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Trimble 900 MHz Radios: FAQ

This document answers some frequently asked questions about the Trimble® 900 MHz radio.

How does the Trimble 900Mhz radio work?

Trimble radios operate in the ISM Band, 902-928 MHz, using Spread Spectrum technology. In US/Canada mode, Trimble radios divide the band into 50 channels and then hop across the channels, spreading the transmission among many different frequencies. This technique allows many radios to share the same frequency band and not interfere with each other.

In ANZ and AUS mode Trimble radios are restricted to a portion of the spectrum by regulations in those countries. The radios still use Spread Spectrum, but over a smaller frequency range and number of channels.

What is the ISM band?

The ISM band, 902-928 MHz, is a spectrum of radio frequency that is freely available. There are no licensing requirements to use the ISM band but all radios that operate in this band must comply to certain restrictions. There are limits on the power output of the radios using the band so that any one radio will not dominate and interfere with the other radios using the spectrum. This is a shared band, and no one user has more rights or privileges than any other.

The power restrictions are defined by a radiated emission specification. The limit on radiated emission is such that a 1 watt radio with a 5 Db gain antenna is within the limits; the Trimble 900 MHz radio has 1 watt output. All Trimble radios and all commercial radios that operate in the ISM band are FCC Part 15 certified, and operate according to all the limitations set forth by the FCC. Trimble radios also comply with the regulations and restrictions of Canada, Australia, and New Zealand to operate in this band.

What is Spread Spectrum technology?

Spread Spectrum is a technique that spreads a signal over a range of frequencies. Spread Spectrum was originally developed during World War II to make radio signals hard to intercept. The radio uses a set of frequencies and then “hops” among the frequencies in a defined pattern, spending a short length of time on one frequency before moving to the next. Both the transmitter and the receiver know the pattern. Trimble radios have 40 hopping patterns available.

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Spread Spectrum is useful since it allows many radios to use the same frequency band without interfering with each other. Each radio manufacturer uses their own unique hopping and timing patterns so the chances of two radios occupying the same frequency at the same time are minimal.

How do other 900 MHz radios work?

Radios from other suppliers operate in a similar way to the Trimble radios. The spectrum is divided into channels, and the radio hops among the channels in a defined pattern. The patterns and timing of each radio manufacturer is different, and no other manufacturer uses the same patterns and timing as Trimble radios.

What about Wireless Internet?

Wireless Internet providers are using the ISM band to provide connectivity in rural areas. Typically, the Internet service provider (ISP) will set up a base station with an omni-directional antenna on a high point to cover a region. The Internet subscribers will have a directional antenna pointed towards the internet base.

Wireless Internet radios tend to use fewer channels in the band since they require higher data rates than an RTK data radio. Wireless Internet radios are permitted to use only a few channels or frequencies to achieve these greater data rates.

Are there interference issues?

Wireless Internet providers are very sensitive to any interference issues. Internet and RTK are very different applications and have different operating methods. In RTK, missing a packet every once in awhile is acceptable. RTK requires real-time corrections, and if any one packet is lost the RTK application moves on to the next packet.

Internet is different in that it requires every packet to be useful. When looking at an Internet site, the user wants to see the whole page, and this requires receiving every packet. If packets were missed, there would be holes in the page with missing information, which is not very useful. Therefore, when a packet is lost due to interference or other reason, it must be re-transmitted. If a packet needs to be re-transmitted, it slows the data rate, making users wait longer and ISPs look bad.

Do Trimble radios interfere with Wireless Internet radios?

To date, there are no instances where Trimble radios interfere with Wireless Internet radios. Tests conducted with an ISP showed that the packet loss did not change when an RTK base station was located in close proximity to an internet base receiver.

There are many users of the ISM band and RTK base stations and Wireless Internet Providers tend to look for similar types of locations—high points that provide good coverage for their service areas. Therefore, when the ISPs run into an issue with packet loss, interference is usually thought to be an issue. There have been several instances where an RTK base was mistakenly suspected of interfering with an Internet radio.

How can I minimize potential interference?

In locations where an RTK base station is sharing a location with an IP, it is best to separate the antennas as much as possible. Trimble recommends vertical and horizontal separation to minimize any potential for interference.