

网络、通信与安全

## 蓝牙室内信道模型与同频干扰研究

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**摘要** 蓝牙使用的是免费的ISM频段, 容易受到同频段内其它设备的干扰, 这些干扰可能来自其他微微网的蓝牙设备。文中分析了蓝牙设备在微微网干扰下的数据传输情况, 具体分析了ACL数据分组在微微网同频干扰下的丢包率及吞吐量。为了符合实际的应用场合, 给出了适用于蓝牙室内传输的无线传播信道模型。根据室内通信的距离, 得出瞬时随机接收信号功率和干扰微微网的随机干扰功率, 并根据蓝牙接收特性曲线求出时隙位错误率, 然后根据蓝牙不同的数据分组类型求出各分组的平均丢包率和吞吐量。通过分析和仿真可以看出, 各ACL数据分组的丢包率和吞吐量基本随通信距离和干扰微微网的数量呈对数下降关系。文中与以往文献相比的特点是: 不是一旦发生数据分组“碰撞”就认为丢包, 而是由信号和干扰的强度来决定分组是否发送成功。因此分析结果更加准确和实用。

**关键词** [蓝牙](#) [干扰](#) [数据分组](#) [吞吐量](#) [丢包率](#)

分类号

## Analysis on Bluetooth indoor channel model and piconet interference

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### Abstract

Bluetooth uses free ISM frequency band, which is easy to be interfered by other device in the same band. Interference may come from Bluetooth devices of other piconets. The data transmission performance of Bluetooth is analyzed, including the Packet Error Rate (PER) and throughput of ACL data packet under the inter-piconet interference. For the actually application environment, a wireless propagation indoor channel model is provided. The random received signal power and random interferes power from other piconets is gotten from the transmission distance. The Bit Error Rate of slot is found out through the Bluetooth receive characteristic curve. Finally the average PER and throughput of different data packets is found out. The analysis and simulation in the paper shows that the PER and throughput of ACL packets decreases logarithmically as the distance and the number of piconets raises. Comparing with the formerly documents, the feature of the paper is that whether packets transmits successfully depends on the intensity of signal and interference, not just loss once the collision happens. Therefore, the analysis is more accurate and practical.

**Key words** [Bluetooth](#) [interference](#) [packet](#) [throughput](#) [Packet Error Rate](#)

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