

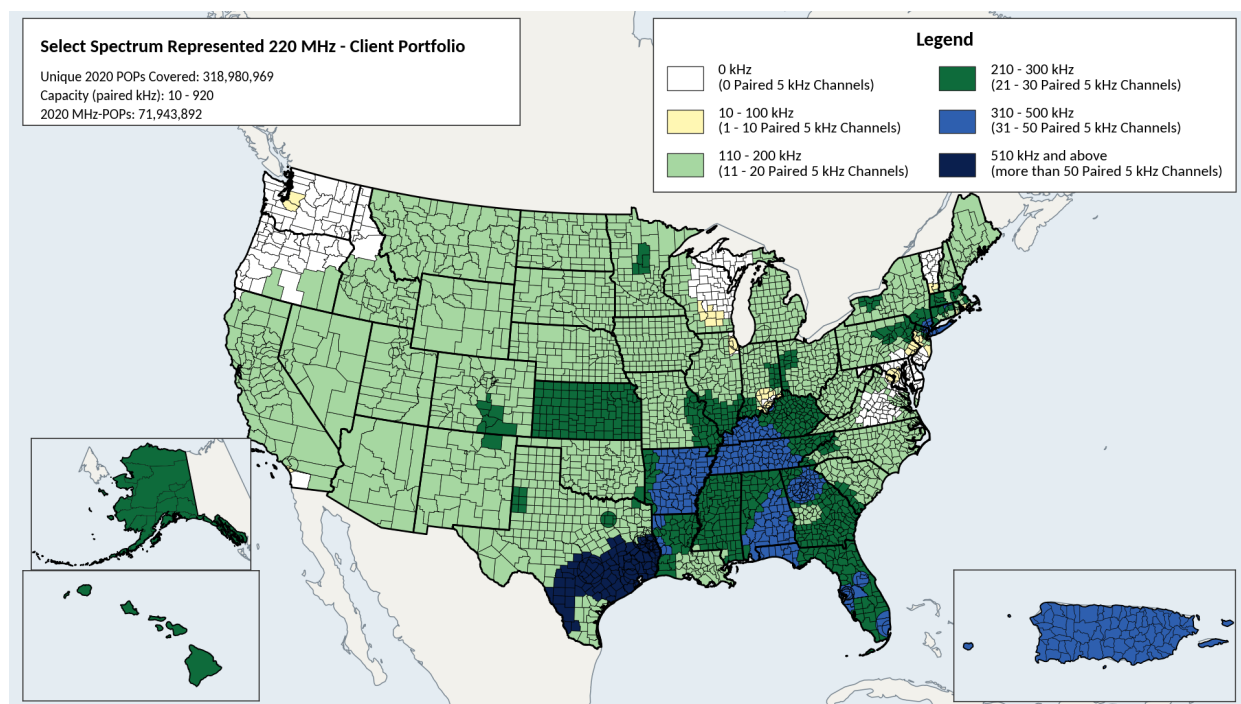


Wireless Spectrum Licenses in the 220 MHz Services (220-222 MHz) Band Ideal for Utility, Critical Infrastructure, IoT, M2M, and Rail Applications Available Nearly Nationwide Over 95% of the US Population

On behalf of multiple clients, Select Spectrum is offering **220 MHz Service Band Phase I and Phase II FCC-licensed spectrum**, that collectively covers approximately 319 million people (2020 Census), or 95% of the U.S. population, and 71.9 million MHz-POPs. The portfolio combines nationwide and regional area-based licenses with additional area-based and site-based capacity over major metropolitan markets.

The 220 MHz Band is composed of 5 kHz wide, paired, channel frequencies, with each channel offering a total of 10 kHz capacity. FCC rules permit contiguous channels to be aggregated into wider carriers. Available contiguity varies, with most markets offering opportunities for contiguous 12.5, 25 and 50 kHz channel sizes. Aggregate capacity varies, with up to nearly 1 MHz of spectrum available in select market areas. Please inquire for more detailed information.

The available 220 MHz license coverage is shown below:



220-222 MHz spectrum has excellent propagation and can be used for a broad range of applications including fixed & mobile data, voice, and video. Licenses are held and in use by utilities, passenger/freight rail lines, and others for a wide range of applications, including positive train control (PTC), land mobile radio (LMR), M2M/Internet of Things (IoT), supervisory control and data acquisition (SCADA), distribution automation (DA), and Oil/Gas applications.

The 220 MHz band is shown with its neighboring service groups below:

216 MHz	217 MHz	218 MHz	219 MHz	220 MHz	222 MHz	225 MHz
Low-Power Radio Service (Unlicensed)	AMTS B A	218-219 MHz A B	AMTS B A	220 MHz	Amateur	
	217.5 MHz	218.5 MHz	219.5 MHz			

220 MHz licenses provide excellent propagation, and the FCC has approved the 220 MHz band for a broad range of uses. The mixed 5 kHz interleaved and contiguous channel plan is suitable for broadcast or two-way; mobile or fixed; voice or narrowband data. Contiguous channels can be aggregated to use wider carriers of 12.5, 25 or up to 50 kHz. Maximum base power is based on height above average terrain. FCC Part 90 rules (47 CFR 90.729) allow base stations up to 500 Watts ERP at antenna heights up to 150 meters above average terrain, reduced at greater heights, with maximum mobile power of 50 Watts ERP. Networks may employ point-to-point, point-multipoint (tall site) and/or cellular architectures. These limits, along with the excellent propagation in the band, allow long range and high reliability in urban and rural areas. Systems have been shown to perform well in the presence of multiple large obstacles including skyscrapers, forested areas and mountains.

220 MHz spectrum is held by a combination of utilities, critical infrastructure, and rail organizations, including **Orange & Rockland Utilities/Consolidated Edison, Pepco/Exelon**, a variety of Utility Co-ops and the **National Rural Telecommunications Cooperative, Alaska Railroad Corporation**, railroad consortium **PTC-220, Amtrak, Massachusetts Bay Transportation Authority**, and others for a variety of applications.

The band is characterized by a combination of wide geographical area licenses with operational flexibility, allowing frequency reuse at multiple sites within the licensed areas, and priority site licenses over dense metropolitan areas. These characteristics make the spectrum ideal for meeting utility and critical infrastructure network requirements, where operators need excellent propagation over wide geographic operating areas and/or have increased need for additional capacity over urban hubs.

Equipment for the band is made by Ondas Networks www.ondas.com, 4RF (now part of Aviat Networks) www.4rf.com, GE Vernova www.gedigitalenergy.com, CalAmp <http://www.calamp.com>, XetaWave www.xetawave.com, Cambium <http://www.cambiumnetworks.com>, Alligator Communications www.alligatorcom.com, Tait Communications www.taitradio.com, L3Harris www.harris.com and Hytera <http://www.hytera.com>.

For LPWAN/IoT deployments, the 220-222 MHz band channels support a wide variety of sensor ecosystems and IoT-oriented applications serving industries ranging from critical infrastructure, industrial, enterprise, agriculture, etc.

The band is compatible with the IEEE 802.16t “GRIDMAN” standard which supports channel sizes as low as 5 kHz and is intended for use by utilities and other critical infrastructure operators.