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<h1>User Manual</h1> <h2>WiFi+ BT Module</h2>

Project Name	WiFi+ BT Module
Approval Sheet Rev.	1.0
Foxconn Part No.	J20H064

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1 Product Introduction

The J20H064 802.11b/g/n+Bluetooth4.0 module provides wireless modem functionality utilizing direct sequence spread spectrum and OFDM/CCK technology. This module is based on Marvell 88W8766P solution which is integrated 2.4GHz IEEE802.11 b/g/n (MAC/baseband/radio), Bluetooth 4.0 + High speed and power amplifiers (PA).

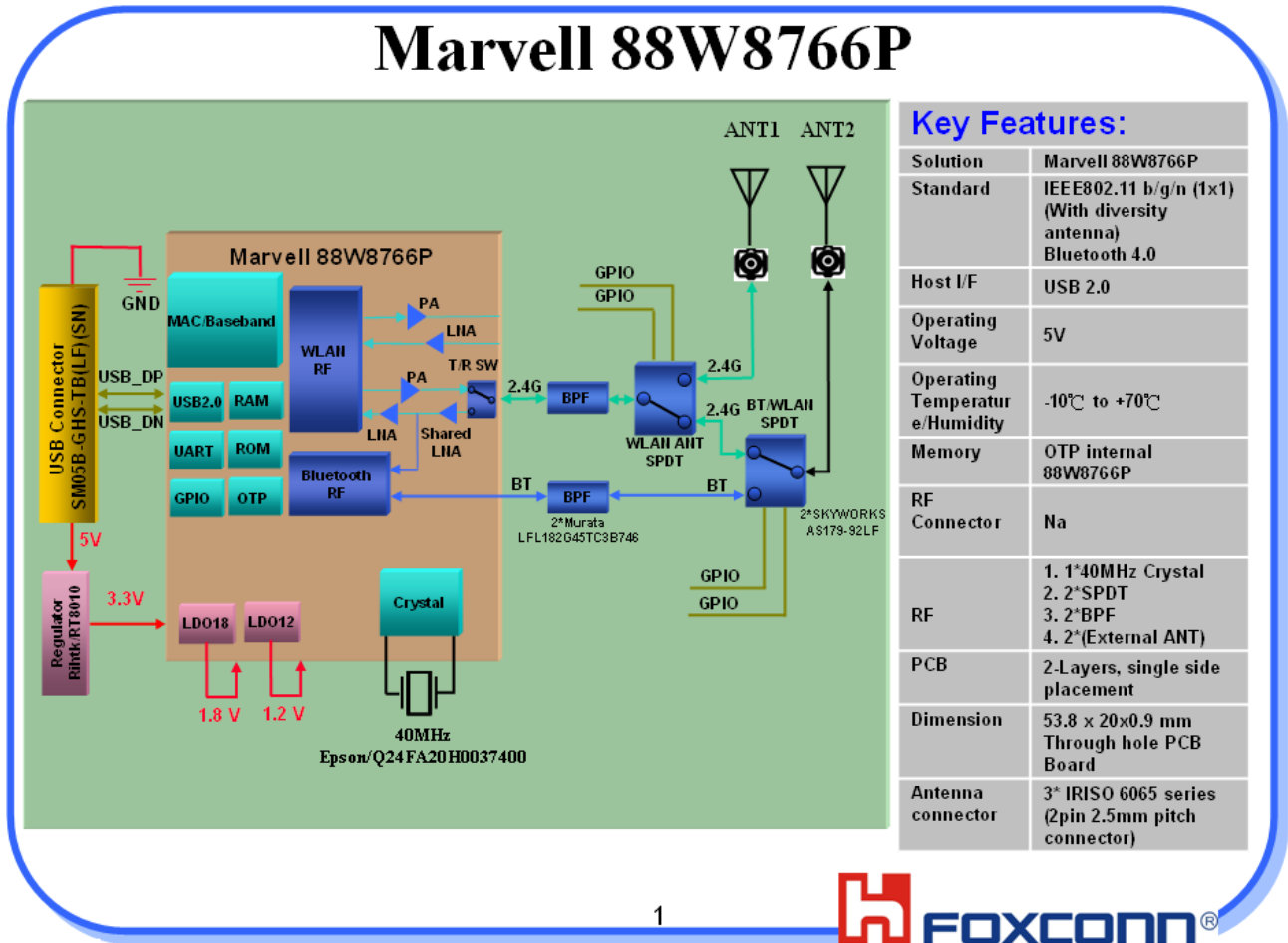
1.1 Application scope

The wireless LAN is compliant to IEEE 802.11b and IEEE 802.11g and IEEE 802.11n standard. The data rate of 802.11b is up to 11Mbps and fallback rates of 5.5, 2, 1Mbps. The data rate of 802.11g is up to 54Mbps and fallback rates of 48,36,24,18,12,9, 6Mbps. The data rate of 802.11n HT20 is up to 65Mbps and fallback rates of 58.5, 52, 39, 26, 19.5, 13, 6.5Mbps;

2 Module Hardware Overview

2.1 Block Diagram

The general HW architecture is shown below Figure:



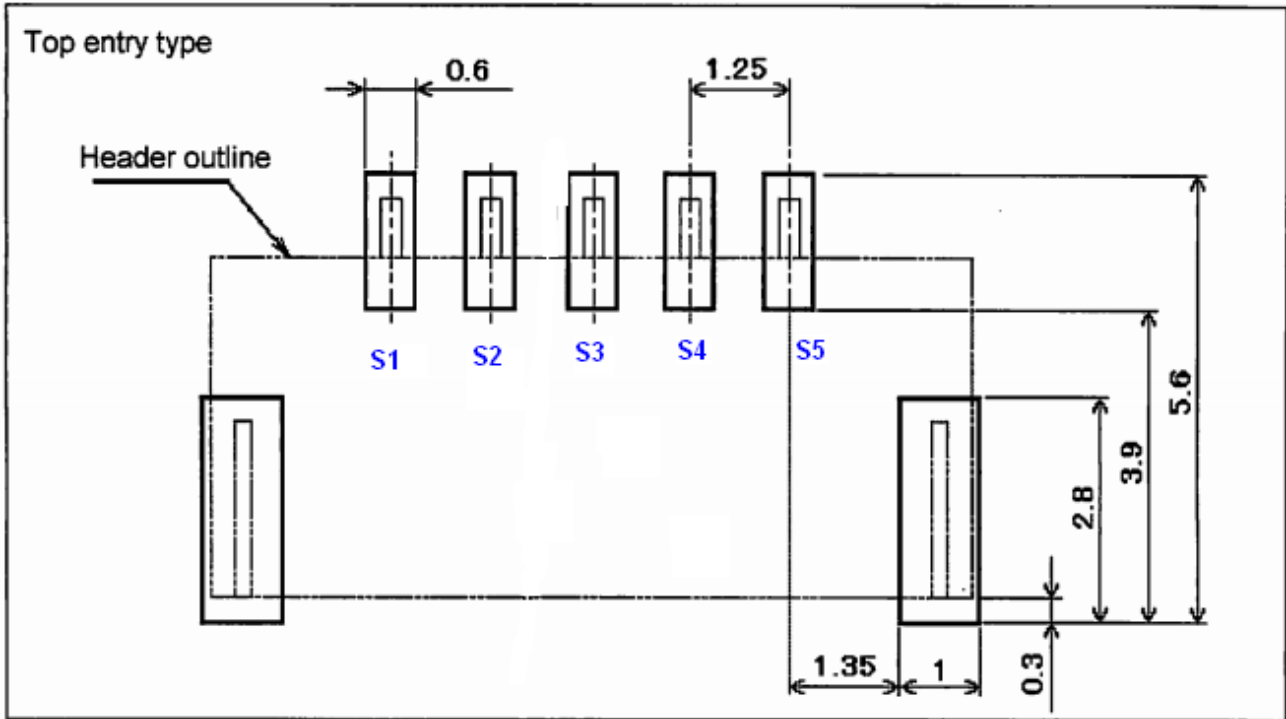
Module Block Diagram

2.2 Features

- ◆ IEEE802.11b/g/n (1X1) and Bluetooth 4.0 based on Marvell 88W8766P solution.
- ◆ USB 2.0 Interface, High and Full Speeds supported.
- ◆ Module is powered by the host with a 5.0V +/- 5% supply.
- ◆ External PCB printed antennas.
- ◆ Two SPDT switch for antenna diversity and Bluetooth function.
- ◆ 2 layers single side design, through hole PCB design with halogen free FR4 material

2.3 Interface and Connector

- ◆ Pin definition:
- ◆ Vendor: JST
- ◆ Vendor P/N: SM05B-GHS-TB(LF)(SN)



Pin Number	Symbol Name	Status	Pin definition
1	GND		Ground
2	DP	I/O	USB positive data
3	DM	I/O	USB negative data
4	UV+	P	USB +5V power input
5	GND		Ground
S1	GND		Ground
S2	GND		Ground

3 Electrical Specification

3.1 Absolute maximum rating

Element	Symbol	Min	Typ	Max	Unit
DC supply voltage	UV+		5.0	6.5	(V)

3.2 Recommended operating rating

Element	Symbol	Min	Typ	Max	Unit
DC supply voltage	UV+	4.5	5.0	5.5	(V)

3.3 DC Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
UV+	Supply voltage	4.5	5.0	5.5	(V)
	Tx Current(1M/15dBm)	200	280	400	(mA)
	Tx Current(11M/15dBm)	200	280	400	(mA)
	Tx Current(6M/15dBm)	200	280	400	(mA)
	Tx Current(54M/15dBm)	200	280	400	(mA)
	Tx Current(MCS0/15Bm/HT20)	200	280	400	(mA)
	Tx Current(MCS7/15dBm/HT20)	200	280	400	(mA)
	Rx Current			90	(mA)
	Bluetooth TX			110	(mA)
Bluetooth RX	--		110	(mA)	

3.4 ESD Information

Mode	Level	Unit
HBM	+/-1500	V
MM	+/-200	V

3.5 Environment Storage Condition

Environment condition	
Temperature	Operating Temperature: -10 deg.C ~70 deg.C
	Storage Temperature: -40 deg.C ~80 deg.C
Humidity	Operating Humidity: 20% ~90%
	Storage Humidity: 20% ~90%



4 RF Specification

4.1 IEEE802.11b

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS / CCK			
Channel	CH1 to CH13			
Data rate	1, 2, 5.5, 11Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels (Calibrated)				
1) Target Power@1Mbps	13.5	15	16.5	dBm
2) Target Power@2Mbps	13.5	15	16.5	dBm
3) Target Power@5.5Mbps	13.5	15	16.5	dBm
4) Target Power@11Mbps	13.5	15	16.5	dBm
2. Spectrum Mask @16dBm				
1) $fc-33MHz < f < fc-22MHz$	-	-	-50	dBr
2) $fc-22MHz < f < fc-11MHz$	-	-	-30	dBr
3) $fc+11MHz < f < fc+22MHz$	-	-	-30	dBr
4) $fc+22MHz < f < fc+33MHz$	-	-	-50	dBr
3. Frequency Error	-15	-	+5	ppm
4 Modulation Accuracy(EVM)@16dBm				
1) 1Mbps	-		-10	dB
2) 2Mbps	-		-10	dB
3) 5.5Mbps	-		-10	dB
4) 11Mbps	-		-10	dB
RX Characteristics	Min.	Typ.	Max.	Unit
5 Minimum Input Level Sensitivity				
1) 1Mbps (FER \leq 8%)	-	-95	-92	dBm
2) 2Mbps (FER \leq 8%)	-	-92	-89	dBm
3) 5.5Mbps (FER \leq 8%)	-	-90	-87	dBm
4) 11Mbps (FER \leq 8%)	-	-88	-85	dBm
6 Maximum Input Level (FER \leq 8%)	-10	-5	-	dBm



4.2 IEEE802.11g

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Channel	CH1 to CH13			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels (Calibrated)				
1) Target Power@6Mbps	13.5	15	16.5	dBm
2) Target Power@9Mbps	13.5	15	16.5	dBm
3) Target Power@12Mbps	13.5	15	16.5	dBm
4) Target Power@18Mbps	13.5	15	16.5	dBm
5) Target Power@24Mbps	13.5	15	16.5	dBm
6) Target Power@36Mbps	13.5	15	16.5	dBm
7) Target Power@48Mbps	13.5	15	16.5	dBm
8) Target Power@54Mbps	13.5	15	16.5	dBm
2. Spectrum Mask @14dBm				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-40	dBr
3 Modulation Accuracy(EVM)@14dBm				
1) 6Mbps	-	-	-5	dB
2) 9Mbps	-	-	-8	dB
3) 12Mbps	-	-	-10	dB
4) 18Mbps	-	-	-13	dB
5) 24Mbps	-	-	-16	dB
6) 36Mbps	-	-	-19	dB
7) 48Mbps	-	-	-22	dB
8) 54Mbps	-	-28	-25	dB
4 Frequency Error	-15	-	+5	ppm
RX Characteristics	Min.	Typ.	Max.	Unit
5 Minimum Input Level Sensitivity				
1) 6Mbps (PER < 10%)	-	-89	-86	dBm
2) 9Mbps (PER < 10%)	-	-87	-84	dBm
3) 12Mbps (PER < 10%)	-	-85	-82	dBm
4) 18Mbps (PER < 10%)	-	-83	-80	dBm
5) 24Mbps (PER < 10%)	-	-80	-77	dBm
6) 36Mbps (PER < 10%)	-	-77	-74	dBm
7) 48Mbps (PER < 10%)	-	-73	-70	dBm
8) 54Mbps (PER < 10%)	-	-72	-69	dBm
6 Maximum Input Level (PER < 10%)	-20	-11	-	dBm



4.3 802.11n HT20

Items	Contents			
Specification	IEEE802.11n HT20			
Mode	OFDM			
Channel	CH1 to CH13			
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7			
TX Characteristics	Min.	Typ.	Max.	Unit
1. Power Levels (Calibrated)				
1) Target Power@MCS0	13.5	15	16.5	dBm
2) Target Power@ MCS1	13.5	15	16.5	dBm
3) Target Power@ MCS2	13.5	15	16.5	dBm
4) Target Power@ MCS3	13.5	15	16.5	dBm
5) Target Power@ MCS4	13.5	15	16.5	dBm
6) Target Power@ MCS5	13.5	15	16.5	dBm
7) Target Power@ MCS6	13.5	15	16.5	dBm
8) Target Power@ MCS7	13.5	15	16.5	dBm
2. Spectrum Mask @14dBm				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-45	dBr
3. Modulation Accuracy(EVM)@14dBm				
1) MCS0	-	-	-5	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-	-28	dB
4. Frequency Error	-15	-	+5	ppm
RX Characteristics	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) MCS0 (PER < 10%)	-	-88	-85	dBm
2) MCS1 (PER < 10%)	-	-85	-82	dBm
3) MCS2 (PER < 10%)	-	-83	-80	dBm
4) MCS3 (PER < 10%)	-	-80	-77	dBm
5) MCS4 (PER < 10%)	-	-77	-74	dBm
6) MCS5 (PER < 10%)	-	-73	-69	dBm
7) MCS6 (PER < 10%)	-	-71	-68	dBm
8) MCS7 (PER < 10%)	-	-70	-67	dBm
6. Maximum Input Level (PER < 10%)	-20	-10	-	dBm

4.4 Bluetooth Standard Specifications

Bluetooth Core Specification version 4.0:

Support all Bluetooth 4.0+HS packet types.

Operating frequency range: 2400MHz ~2483.5MHz

Modulation type:

Basic rate 1Mbps: GFSK,

Enhanced data rate 2Mbps: DQPSK

Enhanced data rate 3Mbps: 8DPSK



5 Operation SOP

- 1: Install normal driver under Linux PC
- 2: search WiFi AP and double click to make connection
- 3: If connection setup is ok, PC can communicate with network through wireless AP.



Items	Contents			
Specification	BT4.0+EDR			
Frequency range	2.4GHz~2.4835GHz			
Data rate	1Mbps, 2Mbps, 3Mbps			
- TX Characteristics -	Min.	Typ.	Max.	Unit
1. Power Levels				
BT Output Power	-3	1	3	dBm
2. Initial Carrier Frequency Tolerance				
Average Offset	-75	2	75	kHz
3. Carrier Drift				
Drift Rate				
DH1	-20	-3	20	kHz/50us
DH3	-20	0	20	kHz/50us
DH5	-20	4	20	kHz/50us
Average Drift				
DH1	-25	-3	25	kHz
DH3	-40	-4	40	kHz
DH5	-40	-5	40	kHz
4. Modulation Characteristic				
F1avg	140	164	175	kHz
F2max	115	135		kHz
F1/F2 Ratio	0.8	0.90		
5. EDR Relative Transmit Power				
2Mbps: P[DQPSK]-P[GFSK]	-4	-0.15	1	dB
3Mbps: P[8DPSK]-P[GFSK]	-4	-0.2	1	dB
6. EDR Carrier Frequency Stability and Modulation Accuracy				
2Mbps: $\pi/4$ DQPSK				
Initial Frequency Error: ω_i	-75	1.2	75	kHz
Frequency Error: ω_0	-10	0	10	kHz
Block Frequency Error: $\omega_i + \omega_0$	-75	2	75	kHz
RMS DEVM	-	-	0.2	
Peak DEVM	-	-	0.35	
99% DEVM (% Symbols ≤ 0.3)	99%	100%		
3Mbps: 8DPSK				
Initial Frequency Error: ω_i	-75	1	75	kHz
Frequency Error: ω_0	-10	0	10	kHz
Block Frequency Error: $\omega_i + \omega_0$	-75	1.6	75	kHz
RMS DEVM	-	-	0.13	
Peak DEVM	-	-	0.25	
99% DEVM (% Symbols ≤ 0.13)	99%	100%		
7. Tx Spurious Emission				
30MHz- 1GHz	-	-60	-36	dBm
1GHz – 13.2GHz	-	-60	-30	dBm



Items	Contents			
Specification	BT4.0+EDR			
Frequency range	2.4GHz~2.4835GHz			
Data rate	1Mbps, 2Mbps, 3Mbps			
- RX Characteristics -	Min.	Typ.	Max.	Unit
1. Minimum Input Level Sensitivity				
GFSK (1Mbps)	-	-	-79	dBm
$\pi/4$ DQPSK (2Mbps)	-	-	-72	dBm
8DPSK (3Mbps)	-	-	-72	dBm
2. Maximum Input Level				
GFSK (1Mbps)	-20	0		dBm
$\pi/4$ DQPSK (2Mbps)	-20	0		dBm
8DPSK (3Mbps)	-20	0		dBm
3. Rx Emission				
30MHz- 1GHz	-	-	-57	dBm
1GHz – 13.2GHz	-	-	-47	dBm

6 Mechanical Specifications

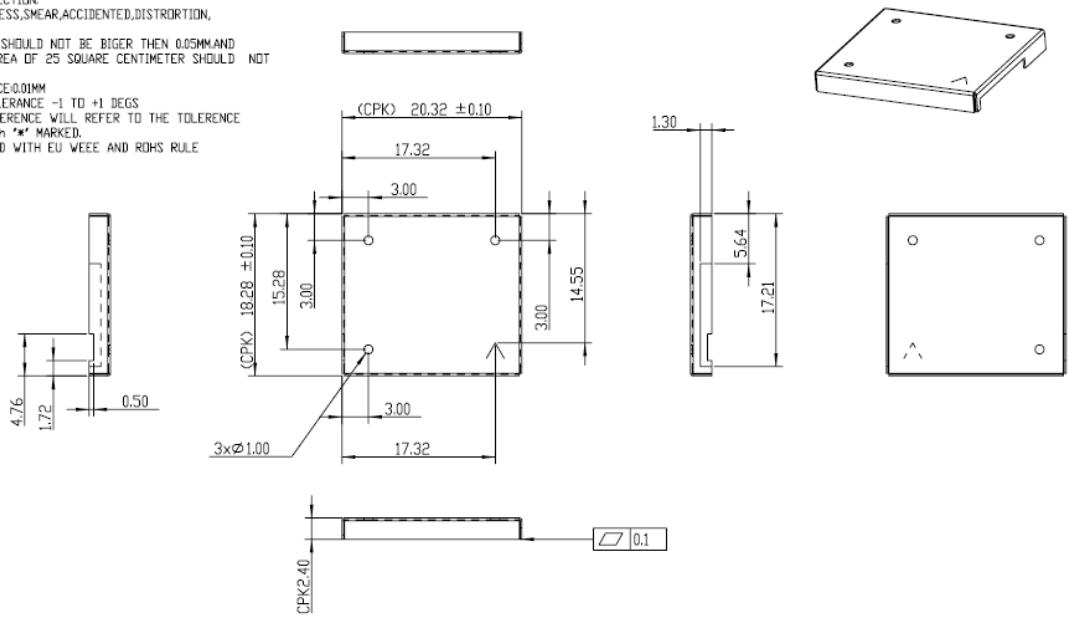
6.1 Shielding Cover Dimension

Dimension (LxWxH): 20.32mm x 18.28mm x 2.4mm

Thickness: 0.2mm

1. * MEANS CRITICAL DIMENSION
2. COLOR/NATURE
3. PART TO BE FREE OF MANUFACTURING LUBRICANTS.
4. ALL UNSPECIFIED INSIDE BEND RADI TO BE 0.25 mm OR LESS.
5. ARROW INDICATES PUNCH DIRECTION.
6. THERE MUST NOT BE SMUDGINESS, SMEAR, ACCIDENTED, DISTORTION, OXIDATION ON THE SURFACE
7. THE WIDTH OF THE SCRATCH SHOULD NOT BE BIGER THEN 0.05MM AND ALL THE SCRATCH IN THE AREA OF 25 SQUARE CENTIMETER SHOULD NOT BE BIGGER THEN 50MM.
8. MATERIAL THICKNESS TOLERANCE: 0.01MM
9. ALL 90 DEG BEND WALLS TOLERANCE -1 TO +1 DEGS
10. THE DIMENSION WITHOUT TOLERANCE WILL REFER TO THE TOLERANCE BOM AS BELOW 'A' level with '*' MARKED.
11. THIS PART MUST BE COMPLIED WITH EU WEEE AND ROHS RULE

REV.	MARK.	DCR/ECN NO.	DATE	UPDATE DESCRIPTION	SIGNATURE
00			2012.02.08	FIRST RELEASE	fu yu
01			2012.02.25	SECOND RELEASE	fu yu



scale 1.000

MATERIAL (SPEC.)		C7521 T=0.2mm		SCALE	2:1	
FINISH		N/A		SHEET	1/1	
LAST USED	---	NDT USED	---	UNIT	mm	
DIMENSION DESIGNATOR		DRAFT TOLERANCE ±0.2*		CRITICAL DIM	MARK *	
PART NAME				SHIELDING COVER		
MODEL				J20H064.00	PART NO. 426.01363.005	
CUSTOMER MODEL				CUSTOMER PART NO.		
DESIGNED				fu yu		
APPROVED				Anda woo		



(For module device use)

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.

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

1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée 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.

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.

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 considéré 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.

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 IC: 2878D-J20H064".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 2878D- J20H064".

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.

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.



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: MCLJ20H064". 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.

For Taiwan 警語：(電信管制射頻器材使用)

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。

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，指依電信法規定作業之無線電通信。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。

Note: 1. 本模組於取得認證後將依規定於模組本體標示審驗合格標籤 2. 系統廠商應於平台上標示「本產品內含射頻模組： XXXyyyLPDzzzz-x (NCC ID) 」字樣