Shared Wireless Access Protocol (Cordless Access) Specification

SWAP–CA

Revision 1.3 draft 20000229

29 February 2000

by

The HomeRF™ Technical Committee

THIS SPECIFICATION IS PROVIDED "AS IS" WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, NONINFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY WARRANTY OTHERWISE ARISING OUT OF ANY PROPOSAL, SPECIFICATION OR SAMPLE.

The HomeRF™ Working Group and all member companies disclaim all liability, including liability for infringement of any proprietary rights, relating to use of information in this specification. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted herein - except that a license is hereby granted to copy and reproduce this specification for internal use only.

The members of the HomeRF™ Working Group (HRFWG) have adopted the Shared Wireless Access Protocol (Cordless Access) (SWAP-CA). The specification has been reviewed by the member companies for technical accuracy and is believed to be complete.

The HRFWG reserves the right to make modifications to the specification. Changes will be published as new revision numbers or errata to the current revision number.

© Copyright 1998-2000 HomeRF Working Group.

*Third-party brands and names are the property of their respective owners.

MICROSOFT CORP.
EXHIBIT 1018

DOCKET ALARM

Find authenticated court documents without watermarks at docketalarm.com.

CONTENTS

1 INTRODUCTION 1
1.1 Document Overview 1
1.2 Abbreviations and Acronyms 2
1.3 Definitions 3
1.4 Document Conventions 5
1.5 History of Changes to this Document 6
1.5.1 Status of this draft revision 9
1.6 Versions of SWAP-CA Document Annexes 9
1.7 Technical Feedback and Document Updates 10

2 REFERENCES 11

3 THE SWAP-CA PROTOCOL 12
3.1 Introduction to SWAP-CA (Informative) 12
3.2 Summary of SWAP-CA Features 13
3.3 Types of Data Service Supported 14
3.3.1 Characteristics of the Asynchronous Data Service 14
3.3.2 Characteristics of the Isochronous Data Service 15
3.3.3 Characteristics of the Isochronous Connectionless Broadcast Data Service 16
3.3.3.1 Uses of the ICBS (Informative) 17
3.4 Network Topology 18
3.4.1 SWAP-CA Device Types 18
3.4.1.1 Active and Passive CPs 19
3.4.1.2 Switching between Class-1 and Class-2 Behavior (Informative) 19
3.4.1.3 SWAP-CA Bridges and Bridge-Aware Nodes 20
3.4.2 Supported Configurations of SWAP-CA Nodes 20
3.4.2.1 Class 1 Managed Network 21
3.4.2.2 Class 2 Managed Network 23
3.4.2.3 Ad-hoc Network 24
3.4.2.4 Bridged Network 25
3.5 SWAP-CA Architecture 25
3.5.1 Introduction to SWAP-CA Architecture 26
3.5.1.1 Compatibility with DECT 26
3.5.2 A-node Architecture 27
3.5.3 I-node Architecture 28
3.5.4 CP Architecture 29
3.5.4.1 Class-1 CP (Separate) 29
3.5.4.2 Class-1 CP (Integrated) 30
3.5.4.3 Class-2 CP 31
3.5.5 U-Plane Architecture 31
3.5.5.1 I-node U-Plane Architecture 32
3.5.5.2 Class-1 CP U-Plane Architecture 33
3.5.6 Voice / PSTN Interface Stack 34
3.5.6.1 I-node Echo Cancellation 34
3.5.6.2 Network Interface and Network Echo Cancellation 35
3.5.6.3 Voice / PSTN Interface 35
3.5.7 On-Air Stack 35

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

3.5.7.1 On-Air Voice Processor 35
3.5.7.2 DECT NWK & DLC 36
3.5.7.3 SWAP-CA MAC 36
3.5.7.4 SWAP-CA PHY 37
3.5.8 The PC Stack and Network Driver 37
3.5.8.1 PC Stack Implementation (Informative) 38
3.5.8.2 Network Driver 38
3.5.9 User-Interface 39
3.5.10 IWU 39
3.5.11 Bridge Architecture 39

4 PHYSICAL (PHY) LAYER 41
4.1 PHY Layer Services 41
4.1.1 PHY Data Service 41
4.1.1.1 PD_TX_DATA Primitive 43
4.1.1.2 PD_RX_START Primitive 44
4.1.1.3 PD_RX_END Primitive 45
4.1.1.4 PD_RX_MAC_INITIAL_HEADER Primitive 45
4.1.1.5 PD_RX_PSDU1 Primitive 46
4.1.1.6 PD_RX_PSDU2 Primitive 47
4.1.2 Example of PPDU transmission (Informative) 47
4.1.3 Effect of Dual PSDU on a Single PSDU node 48
4.1.4 Service Interface for receiving Dual Beacon PSDUs 48
4.1.5 PHY Management Service 49
4.1.5.1 PM_SET_ENABLE Primitive 49
4.1.5.2 PM_SET_CHANNEL Primitive 50
4.1.5.3 PM_GET_CCA Primitive 50
4.2 PHY Layer PDU Structure 51
4.2.1 Ramp On Field 53
4.2.2 Training Sequence (TS) Field 53
4.2.2.1 Use of the Sync Field (Informative) 53
4.2.3 SFD Fields 54
4.2.3.1 TSFD 54
4.2.3.2 CSFD 54
4.2.4 EFD Field 55
4.2.4.1 EFD Field (Informative) 55
4.2.5 PSDU1 Field 55
4.2.6 PSDU2 Field 55
4.2.7 Ramp Off Field 55
4.2.8 Gap Field 56
4.3 Multi-Rate Support 56
4.4 PHY Data Architecture 56
4.4.1 PHY Transmit Processes 56
4.4.1.1 TDMA PPDU 57
4.4.1.2 Single PSDU 57
4.4.1.3 Dual PSDU 58
4.4.1.4 Dual Beacon 59
4.4.2 PHY Receive Processes 60
4.4.3 Effect of Receiving Unsupported PPDU formats (Informative) 60
4.4.4 PHY Receive State Machine 61
4.4.4.1 PHY Receive States 61

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

4.4.4.2 PHY Receive Events 62
4.4.4.3 PHY Receive State Transition Diagram 62
4.4.4.4 PHY Receive State Transitions and Indications 64
4.4.5 Stuffing and Stuff Bit Removal 65
4.4.5.1 Stuffing (Informative) 65
4.4.5.2 Stuffing Procedure 65
4.4.5.3 Stuff Bit Removal Procedure 65
4.4.5.4 Example of Bit-Stuffer Operation (Informative) 66
4.4.6 TDMA SFD Delimiter Procedures 66
4.4.6.1 Transmission 66
4.4.6.2 Detection 66
4.4.7 CSMA SFD and EFD Delimiter Procedures 66
4.4.7.1 Overview (Informative) 66
4.4.7.2 CSFD Detection 66
4.4.7.3 EFD Detection 67
4.4.8 CSMA Scrambler 67
4.4.8.1 Presentation (Informative) 67
4.4.8.2 Overview (Informative) 67
4.4.8.3 CSMA Scrambler Core (Informative) 68
4.4.8.4 CSMA Scrambler (Informative) 69
4.4.8.5 Descrambler (Informative) 69
4.4.8.6 CSMA Scrambler Code 70
4.4.8.7 CSMA Descrambler Code 72
4.4.8.8 CSMA Scrambler Test Harness (Informative) 73
4.4.8.9 CSMA Scrambler Test Vectors 79
4.4.9 TDMA Scrambler 82
4.4.9.1 TDMA Scrambler (Informative) 82
4.4.9.2 TDMA Scrambler (Normative) 82
4.4.10 Bit/Symbol Conversion 83
4.4.11 Differential Encoder/Decoder 83
4.4.11.1 Differential Encoding (Informative) 83
4.4.11.2 Differential Encoder 84
4.4.11.3 Differential Decoder 86
4.4.12 TS Field Generation 88
4.5 PHY Transmit Requirements 88
4.5.1 Modulation 88
4.5.1.1 2-FSK Modulation 88
4.5.1.2 4-FSK Modulation 90
4.5.2 Modulation Transition Times 91
4.5.3 Transmit Power Level 92
4.5.4 Permitted Transmit Power according to SWAP-CA Node Type 92
4.5.5 Occupied Channel Bandwidth 92
4.5.6 Unwanted Emissions 92
4.5.7 Transmit Spectrum Shape 93
4.5.8 Transmit Center Frequency Tolerance 93
4.6 PHY Receive Requirements 93
4.6.1 Receiver Channel Specification Group 93
4.6.2 Receive Error-rate Performance Limits 94
4.6.2.1 Connection Point and A-Nodes 94
4.6.2.2 I-nodes 94
4.6.3 Receiver Center Frequency Acceptance Range 94
4.6.4 Receiver Frequency Range 94

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

4.6.5 Receiver Input Signal Range 94
4.6.6 Receiver Sensitivity 94
4.6.7 Receiver Intermodulation 95
4.6.7.1 2-FSK 95
4.6.7.2 4-FSK 95
4.6.8 Receiver Desensitization 96
4.7 PHY General Requirements 98
4.7.1 Clear Channel Assessment 98
4.7.2 End of PSDU2 Detection 98
4.7.3 Channel Switching / Settling Time 98
4.7.4 Receive To Transmit Switch Time 98
4.7.5 Symbol Rate 98
4.7.6 Operating Temperature Range 98

5 MEDIUM ACCESS CONTROL (MAC) LAYER 99
5.1 Introduction to the SWAP-CA MAC (Informative) 99
5.1.1 Varying MAC Behavior (Informative) 100
5.2 MAC Services 101
5.2.1 MD-SAP Data Service 101
5.2.1.1 MD_DATA Primitive 101
5.2.2 MC-SAP Data Service 103
5.2.2.1 Mapping MAC identities onto DECT MC-SAP identities 103
5.2.2.2 MC_CON Primitive 104
5.2.2.3 MC_DIS Primitive 104
5.2.2.4 MC_UCONT Primitive 105
5.2.2.5 MC_UDTR Primitive 105
5.2.2.6 MC_UDATA Primitive 106
5.2.2.7 MC_CDATA Primitive 107
5.2.2.8 MC_CDTR Primitive 107
5.2.2.9 MC_KEY Primitive 108
5.2.2.10 MC_ENC Primitive 109
5.2.3 MB-SAP Data Service (ICBS) 110
5.2.3.1 MB_CDATA Primitive 111
5.2.3.2 MB_UCONT Primitive (CP only) 112
5.2.3.3 MB_UDTR Primitive (CP Only) 113
5.2.3.4 MB_UDATA Primitive 114
5.2.4 MM-SAP Management Service 114
5.2.4.1 MM_TEACH Primitive 115
5.2.4.2 MM_LEARN Primitive 115
5.2.4.3 MM_START Primitive 116
5.2.4.4 MM_JOIN Primitive 117
5.2.4.5 MM_LOST Primitive 117
5.3 MAC Architecture 118
5.3.1 "Packet" Types (Informative) 120
5.4 MPDU Structures 121
5.4.1 Byte and Bit Ordering 121
5.4.1.1 Introduction (Informative) 121
5.4.1.2 Byte and Bit Ordering (Normative) 123
5.4.2 Reserved Fields and Values 123
5.4.3 Different MPDU Formats 123
5.4.4 MPDU Headers 124

DOCKET ALARM Find authenticated court documents without watermarks at docketalarm.com.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.