

BPSK vs. MSK: A High-Level Overview of Cylink's Experience

BACKGROUND

Cylink Corporation has been developing Direct Sequence Spread Spectrum radio technology and products since 1987. We manufacture and market worldwide FCC Part 15.247 compliant ISM band equipment for the 915 MHz, 2.45 GHz and 5.7 GHz bands. Our radios provide full-duplex fractional T1, wireless voice, data and LAN links up to 512 Kbps with operational ranges up to 60 miles (10-30 miles typical). Cylink offers OEMs its Spectra™ family of low-cost digital integrated spread spectrum transceiver ASICs for cordless telephone, wireless PBX and moderate rate data/LAN applications.

ISSUE

The IEEE, through its P802.11 working group, is now formulating SS standards which, if not done wisely, could significantly inhibit commercial innovation of ISM-band (esp. portable/nomadic). Some of the proposed methods (e.g., DQPSK) use linear amplification designs, which we believe are a step in the wrong direction.

DISCUSSION

Cylink's engineers, under the leadership of Dr. Jim Omura, have investigated the theoretical and practical aspects of a variety of DSSS RF modulation techniques. K. Feher^{1 2} has introduced to this body comparisons of many of the most important performance and implementation trade-offs of a variety of RF modulation techniques. Although Cylink's present products use BPSK, they will soon employ MSK, as do some of our Spectra™ OEMs (e.g., Uniden).

CONCLUSIONS

Feher's paper presents good arguments that constant envelope, non-linear amplification modulation schemes (e.g., MSK), offer important power consumption, reduced out-of-band radiation, coherent or non-coherent detection and VLSI component availability advantages. We support some of Feher's conclusions and sincerely recommend a modulation scheme using non-linear amplification be the basis for the adopted 802.11 DSSS PHY standard.

¹ "FQPSK: A modulation-power efficient RF amplification proposal for increased spectral efficiency and capacity GMSK and $\pi/4$ -QPSK compatible PHY standard", July 1993, doc: IEEE P802.11-93/97.

² "1 Mb/s and Higher Data Rate PHY/MAC: GFSK and FQPSK". September 1993, doc: IEEE P802.11-93/138.