agere systems

WaveLAN™ High-Speed Multimode Chip Set

Features

> Low-cost, high-performance solution for
  IEEE® 802.11a, draft 802.11g and 802.11b
  standards
> Suitable for wireless LAN (WLAN) client,
  infrastructure, and entertainment products
> Highly integrated architecture requires
  <100 external components
> Supports both multimode and 802.11g
  only implementations
> OFDM for *IEEE* 802.11 a and g modes
> Dynamic frequency selection (DFS) for
  spectrum management and transmit
  power control (TPC)
> Frequency "auto-tuning" for 2.4 GHZ-
  2.5 GHz and 5.15 GHz-5.875 GHz bands
> Quality of service (QoS) support
  (draft 802.11e)
> A*E*S, WPA, and W*E*P support
> *Wi-Fi*® and *Bluetooth*™ coexistence support
> Firmware-based architecture offers
  flexibility and quick addition of new
  features
> Low CPU utilization through scatter-
  gather bus mastering DMA architecture
> Automatic power management for
  reduced power consumption and extended
  battery life

Description

The Agere Systems *WaveLAN* 802.11a/b/g chip set is the
latest addition to Agere's *WaveLAN* family and is designed to
provide seamless roaming and high-speed 54 Mbits/s wireless
connectivity in home, office and public environments. Agere's
WaveLAN 802.11a/b/g system platform delivers a superior user
experience and excellent system performance, enabling
simultaneous voice, video and data applications. The *WaveLAN*
802.11a/b/g chip set leverages the strengths of Agere's existing
802.11b technology, to ensure compatibility with the large
installed base of 802.11b products. A firmware-based
architecture allows flexible implementation of new features
and ensures support for the latest industry advances in security
and quality of service (QoS), as reflected in the draft 802.11i
and 802.11e standards, respectively.

System performance is optimized using an advanced low-
IF-down radio architecture that delivers full 64-QAM OFDM
capability. This highly integrated approach results in <100
external components, dramatically reducing the external bill-
of-materials needed for a multimode implementation.   As a
result, Agere is able to provide one common, cost-effective
platform for both 802.11a/b/g and 802.11g solutions that can
be certified worldwide. With a rich set of exposed host
interfaces, this chip set is an ideal selection for a wide range
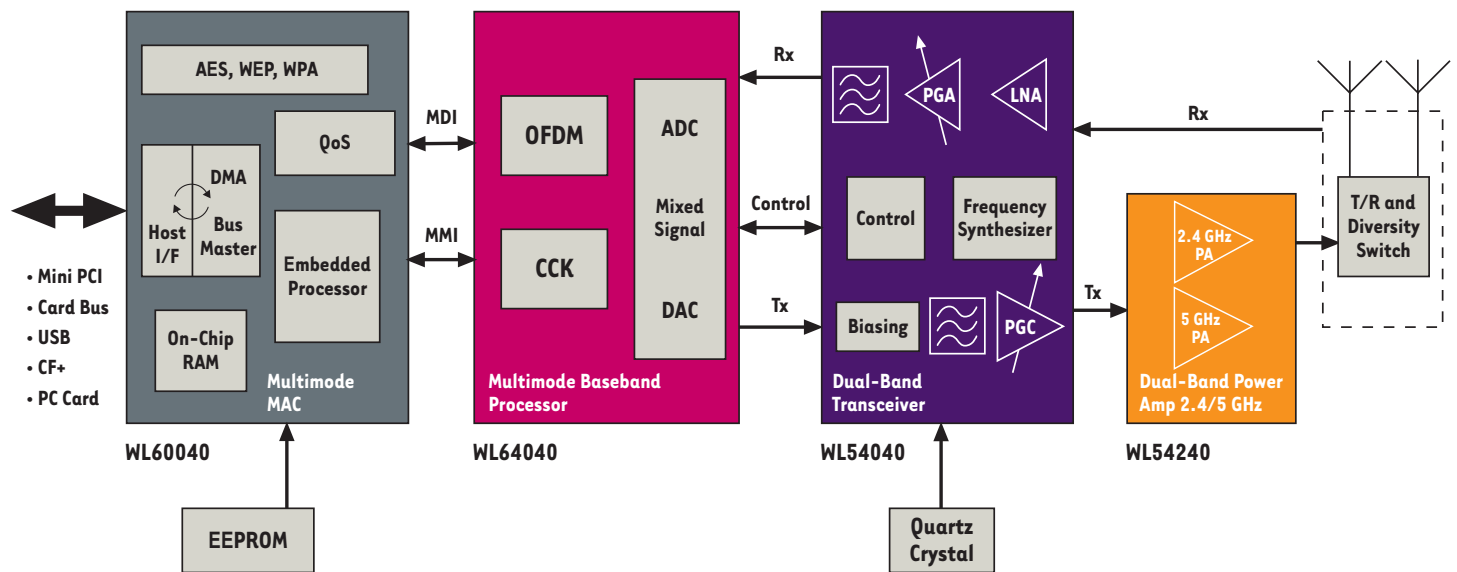of embedded *Wi-Fi* applications that are listed below.

Applications

• *IEEE* 802.11a/b/g LAN client cards for notebooks, desktop
  PCs, and PDAs
• *E*nterprise and home wireless LAN access points
• High-speed wireless bridges
• Entertainment applications

WaveLAN 802.11a/b/g Chip Set Solution

The above figure depicts the *WaveLAN* 802.11a/b/g chip set in a client or infrastructure application that illustrates a system solution in a true dual-band, multimode WLAN environment. This solution is highly integrated with less than 100 standard components needed for WLAN systems.

WL60040 Multimode MAC

- Hardware A*E*S and W*E*P engine
- PCI bus mastering DMA support
- MDI (modem data interface)/MMI (modem management interface) support
- 3 V to 5 V tolerant inputs for all host interface pins
- 196-pin FSBGA package

WL64040 Multimode Baseband

- OFDM modulation/demodulation 6/9/12/18/24/36/48/54 Mbits/s rate for 802.11a/g standards
- CCK, DBPSK, DQPSK 1/2/5.5/11 Mbits/s rate for 802.11b/g standards
- MDI/MMI interface support
- Support for antenna diversity
- 81-pin P-LFBGA package

WL54040 Dual-Band Transceiver

- Direct conversion receiver for 802.11b and low IF receiver for 802.11a/b/g with integrated channel filter
- I-Q differential interface for RX and TX, multiplexed for 802.11a/b/g
- Direct modulation transmitter with programmable output power
- Two integrated voltage regulators
- 48-pin VQFN package

WL54240 Dual-Band PA

- *E*xtremely linear and high-power PA for OFDM and DSSS/CCK
- Analog power control for both bands
- On-chip power detector to compensate the variability of transmit gain
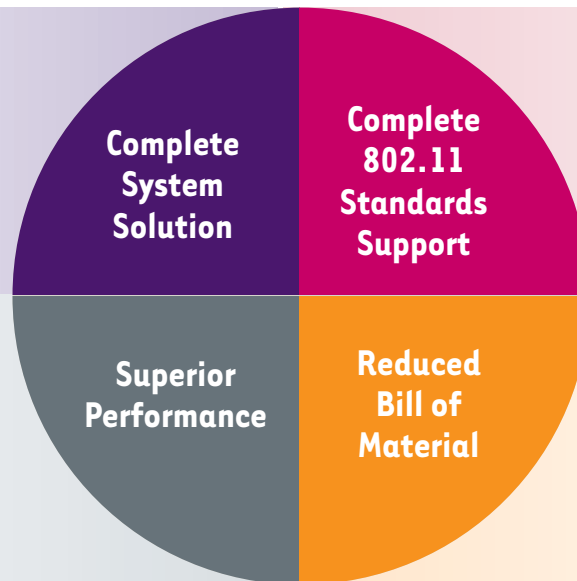- 24-pin mini-VQFN package

WaveLAN
802.11a/b/g

WaveLAN Chip Set Benefits

- Dual-band radio subsystem
- Multimode baseband and MAC
- Host software
- Client and access point reference design
- Compliance and certification
- Common platform for multimode and 802.11g only

- Large frequency coverage
- Several power modes for low power consumption
- Variable output power
- Best performance direct up/low IF radio architecture
- 802.11g short and long slot-time support

Complete System Solution

Complete 802.11 Standards Support

Superior Performance

Reduced Bill of Material

- 802.11a/b/g
- 802.11h
- 802.11i
- 802.11e
- 802.11d
- 802.11f
- 802.1x

- Integrated VCO, XO and PLL
- Dual-band PA with integrated TX power control
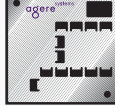- No external IF, SAW or baseband filter required
- Single crystal

WaveLAN 802.11a/b/g Chip Set Summary

Feature	Description
Network Standard	802.11a; 802.11b; draft 802.11g
Frequency Band	2.4—2.5 GHz ISM and 5.15—5.875 GHz 5 GHz UNII and *E*urope harmonization band
Data Rate	802.11g, 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbits/s 802.11g, 802.11b: 1, 2, 5.5, 11 Mbits/s
Modulation	802.11g, 802.11a: DPSK, QPSK, 16QAM, 64QAM OFDM 802.11g, 802.11b: DBPSK, DQPSK, CCK DSSS
Network Architecture	IBSS and infrastructure mode
RF Output Power	Max 24 dBm in 2.4 GHz band Max 20 dBm in 5 GHz band; variable output 1 dB steps
Host Interfaces	PCI, Mini PCI, Card Bus, CF+, USB
QoS	Multiple transmit queues, draft 802.11e firmware upgrade
Security	Hardware W*E*P, hardware A*E*S, WPA (SSN-TKIP), draft 802.11i support
Worldwide Regulation	Dynamic frequency selection, transmit power control (draft 802.11h)
Slot Time	Short and long slot-time support for 802.11g OFDM modulation
Antenna	Hardware antenna diversity
Bus Master	Scatter-gather hardware DMA bus master; low CPU utilization
Software Support	*Windows XP* ™Professional and Home *E*ditions, *Windows* 2000®, *Windows* Millennium, *Windows* 98, *Windows* C*E* and C*E*.NE*T*, *Vx Works*®, *Linux*™
Access Point	802.11f; aging function, point coordinator; timing synchronization
Coexistence	*Bluetooth* and *Wi-Fi* coexistence support
Operating Temperature	−30 ⁰C to 85 ⁰C

Agere *WaveLAN* Product Line

<table>
<tr><th></th><th colspan="2" style="text-align:center">802.11b</th><th colspan="2" style="text-align:center">802.11a/b/g
(also supports 802.11g only mode)</th></tr>
<tr><td>**MAC**</td><td>WL60010
196-pin FSBGA
12x12</td><td></td><td></td><td>WL60040
196-pin FSBGA
12x12</td></tr>
<tr><td>**BB**</td><td>N4080
100-pin TQFP
14x14</td><td></td><td></td><td>WL64040
81-pin P-LFBGA</td></tr>
<tr><td>**RF**</td><td>W4050
48-pin TQFP
7x7</td><td>WL1141
293-pin
RFBGAM1
25x25</td><td></td><td>WL54040
48-pin VQFN
7x7</td></tr>
<tr><td>**PA**</td><td></td><td></td><td></td><td>WL54240
24-pin min VQFN
3.5x4.5</td></tr>
</table>

All package dimensions in mm.

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For additional information, contact your Agere Systems Account Manager or the following:
INTERNET: **http://www.agere.com**
E-MAIL: **docmaster@agere.com**
N. AMERICA: Agere Systems Inc., Lehigh Valley Central Campus, Room 10A-301C, 1110 American Parkway NE, Allentown, PA 18109-9138
              1-800-372-2447, FAX 610-712-4106 (In CANADA: **1-800-553-2448**, FAX 610-712-4106)
ASIA: Agere Systems Hong Kong Ltd., Suites 3201 & 3210-12, 32/F, Tower 2, The Gateway, Harbour City, Kowloon
              Tel. (852) 3129-2000, FAX (852) 3129-2020
              CHINA: **(86) 21-5047-1212** (Shanghai), **(86) 755-25881122** (Shenzhen)
              JAPAN: **(81) 3-5421-1600** (Tokyo), KOREA: **(82) 2-767-1850** (Seoul), SINGAPORE: **(65) 6778-8833**, TAIWAN: **(886) 2-2725-5858** (Taipei)aipei)
EUROPE: **Tel. (44) 1344 296 400**

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