The GraceSense™ Predictive Maintenance System uses a proprietary IEEE 802.15.4 Zigbee-compatible communication protocol for transmitting data between nodes. One of the benefits of IEEE 802.15.4 communication is that it allows a device to communicate using a number of different 2.4 GHz frequency bands to avoid any RF interference that may exist in an application environment. In recent years, as the number of devices using IEEE 802.11 (WiFi), 802.15.4 (Zigbee), and 802.15.1 (Bluetooth) protocols has grown exponentially, it has become increasingly important that any new 2.4GHz deployment take into consideration possible conflicts with other devices.

Because pervasive WiFi networks tend to be high power, operate on a wide band, and carry significant network traffic, it is often recommended to use an 802.15.4 frequency band that minimizes overlap with any other 2.4GHz systems. As such, 802.15.4 channels 15, 20, and 25 are often the best options, and our factory default setting is channel 25 as this channel typically has the least interference. Please note that we also use channel 26 as a dedicated channel to support our over-the-air firmware updates.

It is also important to note that while other sources of 2.4GHz energy may interfere with a GraceSense™ system, our devices do not transmit enough information or with enough power to ever interfere with other more critical communications technologies. In most applications, each of our nodes will transmit no more than 1kB worth of information each hour. This is because of our product focus on embedded intelligence and long battery life.

Below is a graph that shows both the 802.11 (WiFi) and 802.15.4 channels in the 2.4GHz frequency range. In this illustration, you can see that WiFi bands occupy a large amount of frequency space while 802.15.4 bands are narrow. Specifically, it can be seen that 802.15.4 channels 15, 20, and 25 are largely unaffected by typical WiFi networks.

802.15.4 (Zigbee-Compatible) and 802.11 (WiFi) 2.4 GHz Band Overlap

802.11 Channel (North America)

802.11 Spectrum Occupancy (typical)

802.15.4 Channel

Recommended 802.15.4 Channels (25 is Factory Default)

Dedicated for Over-The-Air Firmware Updates

GS-WFS-TN-EN 2009