



# **STA-MU-A0028S (MiniCard-USB version)**

**WiFi 802.11 b/g and Bluetooth v2.0 + EDR  
Combo Mini Card Module**

## **Approval Sheet**

Ver: 1.1



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# 1. Introduction

The **STA-MU-A0028s** product provides the highest level of integration and most aggressive BOM cost by integrating IEEE 802.11b/g and Bluetooth v2.0 + EDR into a single MAC/Baseband chip utilizing a single 2.4GHz transceiver. Integrated on-chip power amplifier and LNA reduce external component count, while still able to deliver ample transmit power for most applications.

Different from any other wireless LAN and Bluetooth chip set vendor, **The 3DSP** uses its patented Software Radio technology to implement both wireless LAN and Bluetooth in software. The highly optimized software radio DSP technology enables **STA-MU-A0028s** to integrate class 1 Bluetooth v2.0 + EDR function without any added cost to the total solution. No extra antenna, PA, RF transceiver, resistor, capacitor, crystal or any components are needed. The software solution even guarantees the Bluetooth RF performance if the wireless LAN performance is tested to be good. It eliminates the need for system manufacturers to separately test the module's Bluetooth RF performance, therefore reduce the testing time and cost.

The **STA-MU-A0028s** utilizes 3DSP's patent pending technologies to fundamentally solve the interference and performance issues existed during 802.11b/g and Bluetooth coexistence, thus improving both 802.11b/g and Bluetooth performance and link stability in real environment. As a result, it enhances user experience in a totally wireless environment, where all devices are connected wirelessly through either Bluetooth link or 802.11b/g link.

The single installation package allows for easy setup and configuration of both 802.11b/g and Bluetooth devices. Combined user interface is intuitive to use. Once configured, both wireless links operate transparently in the background.

## 1.1 Features & Benefits

### [WiFi]

- ✓ Data Rate up to 54Mbps.
- ✓ Single-band 2.4-GHz 802.11b/g with Bluetooth v2.0 + EDR
- ✓ Integrated on-chip PA capable of delivering 20dBm output power
- ✓ Low active transmit and receive power dissipation and ultra-low power in stand-by and idle modes
- ✓ Supports IEEE802.11 b/g

### **Security:**

- ✓ WPA and WPA2 for advanced authentication and encryption
- ✓ AES and TKIP in hardware for reduced power dissipation and encryption speed
- ✓ Worldwide regulatory support
- ✓ Patent pending technology maximizes multimedia streaming performance over Bluetooth over WLAN in coexistence mode



- ✓ Patent pending Software Radio technology allows single radio, single baseband integration of multiple standards
- ✓ Advanced network security features include WPA, WPA2, 802.11i and 802.11x
- ✓ Long and short preamble supported

**[Bluetooth]**

- ✓ Support AFH (Adaptive Frequency Hopping)
- ✓ Support Bluetooth **v2.0** + EDR
- ✓ Forward and backward compatible with Bluetooth **v1.1** and **v1.2**
- ✓ Support for up to seven active Bluetooth devices
- ✓ Class 1 with 18dbm PA, 100m range

## 1.2 Applications

Home networking for device sharing

Wireless office for extension Ethernet range

# 2. Product Specifications

## 2.1 WiFi Product Spec

| WiFi product spec    |   |
|----------------------|---|
| Network Standard     | IEEE 802.11b<br>IEEE 802.11g  |
| Frequency Band       | 2.400-2.4835 GHz  |
| Data Rate            | <i>IEEE 802.11g</i> (auto-fallback):<br>- OFDM: 54, 48, 36, 24, 18, 12, 9 and 6 Mbps<br><i>IEEE 802.11b</i> (auto-fallback):<br>- CCK: 11, 5.5 Mbps<br>- DQPSK: 2 Mbps<br>- DBPSK: 1 Mbps |
| Media Access Control | CSMA/CA with ACK  |



|                                      |  |  |
|--------------------------------------|--|--|
| Channel                              | <i>IEEE 802.11g</i><br>Ch. 1-11 – N. America<br>Ch. 1-13 – Japan<br>Ch. 1-13– Europe ETSI<br>Ch. 10-11 – Spain<br>Ch. 10-13 – France | <i>IEEE 802.11b</i><br>Ch. 1-11 – N. America<br>Ch. 1-14 – Japan<br>Ch. 1-13– Europe ETSI<br>Ch. 10-11 – Spain<br>Ch. 10-13 – France |
| Transmission                         | DSSS · OFDM  |  |
| Modulation                           | <i>IEEE 802.11b</i> (DSSS):<br>CCK @ 11, 5.5 Mbps<br>DQPSK @ 2 Mbps<br>DBPSK @ 1 Mbps  | <i>IEEE 802.11g</i> (OFDM):<br>BPSK @ 6, 9 Mbps<br>QPSK @ 12, 18 Mbps<br>16-QAM @ 24, 36 Mbps<br>64-QAM @ 48, 54 Mbps                |
| Network Architecture                 | Ad-Hoc Mode (Peer-to-Peer), Infrastructure Mode  |  |
| Antenna Type                         | One Ultra Small Coaxial Connector  |  |
| Temperature                          | Operating Temperature  | 32°F to 131°F (0°C to 55°C)  |
|                                      | Storage Temperature  | 4°F to 185°F (-20°C to 85°C)   |
| Humidity                             | 10%-85% (non-condensing)   |  |
| Power Consumption                    | 320mA in Standard mode<br>500mA in Peak  |  |
| Dimensions                           | 30 x 50.95 mm (1.18 x 2.0 in) Module   |  |
| Operating Voltage                    | 3.3V +/- 10%   |  |
| Output Power                         | 802.11g  |  |
|                                      | 802.11b  |  |
|                                      | 54Mbps   | 14.5+/-1 dBm   |
|                                      | 11Mbps   | 17.5+/-2 dBm   |
| Receiver Sensitivity (Typical Value) | -74dBm@54Mbps, -85dBm@11Mbps   |  |
| Range                                | 100m operating range   |  |
| Security                             | 64/128-bit WEP, WPA, WPA2, TKIP, AES   |  |
| Operating System                     | Windows 2000/XP sp2/XP sp3/2003/Vista/Vista 64-bit   |  |

## 2.2 Bluetooth Product Spec

| Bluetooth product spec |  |
|------------------------|--|
| Network Standard       | Bluetooth Class I v2.0 with EDR function, Bluetooth v1.2 |
| Frequency Band         | 2.400-2.4835 GHz   |
| Data Rate              | Up to 3Mbps  |
| Channel                | 79 sub-channels  |
| Transmission           | FHSS (Frequency Hopping Spread Spectrum)                 |



|                          |                       |  |
|--------------------------|-----------------------|--|
| Modulation               |                       | GFSK, DQPSK, D8PSK   |
| Antenna Type             |                       | Same One Ultra Small Coaxial Connector as WiFi connector support       |
| Temperature              | Operating Temperature | 32°F to 131°F (0°C to 55°C)  |
|                          | Storage Temperature   | 4°F to 185°F (-20°C to 85°C)   |
| Humidity                 |                       | 10%-85% (non-condensing)   |
| Power Consumption        |                       | 320mA in Standard mode<br>500mA in Peak                                |
| Bluetooth Transmit Power |                       | ≤20dBm   |
| Receiver Sensitivity     |                       | 3DH5@BER=1%%, -76dBm ; 2DH5@BER=1%%, -90dBm ;<br>GFSK@BER=0.1%, -88dBm |
| Range                    |                       | 100m operating range   |
| <b>Baseband</b>          |                       |  |
| Physical Links           |                       | Support ACL and SCO link   |
| Network Capabilities     |                       | Support Pico-net point-to-point and point-to-multipoint connections    |
| <b>Link Manager</b>      |                       |  |
| 3-slot Packets           |                       | Yes  |
| 5-slot Packets           |                       | Yes  |
| Slot Offset              |                       | Yes  |
| Timing Accuracy          |                       | Yes  |
| Switch                   |                       | Yes  |
| Hold Mode                |                       | Yes  |
| Sniff Mode               |                       | Yes  |
| Test Mode                |                       | Yes  |
| Park Mode                |                       | Yes  |
| RSSI                     |                       | Yes  |
| Power Control            |                       | Yes  |
| Authentication           |                       | Yes  |
| Encryption               |                       | Yes  |
| System Support           |                       | Windows 2000/2003/XP sp2/XP sp3/Vista/Vista 64-bit                     |



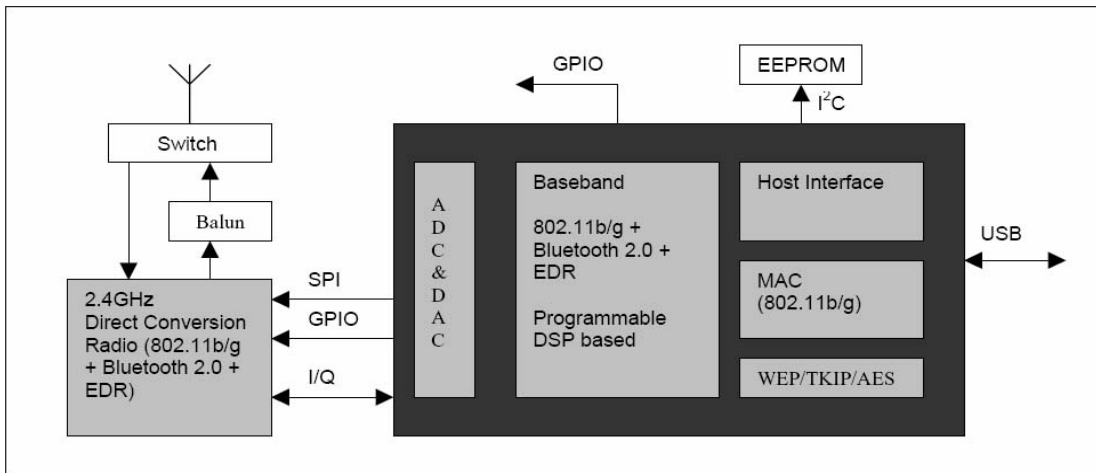
Profile Support

Serial Port Profile , Dial Up Networking Profile, File Transfer Profile, Human Interface Device Profile, Headset Profile, Advanced Audio Distribution Profile, Object Push Profile, Synchronization Profile, LAN Access profile, Personal Area network Profile, Fax Profile, Basic Imaging Profile

### 3. Hardware

HW version: STA-MU-A0028s

#### 3.1 Hardware Architecture



#### 3.2 Chip Information

|                     |   |
|---------------------|---|
| <b>STK9230-AQFG</b> | IEEE 802.11 b/g 2.4GHz Radio Transceiver (integrated PA)          |
| <b>STK9100-CLQG</b> | DSP base 802.11 b/g and Bluetooth v2.0 + EDR for Baseband and MAC |



## 4. Software

### 4.1 Software Version

Driver version      usbBluewur0919.exe (20080919), IVT BlueSoleil 2.7.0.13

### 4.2 Operating System Support

Windows 2000, 2003, Windows XP sp2, Windows XP sp3, Windows Vista and Windows Vista 64-bit

### 4.3 Security

Security support

- ✓ WEP
- ✓ WPA (AES/TKIP)
- ✓ WPA2 (AES)

## 5. Test Result

### 5.1 WiFi RF Test

| Test item                  | Pass or fail |
|----------------------------|--------------|
| Transmitter power          | Pass         |
| Transmit spectrum mask     | Pass         |
| Transmit spectrum flatness | Pass         |





|  |      |
|--|------|
| RF carrier suppression                             | Pass |
| Transmit power-on and power-down ramp              | Pass |
| Transmit center frequency & symbol clock tolerance | Pass |
| Transmit modulation accuracy                       | Pass |
| Receiver minimum input level sensitivity           | Pass |
| Receiver maximum input level                       | Pass |
| Receiver adjacent channel rejection                | Pass |
| Transmit and receive in-band and out-band spurious | Pass |
| Transmit and receive current measurement           | Pass |
| PER Test for Transmitter                           | Pass |
| Bandwidth measurement                              | Pass |

## 5.2 Bluetooth RF Test

| Test item                           | Pass or fail |
|-------------------------------------|--------------|
| Output Power                        | Pass         |
| Power Density                       | Pass         |
| Frequency Range                     | Pass         |
| -20dB Bandwidth                     | Pass         |
| Adjacent Channel Power              | Pass         |
| Modulation Characteristics          | Pass         |
| Initial carrier frequency tolerance | Pass         |
| Carrier frequency drift             | Pass         |
| Sensitivity - Single Packets        | Pass         |
| Sensitivity - Multi Packets         | Pass         |
| C/I Performance                     | Pass         |
| Maximum input Level                 | Pass         |

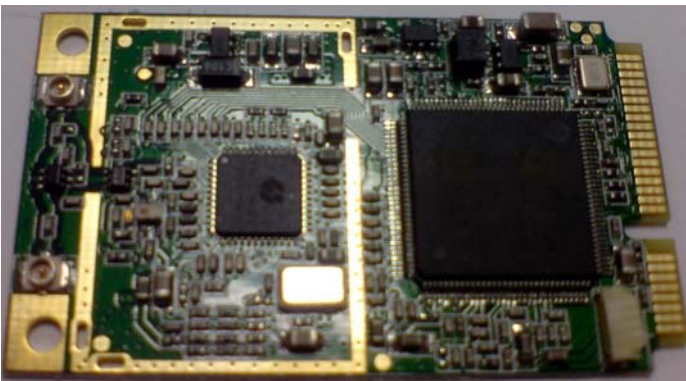
## 5.3 WiFi and Bluetooth Interoperability Test

Please review to the STA-MU-A0028s MINI CARD Card test Report for detail.

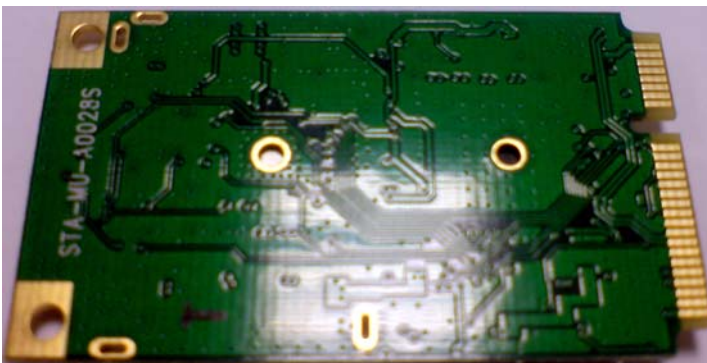


## 6. Appearance

**Front View**



**Back View**





## 7. Certification

- ✓ WiFi Enterprise Logo Certified
- ✓ Bluetooth v2.0 + EDR Certified
- ✓ Microsoft Windows WHTL Certified (2000, XP, Vista, Vista-64)
- ✓ Patent

### 7.1 WiFi Certification

Wi-Fi® Interoperability Certificate

Certification ID: WFA5597



This certificate indicates the capabilities and features that successfully completed interoperability testing by the Wi-Fi Alliance. You may find detailed descriptions of these features at [www.wi-fi.org/certification\\_programs.php](http://www.wi-fi.org/certification_programs.php).

Certificate Date: September 21, 2007  
Category: Reference Design  
Company: 3DSP  
Product: BlueW  
Model/SKU#: 2310

This product has passed Wi-Fi certification testing for the following standards:

| IEEE Standard | Security            |
|---------------|---------------------|
| 802.11b       | WPA™ - Personal     |
| 802.11g       | WPA™ - Enterprise   |
|               | WPA2™ - Personal    |
|               | WPA2™ - Enterprise  |
|               | .                   |
|               | EAP Type(s)         |
|               | EAP-TLS             |
|               | EAP-TTLS/MSCHAPv2   |
|               | PEAPv0/EAP-MSCHAPv2 |
|               | PEAPv1/EAP-GTC      |
|               | EAP-SIM             |

For more information: [www.wi-fi.org/certification\\_programs.php](http://www.wi-fi.org/certification_programs.php)

WiFi® Certificate Products Name: **BlueW\_2310**  
Wi-Fi® Interoperability Certificate ID: **WFA5597**



# 7.2 Bluetooth Qualification Body Certification

Bluetooth.org - The Official Bluetooth Membership Site

第 1 頁, 共 2 頁

Bluetooth SIG Shop | Bluetooth.com



## Qualified Design Listing Details

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    - Component Listings
    - Qualified Listings

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TPG Project [bluew \(Component \(Tested\)\)](#)

Qualified Design ID (QD ID) [B013118](#)

PRD 1.0 ID (QP ID)

Design Name [BlueW-BB/LM/HCI-2310](#)

Member Company [3DSP](#)

Core Version [2.0/2.0+EDR](#)

Design Model Number [2310](#)

Hardware Version Number [2310](#)

Software Version Number [2.0](#)

Qualification Assessment Date [September20/2007](#)

Listing Date [September20/2007](#)

Design Description [The 3DSP BlueW-2310 product provides the highest level of integration by integrating IEEE 802.11b/g and Bluetooth 2.0 + EDR into a single MAC/Baseband chip utilizing a single 2.4GHz transceiver](#)

Product Type [Component \(Tested\)](#)

[Technical Data Sheet \(RIN\)](#) **\*\* Open Reference Integration Notes (RIN) \*\***

Listed By [Felix.Tsang](#)

Approved by BQE [Jan-Willem Vonk](#)

Profile [Role / Version \(If Any\)](#)

Baseband

Link Manager

Host Controller Interface

https://www.bluetooth.org/tpg/QLI\_viewQDL.cfm?qid=13118

2007/11/26

**Bluetooth Certificate Products Name: BlueW\_2310**  
**BQB IC Certification ID: B013118**  
**BQB Module Certification ID: B013452**

# 7.3 Patent

## Application Patent Advantage:

**Application One Aerial WLAN 54M channel Share (WLAN & Bluetooth in coexistence mode) to assist the customer to Lower Costs.**

**US Patent Licence: 20070197256**



## 8. Specifications

|                       |  |
|-----------------------|--|
| WLAN Spec             | IEEE 802.11b/g   |
| Transmit Power        | 13 dBm to 17 dBm   |
| Sensitivity           | -74dBm@54Mbps, -85dBm@11Mbps   |
| Frequency Channel     | 14   |
| Modulation            | 802.11g: OFDM / 802.11b: DSSS  |
| Security Features     | WEP, WPA, AES, TKIP, WPA2  |
| WEP Key Bits          | 64 / 128 bit   |
| Protocol              | TCP/IP   |
|                       |  |
| Bluetooth Spec        | Bluetooth 1.2 and 2.0 + EDR  |
| Transmit Power        | ≤ 20dBm  |
| Sensitivity           | 3DH5@BER=1%%, -76dBm ; 2DH5@BER=1%%, -90dBm ; GFSK@BER=0.1%, -88dBm                              |
| Frequency Channel     | 79   |
| Modulation            | DQPSK, D8PSK, GFSK   |
| Profile               | SPP, DUN,HID, HSP, A2DP, OPP, SYN, LAN, PAN, FAX, FTP, BIP                                       |
|                       |  |
| Operating Temperature | 32°F to 131°F (0° C to 55° C)  |
| Storage Temperature   | 04°F to 185°F (-20° C to 85° C)  |
| Operating Humidity    | 10% to 85%, Non-Condensing   |
| Storage Humidity      | 5% to 90%, Non-Condensing  |
| Interface Standard    | MiniCard (USB part: 2.0)   |
| LED Indicators        | Power, Bluetooth   |
| Power                 | DC: 3.3V, Normal 320mA / Peak 500mA  |
| Certifications        | CE, FCC Class B, Wi-Fi Certification(802.11b/g), BQB , WHQL: Vista 32-bit, Vista-64bit, XP, 2000 |
| Dimensions            | 30 x 50.95 mm (1.18 x 2.0 in) Module   |
| Unit Weight           | 9 g. (0.31 oz)   |