

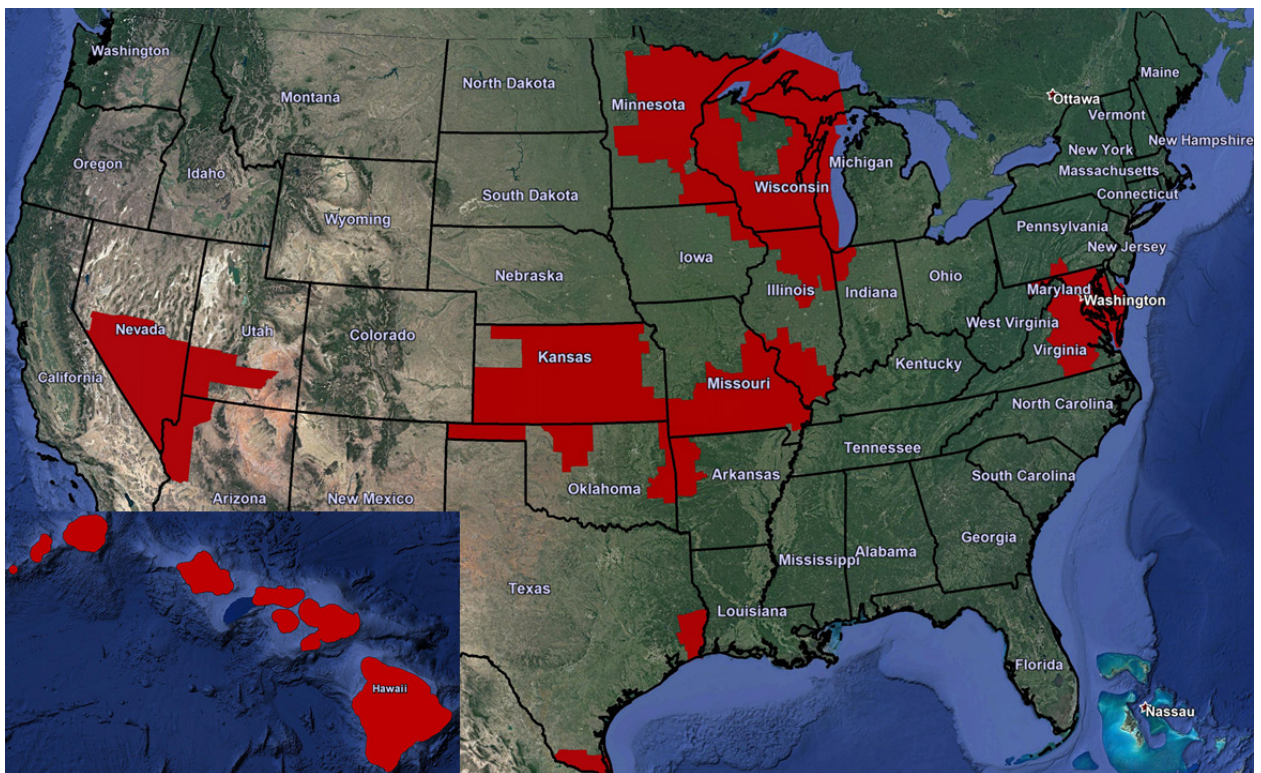
Wireless Spectrum Licenses in 450 MHz (UHF) Ideal for Land Mobile Radio & Data Applications

Available in Hawaii, Nevada, Texas, Illinois, Wisconsin & Additional States

Select Spectrum is offering **UHF Lower Band Paging (450 MHz) FCC licensed spectrum** across portions of 18 states including Hawaii, Nevada, Texas, Kansas, Missouri, Illinois, and Wisconsin. Additional licenses coverage is available across multiple dense urban metropolitan areas throughout Maryland and Virginia. Major cities covered include Honolulu, Las Vegas, St. Louis, Milwaukee, Chicago, and Baltimore. Together, these licenses cover a population of over 46 million in both urban and rural markets.

Available spectrum varies, with between 50 to 1300 kHz bandwidth in each of the various market areas. In Hawaii and South Texas 900 kHz and 1300 kHz of contiguous spectrum, respectively, is available for purchase. With multiple adjacent licenses, it is possible to combine and deploy sophisticated, high-bandwidth networks.

Available markets in this offering are shown in the map below:



These licenses can support a wide variety of uses and are ideal for remote monitoring for critical infrastructure, smart grid, utility communications, public safety and paging. Common uses include land mobile radio, SCADA systems, Oil & Gas production/pipelines and transportation.

The 450 MHz band is shown with neighboring service groups below:

IG /BP Part 90	450 MHz Paging Part 22	VHF Low-Power Part 90	Unlicensed	Industrial/ Business Pool Part 90	450 MHz Paging Part 22	IG /BP Part 90
453 MHz	454	455	456	457	458	460

Paired 450 MHz spectrum can be used for voice or data in 2-way or broadcast modes including fixed and mobile services. The interleaved channel plan allows full duplexing and simultaneous multipoint digital broadcasts from multiple transmitters on either the upper or lower channel blocks. Half-duplex (time-division duplex “TDD”) is also allowed. Maximum base station power is 3,500 Watts ERP, while mobile units may transmit at up to 60 watts ERP. The generous rules allow for long range and high reliability in both high-density urban areas and rural areas. Networks may employ point-to-point, and/or point-multipoint (tall site) architectures.

Subject to FCC Part 22 Paging rules, the 2 x 25 kHz channel spacing allows for use for land mobile radio “LMR” and data transmission systems. Each license is permitted 2 x 20 kHz of effective bandwidth with an assigned center frequency, allowing for interference protection and compatibility with narrowband technologies. The FCC is considering a proposal (DA 14-1508) to update Part 22 rules, particularly Subpart E, providing more varied use of the paging bands. The new rules would allow for greater flexibility by permitting full use of the channel spacing & frequency offsets by licensees that hold adjacent blocks and allow innovative technologies such as TETRA and 12.5 kHz/6.25 kHz narrowband LMR equipment. Commenters have been unanimously supportive of the measure, but waivers would be required in the interim to satisfy FCC regulatory compliance. Select Spectrum believes waivers are likely to be granted (see FCC Order DA 15-1064), provided that they correspond to the proposal found in DA 14-1508 and sufficiently meet the stated FCC goals of fostering technological innovation and serving public interest.

Equipment for the band is made by Ondas Networks www.ondas.com, 4RF www.4rf.com, XetaWave www.xetawave.com, Alligator Communications www.alligatorcom.com, Motorola Solutions <https://www.motorolasolutions.com>, ESTeem www.esteem.com, Hytera www.hytera-mobilfunk.com, Kenwood www.kenwood.com, and Tait Communications www.taitradio.com. For spectrum blocks of 100 kHz or greater, the band is also compatible with a new IEEE wireless standard – 802.16s “GRIDMAN”. This high reliability standard is intended for use by utilities and other critical infrastructure operators.

Basic information about some key markets in the overall offering is shown below:

Market	kHz	Max 2017 POPs	MHz POPs	Market	kHz	Max 2017 POPs	MHz POPs
Honolulu, HI	900	1,427,538	1,284,784	Rochester MN-IA-	400	351,315	140,526
Las Vegas, NV	200	2,695,558	208,500	Minneapolis, MN	450	4,484,488	348,628
Wichita, KS	500	1,209,412	604,706	St. Louis, MO-IL	200	3,694,893	738,979
Topeka, KS	300	476,687	143,006	Madison, WI	50	1,069,213	53,461
OK City, OK	300	113,774	34,132	La Cross, WI	450	263,118	118,494
McAllen, TX	1300	1,370,424	1,781,551	Chicago, IL	600	10,799,978	6,479,987
Tulsa, OK-KS	500	476,687	143,006	Green Bay WI	200	690,731	138,146
Fort Smith AR-	400	354,083	141,633	Appleton, WI	100	482,134	48,213
Fayetteville	450	601,874	270,888	Milwaukee, WI	50	2,363,834	118,192
Beaumont, TX	100	469,537	46,954	Richmond, VA	100	1,720,301	173,030
Duluth MN	300	352,369	105,711	Washington, DC	50	9,928,485	496,424
Joplin MO-KS-	750	280,818	210,614	Salisbury, MD	50	450,244	22,512
Springfield	350	1,013,648	354,777	Total	50-1300	46,778,183	14,115,437

Most licenses cover their entire original assignments, but some licenses in dense markets have been disaggregated in accordance with FCC rules including §22.513 of Title 47, Part 22. Under the same rules, licensees may further disaggregate licenses. Individual call sign information is available upon request. Please contact us for additional information regarding these licenses.