

Product Specification

Project Name	802.11 b/g/n 2T2R Wireless Module
Customer	FOXCONN
Customer Part No.	6M01B0000Y000
Foxconn Part No.	WFU032-VZ

Approved:	Approved:	Prepared by:
		
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Revision History

Date	Number	Editor	Comments
2021-Jan-05	1.0	Kevin Yao	Initial Draft
2021-Feb-04	1.1	Cathy Kuo	Updated FCC and IC statement from page 11 to 18

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CHAPTER 1. MODULE OVERVIEW

The Foxconn WFU032-VZ 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 Pin Definition

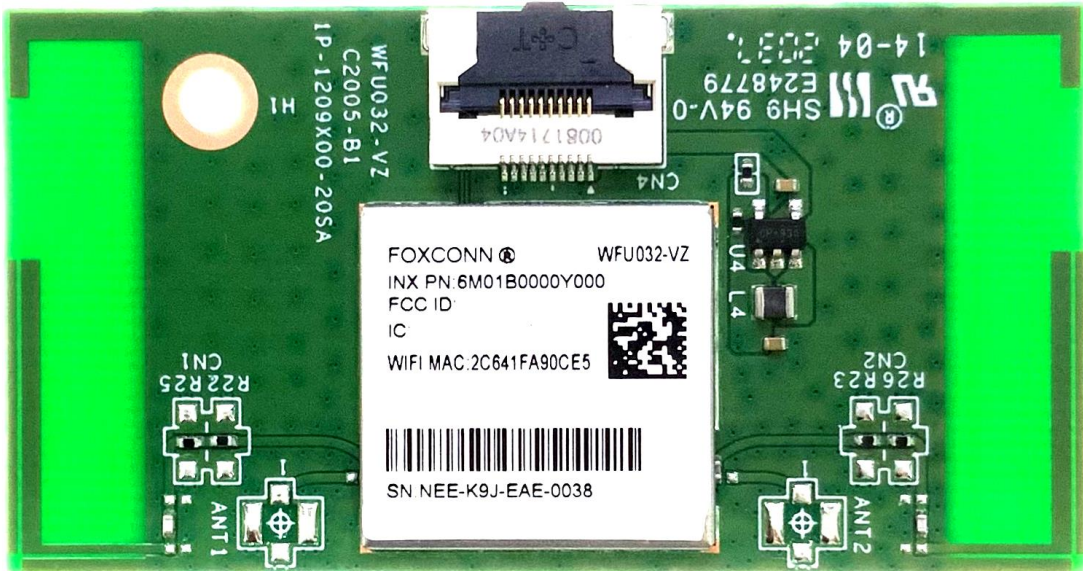


Figure 1 Pin Definitions (Module Top View)

Table 1 Pin Definitions

Pin number	Symbol name	Type	Pin description
1	VBUS	Power	DC 5V
2	VBUS	Power	DC 5V
3	BGF_INT_B	I/O	BT_wake on
4	GND	GND	Ground
5	GND	GND	Ground
6	U2D-	I/O	USB data -
7	U2D+	I/O	USB data +
8	GND	GND	Ground
9	WIFI_INT_B	I/O	Wi-Fi_wake on
10	PMU_EN	I/O	reset

CHAPTER 2. ELECTRICAL AND RF SPECIFICATION

2-1 Recommended Operation Rating

Table 2 Operation Rating

	Condition	Min	Typ.	Max.	Unit
VDD	5	4.5	5	5.5	V
RF Interface	Zo		50		Ohm

2-2 Power Consumption

Table 3 Power Consumption

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

2-3 WLAN RF Specification – TX

Table 4 IEEE 802.11 b/g/n TX 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	7
2	DQPSK	14	HT20-MCS1	BPSK	7
5.5	CCK	14	HT20-MCS2	QPSK	7
11	CCK	14	HT20-MCS3	QPSK	7
6	OFDM	10	HT20-MCS4	16-QAM	7
9	OFDM	10	HT20-MCS5	16-QAM	7
12	OFDM	10	HT20-MCS6	64-QAM	7
18	OFDM	10	HT20-MCS7	64-QAM	7
24	OFDM	10	HT40-MCS0	BPSK	5
36	OFDM	10	HT40-MCS1	QPSK	5
48	OFDM	10	HT40-MCS2	QPSK	5
54	OFDM	10	HT40-MCS3	16-QAM	5
			HT40-MCS4	16-QAM	5
			HT40-MCS5	64-QAM	5
			HT40-MCS6	64-QAM	5
			HT40-MCS7	64-QAM	5

Tolerance: +/-2dBm

※HT20/HT40 Total Max. Power = WLAN0 /1 SISO Max. Power + 3dBm

2-4 WLAN 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

2-5 Environment Specifications

Operating Conditions (preliminary)

Operation Temperature : 0 ~ 60°C

Storage Conditions (preliminary)

Non-Operation Temperature : -10 ~ 60°C (Typ. 25°C)



CHAPTER 3. MECHANICAL SPECIFICATION

3-1 Module Assembly Dimension

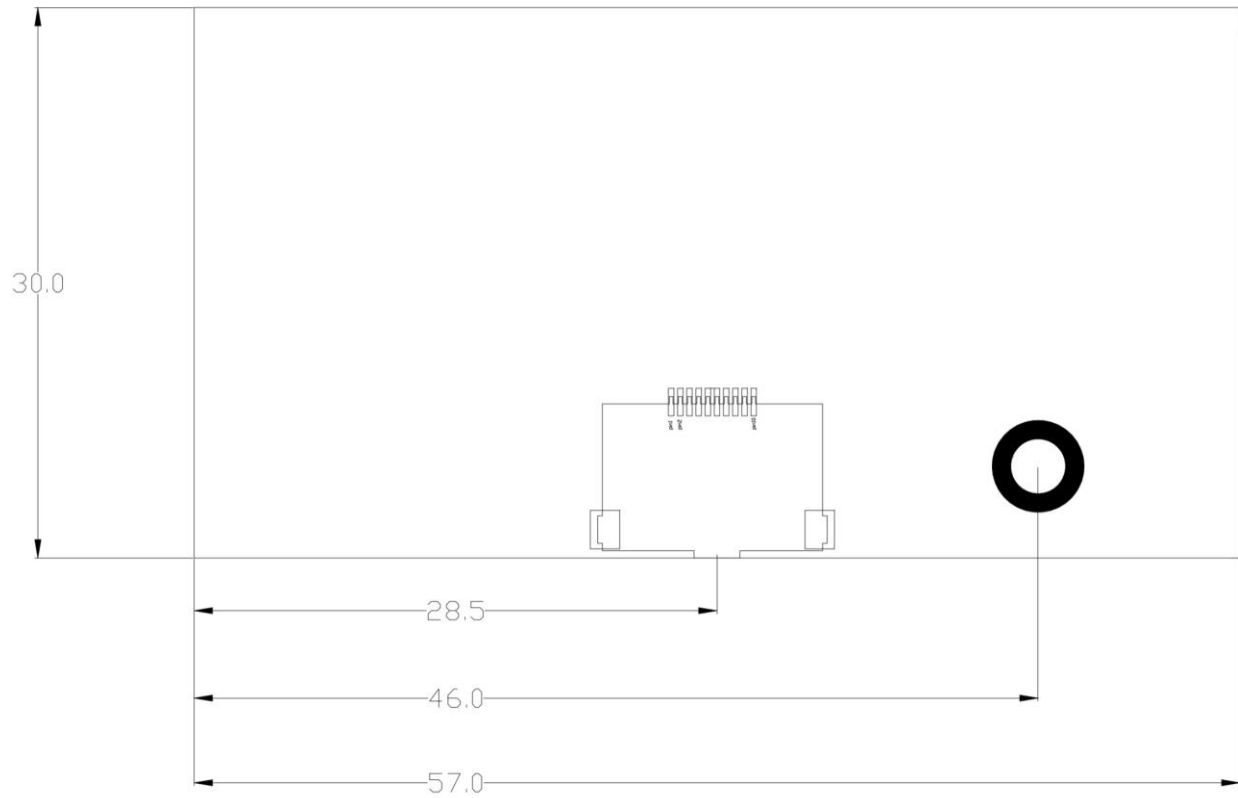


Figure 2 Mechanical Drawing

3-2 Module Photo

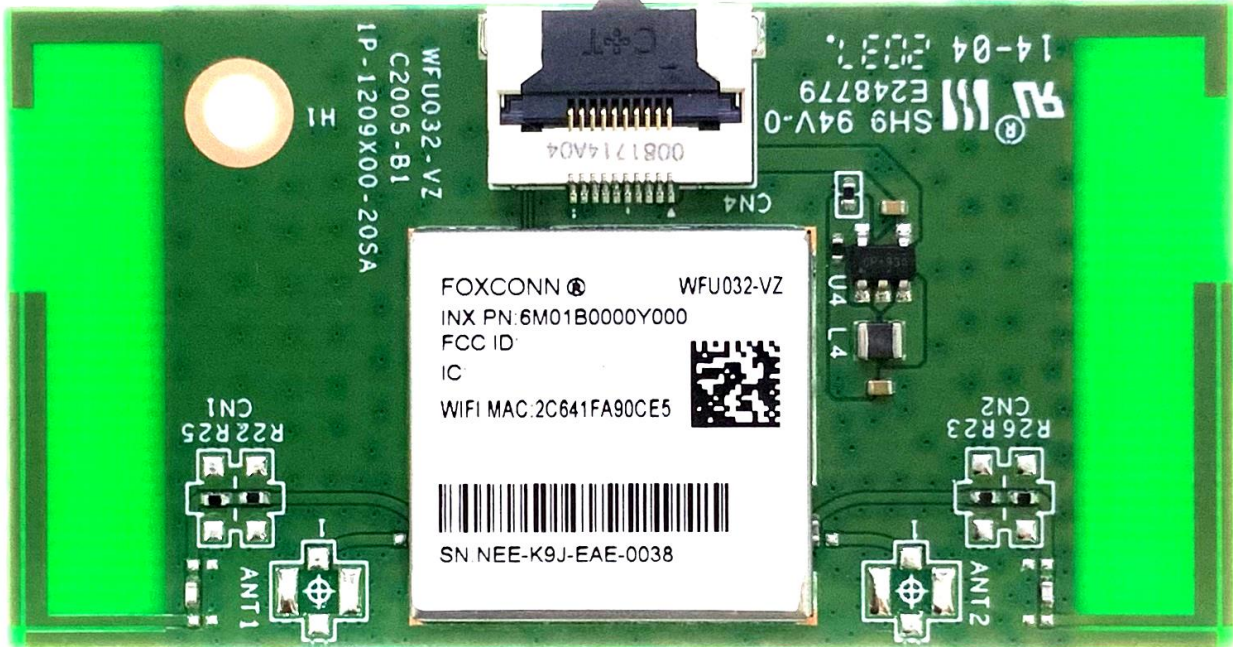


Figure 3 Top Side Photo

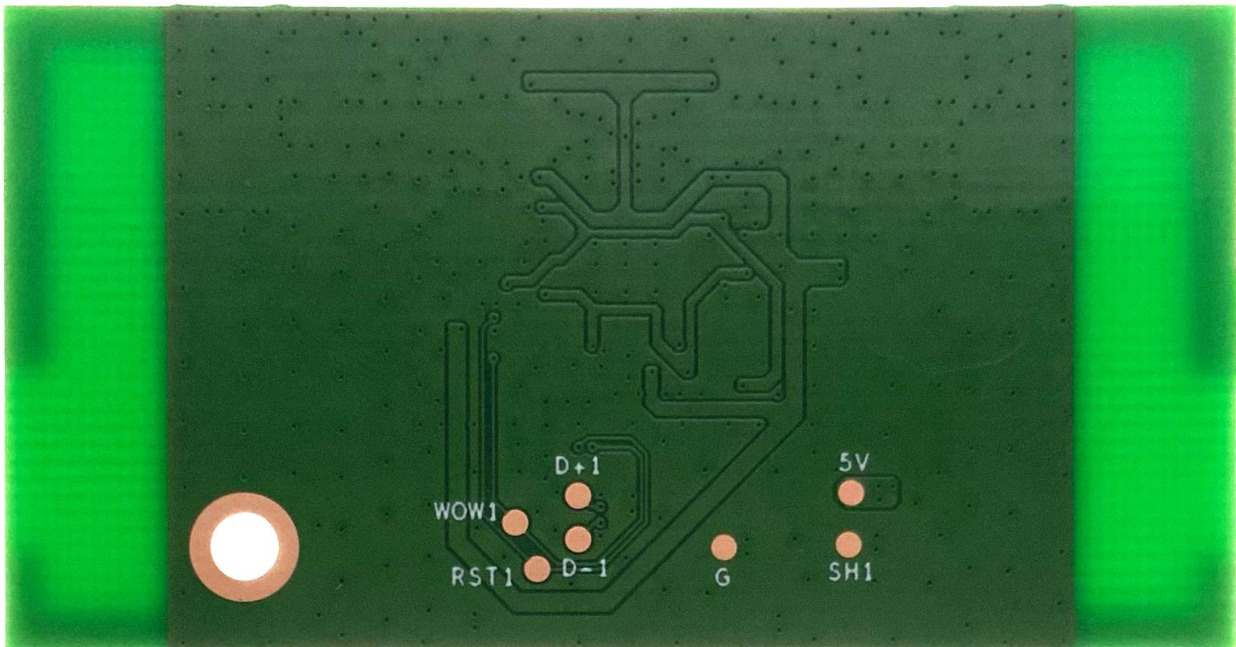


Figure 4 Bottom Side Photo

3-3 Label Specification

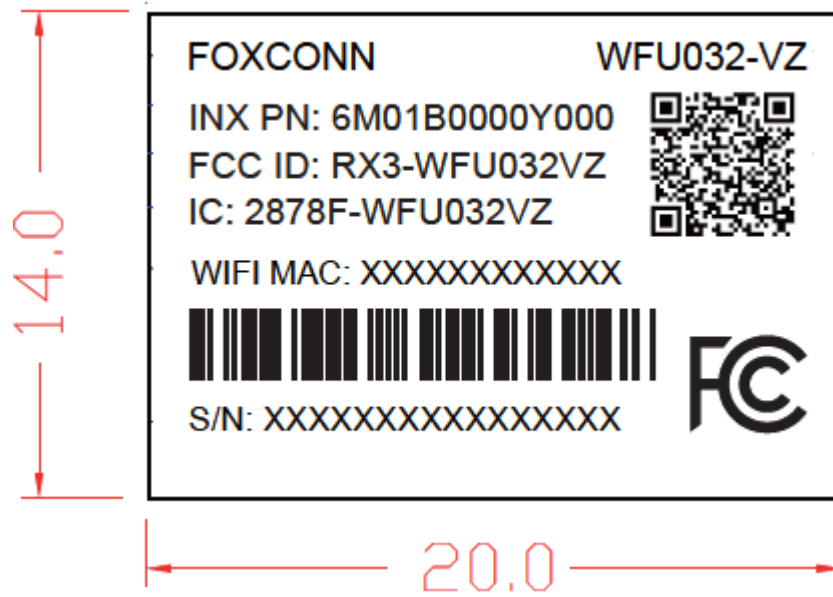


Figure 5 Label Specification

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 module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:

KDB 996369 D03 OEM Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15C

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable.

2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

Type: PCB, Internal

Frequency [MHz]	ANT_1		ANT_2	
	Peak Gain [dBi]	Average Gain [dBi]	Peak Gain [dBi]	Average Gain [dBi]
2412	3.7	-2.8	3.4	-1.7
2437	3.9	-2.4	3.4	-1.7
2442	3.9	-2.4	3.4	-1.7
2462	4.3	-2.1	3.5	-1.6
2472	4.2	-2.1	3.4	-1.8

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: “Contains FCC ID: RX3-WFU032VZ. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all 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 re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

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.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.

Industry Canada statement

This device complies with ISED's licence-exempt RSSs. 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.

Radiation Exposure Statement:

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

This device is intended only for OEM integrators under the following conditions: (For module device use)

- 1) The antenna must be installed and operated with greater than 20cm 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 Canada authorization is no longer considered valid and the IC 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 Canada authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC:2878F-WFU032VZ".

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.

Déclaration d'Industrie Canada

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

- 1) L'antenne doit être installée et exploitée avec plus de 20 cm entre l'antenne et les utilisateurs, et
- 2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considérée comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de 20 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 2878F-WFU032VZ".

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.