1. Introduction

Ambit Project Name: WLAN 802.11b USB Module
Ambit Project Number: T60H685.02---GlobeSpan Virata Prism 3.0

This documentation describes the approval specification of the Ambit USB WLAN Module. It is a confidential document of AMBIT.

1.1 Scope

AMBIT USB WLAN Module is complied with IEEE 802.11b standard and can be used to provide a wireless network interface card. The USB WLAN Module complies with USB 1.1 specification to support a variety of low-cost wireless network interfaces to build wireless connection via simple SMT procedure to speed the time to market. Four GlobeSpan Virata's chips are implemented in the RF module including ISL3871, ISL3984, ISL3684, ISL3084.

Since Notebook PC market is its target, the mechanical size, and power consumption are the focus of the module design.

1.2 Wireless LAN Function

- Compatible with IEEE 802.11b high data rate standard to provide wireless speed of 11Mbps data rate
- Dynamic data rate switching with 11, 5.5, 2 and 1Mbps
- Allows auto fallback data rate for optimized reliability, throughput and transmission range
- Supports wireless data encryption with 40/ 128-bit WEP standard for security
- Drivers supports Windows 98SE, 2000, Windows ME and XP

2. Specification

2.1 WLAN Hardware Specification

Radio Technology　　　　　Comply with IEEE 802.11b Direct Sequence Spread Spectrum physical layer.

Operating Frequency　　　　2.412GHz ~ 2.462GHz ISM band

Modulation Schemes　　　　DQPSK, DBPSK and CCK

Channel Number　　　　　1 ~ 11 channels

Regulation Domain　　　　Default domain channel Ch1 ~ Ch11

WLAN Data Rate　　　　　11Mbps with fall back rates of 5.5, 2, and 1Mbps

Spreading　　　　　　　11-chip Barker Sequence

Media Access Protocol　　　CSMA/CA with ACK

Transmitter Output Power Level 14dBm (Typical)

Max .TX mode current　　　320 mA

Max. RX mode current　　　280 mA

Power saving mode current　100mA

Antenna Connector Type　　Hirose U-FL type connector.

Operating Voltage　　　　DC 3.3 +/- 5% V

Host Interface　　　　　USB specification reversion 1.1; using 60-pins SMD board to board connector with customer defined pin assignment

Minimum input level – Receiver Sensitivity Min. –80dBm for 11Mbps @ 8% PER

Min.-83dBm for 5.5Mbps @ 8% PER

Min.–83dBm for 1/2Mbps @ 8% PER

Maximum input level -10dBm for 11Mbps defined by 802.11b

Channel center frequency:

Channel ID	Center Frequency
1	2412MHz
2	2417MHZ
3	2422MHz
4	2427MHZ
5	2432MHz
6	2437MHZ
7	2442MHz
8	2447MHZ
9	2452MHz
10	2457MHZ
11	2462MHz

RF center frequency and clock accuracy +/- 25ppm

3. Product Requirements

3.1 Hardware Requirements

PCB   6-layer design

802.11b WLAN Solution   Prism 3.0 chip set

3.2 Hardware Architecture

The system block diagram is shown in Figure 1. The Wireless LAN module design based on GlobeSpan Virata Prism 3.0 solution, which consists of PA (ISL3984), VCO (ISL3084), I/Q Modulator/Demodulator (ISL3684) and BBP/MAC (ISL3871IK18).
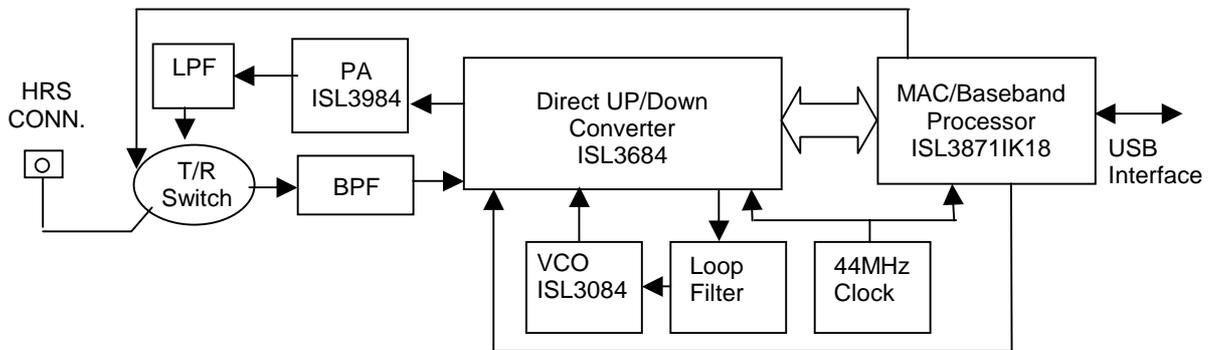
Figure 1. System block diagram of T60H685.00

3.2.1 FAA radio off implement

Pin 5 of I/F connector provided the function for FAA radio off requirement. Pin 5 will turn off the radio circuit when it is at low state and turn on the radio circuit when it is at high state.

The FAA signal is connected to pin1 of U5 and U6 respectively, then U5 U6 will output a signal to PE1/ PA_PE to shut down ZIF chip 3684, VCO (3084) and PA (3984).

3.2.2 Radio on/off function

Currently the T60H685.00 has function to disable the radio circuit from the software command by MAC (ISL3871IK18), this command will stop data transmission.

3.3 Software Requirements

3.3.1 Operating System

The Ambit Wireless LAN embedded module shall support driver in the Microsoft Windows 2000, XP for the embedded system application.

3.4 Mechanical Requirements

Small form factor (45mmx 23mmx4.4mm) with single Hirose U-FL type connector
Height (Top/PCB/Bottom): 4.4mm (1.7mm/0.6mm/2.1mm)

4. Wi-Fi Compatibility

The Ambit 802.11b Wireless LAN embedded module shall pass the standard test plan, which includes hardware compatibility and reliability, and software compatibility test.
The subject product must be approved by WECA.

5. Regulatory Requirements

5.1 Regulation requirements

The product must be complied with the regulation requirements of

1) FCC (Domain channel: 1~11 channel) before marketing in USA

6. Reliability and Quality

6.1 Reliability

Mean Time Between Failure (MTBF)   30,000 hour

6.2 Quality

The product quality must be followed-up by Ambit factory quality control system.

7. Environmental Requirements

7.1 Temperature

7.1.1 Operating Temperature Conditions

The product shall be capable of continuous reliable operation when operating in ambient temperature of 0 degree C to +50 degree C.
The surface temperature of U1, U3, U11, U12, U15 shall be capable of continuous reliable operation under +70 degree C.

7.1.2 Non-Operating Temperature Conditions (including warehouse)

Neither subassemblies shall be damaged nor shall the operational performance be degraded when restored to the operating temperature when exposed to storage temperature in the range of -10 degree C to +70 degree C.

7.2 Humidity

7.2.1 Operating Humidity Conditions

The product shall be capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.

7.2.2 Non-Operating Humidity conditions (including warehouse)

The product shall not be damaged nor shall the performance be degraded after exposure to relative humidity ranging from 5% to 95% non-condensing.