



*User's Manual*

G-663

**802.11G WIRELESS LAN MODULE**

*(TI 1350A)*

Reversion 1.2

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## 1. Revision History

Date	Release	Author	Description
2005/06/09	0.90	Kimmy Peng	First Release
2005/06/13	0.92	Kimmy Peng	Revise specification base on the input from PS review meeting
2005/06/13	0.93	Kimmy Peng	Word correction
2005/08/23	0.94	Kevin Yen	Spec updating after C2 verification on page 5
2005/10/3	1.00	Kevin Yen	Spec updating with output power and power consumption
2005/11/18	1.10	Kevin Yen	Spec updating after C3-2 verification on page 5 to 8.
2005/11/29	1.20	Kevin Yen	Spec updating

## 2. Related Documents

Date	Author	Document
Y2003	Richard Chou	G-660 PS

### 3. Introduction

G-663 is an IEEE 802.11g 54Mbps wireless LAN module. It operates at 2.4GHz unlicensed frequency band for wireless networks in the home or office environment. Base on the Ti TNETW1350A chipset. G-663 supports rapid data transfer rate up to 54Mbps and users could work anywhere in the coverage area and enjoy the convenience and mobility of wireless.

The G-663 also backward compatible with 802.11b access point by using 802.11b standard.

Wireless G-663 also provides a high quality utility, including site survey tool, to allow user easy setting and maintain wireless networking activities. With built-in IEEE 802.1x client support and dynamic WEP key exchange features, Wireless G-663 provides best security access.

### 4. Features

- IEEE 802.11g complies.
- Backward compatible with IEEE 802.11b standard.
- Wire-free access to networked resources from anywhere beyond the desktop.
- Interference resistant designed guarantee reliable performance.
- Delivers data rate up to 54 Mbps.
- Dynamically shifts between 54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps network speed, based on signal strength, for maximum availability and reliability of connection.
- Allows users move between Access Points without resetting their connection reconfiguration.
- Uses 2.4GHz frequency band, which complies with worldwide requirement
- Support WPA2 and AES
- Support WDS, WMM,mSSID,
- Dynamic WEP key exchange support

Remark: \* Future support

## 5. Specification

Specifications	
<b>Product Name</b>	802.11G WIRELESS LAN MODULE
<b>Interface</b>	VLYNQ ( VLYNQ1 CLOCK AS INPUT , VLYNQ2 CLOCK AS OUTPUT )
<b>Network Standard</b>	IEEE802.11g/b COMPLIANT
<b>Data Rate</b>	54Mbps with automatic fallback to 48, 36, 24,18,12,11,9,6,5.5, 2,1 Mbps
<b>Modulation</b>	802.11g---- 54,48,36,24,18,12,9,6Mbps (OFDM) 802.11b---- CCK (11Mbps, 5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
<b>Operating Frequency</b>	USA (FCC): 2.412GHz~2.462GHz, Europe (CE): 2.412GHz~2.472GHz, Taiwan (DGT): 2.412GHz~2.462GHz
<b>Operating Channels</b>	1~11 for N. America, 1~13 for Europe (ETSI), 1~11 channels for Taiwan (DGT)
<b>Antenna</b>	Default is single antenna, reserve the capability for dual diversity antenna
<b>Receiver Sensitivity</b>	<p><b>-96 dBm @ 1M (CCK, 8% PER)</b></p> <p><b>-91 dBm @ 2M (CCK, 8% PER)</b></p> <p><b>-87 dBm @ 5.5M (CCK, 8% PER)</b></p> <p><b>-84 dBm @ 11M (CCK, 8% PER)</b></p> <p><b>-91 dBm @ 6M (OFDM, 10% PER)</b></p> <p><b>-86 dBm @ 9M (OFDM, 10% PER)</b></p> <p><b>-85.6 dBm @ 12M (OFDM, 10% PER)</b></p> <p><b>-83 dBm @ 18M (OFDM, 10% PER)</b></p> <p><b>-81 dBm @ 24M (OFDM, 10% PER)</b></p> <p><b>-77 dBm @ 36M (OFDM, 10% PER)</b></p> <p><b>-74 dBm @ 48M (OFDM, 10% PER)</b></p> <p><b>-72 dBm @ 54M (OFDM, 10% PER)</b></p>
<b>Current Consumption</b>	TX current consumption: (OFDM) 550 mA @ 20 dBm , 3.3V (CCK) 550 mA @ 20 dBm , 3.3V RX current consumption: 260 mA
<b>Operational Voltage</b>	Co-layout with both 3.3/5V DC (3.3V is default value while 5V is optional)
<b>Operating Temperature</b>	0 to 50 °C
<b>Humidity</b>	10% to 90% Non-condensing
<b>Dimensions (mm)</b>	59.6 mm x 44.6 mm

<b>Weight (g)</b>	<b>10.2g +/- 0.5g</b>								
<b>Calibration Transmit Output Power (FCC, 802.11g)  (For calibration in Production )</b>	<p>Test engineer can use following specifications for calibration in Production .</p> <p>Typical Ouput Power= Maximum Output power -1.5dB</p> <p>Minimum Ouput power = Maximum Output power- 3dB</p>								
		<b>Maximum Output Power (802.11g , FCC)</b>							
	<b>Channel</b>	<b>6</b>	<b>9</b>	<b>12</b>	<b>18</b>	<b>24</b>	<b>36</b>	<b>48</b>	<b>54</b>
		<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>
	<b>Channel 1</b>	16.5	16.5	16.5	16.5	16.5	16.5	16.3	16
	<b>Channel 2</b>	18	18	18	18	18	18	17.8	17.5
	<b>Channel 3</b>	19	19	19	19	19	19	18.8	18.5
	<b>Channel 4</b>	20	20	20	20	20	20	18.8	18.5
	<b>Channel 5</b>	20	20	20	20	20	20	18.8	18.5
	<b>Channel 6</b>	20	20	20	20	20	20	18.8	18.5
	<b>Channel 7</b>	20	20	20	20	20	20	18.8	18.5
	<b>Channel 8</b>	20	20	20	20	20	20	18.8	18.5
<b>Channel 9</b>	19	19	19	19	19	19	18.8	18.5	
<b>Channel 10</b>	18	18	18	18	18	18	17.8	17.5	
<b>Channel 11</b>	16	16	16	16	16	16	15.8	15.5	
* Above sheet display with Average output power									

<p>Calibration Transmit Output Power (FCC , 802.11b)</p> <p>(For calibration in Production )</p>	<p>Test engineer can use following specifications for calibration in Production .</p> <p>Typical Ouput Power= Maximum Output power -1.5dB</p> <p>Minimum Ouput power = Maximum Output power- 3dB</p>				
	<p>Maximum Output Power (802.11b , FCC)</p>				
	Channel	1	2	5.5	11
		Mbps	Mbps	Mbps	Mbps
	Channel 1	18	18	18	18
	Channel 2	19	19	19	19
	Channel 3	19	19	19	19
	Channel 4	20	20	20	20
	Channel 5	20	20	20	20
	Channel 6	20	20	20	20
	Channel 7	20	20	20	20
	Channel 8	20	20	20	20
	Channel 9	20	20	20	20
Channel 10	18	18	18	18	
Channel 11	18	18	18	18	
<p>* Above sheet display with Average output power</p>					

<b>FCC (802.11b,802.11g) Transmit Power Limit Table for 3.3V application</b>	<p>We can use FCC Transmit Power Limit Table for 3.3V application to pass FCC certification</p> <p>Firmware Engineer must add this table to FCC part of AP code</p> <p>Test engineer can not use this table for calibration in production</p>				
		<b>Gain changes (dB) for TX Data Rates</b>			
	<b>Channel</b>	<b>6M,9M, 12M</b>	<b>18M,24M, 36M</b>	<b>48M 54M</b>	<b>1M,2M, 5.5M,11M</b>
	<b>Channel 1</b>	-4	-4	-4	-4
	<b>Channel 2</b>	0	0	0	0
	<b>Channel 3</b>	0	0	0	0
	<b>Channel 4</b>	0	0	0	0
	<b>Channel 5</b>	0	0	0	0
	<b>Channel 6</b>	0	0	0	0
	<b>Channel 7</b>	0	0	0	0
	<b>Channel 8</b>	0	0	0	0
	<b>Channel 9</b>	0	0	0	0
	<b>Channel 10</b>	0	0	0	0
<b>Channel 11</b>	-4	-4	-4	-4	



<b>ETSI Calibration Transmit Output Power (ETSI, 802.11g)</b>	<p>Firmware engineer can use following specifications to calibrate ETSI output power with AP</p> <p>Typical Ouput Power= Maximum Output power -1.5dB</p> <p>Minimum Ouput power = Maximum Output power- 3dB</p>								
	<b>Channel</b>	<b>Maximum Output Power (802.11g , ETSI)</b>							
		<b>6 Mbps</b>	<b>9 Mbps</b>	<b>12 Mbps</b>	<b>18 Mbps</b>	<b>24 Mbps</b>	<b>36 Mbps</b>	<b>48 Mbps</b>	<b>54 Mbps</b>
	<b>Channel 1</b>	16.5	16.5	16.5	16.5	16.5	16.5	16.3	16
	<b>Channel 2</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 3</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 4</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 5</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 6</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 7</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 8</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 9</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 10</b>	17	17	17	17	17	17	16.8	16.5
	<b>Channel 11</b>	16	16	16	16	16	16	15.8	15.5
	<b>Channel 12</b>	17	17	17	17	17	17	16.8	16.5
<b>Channel 13</b>	17	17	17	17	17	17	16.8	16.5	
<p>* Above sheet display with Average output power</p>									

<b>ETSI Calibration Transmit Output Power (ETSI , 802.11b)</b>	<b>Firmware engineer can use following specifications to calibrate ETSI output power with AP</b>				
	<b>Typical Ouput Power= Maximum Output power -1.5dB</b>				
	<b>Minimum Ouput power = Maximum Output power- 3dB</b>				
		<b>Maximum Output Power (802.11b , ETSI)</b>			
	<b>Channel</b>	<b>1</b>	<b>2</b>	<b>5.5</b>	<b>11</b>
		<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>	<b>Mbps</b>
	<b>Channel 1</b>	17	17	17	17
	<b>Channel 2</b>	17	17	17	17
	<b>Channel 3</b>	17	17	17	17
	<b>Channel 4</b>	17	17	17	17
	<b>Channel 5</b>	17	17	17	17
	<b>Channel 6</b>	17	17	17	17
	<b>Channel 7</b>	17	17	17	17
	<b>Channel 8</b>	17	17	17	17
<b>Channel 9</b>	17	17	17	17	
<b>Channel 10</b>	17	17	17	17	
<b>Channel 11</b>	17	17	17	17	
<b>Channel 12</b>	17	17	17	17	
<b>Channel 13</b>	17	17	17	17	
* Above sheet display with Average output power					

We can use ETSI Transmit Power Limit Table for 3.3V application to pass FCC certification  
 Firmware Engineer must add this table to ETSI part of AP code  
 Test engineer can not use this table for calibration in production

ETSI  
 (802.11b,802.11g)  
 Transmit Power  
 Limit Table for 3.3V  
 application

Channel	Gain changes (dB) for TX Data Rates			
	6M,9M, 12M	18M,24M, 36M	48M 54M	1M,2M, 5.5M,11M
Channel 1	0	0	0	-1
Channel 2	-1	-1	-1	-2
Channel 3	-2	-2	-2	-2
Channel 4	-3	-3	-2	-3
Channel 5	-3	-3	-2	-3
Channel 6	-3	-3	-2	-3
Channel 7	-3	-3	-2	-3
Channel 8	-3	-3	-2	-3
Channel 9	-2	-2	-2	-3
Channel 10	-1	-1	-1	-1
Channel 11	0	0	0	-1
Channel 12	-3	-3	-2	-3
Channel 13	-3	-3	-2	-3

## FCC Statement

**Warning:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is needed. Consult the dealer or an experienced radio/TV technician for help.

### Service Center in U.S.A

Company Name : ZyXEL Communications, INC. USA

Company Address: 1650 E. Miraloma Ave. Placentia, CA 92870

Tel: (714)632-0858



### CAUTION:

1. To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
2. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter

### **This device is intended only for OEM integrators under the following conditions:**

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users. For

laptop installations, the antenna must be installed to ensure that the proper spacing is maintained in the event the users places the device in their lap during use (i.e. positioning of antennas must be placed in the upper portion of the LCD panel only to ensure 20 cm will be maintained if the user places the device in their lap for use) and

2) The transmitter module may not be co-located with any other transmitter or antenna. As long as the 2 conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

**IMPORTANT NOTE:** In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### **End Product Labeling**

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ASDL modems, certain laptop configurations, and similar equipment). The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: I88G663".

### **RF Exposure Manual Information That Must be Included**

The users manual for end users must include the following information in a prominent location "IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

### **Additional Information That Must be Provided to OEM Integrators**

The end user should NOT be provided any instructions on how to remove or install the device.

**注意！**

依據 低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。