

## 1.2 Operational Descriptions

	Transmitter	Receiver
Operating frequency range	2402 - 2480 MHz	2402 - 2480 MHz
Type of modulation	FHSS modulation	FHSS modulation
Number of channels	79	79
Channel separation	1 MHz	1 MHz
Type of antenna	Integral Antenna	Integral Antenna
Antenna gain (dBi)	0	
Power level	variable	
Type of equipment	stand alone, plug-in radio device	stand alone, plug-in radio device
Connection to public utility power line	No	
Nominal voltage	$V_{\text{nor}}$ : 13.5 V	$V_{\text{nor}}$ : 13.5 V
Independent Operation Modes	Page scan Inquiry scan Connection state - ACL Link Connection state - SCO Link	

### 1.2.1 Product Descriptions

The test item is a Handsfree Car Kit based on the Bluetooth technology. Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices. Bluetooth operates in the unlicensed ISM Band at 2.4 GHz. In the US a band of 83.5 MHz width is available. In this band, 79 RF channels spaced 1 MHz apart are defined. The channel is represented by a pseudo-random hopping sequence through the 79 channels. The channel is divided into time slots, with a nominal slot length of 625  $\mu\text{s}$ , where each slot corresponds to different RF hop frequencies. The nominal hop rate is 1600 hops/s. The symbol rate on the channel is 1 Ms/s.

### 1.2.2 Technical Background of the Wireless Technology

Bluetooth operates in the unlicensed ISM band at 2.4 GHz. A frequency hop transceiver is applied to combat interference and fading. A shaped, binary FM modulation is applied to minimize transceiver complexity. The symbol rate is 1 Ms/s. A slotted channel is applied with a nominal slot length of 625  $\mu\text{s}$ . For full duplex transmission, a Time-Division Duplex (TDD) scheme is used. On the channel, information is exchanged through packets. Each packet is transmitted on a different hop frequency. A packet nominally covers a single slot, but can be extended to cover up to five slots. The Bluetooth protocol uses a combination of circuit and packet switching. Slots can be reserved for synchronous packets. Bluetooth can support an asynchronous data channel, up to three simultaneous synchronous voice channels, or a channel which simultaneously supports asynchronous data and synchronous voice. Each voice channel supports a 64 kb/s synchronous (voice) channel in each direction. The asynchronous channel can support maximal 723.2 kb/s asymmetric (and still up to 57.6 kb/s in the return direction), or 433.9 kb/s symmetric. The Bluetooth system consists of a radio unit, a link control unit, and a support unit for link management and host terminal interface functions.