

Contents

Abstract	i
Acknowledgments	v
Contents	vii
List of Figures	ix
Abbreviations	xiii
Symbols	xv
1 Introduction	1
1.1 Summary of original contributions	5
1.2 Organization of the thesis	5
1.3 Publications	6
2 Q²PSK Modulation	7
2.1 The idea of Q ² PSK modulation	7
2.2 Design rules of bandlimited Q ² PSK Systems	13
2.2.1 Design of the pulse shaping filter	16
2.3 Summary	18
2.A Impulse responses of filters	19
3 Extension of the original Q²PSK	21
3.1 Realization by modulation and demodulation	21
3.2 Extension to a MC system	23
3.3 Summary	27
4 Multicarrier Data Transmission	29
4.1 Basic Theory	29
4.2 Orthogonal Frequency Division Multiplexing	33

4.3	OQAM-MC	36
4.4	VSB-MC	39
4.4.1	Single-Carrier System	39
4.4.2	Multicarrier System	43
4.5	Summary	45
4.A	Derivations for the VSB-MC system	46
5	Interference in Multicarrier Systems	49
5.1	Transmission channel models	49
5.1.1	Time-invariant multipath channel	50
5.1.2	Time-variant mobile radio channel	52
5.2	Interferences of VSB-MC system	54
5.3	Interferences of the OQAM-MC system	56
5.4	Summary	59
6	Simulation results	61
6.1	Equalization	61
6.1.1	Zero-Forcing Equalizer	63
6.1.2	Extended Zero-Forcing Equalizer	63
6.1.3	Optimal Sequence Detection	64
6.2	Interferences	65
6.2.1	Simulation Results	67
6.3	Bit Error Rate performance	68
6.4	Summary	73
6.A	Modified Viterbi Equalizer for VSB-MC	76
7	Conclusion	79
7.1	Summary	79
7.2	Outlook	80