[0140] Due to typical transceiver size constraints, a single antenna may be desirable for transmit and receive according to the invention. However, it is possible to use two antennas for transmit and receive diversity. Simple schemes like switched diversity can be easily incorporated in a given transceiver device according to the invention, while also being transparent to other devices (e.g. in a Bluetooth piconet). The modulation techniques described above are also applicable to more complex transmit diversity techniques such as, space time coding, beam forming and others.

[0141] The aforementioned modulation schemes of the invention also allow more complex coding schemes like parallel concatenated trellis coded modulation (PCTCM) and serially concatenated trellis coded modulation (SCTCM). Also, a lower complexity trellis code (which can perform better than the turbo coding of **FIG. 37**) can easily be incorporated in transceiver devices according to the invention.

[0142] As discussed above, FIGS. **10** (receiver) and **11** (transmitter) illustrate an exemplary transceiver for mode 2. Many parts of the mode 2 receiver, for example, the front end filter **105**, LNA **106**, RF/IF converter **107**, and the SAW filter **108** can be shared with mode 1. The baseband for a mode 2 receiver requires additional logic (beyond mode 1) for receive filtering, AGC, timing acquisition, channel estimation, QAM demodulation and Viterbi decoding in the case of ARQ. In some embodiments, the extra gate count for this additional logic is approximately 10,000 gates.

[0143] As discussed above, FIGS. **30** (receiver) and **31** (transmitter) illustrate an exemplary transceiver for mode 3. Many parts of the mode 3 receiver, for example, the front end filter **308**, LNA **306**, and RF/IF converter **302** can be shared with mode 1. The implementation of mode 1+mode 3 will require an additional SAW filter over a mode 1 implementation because of the larger bandwidth of mode 3 compared to mode 1. The baseband for a mode 3 receiver requires additional logic (beyond mode 1) for AGC, timing acquisition, channel estimation, QAM demodulation, equalization and turbo decoding. In some embodiments, the extra gate count for this additional logic is approximately 100,000 gates.

[0144] It will be evident to workers in the art that exemplary transceiver embodiments according to the invention can be realized, for example, by making suitable hardware and/or software modifications in a conventional Bluetooth MAC. Some exemplary advantages provided by the invention as described above are listed below.

[0145] Interoperability with Bluetooth: a high rate WPAN piconet according to the invention can accommodate several mode 1 (Bluetooth) and mode 2 or mode 3 devices simultaneously.

[0146] High Throughput: in mode 3 a high rate WPAN according to the invention supports 6 simultaneous connections each with a data rate of 20 Mbps giving a total throughput of 6×20=120 Mbps over the whole 2.4 GHz ISM band. In mode 2 the high rate WPAN supports the same number of connections as Bluetooth with a data rate of up to 4 Mbps each.

[0147] Coexistence: there is only a 10% reduction in throughput for Bluetooth in the vicinity of an exemplary WPAN according to the invention. The PLS technique implies a 0% reduction in throughput for IEEE 802.11 in the vicinity of a WPAN according to the invention because PLS will select a different frequency band.

[0148] Jamming Resistance: the PLS technique helps avoid interference from microwave, Bluetooth and IEEE 802.11, thus making it robust to jamming.

[0149] Low Sensitivity Level: exemplary sensitivity level for mode 2 is -78 dBm and for mode 3 is −69 dBm.

[0150] Low Power Consumption: the estimated power consumption for mode 2 in year 2001 is 25 mW average for receive and 15 mW average for transmit, and the estimated power consumption for mode 3 in year 2001 is 95 mW average for receive and 60 mW average for transmit.

[0151] Although exemplary embodiments of the invention are described above in detail, this does not limit the scope of the invention, which can be practiced in a variety of embodiments.

What is claimed is:

1. A method of selecting a frequency band for use in wireless packet communications between wireless packet communication transceivers, comprising:

a first wireless packet communication transceiver transmitting over a wireless communication link a plurality of probe packets respectively on a plurality of probe frequencies within an available frequency bandwidth;

a second wireless packet communication transceiver receiving the probe packets and obtaining therefrom information indicative of frequency channel quality associated with the plurality of frequencies;

using the frequency channel quality information to produce information indicative of frequency band quality associated with a plurality of frequency bands within the available frequency bandwidth; and

based on the frequency band quality information, selecting one of the frequency bands for use in wireless packet communications between the first and second wireless packet communication transceivers.

2. The method of claim 1, wherein the selected frequency band includes a plurality of said probe frequencies.

3. The method of claim 1, wherein said probe frequencies are distributed across the available frequency bandwidth.

4. The method of claim 3, wherein said probe frequencies are distributed evenly across the available frequency bandwidth.

5. The method of claim 3, wherein the distribution of probe frequencies across the available frequency bandwidth corresponds to a total number of probe packets in said plurality of probe packets.

6. The method of claim 1, wherein said transmitting step includes the first wireless packet communication transceiver transmitting the probe packets sequentially on a corresponding sequence of said probe frequencies, and using a pseudo random sequence to determine the sequence of probe frequencies.

7. The method of claim 6, wherein said last-mentioned using step includes using the pseudo random sequence to determine a sequence of frequency offset values from a