between mode 1 operation and mode 3 operation by selecting between a mode 1 transceiver (XCVR) section **197** and a mode 3 transceiver section **198**. The mode controller **195** communicates at **192** with the mode 1 transceiver section **197**, and also communicates at **193** with the mode 3 transceiver section **198**.

[**0078**] Since the Bluetooth (mode 1) transceiver **197** is capable of hopping at the maximum rate of 3200 hops/sec (each hop is on a 1 MHz band), this rate can be used for channel sounding. This means that the duration of each slot (master-to-slave or slave-to-master) is 312.5 microseconds. A pseudorandom hopping pattern is used in some embodiments. This pattern is chosen such that the entire 79 MHz range is sampled at a sufficient rate (e.g. in 5 MHz steps) to identify the best 22 MHz frequency band. Using this hopping pattern the master can, in mode 1 (Bluetooth), send the slave short packets, also referred to herein as probe packets, of the format shown in **FIG. 20**. Notice that exemplary probe packet of **FIG. 20** is the same as a Bluetooth ID packet. The slave estimates the channel quality based, for example, upon the correlation of the access code (e.g. the Bluetooth sync word) of the received probe packet. Note that a special or dedicated probe packet is not necessarily required, because channel quality can also be estimated based on normal mode 1 traffic packets.

[**0079**] Referring to the example of **FIG. 21**, after 16 probe packets (each of time duration 312.5 microseconds including turn around time), the slave will decide on the best contiguous 22 MHz band to use in mode 3, and will then send the index of the lowest frequency of that band to the master 8 times using 8 slots (each of time duration 312.5 microseconds). This index will be a number from 1 to 57 (79 (bandwidth of ISM band)−22 (bandwidth in mode 3)=57), and thus requires a maximum of 6 bits. These 6 bits are repeated 3 times, so the payload of each slave-to-master packet (**FIG. 22**), also referred to herein as selection packets, will be a total of 18 bits. This leaves 226 μsec. for the turn around time. The number n (e.g. 16 in **FIG. 21**) of master-to-slave packets and the number k (e.g. 8 in **FIG. 21**) of slave-to-master packets can be predefined by the PLS protocol or agreed upon during the initial handshake between the master and slave. Also, the slave can send probe packets to the master so the master can evaluate the slave-to-master channel.

[**0080**] The channel state of each 1 MHz band can be estimated, for example, by using the maximum value of the correlation of the access code or any known part of the probe packet. This gives a good estimate of the amplitude of the fading parameter in that 1 MHz channel. The best 22 MHz band can then be chosen using this information.

[**0081**] For example, for each contiguous 22 MHz frequency band, where the jth frequency band is designated $f(j)$, a quality parameter q(j) can be calculated as follows

$$q_{f(j)} = \sum_i |\alpha_i|^2$$

[**0082**] where $|\alpha_i|$ is the magnitude of the fading parameter amplitude estimate (e.g. a correlation value) for the ith frequency hop in $f(j)$. The frequency band $f(j)$ having the maximum $q_{f(j)}$ is taken to be the best band.

[**0083**] As another example, a quality parameter $q_{f(j)}$ can be calculated for each contiguous 22 MHz band as

$$q_{f(j)}=\min|\alpha_i|$$

[**0084**] and the band $f(j)$ having the maximum $q_{f(j)}$ is selected as the best band.

[**0085**] As another example, the following quality parameters can be calculated for each contiguous 22 MHz band:

$$q_{f(j)} = \sum_i |\alpha_i|^2$$

$$A_{f(i)}=\min|\alpha_i|$$

$$B_{f(j)}=\max|\alpha_i|$$

[**0086**] Those frequency bands $f(j)$ whose associated $A_{f(j)}$ and $B_{f(j)}$ produce a ratio $A_{f(j)}/B_{f(j)}$ larger than a predetermined threshold value can be identified, and the one of the identified frequency bands having the largest $q_{f(j)}$ is taken to be the best band. The threshold value can be determined, for example, empirically on the basis of experimentation for desired performance in expected channel conditions.

[**0087**] Consider a PLS example with n=16 and k=8. This indicates that the 79 MHz band should be sampled in 5 MHz steps. The hopping pattern is therefore given by:

[**0088**] o={0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75}.

[**0089**] The ith PLS frequency hop is defined to be f(i)=(x+o(i))mod(79); i=1, 2 . . . , 16.

[**0090**] Here x is the index of the Bluetooth hopping frequency that would occur at the beginning of the PLS procedure, and can have values of x=0, 1, 2, . . . , 78. The index i can be taken sequentially from a pseudo random sequence such as:

[**0091**] P={16, 4, 10, 8, 14, 12, 6, 1, 13, 7, 9, 11, 15, 5, 2, 3}.

[**0092**] Different pseudo random sequences can be defined for different values of n and k.

[**0093**] The 8 transmissions from the slave to the master can use, for example, the first 8 frequencies of the sequence f(i), namely f(i) for i=1, 2, . . . , 8.

[**0094**] The above exemplary procedure can be summarized as follows:

[**0095**] 1. Master sends to the slave the probe packet on the frequencies determined by the sequence f(i). The transmit frequency is given by (2402 +f(i)) MHz;

[**0096**] 2. Slave estimates the quality of each channel;

[**0097**] 3. After 16 master-to-slave probe packets, the slave estimates the best 22 MHz band using all the quality information it has accumulated;

[**0098**] 4. The slave sends to the master a selection packet including the index of the lowest frequency of the best 22 MHz band;

[**0099**] 5. The slave repeats step 4 a total of 8 times; and