

# Application note mapping ber and signal strength of p25

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**What is the bandwidth of a P25 radio?** Phase P25 1 radios are designed for 12.5 kHz channel bandwidths. Phase 1 P25 radios must also be able to operate in analog mode on 25 kHz or 12.5 kHz channels. This backward compatibility allows P25 users to gradually transition to digital while continuing to use analog equipment.

**How does P25 work?** In P25 digital mode, the P25 transmitter will convert all analog audio to packets of digital information by using an IMBE™ vocoder, then decode the digital information back to analog audio in the receiver. Error correction coding is added to the digital voice information as well as other digital information.

**What is the bit error rate for P25?** The P25 standard specifies the bit pattern that should be used for this test. The receiver sensitivity test is made by generating a 1031 Hz tone test pattern, at the receiver sensitivity level, and then measuring the bit error rate. At this level the bit error rate should be 5% or less.

**Can P25 talk to analog?** P25 radios have a "multi-mode" receive function which allows the radio to be programmed to receive both analog and digital transmissions.

**What is a P25 frequency?** The P25 radio systems are available with frequency bands: VHF (136 – 174 MHz), UHF (403 – 512 MHz, 806 – 870 MHz), and 700 MHz (746 – 806 MHz).

**What is the data rate of P25?** Project 25 Digital Trunking Phase II(PII) is 6000 symbols per second where each symbol encodes two bits of data for a raw bit rate of 12000 bps and utilizes the AMBE vocoder. P25 Phase I uses a 4800 baud, 9600bps control channel.

**What is the P25 specification?** P25 is a set of standards that manufacturers can follow to ensure that their LMR equipment can interoperate (communicate) with equipment produced by other manufacturers.

**How to program a P25 radio?**

**What is the P25 wait time?** To prevent this, a user-configurable P25 wait time (from 0 to 1000 ms) has been added. During the wait time, the scanner evaluates the received signal; if it detects P25 data, the scanner opens squelch immediately. If it does not detect any P25 data, the scanner opens squelch as soon as the wait time expires.

**How to do a BER test?** To perform a bit error rate test, a pre-defined data stream is sent through a network link input, then the output of the link at the receiving end is analyzed to assess the number of errors detected versus the number of bits transmitted over a given time frame.

**What is a bad bit error rate?** A bad bit error rate (bad BER), is any data transmission that contains an excessive number of errors.

**What are the benefits of P25?** Improved Spectral Efficiency and Ease of Migration  
This is especially important in certain frequency bands where narrowband operation is required by the FCC. The P25 standard is spectrally efficient as it operates in a 12.5 KHz channel bandwidth for both P25 Phase 1 FDMA and Phase 2 TDMA operations.

**Is P25 analog or digital?** P25 is a suite of standards designed for interoperable digital two-way radio products. It was specifically made for public safety, security, and public service applications. Over time, P25 has gained worldwide acceptance and is also used in commercial settings.

**Who uses P25?** P25 was developed by public safety professionals in North America and has gained acceptance for public safety, security, public service, and commercial applications worldwide.

**What modulation does P25 use?** The two most common types of simulcast modulation are Continuous Four Frequency Modulation (C4FM) and Linear

Simulcast Modulation (LSM). LSM is a type of Phase Shift Keying and C4FM is a type of Frequency Shift Keying. The P25 standard allows for both C4FM and LSM.

### **What is the bandwidth of P25?**

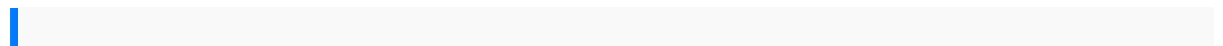
**Is P25 encrypted?** Advanced Encryption Standard AES-256 is the standard encryption for P25 voice communications and is the only approved encryption algorithm for federal SBU communications. Public-safety officials have for many years expressed concern about the use of non-standard (non-AES) encryption in public-safety LMR systems.

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**What band is P25?** Tait P25 trunked networks deliver spectrally efficient, reliable and scalable communications. From single site to statewide, they can communicate across combinations of UHF, VHF and 700/800MHz bands.

**What is the bandwidth of US FM radio?** The FM broadcast in the United States starts at 88.0 MHz and ends at 108.0 MHz. The band is divided into 100 channels, each 200 kHz (0.2 MHz) wide. The center frequency is located at 1/2 the bandwidth of the FM Channel, or 100 kHz (0.1 MHz) up from the lower end of the channel.

**What is the bandwidth of a radio signal?** The bandwidth of a signal is defined as the difference between the upper and lower frequencies of a signal generated. As seen from the above representation, Bandwidth (B) of the signal is equal to the difference between the higher or upper-frequency (fH) and the lower frequency (fL).



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