interval, whereas embodiments 2, 4, 5 and 6 utilize 24 samples in the guard interval.

Embodiments 3, 7, 8 and 9 result in slightly modified OFDM symbol duration of approximately 3.64 μsecs. The spectral width for embodiment 1 is the same as that as 802.11a standard. Embodiments 2 and 3 exhibit 10% wider spectral width than 802.11a whereas embodiments 4-9 exhibit 0.83% wider spectral width than 802.11a. The thermal noise performance for embodiments 1, 3, 7 and 8 are approximately the same as that of 802.11a, whereas embodiments 2, 4-6 and 9 exhibit slightly worse noise performance than 802.11a. The delay spread performance for embodiment 1 is the same as that as 802.11a. Embodiments 2, 4, 5, and 6 exhibit 50% better delay spread performance as compared to 802.11a, whereas embodiments 3, 7, 8 and 9 exhibit 10% worse delay spread performance as compared to 802.11a.

FIG. **12** is a graph diagram of an exemplary packet configuration **1200** according a super short mode of operation. In general, the first, serially modulated packet portions are dropped for the super short mode. In the embodiment shown, the packet configuration **1200** includes an OFDM sync pattern **1201**, followed by an OFDM signal symbol **1203**, followed by an OFDM payload **1205**. It is understood that other parallel modulation techniques may be utilized. A data rate section **1207** and a data count section **1209** are provided in the signal symbol **1203**. The data rate section **1207** is a bit field specifying the data rate, such as the standard 802.11a rates, and the data count section **1209** is a bit field indicative of the number of data bytes in the payload **1205**. The packet configuration **1200** does not include a standard 802.11b header and is therefore incompatible and not otherwise interoperable or coexistent with 802.11b devices. The entire packet configuration **1200** utilizes a single clock source, such as 20 MHz, to simplify the transceiver circuitry. The packet configuration **1200** may be utilized by either of the devices **103**, **105** within the area **101** to communicate with each other. However, the standard 802.11b devices **107**, **109** are not compatible and may not coexist within the same area **101** as the devices **103**, **105** utilizing the super short preamble option.

It is appreciated that a dual packet configuration for wireless communications according to at least one embodiment of the present invention enables compatibility with existing devices based on a serial modulation while enabling communication at different or higher data rates by using parallel modulation for the payload. In particular, the dual packet configuration includes a first portion that is modulated according to a serial modulation and a second portion that is modulated according to a parallel modulation. A dual packet configuration with a first portion comprising a preamble and header modulated with DSSS serial modulation according to 802.11b in the 2.4 GHz band enables dual mode devices to coexist in the same communication area as 802.11b compatible devices. The header includes a length field that specifies the duration of the second portion of the dual packet, so that 802.11b devices know how long to back off. The second portion modulated with a parallel modulation, such as OFDM or the like, enables the dual mode devices to communicate at different or higher rates, such as up to 54 Mbps or more, without interruption from the 802.11b devices.

In some embodiments, dual mode transmitters and receivers may each be capable of communicating in a super short mode in which only the second portion is utilized. The first, serial portion is not used, so that overall data throughput may be increased. The super short mode is used only for dual mode devices and is generally not compatible with single mode devices. For example, the parallel modulation mode is not compatible with the serial modulation techniques utilized by the 802.11b devices, so that a dual mode device may not coexist or communicate in the same area as active 802.11b devices. For embodiments in which the serial modulation for the first packet portions are 802.11b compatible, the super short mode is advantageous when 802.11b devices are shut off or otherwise not active in the same area, so that the dual packet mode devices may be operated with enhanced data throughputs.

In other embodiments, the dual mode transmitters and receivers may each be capable of communicating in a standard mode in which the second portion is modulated according to the serial modulation. For example, this mode may be advantageous when the serial modulation is compatible with other devices, such as 802.11b devices. Thus, the dual mode devices may include the capability to communicate with the 802.11b devices in standard mode at the standard 802.11b rates, while also able to communicate with other dual mode devices at different or higher data rates.

Although a system and method according to the present invention has been described in connection with the preferred embodiment, it is not intended to be limited to the specific form set forth herein, but on the contrary, it is intended to cover such alternatives, modifications, and equivalents, as can be reasonably included within the spirit and scope of the invention as defined by the appended claims.

The invention claimed is:

1. A transmitter that uses a dual packet configuration for wireless communication, comprising:
- a first modulator that modulates a first portion of each packet solely according to a serial modulation; and
- a second modulator that modulates a second portion of each packet solely according to a parallel modulation, wherein the parallel modulation comprises orthogonal frequency division multiplexing (OFDM), and wherein the second portion further comprises:
- an OFDM synchronization pattern;
- an OFDM signal symbol;
- an OFDM payload;
- the OFDM signal symbol including a data rate section and a data count section.

2. The transmitter of claim **1**, wherein the first portion includes a preamble and a header.

3. The transmitter of claim **2**, wherein the preamble comprises a long preamble.

4. The transmitter of claim **2**, wherein the preamble comprises a short preamble.

5. The transmitter of claim **2**, the header including an OFDM mode bit.

6. The transmitter of claim **5**, the header further including a length field indicating the duration the second portion.

7. The transmitter of claim **1**, further comprising:
- the OFDM signal symbol including a data rate section and a data count section.

8. The transmitter of claim **1**, further comprising:
- the first portion based on a first clock fundamental; and
- the second portion based on a second clock fundamental.

9. The transmitter of claim **8**, wherein the first clock fundamental is approximately 22 Megahertz (MHz) and the second clock fundamental is approximately 20 MHz.

10. The transmitter of claim **1**, wherein the first and second portions are based on a single clock fundamental.