



WFU032

IEEE 802.11 b/g/n 2x2 Module

Product Specification 2.5

Approved:	Approved:	Prepared by:
<hr/>	<hr/>	<hr/>
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Revision History

Date	Number	Approver	Comments
June 16, 2016	1.0	Hans Huang	Initial Draft
July 18, 2016	2.0	Hans Huang	(1) Update Tx Power Consumption (2) Update Tx Power (3) Update Label Specification (4) Update EEPROM information (5) Update Module Photo
Nov 10,2016	2.1	Hans Huang	(1) Add connector drawing (2) Add power on sequence (3) Add certification
Nov 14,2016	2.2	Hans Huang	Update Power Consumption
Mar 08,2017	2.3	Cathy Kuo	Added Waring Statement
Mar 10,2017	2.4	Cathy Kuo	Updated TX Power table
Mar 27,2017	2.5	Cathy Kuo	Updated TX Power table

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TABLE OF CONTENTS

Revision History 1

Chapter 1. Module Overview 4

 1-1 Key Characteristic 4

 1-2 Certification..... 4

 1-3 USB Pin Definition 5

Chapter 2. Electrical and RF Specificaiton 7

 2-1 Recommended Operation Rating 7

 2-2 Power On Sequence 7

 2-3 Power Consumption..... 8

 2-4 WiFi RF Specification – TX 8

 2-5 WiFi RF Specification – RX..... 9

Chapter 3. MECHANICAL SPECIFICATION 10

 3-1 Module Assembly Dimension 10

 3-2 Label Specification 11

Chapter 4. Additional Information 12

 4-1 EEPROM Information 12

 4-2 Module Photo 12

 4-3 Environment Specifications 12

Figures:

Figure 1 Connector Drawing	6
Figure 2 Power on sequence	7
Figure 3 Mechanical Drawing	10
Figure 4 Label Drawing	11
Figure 5 Top Side Photo.....	12
Figure 6 Bottom Side Photo.....	12

Tables

Table 1 Pin Definitions	5
Table 2 Operation Rating	7
Table 3 Power Consumption.....	8
Table 4 IEEE 802.11 b/g/n TX Output Power (WLAN0 & WLAN1)	8
Table 5 IEEE 802.11 b/g/n Rx sensitivity (WLAN0 & WLAN1).....	9

CHAPTER 1. MODULE OVERVIEW

The Foxconn WFU032 WLAN module contains the MTK® MT7603U single-chip which is a highly integrated Wi-Fi single chip which supports 300 Mbps PHY rate. It fully complies with IEEE 802.11n and IEEE 802.11 b/g standards, offering feature-rich wireless connectivity at high standards, and delivering reliable, cost-effective throughput from an extended distance.

1-1 Key Characteristic

- CMOS technology with an integrated PA, LNA, RF, Baseband, and MAC
- 2T2R mode with support for a 300 Mbps Tx/Rx PHY rate
- 20/40MHz bandwidth
- WoWLAN via GPIO(client mode), Support Host Sleep(AP mode)
- Reverse direction grant data flow and frame aggregation
- Security : WFA WPA/WPA2 personal, WPS2.0, WAPI
- QoS: WFA WMM, WMM PS
- A full-speed USB 2.0-compliant interface for WLAN

1-2 Certification

China SRRC

1-3 USB Pin Definition

Table 1 Pin Definitions

Pin#	Name	Description
1	RST	Reset pin, active low.
2	Vcc	+5V Power Supply
3	D-	USB Data D-
4	D+	USB Data D+
5	GND	GND
6	WOW	Wake on WLAN. Default active low to wake-up the system. (If not used, please floating it.)



Vendor: Jiangsu Lezhi Electronics CO.,LTD (江蘇樂智電子科技有限公司)

PN: LZE 12500-06AWB

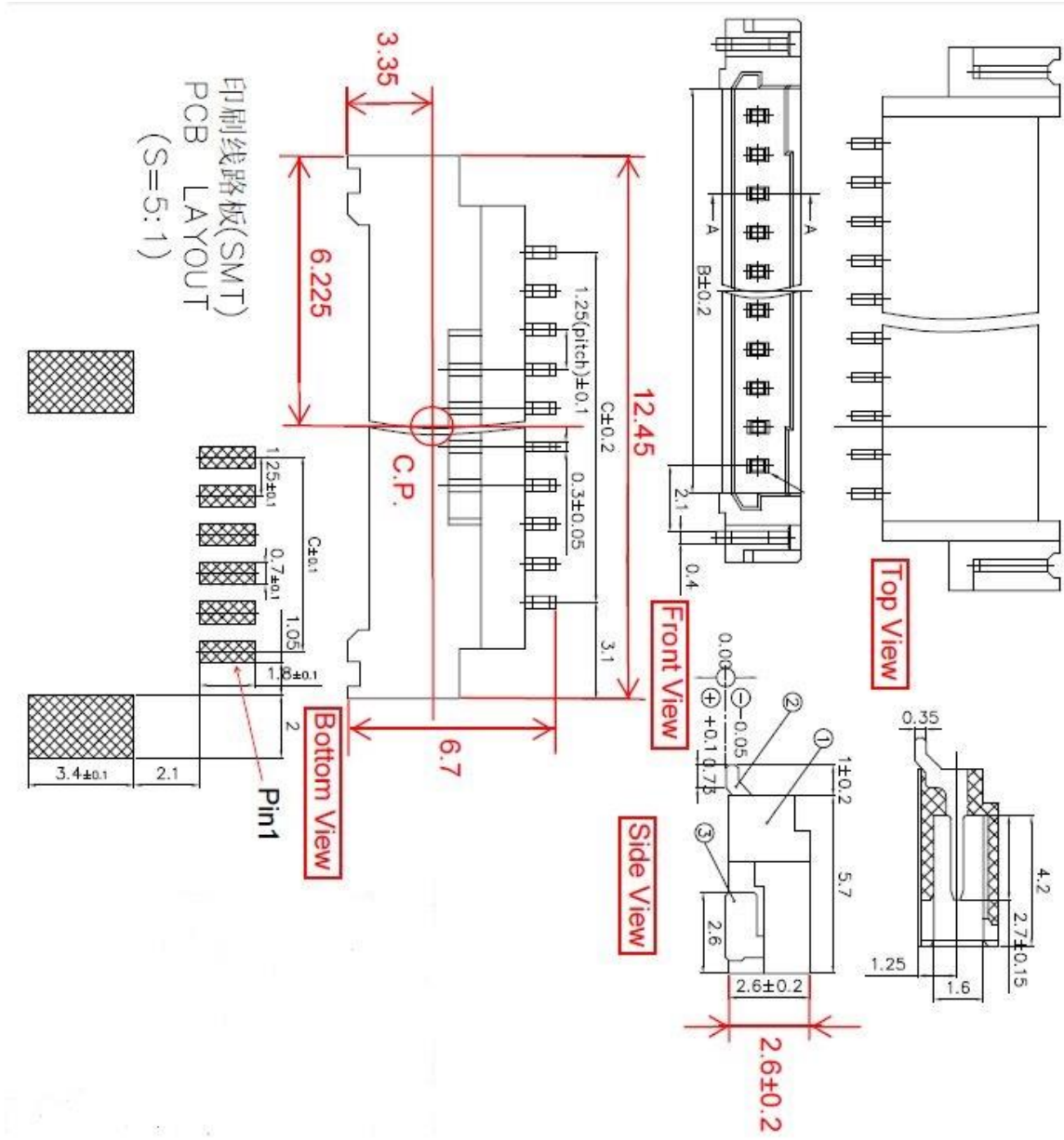


Figure 1 Connector Drawing

CHAPTER 2. ELECTRICAL AND RF SPECIFICATION

2-1 Recommended Operation Rating

Table 2 Operation Rating

Parameter	Min	Typ.	Max.	Unit
Vcc	4.5	5	5.5	V
RST (Active Low)	2.97	3.3	3.63	V
WOW	2.97	3.3	3.63	V
V _{DP} / V _{DM}	0		5.5	V
RF Interface		50		Ohm

Note: WoW is an output pin for wake up host and can be set active high or low by MT7603U WiFi driver. If you don't use the WoW function, keep floating in hardware design.

2-2 Power On Sequence

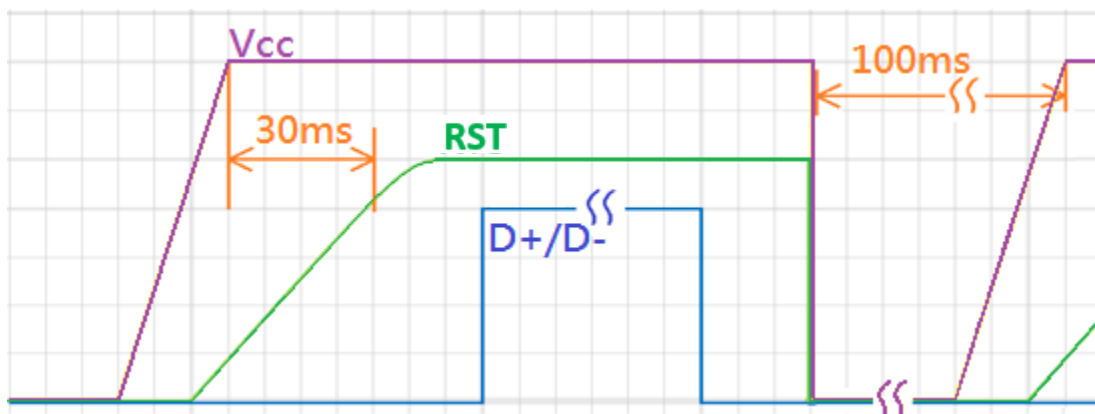


Figure 2 Power on sequence

Note :

1. RST_N must be 30 ms delay at least after Vcc(5V) ready.
2. USB_DP/DM must be delay at least after RST_N.
3. Restart time should be 100ms.

2-3 Power Consumption

Power consumption is measured using current probe loop on the Power rails of the USB interface (Pins).

Table 3 Power Consumption

Description	Typical (Max)	Unit
IDLE	56 (61)	mA
2G/2T- N mode HT 40MHz MCS 7(14dBm)	131	mA
2G/2T- N mode HT 20MHz MCS 7(14dBm)	206	mA
2G/2T- G mode OFDM54M(15dBm)	220	mA
2G/2T- B mode CCK11M (15dBm)	375	mA
2G/2R- N mode HT 40MHz MCS 7 (-60dBm)	70	mA
2G/2R- N mode HT 20MHz MCS 7 (-60dBm)	65	mA
2G/2R- G mode OFDM54M (-60dBm)	63	mA
2G/2R- B mode CCK11M (-60dBm)	61	mA

2-4 WiFi RF Specification – TX

Table 4 IEEE 802.11 b/g/n TX Average Output Power (WLAN0&WLAN1)

Data Rate (Mbps)	Modulation	Tx Typical Power (dBm)	Data Rate (Mbps)	Modulation	Tx Typical Power (dBm)
1	DBPSK	14	HT20-MCS0	BPSK	12
2	DQPSK	14	HT20-MCS1	BPSK	12
5.5	CCK	14	HT20-MCS2	QPSK	12
11	CCK	14	HT20-MCS3	QPSK	12
6	OFDM	15	HT20-MCS4	16-QAM	12
9	OFDM	15	HT20-MCS5	16-QAM	12
12	OFDM	15	HT20-MCS6	64-QAM	12
18	OFDM	15	HT20-MCS7	64-QAM	12
24	OFDM	15	HT40-MCS0	BPSK	12
36	OFDM	15	HT40-MCS1	QPSK	12
48	OFDM	15	HT40-MCS2	QPSK	12
54	OFDM	15	HT40-MCS3	16-QAM	12
			HT40-MCS4	16-QAM	12
			HT40-MCS5	64-QAM	12
			HT40-MCS6	64-QAM	12
			HT40-MCS7	64-QAM	12

Tolerance: +0.5dBm/-2dBm

2-5 WiFi RF Specification – RX

Table 5 IEEE 802.11 b/g/n RX Sensitivity (WLAN0&WLAN1)

Data Rate (Mbps)	Modulation	Rx Sensitivity (dBm)		Data Rate (Mbps)	Modulation	Rx Sensitivity (dBm)	
		Max.	Typ.			Max.	Typ.
1	DBPSK	-83	-94	HT20-7.22	BPSK	-82	-89.5
2	DQPSK	-80	-93	HT20-14.44	QPSK	-79	-86
5.5	CCK	-83	-91	HT20-21.67	QPSK	-77	-84
11	CCK	-80	-88	HT20-28.89	16-QAM	-74	-81.5
6	OFDM	-85	-90	HT20-43.33	16-QAM	-70	-78
9	OFDM	-84	-88	HT20-57.78	64-QAM	-66	-73.5
12	OFDM	-82	-87	HT20-65	64-QAM	-65	-72
18	OFDM	-80	-86	HT20-72.22	64-QAM	-64	-70
24	OFDM	-77	-83	HT40-15	BPSK	-79	-86
36	OFDM	-73	-80	HT40-30	QPSK	-76	-83
48	OFDM	-69	-77	HT40-45	QPSK	-74	-81
54	OFDM	-68	-75	HT40-60	16-QAM	-71	-78
				HT40-90	16-QAM	-67	-75
				HT40-120	64-QAM	-63	-70.5
				HT40-135	64-QAM	-62	-69
				HT40-150	64-QAM	-61	-67

CHAPTER 3. MECHANICAL SPECIFICATION

3-1 Module Assembly Dimension

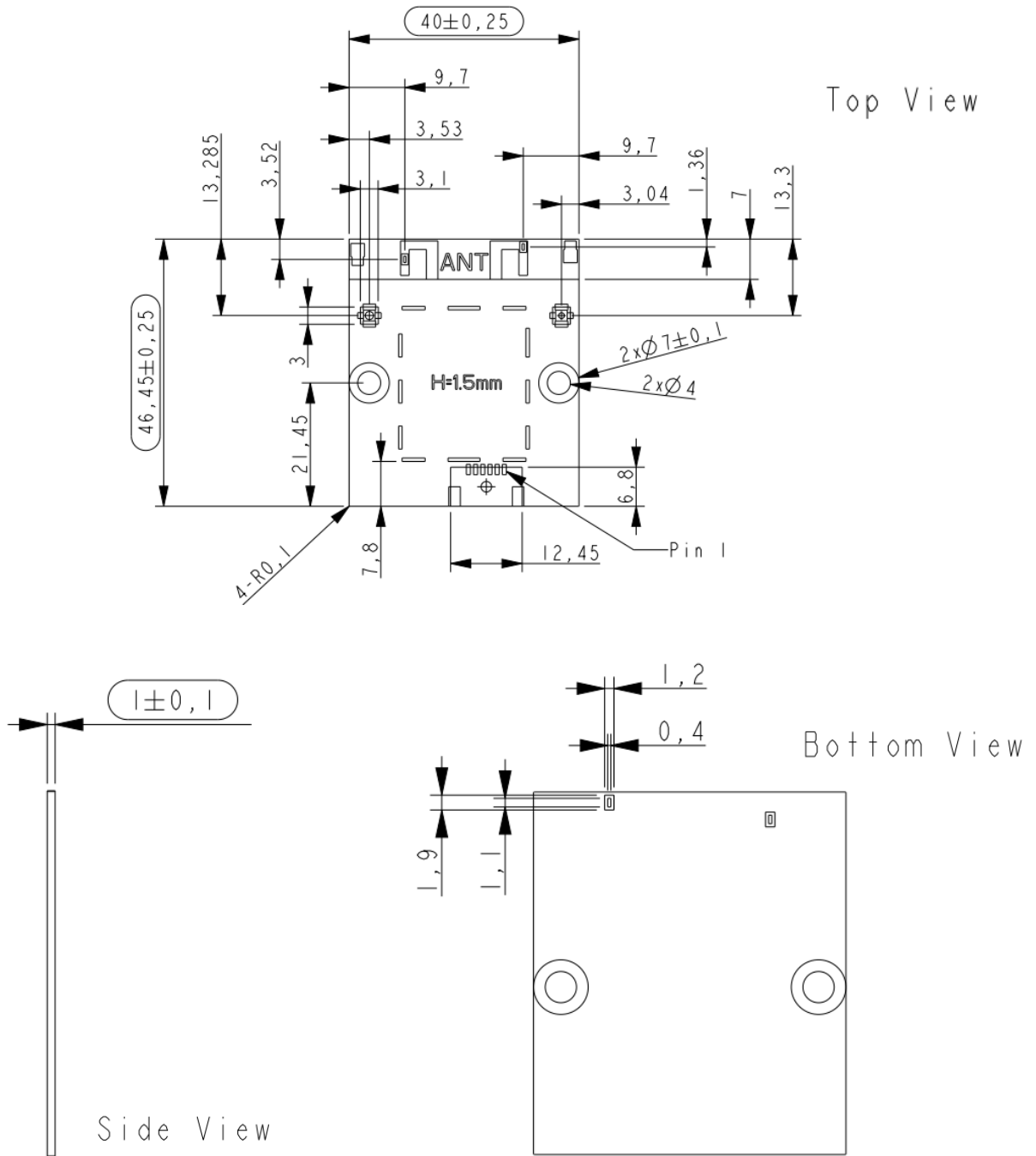


Figure 3 Mechanical Drawing

3-2 Label Specification

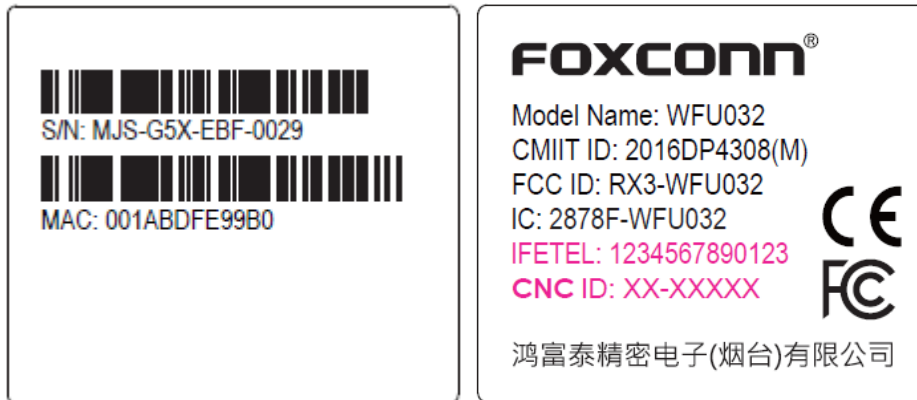


Figure 4 Label Drawing

CHAPTER 4. ADDITIONAL INFORMATION

4-1 EEPROM Information

WLAN Type	Mode	PID	VID
MT7603U WiFi	b/g/n	7603	0E8D

4-2 Module Photo

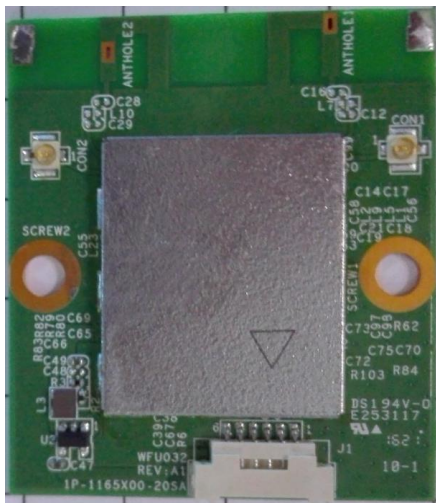


Figure 5 Top Side Photo

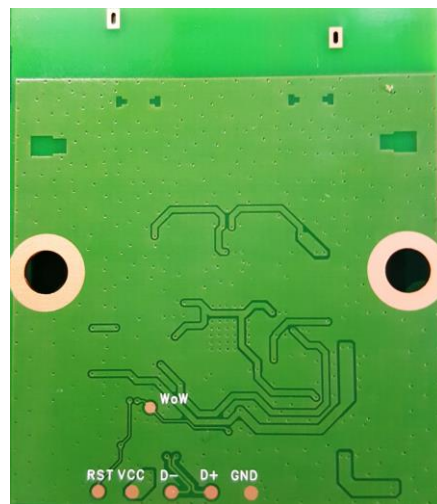


Figure 6 Bottom Side Photo

4-3 Environment Specifications

Operation

Operation Temperature : 0~55 °C
 Relevant Humidity: 5 ~ 90% (non-condensing)

Storage

Operation Temperature : -20~105 °C
 Relevant Humidity: 5 ~ 90% (non-condensing)

Federal Communication Commission Interference Statement

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.

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 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 connected.
- Consult the dealer or an experienced radio/TV technician for help. FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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, and 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test 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

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 reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: RX3-WFU032". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Canada, Industry Canada (IC) Statement

This Class B digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

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

RF Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Required end product labeling:

Any device incorporating this module must include an external, visible, permanent marking or label which states: "Contains IC: 2878F-WFU032"

This radio transmitter (identify the device by certification number or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Type: PIFA Peak Gain: 3.82dBi

Canada, Industrie Canada (IC) Déclaration

Cet appareil numérique de classe B est conforme à la norme NMB-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Déclaration d'exposition aux radiations:

Cet appareil est conforme aux limites d'exposition aux rayonnements définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 centimètres entre le radiateur et votre corps.

Obligation d'étiquetage du produit final:

Tout dispositif intégrant ce module doit comporter un externe, visible, marquage permanent ou une étiquette qui dit: "Contient IC : 2878F - WBUA31".

Cet émetteur radio (identifier le dispositif par numéro de certification ou le numéro de modèle , si la catégorie II) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous avec le gain maximal admissible indiqué . types d'antennes non inclus dans cette liste , ayant un gain supérieur au gain maximum indiqué pour ce type , sont strictement interdits pour une utilisation avec cet appareil.

Type d'antenne: PIFA Pic Gain: 3.82dBi