1 SYNCHRONIZATION AND AUTHENTICATION

The handset and base adopt frequency-hopping spread-spectrum technology. There are a total 75 hopping frequencies (refer to a separate document for the actual channel frequencies used). The minimum separation between two channel carrier frequencies is 864 kHz. The carrier will hop to another frequency that is selected from a pre-defined ordered list of random hopping frequencies every 10ms.

The list is defined as follows:

46, 63, 48, 37, 58, 42, 71, 41, 69,16, 40, 1, 60, 17, 70, 3, 39, 27, 44, 20, 49,65,30, 10, 73, 23, 51, 29, 74, 59, 43, 31, 50, 9, 38, 52, 28, 56, 11, 66, 25, 55, 47, 54, 21, 62, 15, 35, 53, 13, 34, 6, 0, 67, 61, 24, 12, 5, 32, 7, 33, 64, 2, 57, 8, 22, 68, 14, 26, 45, 72, 18, 36, 4, 19

This list determines the hopping sequence. It is generated from a pseudorandom number generator. Each frequency appears once in the list. The sequence is pseudorandom. The transmit carrier will hop to the next frequency in the list every 10ms. When it reaches the end of the list, it will hop to the beginning of the list. Each frequency is used equally on the average by the handset and base. The maximum time of occupancy on any frequency is 400 ms within a 30 seconds period.

The handset and base have unique 40-bit identification numbers (ID) separately stored in its respective EEPROM. Both the handset and the base have their ID and security key stored in the EEPROM subscription data area. Before the handset and the base access each other, authentication of handset must be done. First, the base sends a random number to handset called 'challenge'. Then handset calculates a 'response' by combining the authentication key with the random information and sends the 'response' to the base. The base also calculates the expected 'response' and compares it with the received 'response'. If they are the same, the handset and the base are synchronized and they can establish link later.

The handset must synchronize with the base anytime. Otherwise the handset will seek the base and do authentication again.

The above processes are illustrated by the diagram on next page.