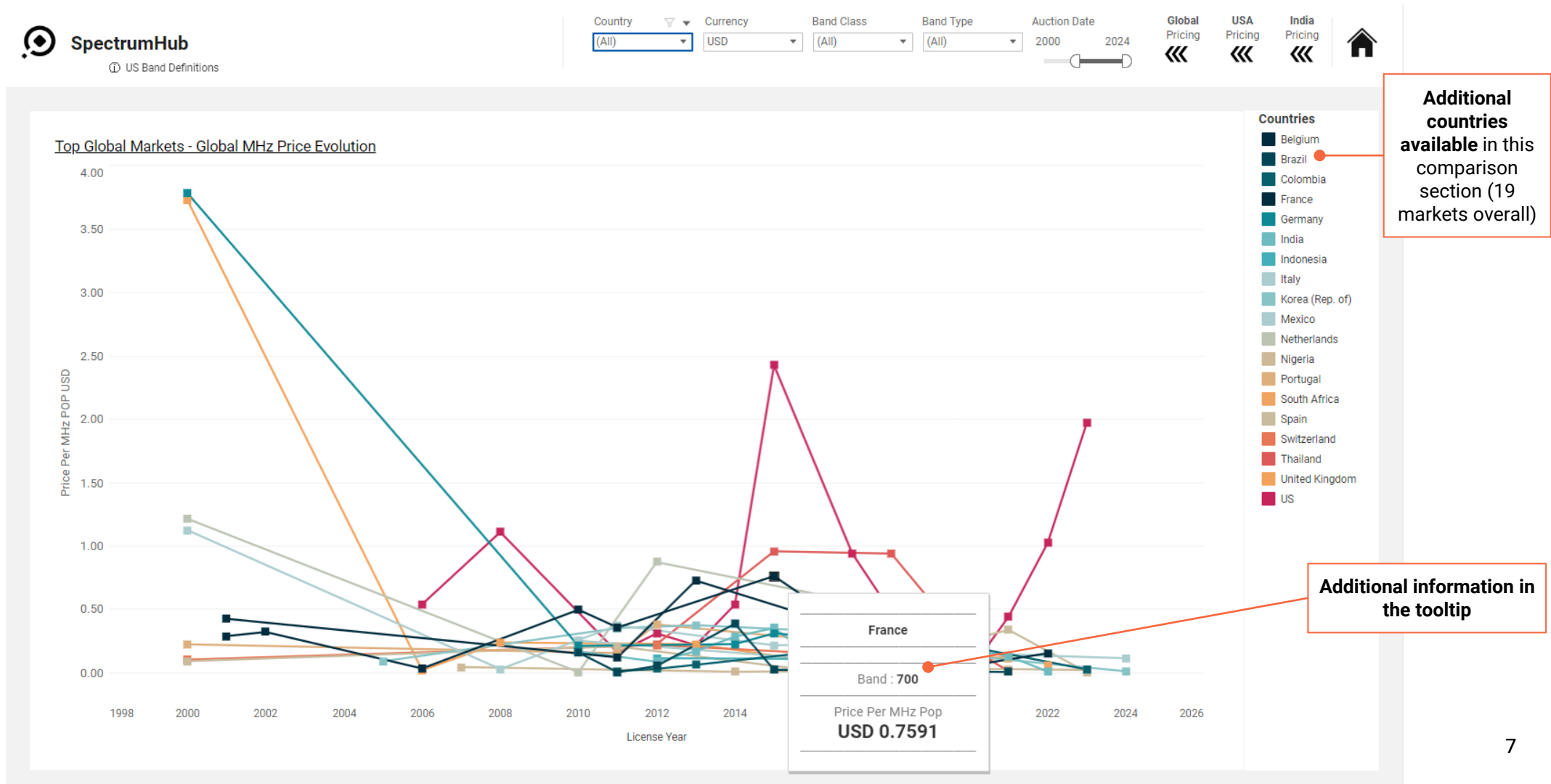
Price per MHz Pop:  
**USD 0.2279**

*Note: The table above presents the latest price among all available data*

**Tooltip:** Users can see more detailed historic spectrum auction breakdown


# New features: More detailed available on global comparisons


Screenshot to come.....showing tooltip on the cross-market pricing analysis



## New features: More details about the spectrum holdings at a glance available in the Worldwide section...


SpectrumHub 2.0 provides a broader overview of the average national holdings based with additional fields like average MHz depth, population covered, % of coverage and MHz-Pop.



Country  
Portugal
Band Class  
Multiple values
Bands  
Multiple values


Selected Country : **Portugal** | Band Type : ITU | Population: **10,348,650**  
Use the buttons to toggle between Spectrum Holdings, Price & License Renewal Analysis

Select a Country



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Spectrum Holdings
Price

**Additional spectrum holdings details**

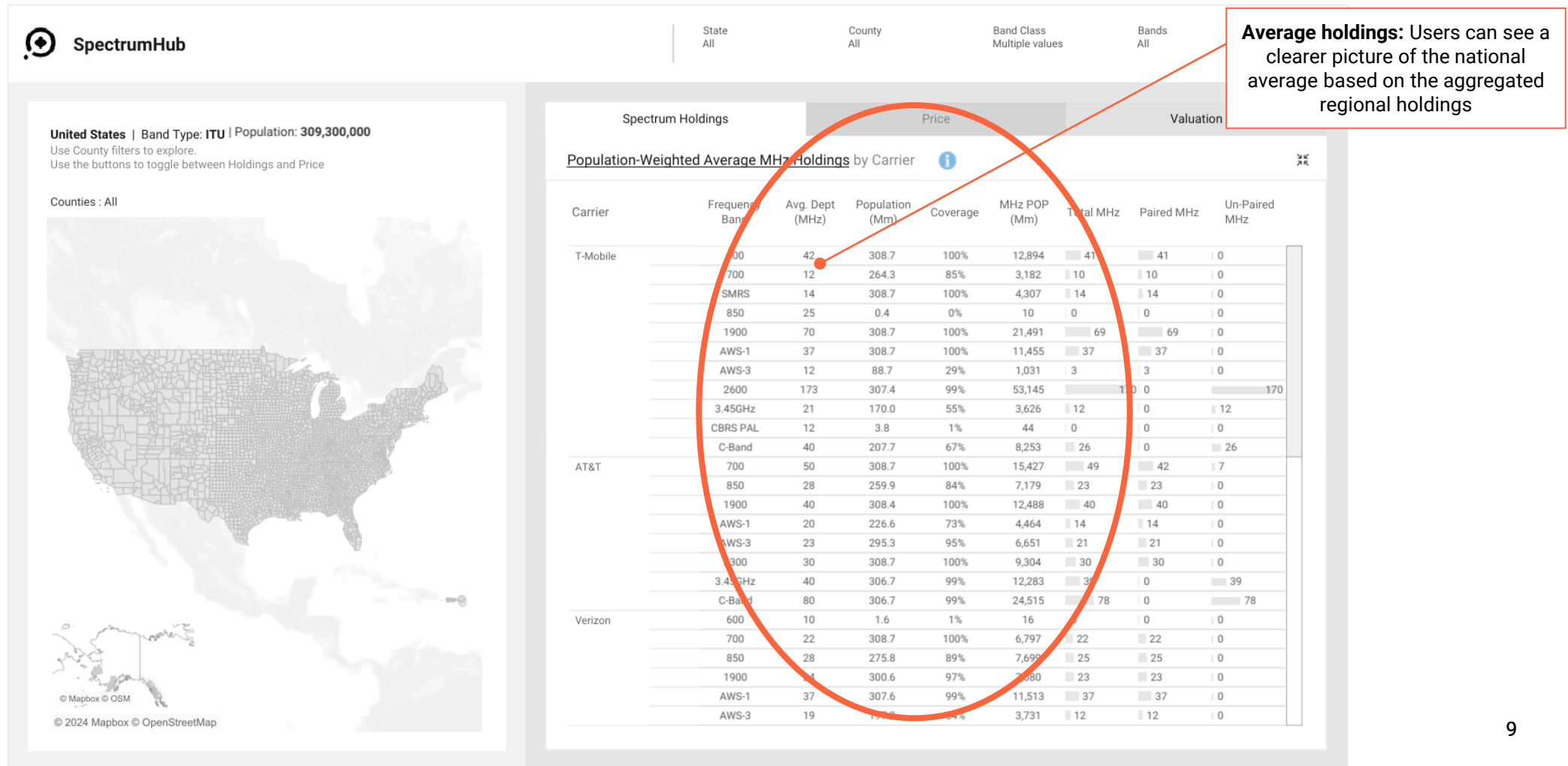
Population-Weighted Average MHz Holdings by Carrier. i

Carrier	Frequency band	Avg Depth (Mhz)	Population (Mm)	% Coverage	MHz Pop (Mm)	Total MHz	Paired MHz	Unpaired MHz
Vodafone	700	20	10.3	100%	207	20	20	0
	800	20	10.3	100%	207	20	20	0
	900	20	10.3	100%	207	20	20	0
	1800	40	10.3	100%	414	40	40	0
	2100	40	10.3	100%	410	40	40	0
	2600	65	10.3	100%	673	65	40	25
	3300-3800 (C-Band)	90	10.3	100%	931	90	0	90
NOS	700	20	10.3	100%	207	20	20	0
	800	20	10.3	100%	207	20	20	0
	900	20	10.3	100%	207	20	20	0
	1800	40	10.3	100%	414	40	40	0
	2100	40	10.3	100%	410	40	40	0
	2600	40	10.3	100%	414	40	40	0
	3300-3800 (C-Band)	100	10.3	100%	1,035	100	0	100
MEO	700	10	10.3	100%	103	10	10	0
	800	20	10.3	100%	207	20	20	0
	900	20	10.3	100%	207	20	20	0
	1800	40	10.3	100%	414	40	40	0
	2100	40	10.3	100%	410	40	40	0
	2600	40	10.3	100%	414	40	40	0
	3300-3800 (C-Band)	90	10.3	100%	931	90	0	90
Dense Air	3300-3800 (C-Band)	100	10.3	100%	1,035	100	0	100
DIGI (Dixarobil)	900	10	10.3	100%	103	10	10	0
	1800	10	10.3	100%	103	10	10	0
	2600	35	10.3	100%	362	35	10	25
NOWO	1800	20	10.3	100%	207	20	20	0
	2600	10	10.3	100%	103	10	10	0
	3300-3800 (C-Band)	20	10.3	100%	207	20	0	20



## ...and in the regional spectrum markets like the US and India

Like SpectrumHub 1.0, SpectrumHub 2.0 allows users to analyse spectrum holdings at a granular level by individual region for markets like the US and India including paired and unpaired spectrum. However, in SpectrumHub 2.0, we now provide more details of the average national holdings based on the aggregated regional holdings



**SpectrumHub**

State: All | County: All | Band Class: Multiple values | Bands: All

**United States** | Band Type: ITU | Population: 309,300,000  
Use County filters to explore.  
Use the buttons to toggle between Holdings and Price

Counties: All

**Population-Weighted Average MHz Holdings by Carrier**

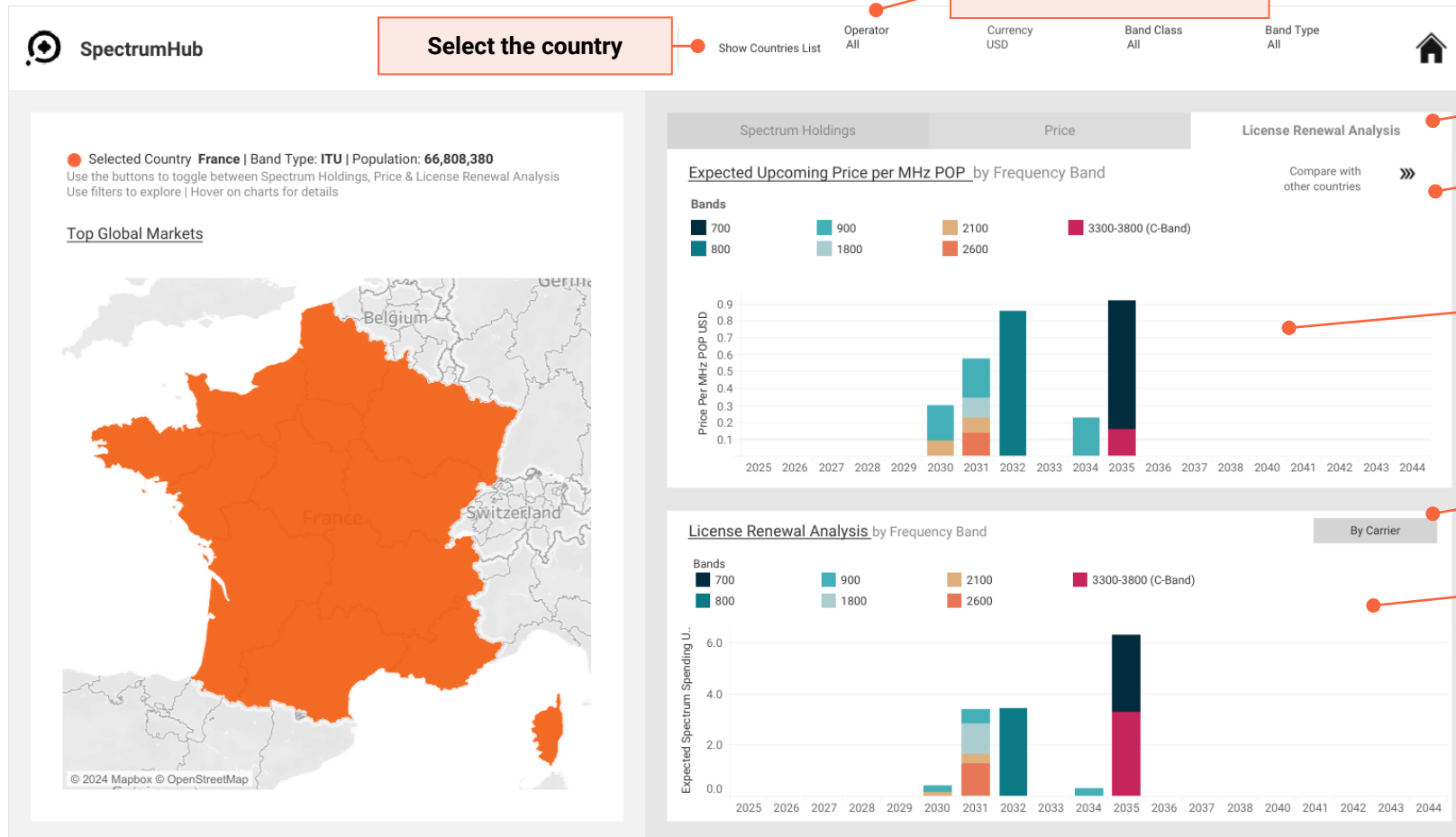
Carrier	Frequency Band	Avg. Dept (MHz)	Population (Mm)	Coverage	MHz POP (Mm)	Total MHz	Paired MHz	Un-Paired MHz
T-Mobile	600	42	308.7	100%	12,894	41	41	0
	700	12	264.3	85%	3,182	10	10	0
	SMRS	14	308.7	100%	4,307	14	14	0
	850	25	0.4	0%	10	0	0	0
	1900	70	308.7	100%	21,491	69	69	0
	AWS-1	37	308.7	100%	11,455	37	37	0
	AWS-3	12	88.7	29%	1,031	3	3	0
	2600	173	307.4	99%	53,145	100	0	170
	3.45GHz	21	170.0	55%	3,626	12	0	12
	CBRS PAL	12	3.8	1%	44	0	0	0
AT&T	C-Band	40	207.7	67%	8,253	26	0	26
	700	50	308.7	100%	15,427	49	42	7
	850	28	259.9	84%	7,179	23	23	0
	1900	40	308.4	100%	12,488	40	40	0
	AWS-1	20	226.6	73%	4,464	14	14	0
	AWS-3	23	295.3	95%	6,651	21	21	0
	1900	30	308.7	100%	9,304	30	30	0
Verizon	3.45GHz	40	306.7	99%	12,283	30	0	39
	C-Band	80	306.7	99%	24,515	78	0	78
	600	10	1.6	1%	16	0	0	0
Verizon	700	22	308.7	100%	6,797	22	22	0
	850	28	275.8	89%	7,699	25	25	0
	1900	24	300.6	97%	7,080	23	23	0
	AWS-1	37	307.6	99%	11,513	37	37	0
	AWS-3	19	170.0	84%	3,731	12	12	0

**Average holdings:** Users can see a clearer picture of the national average based on the aggregated regional holdings

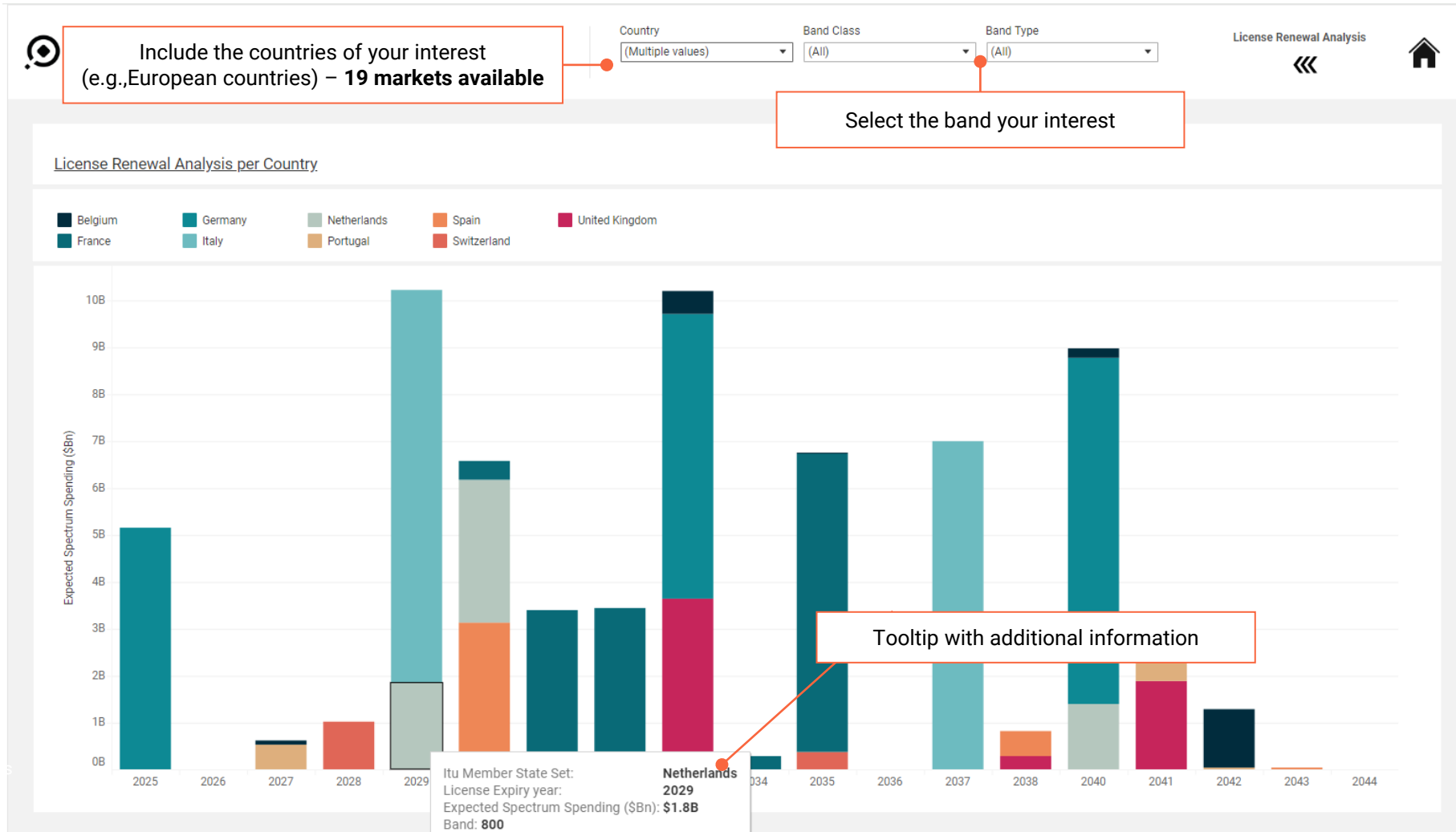
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# New features: New licence renewal analysis per country in more detail...

In the US, where spectrum is held on freehold, the value of spectrum holdings is more relevant. However, in most other global markets spectrum tends to be sold on a leasehold basis on 10–25-year terms and therefore operators can face expensive renewals. In SpectrumHub 1.0, we showed when the spectrum came due for renewal, but we now add in a new section to allow clients to be able to more easily map out future renewals in more detail, with future prices estimated based off the most recent prices paid per band in each respective market.



...along with comparisons of expected spectrum renewal spending across different countries



# New features: New pricing points in the US including secondary market transactions...

There was clear demand after SpectrumHub 1.0 to be able to see additional prices to original auction prices from secondary market transactions. We included what we believe are the most relevant ones. We also included a toggle to switch between the "Show Original Ref Price" and "Show Latest Ref Price" tables to be able to see how recent prices paid both market-wide and by carrier have changed over time.

Band Class: All
Bands: All

**United States | Band Type: ITU**  
Use filters to explore | Use the buttons to toggle between Spectrum Holdings and Price

**US National Price per MHz Pop USD**

© OpenStreetMap

Spectrum Holdings
Price
Valuation

**Price Per MHz Pop Over Time in USD by Frequency Band**

**Bands** | Click squares to highlight bands on the chart

600
SMRS
AWS-H
2300
CBRS PAL
AWS 3 - Unpaired

700
850
AWS-1
2600
C-Band

700 - FirstNet
1900
AWS-4
3.45GHz
AWS 3 - Paired

**Additional price points including not only auctions but other reference prices**

**Price Per MHz Pop in USD by Frequency Band and Carrier**

Show Original Ref Price

	600	700	SMRS	850	1900	AWS-H	AWS-1	AWS-3 Paired	AWS-3 Unpaired	AWS-4	2300	2600	3.45GHz	CBRS PAL	C-Band	700 - FirstNet
AT&T		\$2.10		\$2.07	\$2.57		\$1.99	\$2.88			\$2.64		\$1.03		\$1.04	\$1.97
DISH	\$2.41	\$0.97				\$2.64		\$2.70	\$0.51	\$1.57			\$1.08	\$0.23	\$0.64	
T-Mobile	\$1.98	\$1.97	\$1.99	\$1.26	\$2.69		\$3.07	\$1.63				\$1.06	\$1.10		\$1.17	
US Cellular	\$1.27	\$1.46		\$1.17	\$1.57		\$1.21	\$0.97					\$0.70	\$0.24	\$0.89	
Verizon		\$1.37		\$2.01	\$2.86		\$2.60	\$2.92						\$0.58	\$1.00	

Note: mmWave valuation and pricing will be available soon

**Select by original reference price and latest reference price**

...and more details about MHz acquired, price paid, population and transaction type



Additional pricing points and additional important notes in the tooltip available

Price Per MHz Pop in USD by Frequency Band and Carrier						
	600	700	SMRS	850	1900	AWS-H
AT&T		\$1.18		\$1.05	\$0.68	
DISH	\$1.12	\$0.55				\$0.53
T-Mobile	\$0.91	\$1.11	\$0.83	\$0.64	\$0.58	
US Cellular	\$0.59	\$0.82		\$0.59	\$0.40	
Verizon		\$0.77		\$1.03	\$0.72	

Note: mmWave valuation and pricing will be available soon

Carrier: **DISH**

Band: **AWS-H**

Auction Date: **2014**

MHz Acquired: **10.0**

Population Covered: **100%**

MHz POP (Mm): **3,128**

Price Paid (Mm): **1,672**

Type: **Secondary Transaction**

Price per MHz Pop: **\$0.5300**

Show Latest Ref Price

2600	3.45GHz	CBRS PAL	C-Band	700 - FirstNet
\$0.69	\$0.72	\$0.15	\$1.04	\$1.04
\$0.22	\$0.73	\$0.16	\$1.17	
	\$0.47	\$0.16	\$0.89	
		\$0.39	\$1.00	

Expanded tooltip with additional information

# New features: New spectrum valuation section in the US

For a market like the US, where spectrum is awarded on a freehold basis, we are now very excited to be able to show the theoretical value of each carrier's spectrum based on both the initial price they paid for the spectrum, and then also the "revalued" price based on the most recent comparables for that spectrum band.

**Valuation of freehold spectrum by frequency band: detailed value of spectrum holdings by band at the total national level**

**Valuation by Frequency Band**

	Original Population (Mm)	Average Depth (Mhz)	Mhz-Pops (Mm)	% Of Us Pops Covered	Original Band Value (\$, Mm)	Original \$/Mhz-Pop	Latest Population (Mm)	Latest Mhz-Pops (Mm)	Latest Band Value (\$, Mm)	Latest \$/Mhz-Pop	Appreciation
600	313	68	21,241	100%	19,311	\$0.91	340	23,090	45,443	\$1.97	116%
700	286	62	17,708	100%	19,590	\$1.11	340	21,085	41,496	\$1.97	78%
700 - FirstNet	313	20	6,257	100%	6,500	\$1.04	340	6,802	13,386	\$1.97	89%
SMRS	335	14	4,474	100%	3,684	\$0.82	340	4,761	9,370	\$1.97	139%
850	313	50	15,642	100%	15,692	\$1.00	340	17,004	33,465	\$1.97	96%
1900	313	130	40,670	100%	27,131	\$0.67	340	44,211	116,705	\$2.64	296%
AWS-H	313	10	3,128	100%	1,672	\$0.53	340	3,401	8,977	\$2.64	394%
AWS-1	286	90	25,539	99%	13,700	\$0.54	338	30,409	80,273	\$2.64	392%
AWS 3 - Unpaired	313	15	4,693	100%	2,336	\$0.50	340	5,101	2,540	\$0.50	0%
AWS-4	313	40	12,514	100%	1,940	\$0.16	340	13,603	21,341	\$1.57	912%
2300	313	20	6,257	100%	1,918	\$0.31	340	6,802	17,955	\$2.64	761%
2600	313	194	60,692	100%	12,991	\$0.21	340	65,976	67,351	\$1.02	377%
3.45GHz	335	100	32,926	98%	22,418	\$0.68	334	33,418	34,115	\$1.02	50%
CBRS PAL	313	70	21,241	97%	4,586	\$0.22	330	23,090	7,491	\$0.32	50%
C-Band	335	280	92,193	98%	94,114	\$1.02	334	93,571	95,521	\$1.02	0%
AWS 3	313	50	15,618	100%	41,227	\$2.64	340	16,977	44,816	\$2.64	0%

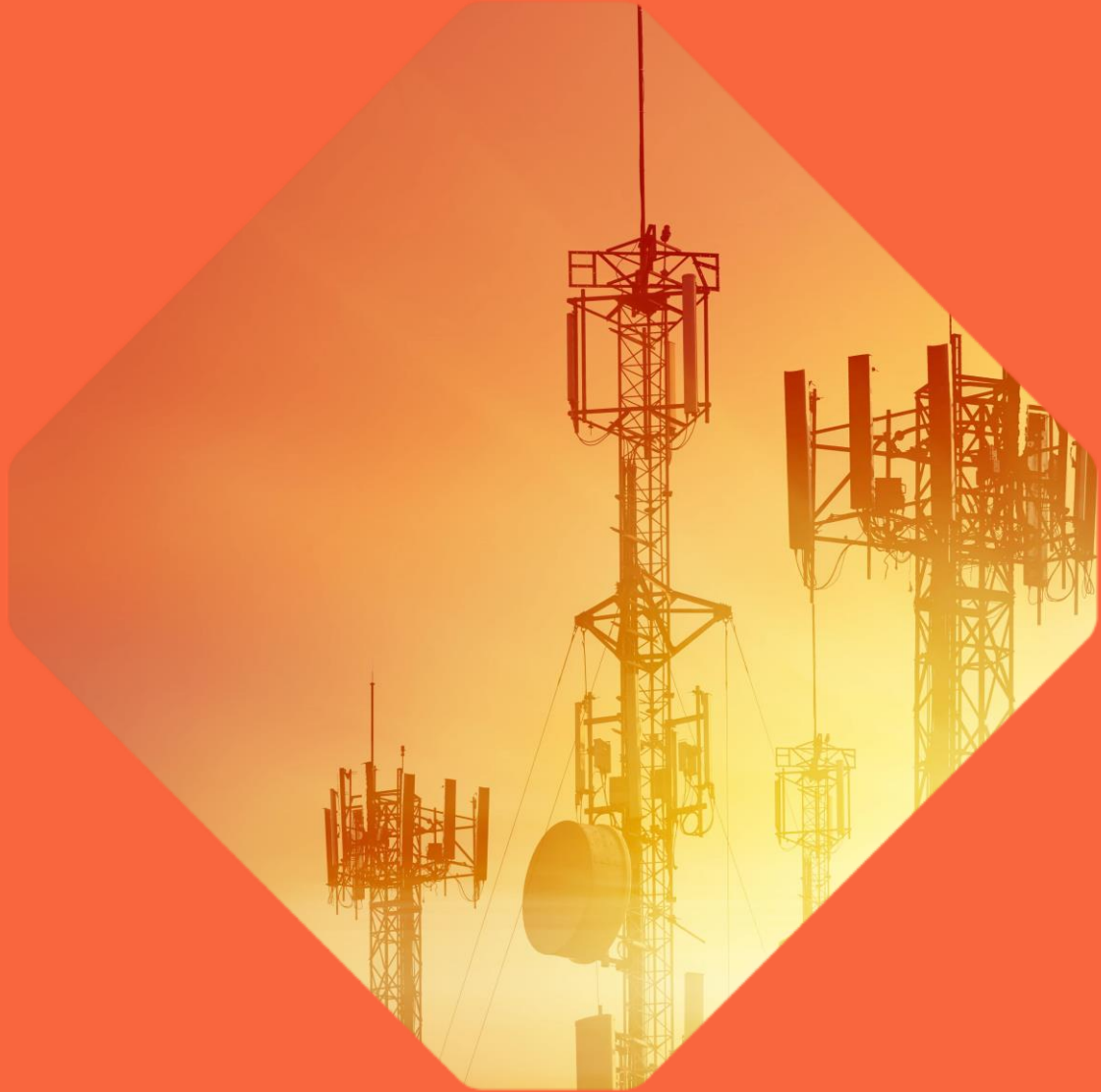
**Detailed valuation: Users can see a detailed breakdown of each carrier's spectrum value by band based on the most recent market prices paid for a "marked-to-market" spectrum holding**

**Valuation by Carrier**

	Original Pops (Mm)	Average Depth (Mhz)	Mhz-Pops (Mm)	% Of US Pops	National Average Mhz	Value at Original Price (\$, M..)	Original \$/Mhz-Pops	Latest Pops (Mm)	Latest Mhz-Pops (Mm)	Value at Latest Price (\$, Mm)	Latest \$/Mhz-Pop	Appreciation
600	28	20	561	9%	2	329	\$0.59	30	610	773	\$1.27	116%
700	43	16	682	15%	2	561	\$0.82	51	812	1,189	\$1.46	78%
850	28	24	660	9%	2	392	\$0.59	30	718	837	\$1.17	96%
1900	26	17	431	8%	1	171	\$0.40	28	468	736	\$1.57	296%
AWS-1	14	15	212	5%	1	52	\$0.25	17	252	307	\$1.21	392%
AWS-3	25	14	350	8%	1	338	\$0.97	27	380	368	\$0.97	0%
3.45GHz	35	36	1,244	10%	4	580	\$0.47	35	1,263	880	\$0.70	50%
C-Band	32	51	1,632	10%	5	1,450	\$0.89	33	1,656	1,472	\$0.89	0%
CBRS PAL	3	32	83	1%	0	14	\$0.16	3	91	22	\$0.24	50%
<b>Total</b>	<b>47</b>	<b>123</b>	<b>5,773</b>	<b>15.00%</b>	<b>18.4</b>	<b>3,887</b>	<b>\$0.66</b>	<b>51</b>	<b>0</b>	<b>6,250</b>	<b>\$1.05</b>	<b>59%</b>

**Select operator among the top 5 carriers in the US**

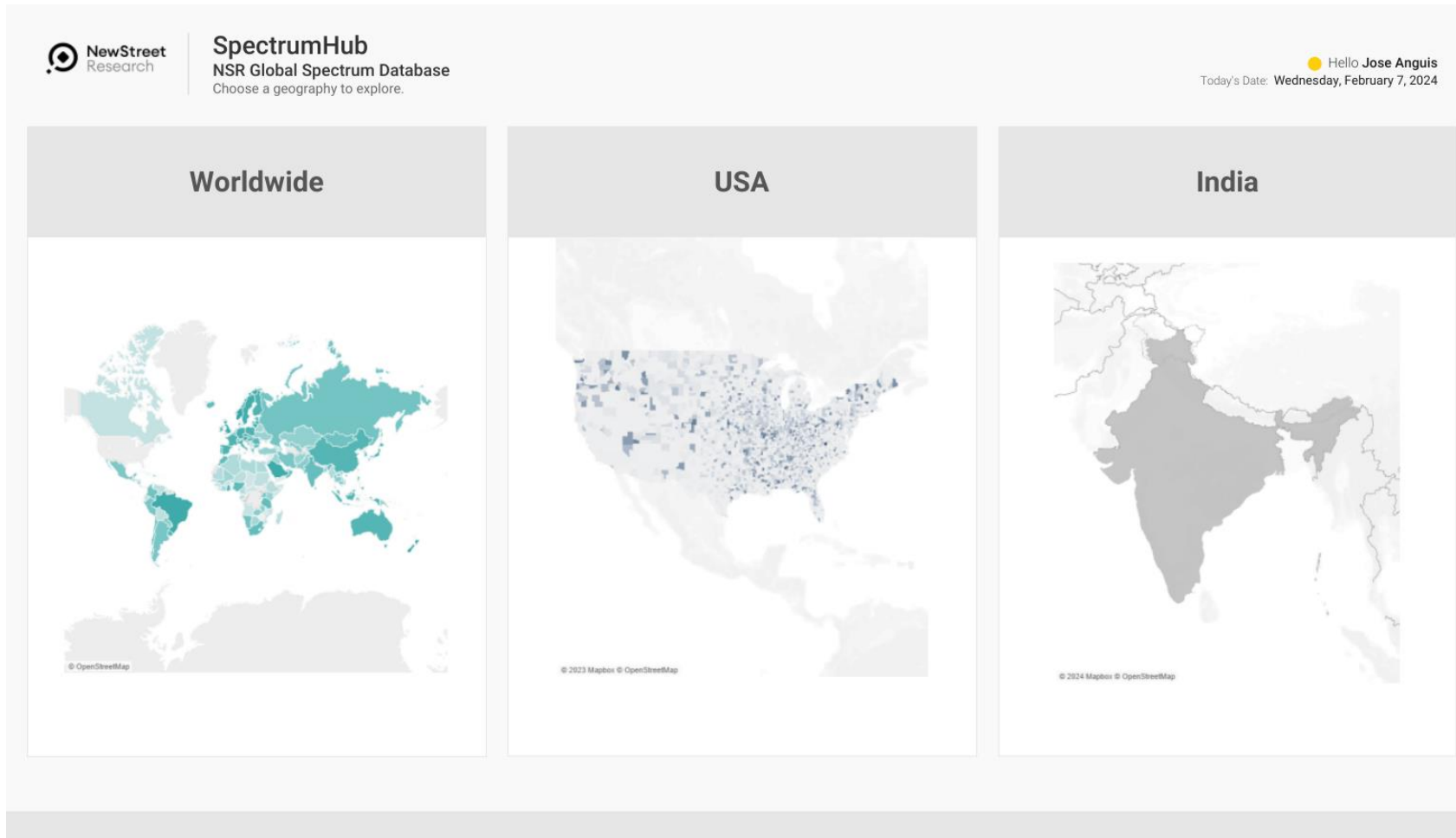
**NEW Valuation tab in the US**



**A reminder of the core SpectrumHub features**

## Three starting options: US, India and then everywhere else

Although we have added in a lot of new features into SpectrumHub 2.0, the core operating principles remain the same as the initial launch of **SpectrumHub**, which is structured in 3 big dashboards: US, India and Worldwide. The US and India remain split out as two markets with more detailed regional spectrum analysis, and for the rest of the world, users can then access all other countries separately.



The screenshot displays the SpectrumHub interface. At the top left is the NewStreet Research logo. The main header reads "SpectrumHub" and "NSR Global Spectrum Database" with the instruction "Choose a geography to explore." On the top right, it says "Hello Jose Anguis" and "Today's Date: Wednesday, February 7, 2024". Below the header are three map panels:

- Worldwide:** A world map with various regions highlighted in shades of teal and green.
- USA:** A map of the United States with numerous small blue squares indicating data points across the country.
- India:** A map of India with a dark grey shaded area covering the country.

Each map panel has a small copyright notice at the bottom: "© OpenStreetMap" for Worldwide, "© 2023 Mapbox © OpenStreetMap" for USA, and "© 2024 Mapbox © OpenStreetMap" for India.



# Each of the three dashboards follows the same structure, with 3 clear differentiated sections

Each of the three dashboards has the same structure, consisting of three tabs containing the three main analyses (up from two in SpectrumHub 1.0). This features 1) Spectrum Holdings tab, which provides detailed MHz breakdowns by band and carrier for each country; and 2) Price tab, which offers \$ per MHz population analysis by band and carrier for each of the countries, and pricing comparisons among different countries, and 3) Detailed analysis looking at either licence renewals, or spectrum valuations (in the US, where spectrum is freehold)

**Filters area:** Users can select the desired country and filter by Band Class or Bands

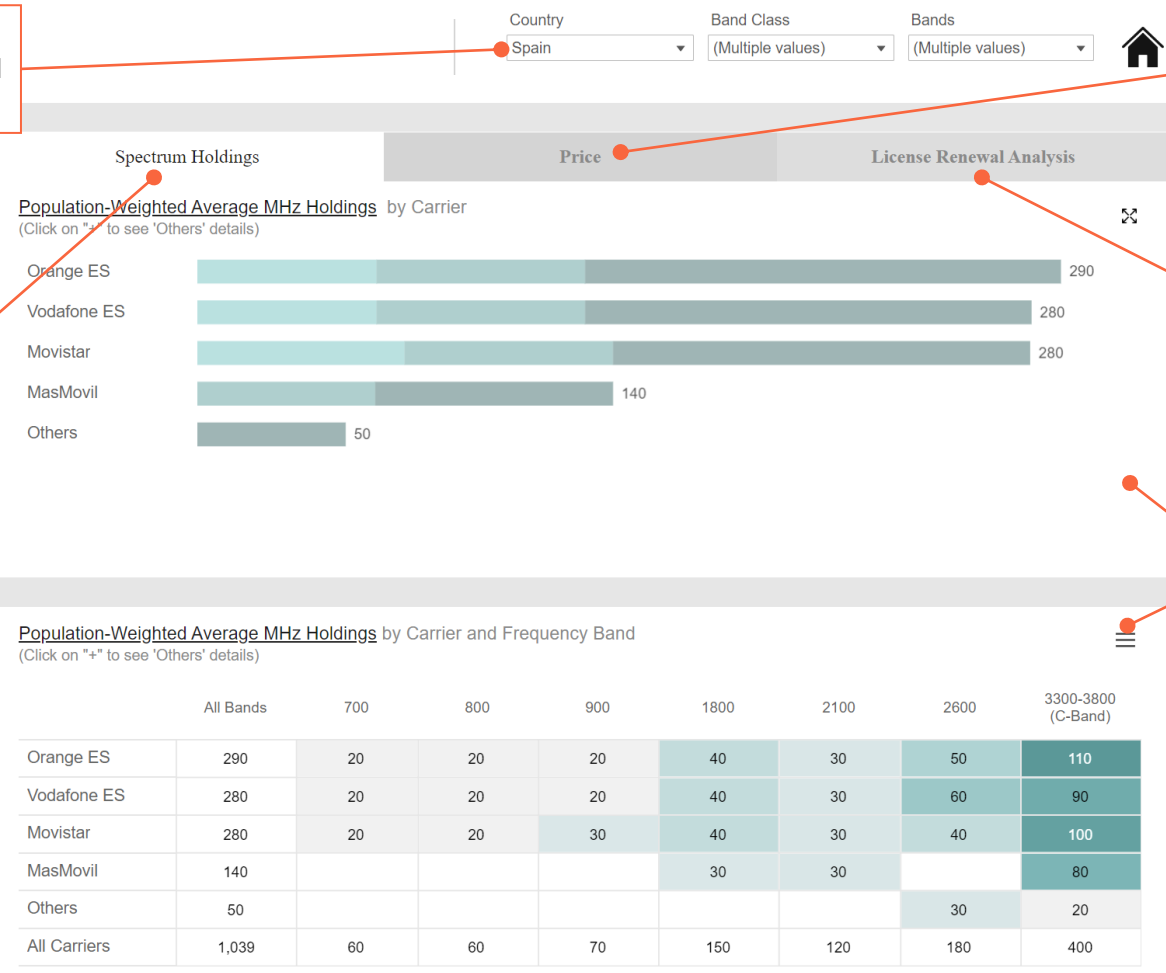
**Price analysis section**

**Spectrum Holdings analysis section**

**Licence renewal analysis**

**Map area:** Highlight countries available and act as a country selector as well

**Chart area**



# Complete global spectrum ownership mapped out

Clicking through to the Worldwide option, then offers a dropdown menu to allow users to pick out practically **any market globally** and to see who owns what spectrum and at which frequencies.

Country selector: Users can select the desired country here

Country: Spain | 
 Band Class: (Multiple values) | 
 Bands: (Multiple values)

Selected Country : **Spain** | Band Type : **ITU**  
 Use the buttons to toggle between Spectrum Holdings, Price & License Renewal Analysis

[Select a Country.](#)

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### Spectrum Holdings

Population-Weighted Average MHz Holdings by Carrier  
 (Click on "+" to see 'Others' details)

Orange ES	[Progress bar]
Vodafone ES	[Progress bar]
Movistar	[Progress bar]
MasMovil	[Progress bar]
Others	50

Population-Weighted Average MHz Holdings by Carrier and F

(Click on "+" to see 'Others' details)

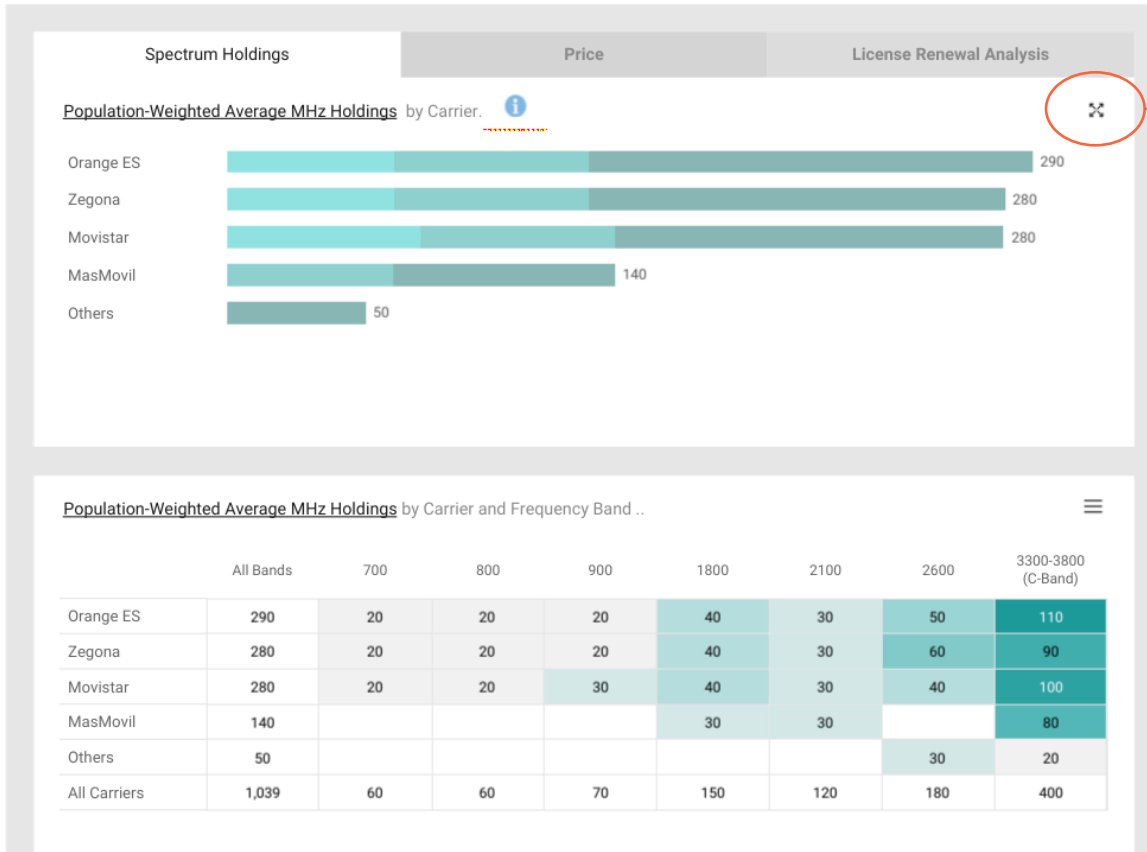
	All Bands	700	800
Orange ES	290	20	20
Vodafone ES	280	20	20
Movistar	280	20	20
MasMovil	140		
Others	50		
<b>All Carriers</b>	<b>1,039</b>	<b>60</b>	<b>60</b>

### License Renewal Analysis

	2100	2600	3300-3800 (C-Band)
Austria			290
Azerbaijan			280
Bahrain			280
Cameroon	30	50	110
Canada	30	60	90
Chad	30	40	100
China	30		80
Colombia		30	20
Costa Rica	120	180	400

# Spectrum holdings by carrier and band, and further subdivision of spectrum available

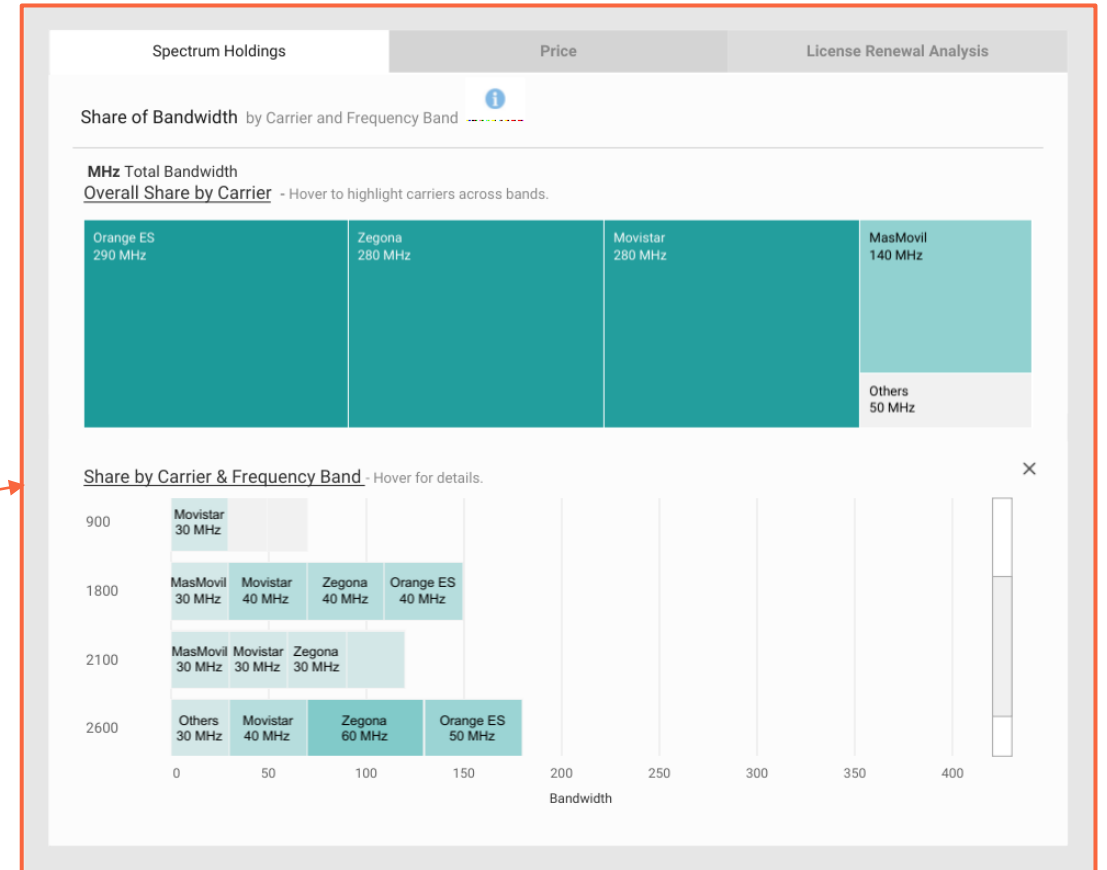
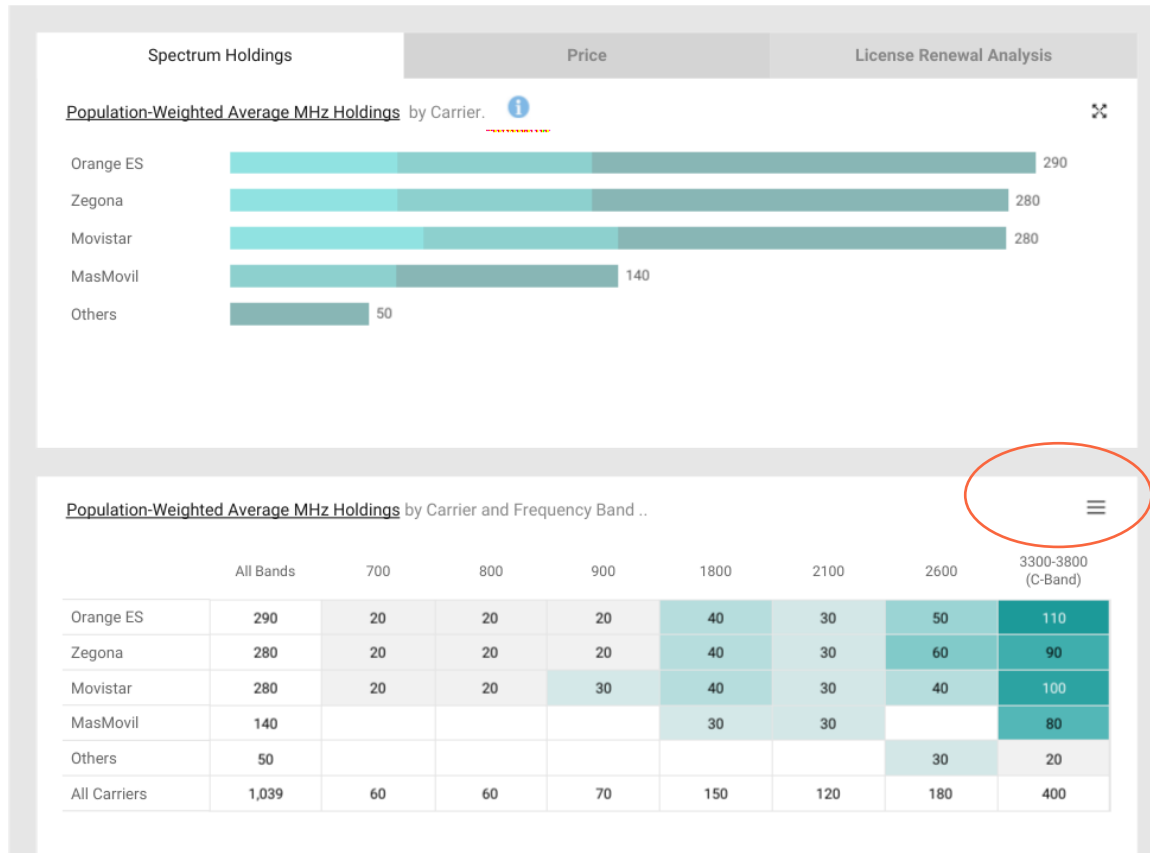
The top chart shows the total spectrum holdings by carrier. Users can access additional details by toggling the switch next to the chart, revealing a table that breaks down the spectrum holdings by paired (FDD) and unpaired (TDD) MHz for each band. This breakdown is crucial for understanding carriers' spectrum ownership across various frequencies.



Carrier	Frequency band	Avg Depth (Mhz)	Population (Mm)	% Coverage	MHz Pop (Mm)	Total MHz	Paired MHz	Unpaired MHz
Orange ES	700	20	46.4	100%	928	20	20	0
	800	20	46.4	100%	928	20	20	0
	900	20	46.4	100%	928	20	20	0
	1800	40	46.4	100%	1,857	40	40	0
	2100	30	46.4	100%	1,393	30	30	0
	2600	50	46.4	100%	2,321	50	40	10
3300-3800 (C-Band)		110	46.4	100%	5,106	110	0	110
Zegona	700	20	46.4	100%	928	20	20	0
	800	20	46.4	100%	928	20	20	0
	900	20	46.4	100%	928	20	20	0
	1800	40	46.4	100%	1,857	40	40	0
	2100	30	46.4	100%	1,393	30	30	0
	2600	60	46.4	100%	2,785	60	40	20
3300-3800 (C-Band)		90	46.4	100%	4,178	90	0	90
Movistar	700	20	46.4	100%	928	20	20	0
	800	20	46.4	100%	928	20	20	0
	900	30	46.4	100%	1,374	30	30	0
	1800	40	46.4	100%	1,857	40	40	0
	2100	30	46.4	100%	1,393	30	30	0
	2600	40	46.4	100%	1,857	40	40	0
3300-3800 (C-Band)		100	46.4	100%	4,642	100	0	100
MasMovil	1800	30	46.4	100%	1,374	30	30	0
	2100	30	46.4	100%	1,393	30	30	0
3300-3800 (C-Band)		80	46.4	100%	3,713	80	0	80
Others	2600	30	46.4	100%	1,393	30	20	10
	3300-3800 (C-Band)	20	46.4	100%	928	20	0	20

## Graphical display of spectrum holdings also available

The bottom table displays the aggregate spectrum holdings of each carrier across different frequency bands. Users can visualize the same data graphically using the switch located above the table.



# SpectrumHub includes a price analysis section: a critical feature for financial investors

The price section delivers a detailed price analysis, encompassing historical pricing data (top chart) and most recent pricing data (bottom table) for each band and carrier.

**Filters area:** One can select the country, choose between local currency or USD and filter by bands with these drop-down menus

**Pressing "Compare with other countries" toggle, we open the cross-market pricing comparisons (see next slide)**

**Selected Country:** Spain | Band Type: ITU | Population: 46,418,270  
 Use the buttons to toggle between Spectrum Holdings, Price & License Renewal Analysis  
 Use filters to explore | Hover on charts for details

**Top Global Markets**

**Price History Chart:** Shows price per MHz Pop in USD from 1998 to 2024 for various frequency bands. The chart includes a legend for bands: 700, 800, 900, 1800, 2100, 2600, 3300-3800 (C-Band), and mmWave.

**Price Per MHz Pop in USD by Carrier and Frequency Band**

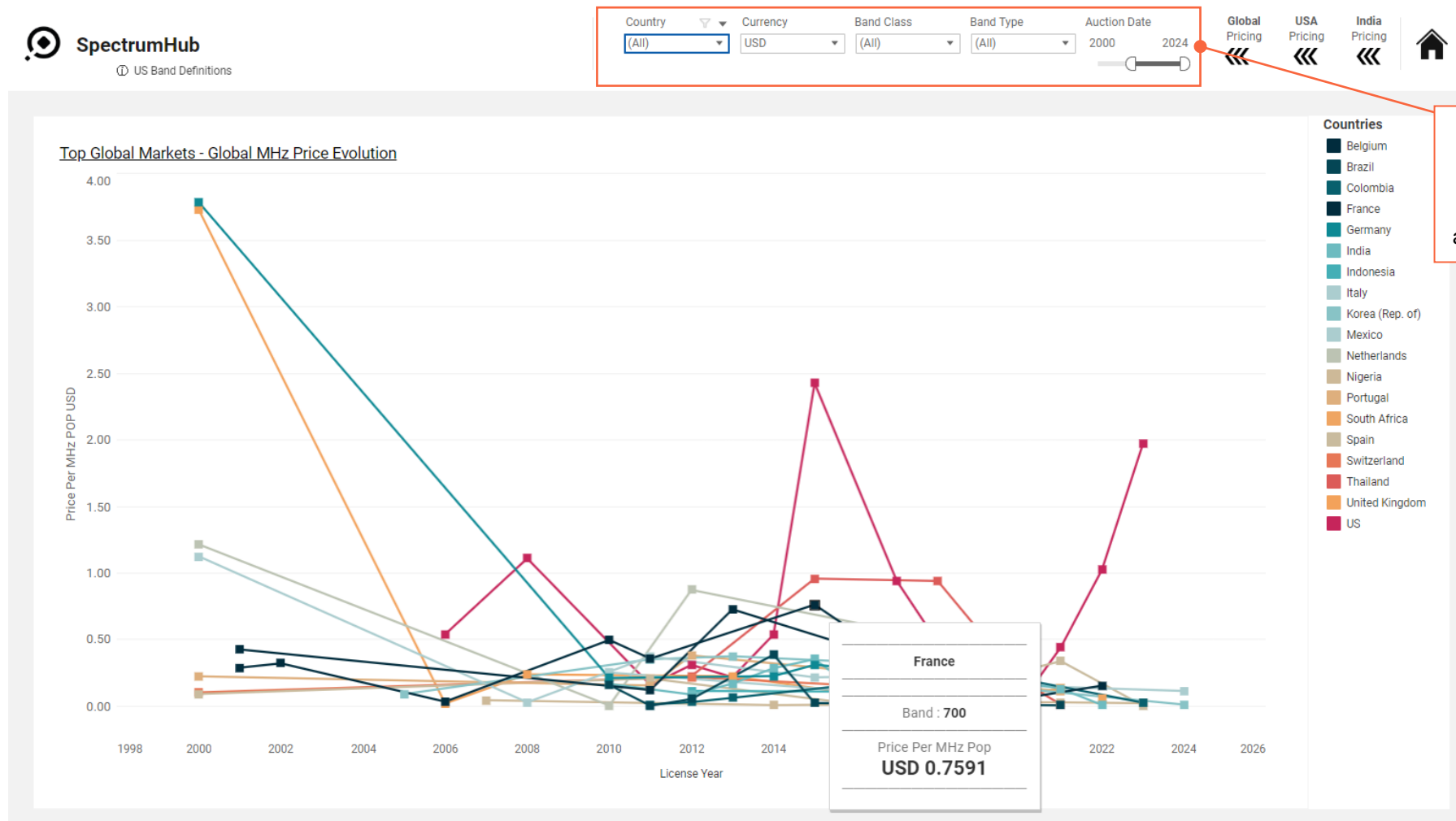
	700	800	900	1800	2100	2600	3300-3800 (C-Band)	mmWave
MasMovil				USD 0.04	USD 0.09		USD 0.07	
Movistar	USD 0.39	USD 0.67	USD 0.53		USD 0.09	USD 0.04	USD 0.05	USD 0.00
Orange ES	USD 0.44	USD 0.67	USD 0.40		USD 0.09	USD 0.04	USD 0.05	USD 0.00
Others						USD 0.04		USD 0.00
Zegona	USD 0.44	USD 0.67			USD 0.09	USD 0.03	USD 0.11	USD 0.00

*Note: The table above presents the latest price among all available dates for each specific frequency band and carrier.*

The map highlights the selected country

## Price analysis can be done across different countries

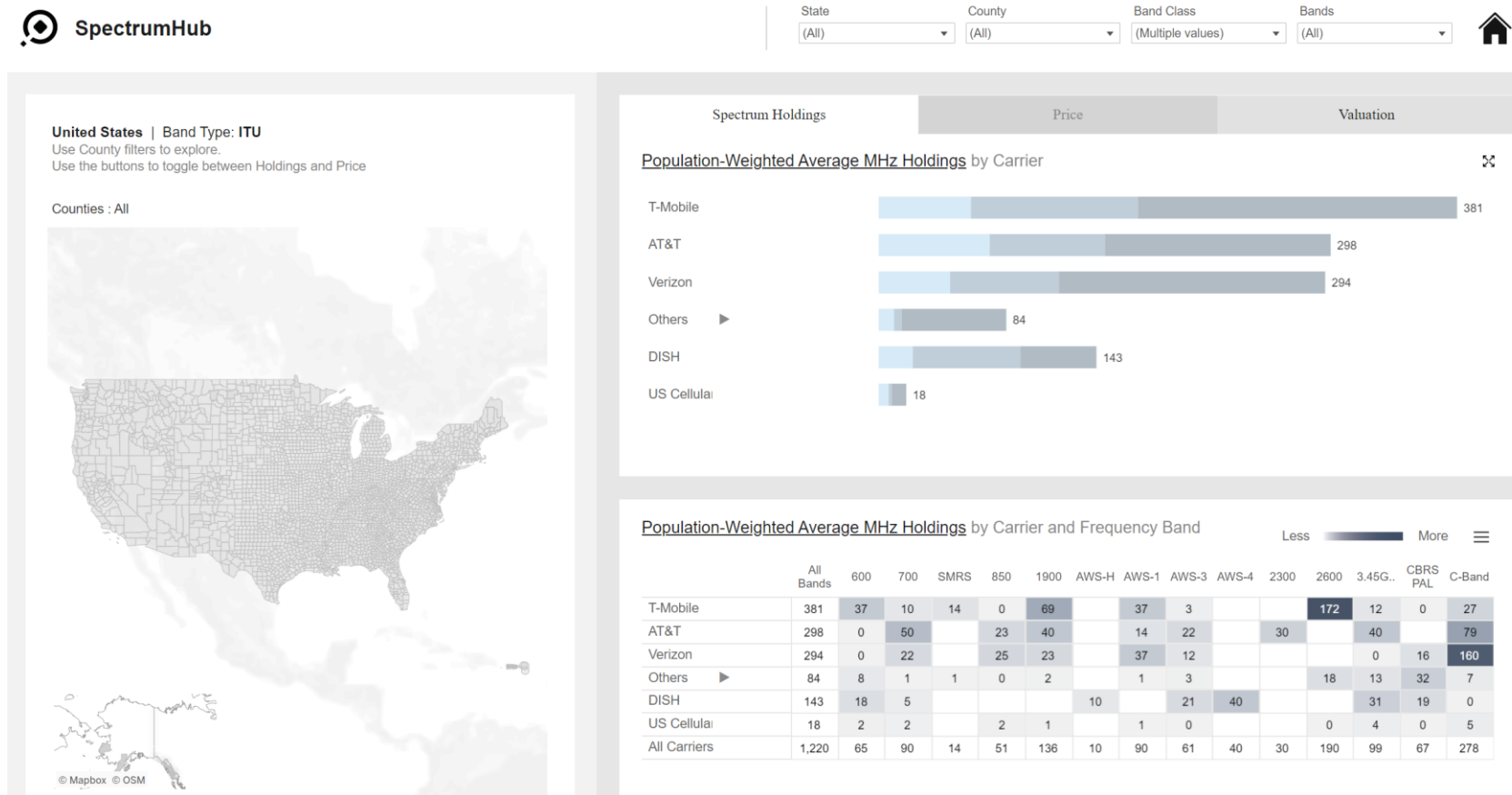
The price section delivers a detailed price analysis, encompassing historical pricing data (top chart) and most recent pricing data (bottom table) for each band and carrier. While currently available for seven countries (Germany, Italy, Spain, France, UK, US and India), we are committed to expanding this feature to other countries in upcoming product versions.



By selecting different countries, bands and dates, one can then explore specific auctions in more detail

# In the US section, the national view displays spectrum holdings weighted by the total country population

The structure of the US section mirrors that of the Worldwide dashboard. However, unlike the Worldwide dashboard, the US section includes views at both the county and state levels due to the unique characteristics of its licenses, which are at the market level rather than the national level. The national view displays a population-weighted average of spectrum by band and carrier. Thanks to this view, we can address questions such as the spectrum ownership of DISH and provide band-specific detail.



# SpectrumHub also offers a state-level perspective of the spectrum holdings in the US



The state view displays a population-weighted average of spectrum by band and carrier in that specific state.

**United States | Band Type: ITU**  
 Use County filters to explore.  
 Use the buttons to toggle between Holdings and Price

Counties : All

**Population-Weighted Average MHz Holdings by Carrier**

Carrier	Holdings (MHz)
T-Mobile	421
AT&T	306
Verizon	293
DISH	141
Others	67
US Cellular	3

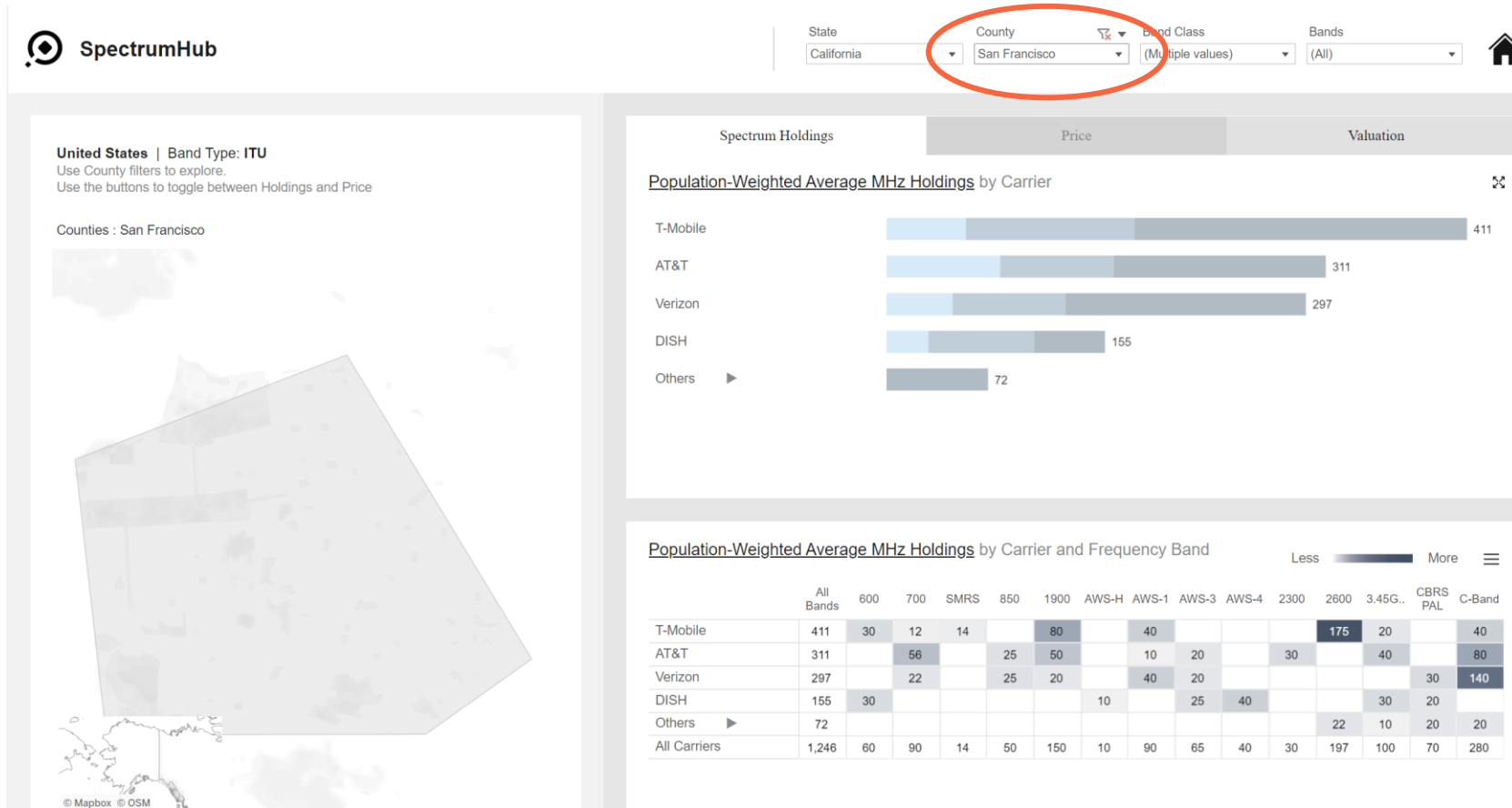
**Population-Weighted Average MHz Holdings by Carrier and Frequency Band**

	All Bands	600	700	SMRS	850	1900	AWS-H	AWS-1	AWS-3	AWS-4	2300	2600	3.45G..	CBRS PAL	C-Band
T-Mobile	421	40	12	14		73		40	0			185	18		39
AT&T	306		54		24	45		12	20		30		40		80
Verizon	293		22		25	19		37	21					24	145
DISH	141	22	1				10		22	40			31	15	
Others	67	2				0			1			9	10	29	16
US Cellular	3	0	0		0				0				1		1
All Carriers	1,231	65	90	14	50	136	10	90	64	40	30	193	100	68	280



## Users can also go further into individual counties for key holdings

The county view displays a population-weighted average of spectrum by band and carrier in that specific county.



**SpectrumHub** | State: California | **County: San Francisco** | Band Class: (Multiple values) | Bands: (All)

**United States | Band Type: ITU**  
Use County filters to explore.  
Use the buttons to toggle between Holdings and Price

Counties : San Francisco

**Population-Weighted Average MHz Holdings by Carrier**

Carrier	Holdings (MHz)
T-Mobile	411
AT&T	311
Verizon	297
DISH	155
Others	72

**Population-Weighted Average MHz Holdings by Carrier and Frequency Band**

	All Bands	600	700	SMRS	850	1900	AWS-H	AWS-1	AWS-3	AWS-4	2300	2600	3.45G..	CBRS PAL	C-Band
T-Mobile	411	30	12	14		80		40				175	20		40
AT&T	311		56		25	50		10	20		30		40		80
Verizon	297		22		25	20		40	20					30	140
DISH	155	30					10		25	40			30	20	
Others	72											22	10	20	20
All Carriers	1,246	60	90	14	50	150	10	90	65	40	30	197	100	70	280

# India section

As with the US, India offers a regional view alongside the national view due to the existence of telecom circles for spectrum licenses

Different spectrum circles can be selected

**India | Market(s) : All | Band Type: ITU**  
 Use Market and Band filters to explore  
 Use the buttons to toggle between Holdings and Price  
 Hover for details

**Spectrum Holdings**  
Population-Weighted Average MHz Holdings by Carrier

Carrier	Holdings (MHz)
Others	277
Reliance Jio	216
Bharti Airtel	203
Vodafone India	130
BSNL	43
Aircel	13
Reliance Communications Limited	10

**Price**

**Market** (All) | **Band Class** (Multiple values) | **Bands** (All)

Population-Weighted Average MHz Holdings by Carrier and Frequency Band

	Grand Total	700	850	900	1800	2100	2300	2600	3300-3800 (C-Band)
Others	277		1	5	39	38	20	150	25
Reliance Jio	216	20	18		28		40		109
Bharti Airtel	203		3	12	31	21	36		100
Vodafone India	130			14	31	20	2	17	45
BSNL	43			11	0	19		13	
Aircel	13			0	7	6			
Reliance Communications Lim..	10		4	1	1	5			
Grand Total	892	20	26	43	137	109	98	180	279

Note: "Others" correspond to Indian military services spectrum and other local/regional operators.

For those clients who don't yet have access, but would like access to **SpectrumHub**, please contact  
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