

Contents

1	Introduction	1
1.1	Motivations and Concepts of U-LTE	1
1.2	Benefits and Obstacles of U-LTE	3
1.3	Three Types of U-LTE	4
1.3.1	LTE-U	4
1.3.2	LAA-LTE	5
1.3.3	MulteFire	7
1.4	Coexistence of U-LTE and Wi-Fi	7
1.5	Requirements of U-LTE Coexistence Mechanisms	8
1.6	Structure of this Brief	9
	References	10
2	Requirements and Regulations in the 5 GHz Unlicensed Spectrum	11
2.1	Radio Spectrum Management: An Overview	11
2.2	Frequency Channels	14
2.3	Transmission Power	14
2.3.1	RLAN Band 1 (5150–5350 MHz)	15
2.3.2	RLAN Band 2 (5470–5725 MHz)	16
2.3.3	BRAN (5725–5875 MHz)	16
2.4	Transmission Power Control	16
2.5	Dynamic Frequency Selection	17
2.6	Channel Access Mechanisms	17
2.6.1	FBE-Based Mechanism	17
2.6.2	LBE-Based Mechanism	19
	Reference	20
3	LTE-Advanced: An Overview	21
3.1	System Overview	21
3.1.1	Network Architecture	22
3.1.2	Capabilities and Features	23

3.2	Channel Access Mechanisms	24
3.2.1	LTE-A Physical Layer	25
3.2.2	LTE-A Medium Access Control	28
3.3	Changes Expected for Future Releases	29
	References.	30
4	IEEE 802.11/Wi-Fi Medium Access Control: An Overview	31
4.1	IEEE 802.11/Wi-Fi Evolution.	31
4.2	IEEE 802.11 CSMA/CA.	33
4.2.1	DCF and PCF	33
4.2.2	Basic Medium Access.	34
4.2.3	Medium Access with Collision Avoidance	34
4.3	IEEE 802.11e EDCA	38
4.3.1	EDCA and HCCA	39
4.4	Important Observations on CSMA/CA	40
	References.	41
5	U-LTE and Wi-Fi Coexistence: A Survey	43
5.1	Impacts of U-LTE on Wi-Fi Operation and Performance	43
5.2	Existing Solutions to Address U-LTE and Wi-Fi Coexistence Concerns.	45
	References.	48
6	Network-Aware Adaptive LBT (NALT) Coexistence Mechanism	49
6.1	Background and Theoretical Basis	49
6.2	Proposed Mechanism	52
6.3	Performance Evaluation	54
6.3.1	System Model.	54
6.3.2	Simulation Results	55
6.4	Discussion and Future Work	57
	References.	58
7	Open Questions and Potential Research Directions	59
7.1	LTE-U-Aware CSMA-CA and LTE-U with LBT.	59
7.2	LAA-LTE with Exponential Back-Off	60
7.3	Wi-Fi-Aware LTE-U and LAA-LTE	62
7.4	Collaborative U-LTE and Wi-Fi.	63
7.5	Inter-operator U-LTE Coexistence	63
7.6	Other Considerations on Coexistence	63
7.7	Emerging Wi-Fi Technologies and U-LTE.	64
	References.	64

Long Term Evolution in Unlicensed Bands

Ho, Q.-D.; Tweed, D.; Le-Ngoc, T.

2017, XII, 65 p. 31 illus., Softcover

ISBN: 978-3-319-47345-1