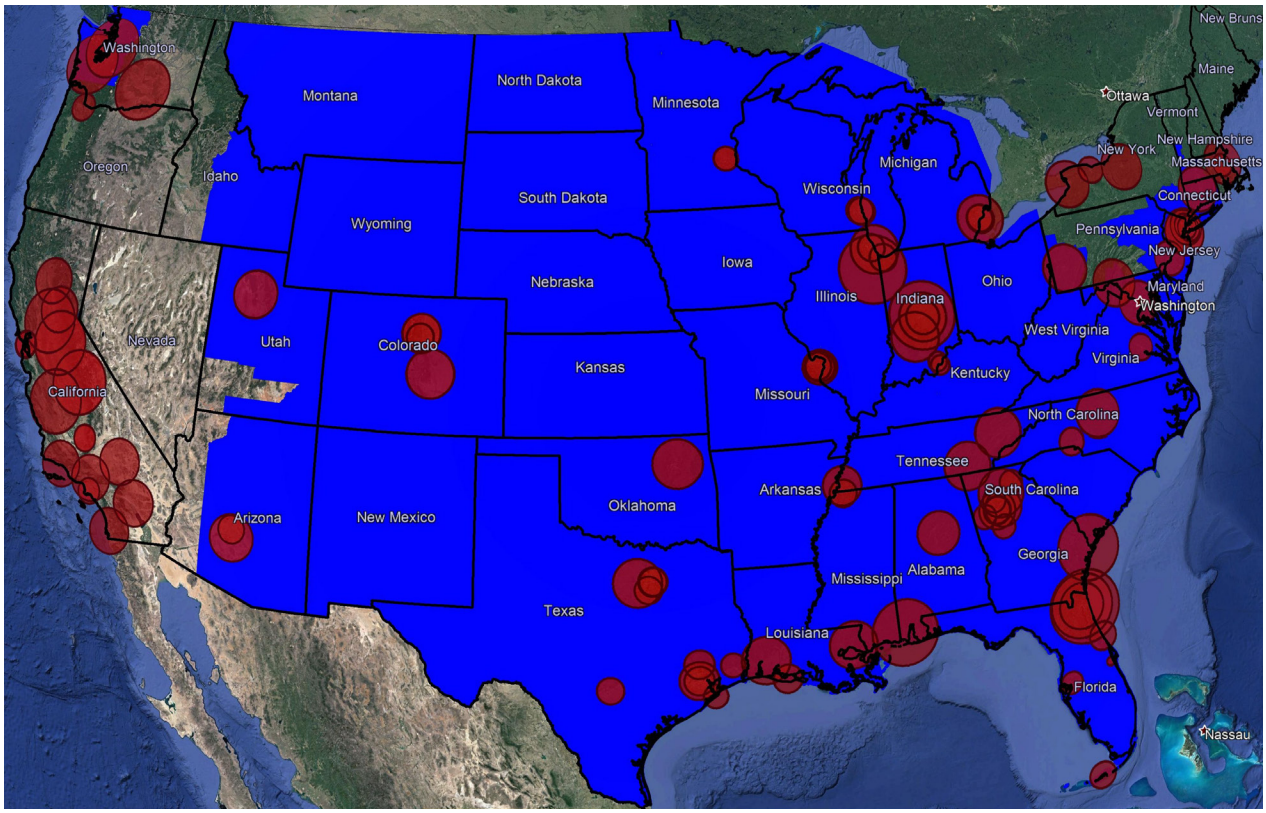
March 2022

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

Select Spectrum is offering one hundred seventy **220 MHz Services Phase I Site-Based and Phase II Area-Based FCC licensed spectrum,** with licenses collectively providing coverage over a population of nearly 311 million, or 93.8% of the total US population.

Available 220 MHz license coverage is shown below; with area-based Phase II "QA" licenses shown as blue, site-based Phase I "QT" licenses in red.



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.

Select Spectrum client, **VIE Technologies**, is now offering an innovative, proprietary piece of Intellectual Property, "ERICA" - Enhanced Range Intelligent Communications Architecture, that is tailored to leverage ultra-narrowband 220-222 MHz band 5 kHz wide channels for ultra-high performance Low Power Wide Area Network (LPWAN) deployments.

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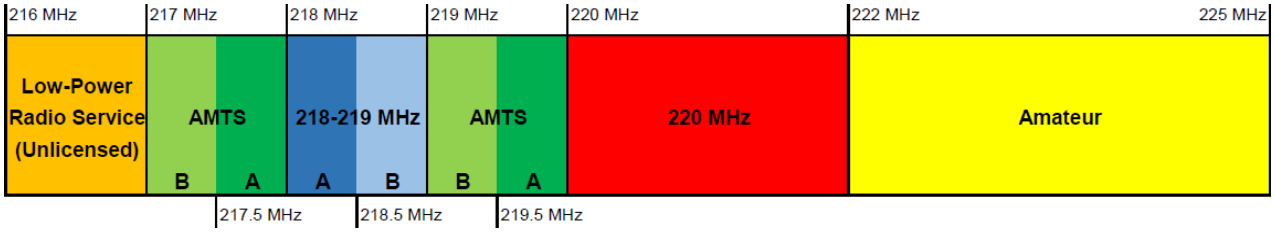
Visit our website at http://selectspectrum.com to learn more

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



The 220 MHz Band is composed of 5 kHz wide, paired, channel frequencies, with each channel offering a total of 10 kHz capacity. FCC regulations permit aggregation of adjacent channels so that operators may utilize 10 or 15+ kHz wide channels that can support a wide variety of voice and data applications. Please inquire for details on the availability of adjacent channel opportunities.

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. Licenses can be aggregated to use wider carriers of 12.5, 25 or more kHz. Maximum base power is based on height above average terrain. FCC Part 90 rules allow up to 125 Watts ERP From the base station 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.

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 a wide range of critical infrastructure industries that require networks to be built over wide geographic operating areas and/or have increased need for capacity over urban hubs.

For LPWAN/IoT deployments, ERICA can unlock the full potential 220-222 MHz band channels to support a wide variety of sensor ecosystems and IoT-oriented applications serving industries ranging from critical infrastructure, industrial, enterprise, agriculture, etc. The ERICA protocol supports higher data rates than competing LPWAN solutions in ISM bands – 300-1800 bps UL / 1100-3600 bps DL. Please inquire for more information on the ERICA IP offering.

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 Council**, **Alaska Railroad Corporation**, railroad consortium **PTC-220**, **Amtrak**, **Massachussetts Bay Transportation Authority**, and others for a variety of applications.

Equipment for the band is made by Ondas Networks www.ondas.com, 4RF www.4rf.com, GE MDS 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. 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.

Below is a summary of the aggregate coverage and capacity provided by the available licenses:

Total POPs Covered	Total Licenses Available	Aggregate kHz Available (Min)	Aggregate kHz Available (Max)	Total MHz POPs	Avg. kHz Available
311,137,661	170	35	1000	92,250,428	300

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