

CDI-W30721DM

Dual band WiFi4+BLE5.0 Module Spec
(UART, 1 antenna type,with shielding)

Software:

客 户 Customer	客户承认 Approve（请盖印章）	日 期 Date

拟制 Design	审核 Check	批准 Approve	版本 Version	日期 Date
			V1.3	2025.05.26

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更改记录:

Reversion History:

版本 Version	日期 Date	更改内容 Modification
1.0	2025.03.10	First release
1.1	2025.03.20	Revise PIN definition (PIN19)
1.2	2025.04.12	Update power parameter(2.4G 11g/ BLE)
1.3	2025.05.26	Update module photo (Add Laser Marking information)

1.Overview

CDI-W30721DM be based on RTL8721DM-VA1 designed module, it is a highly integrated single-chip low power dual bands (2.4GHz and 5GHz) Wireless LAN (WLAN) and Bluetooth Low Energy (BLE 5.0communication controller) .

There are also audio codec, Key-Scan and touch keys integrated into this IC Besides, High speed connectivity interfaces,flexible design configures GPIO to different functions according to applications.

2.Features

- Wi-Fi 802.11 a/b/g/n 1x1, 2.4GHz &5GHz
- Supports 20MHz/40MHz up to MCS7
- Internal PTA interface for arbitrating data transmission between Wi-Fi and internal Bluetooth or external 2.4G devices
- Both central and peripheral modes
- BLE 5.0
- Low power beacon listen mode

3.General Specification

Model	CDI-W30721DM
Product Name	WLAN 802.11 a/b/g/n+BLE5.0 Module Spec
Major Chipset	RTL8721DM-VA1-CG
Standard	802.11 a/b/g/n
Frequency Band	Dual band 2.4GHz&5GHz ISM
Interface	UART
Operating Temperature	-10~ 70°C ambient temperature
Storage Temperature	-55 ~ 125°C ambient temperature
Humidity	5% to 90 % maximum (non-condensing)
Dimension	33.0x20.5 x3.0(L*W*H) ±0.2mm

RF Specification

2.4GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11b/g/n WiFi compliant
Receive Sensitivity 11b@8%PER	11Mbps PER @ -83dBm
Receive Sensitivity 11g@10%PER	54Mbps PER @ -71dBm
Receive Sensitivity 11n@10%PER	MCS7 PER @ -68dBm

5GHz RF Specification

Feature	Description
WLAN Standard	IEEE 802.11a/n WiFi compliant
Receive Sensitivity 11a@10%PER	54Mbps PER @ -71dBm
Receive Sensitivity 11n@10%PER	MCS7 PER @ -68dBm

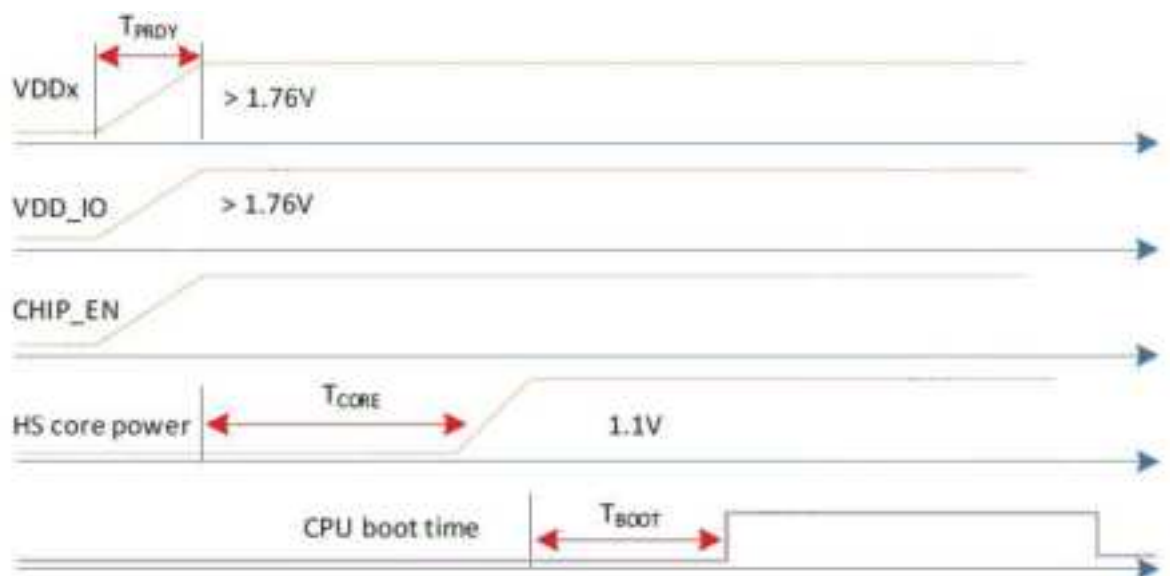
BLE RF Specification

Feature	Description
WLAN Standard	BLE5.0 1M/2Mbps
Receive Sensitivity @BER=1% FOR GFSK(1Mbps)	PER @ -86dBm
Receive Sensitivity @PER=30.8% FOR BLE	PER @ -90dBm

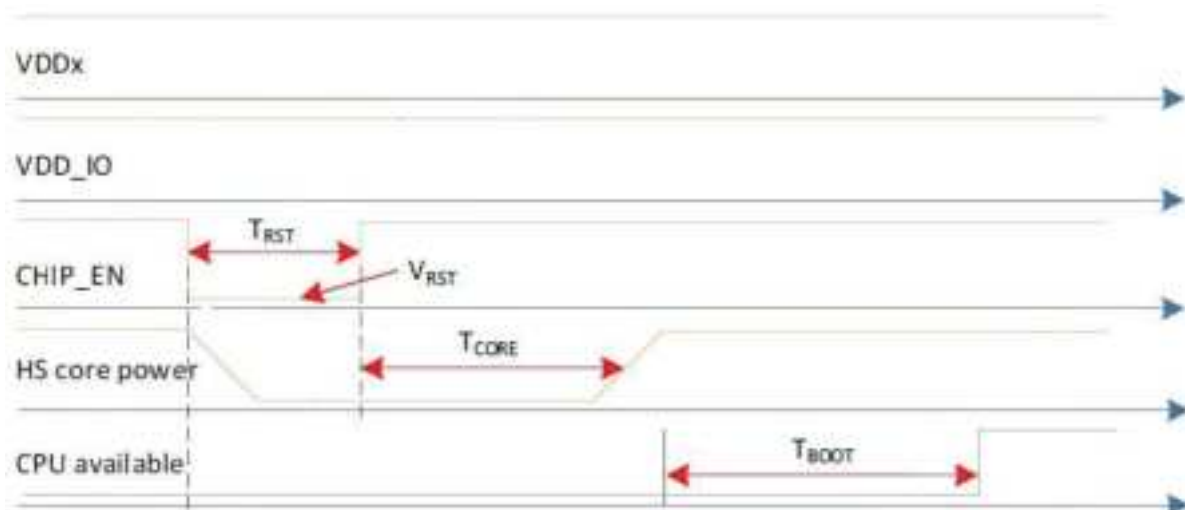
4. Electrical Characteristics

symbol	Parameter	Minimum	Typical	Maximum	Units
VBAT/VDD	3.3V supply voltage	2.97	3.3	3.63	V
VBAT/VDD	current	--	--	500	mA

4.1 Power-on or Resuming from Deepsleep Sequence



Shutdown Sequence



[illegible]

NO	Name	Description
1	GND	Ground connections
2	PA12	General purpose input/output,can be use application Tx port
3	PA13	General purpose input/output,can be use application Rx port
4	PA14	General purpose input/output
5	PA15	General purpose input/output
6	PA27	General purpose input/output
7	PA30	General purpose input/output
8	GND	Ground connections
9	VD1833	Main power source input(+3.3V)
10	GND	Ground connections
11	PA28	External reference resistor for USB analog, 1% accuracy
12	GND	Ground connections

13	PA26	USB differential bus
14	PA25	USB differential bus
15	GND	Ground connections
16	PB1	General purpose input/output
17	PB2	General purpose input/output
18	PB3	General purpose input/output
19	PB13	FLASH SPI CLK
20	PB14	FLASH SPI Data Input (Data Input Output 0)
21	PB16	FLASH Chip Select Input
22	PB17	FLASH SPI Data Input (Data Input Output 1)
23	SPI_WP	FLASH Write Protect Input
24	GND	Ground connections
25	PB22	General purpose input/output
26	PB23	General purpose input/output
27	GND	Ground connections
28	CHIP-EN	CHIP-EN(default pull-up,pull-down reset)
29	GND	Ground connections
30	PA8	UART_LOG_RX (UART_DOWNLOAD)
31	PA7	UART_LOG_TX (UART_DOWNLOAD)
32	GND	Ground connections
33	GND	Ground connections

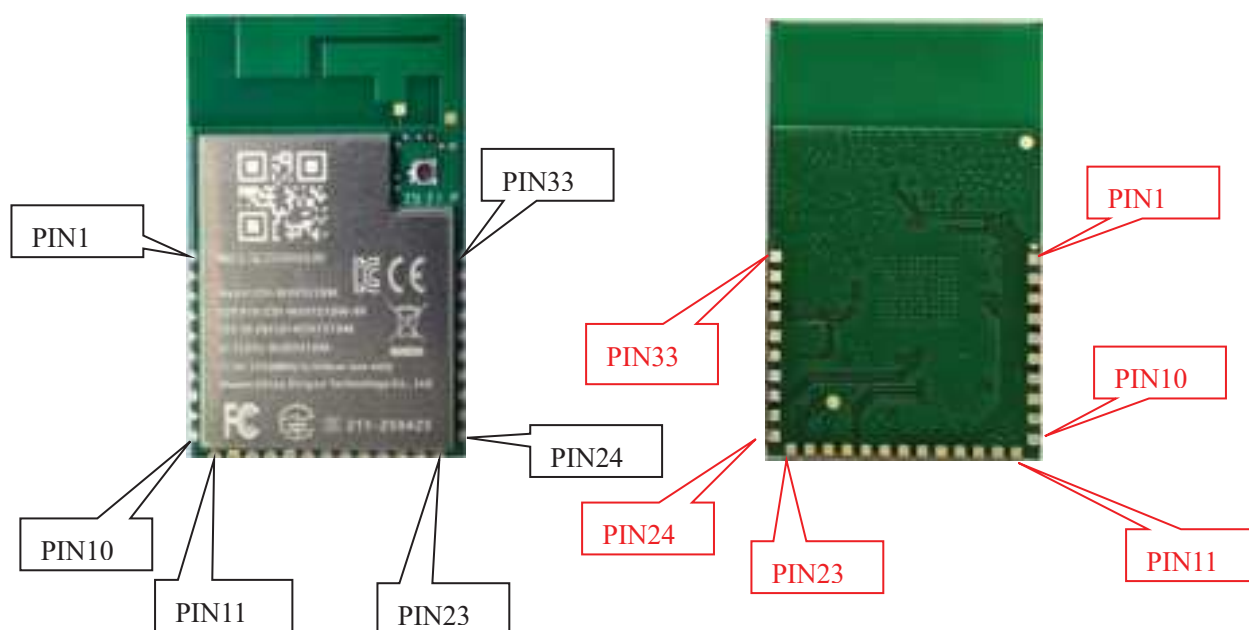
Download : UART_LOG_RX、UART_LOG_TX 、(TX ground before power-on)

When downloading software, run it first and then power on the module

6.Supplier

Supplier list	
Name of material	Material brand
Crystal	FJ /JWT /KYX /TKD
Duplexer	ACX/Walsin/GLEAD/TDK/ Sunlord/FTR
Inductor	Sunlord/CHILISIN/SAMWHA/TDK/MuRata/INPAQ
WiFi chip	Realtek
Capacitance	SAMSUNG /EYANG/ WALSIN/ MuRata/TAIYO/ Darfon
FLASH	MXIC/Winbond/ZBIT/Fudan/GigaDevice
Switch	Maxscend/RichWave/GSR
PCB	Bomin/Kexiang/Sunlord/Taijing

7.Physical photo



8. Warpage



翘曲（间隙）的检验标准：

Warpage (Clearance) Inspection Standard:

将模组放在水平大理石上，用 0.1mm 厚度的塞尺测量模组底部与大理石之间的间隙，

要求 $\text{gap} \leq 0.1\text{mm}$

Place the module on a horizontal marble surface, and use a 0.1mm-thick feeler gauge to measure the clearance between the bottom of the module and the marble. The requirement is that the $\text{gap} \leq 0.1\text{mm}$.

9. Baking & storage temperature & Recommended Reflow Profile（烘烤，储存温度和推荐炉温）

9.1 Baking & storage temperature

A. Storage life: 12 months. Storage conditions: $<40^{\circ}\text{C}$. Relative humidity: $<90\%\text{R.H.}$

(保存期限：12个月，储存环境条件：温度在： $<40^{\circ}\text{C}$ ，相对湿度： $<90\%\text{R.H.}$)

B. After this bag is opened, devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be. (模块包装被拆后，SMT 组装之时限)

a. Check the humidity card :stored at $\leq 20\%\text{RH}$. If :30%~40%(pink) or greater than 40%(red). Labeling module has moisture absorption. (检查湿度卡：显示值应小于30%（蓝色），如：30%~40%(粉红色)或者大于40%（红色）表示模块已吸湿气.)

b. Mounted within 168 hours at factory conditions of: $t \leq 30^{\circ}\text{C}$, $\leq 60\%\text{R.H.}$

(工厂环境温度湿度管制： $\leq 30^{\circ}\text{C}$, $\leq 60\%\text{R.H.}$, 168小时内。)

c. Once opened, the workshop the preservation of life for 168 hours.

(拆封后，车间的保存寿命为168小时.)

C. Module apart packing after 168 hours, If baking is required, devices may be baked for.

(如在拆封后的168个小时内未使用完，需要烘烤，烘烤条件如下：)

a. Modules must be to remove module moisture problem. (模块须重新烘烤，以除去模块吸湿问题.)

b. Baking temperature: $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 120 hours. (烘烤温度条件： $40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ，120小时).

c. After baking, put proper amount of desiccant to seal packages.

(烘烤后，放入适量的干燥剂再密封包装)

D. Module reel packaging items as follows: (模块卷盘包装事项如下：)

a. Storage life: 12 months. Storage conditions: $<40^{\circ}\text{C}$. Relative humidity: $<90\%\text{R.H.}$

(保存期限：12个月，储存环境条件：温度在： $<40^{\circ}\text{C}$ ，相对湿度： $<90\%\text{R.H.}$)

b. Module apart packing after 168 hours, To launch patch need to bake, to move the module hygroscopic, baking temperature conditions: 125°C , 8 hours.

c. (模块拆开包装 168 小时后，如要上线贴片需要重新烘烤，以除去模块吸湿问题，烘烤温度

条件：125℃，8 小时。)

- d. The actual number of module reel packing which is based on the actual number of packages to the customer requirements .

(模块卷盘包装以客户要求的实际包装数量为准。)

E. Module pallet packaging items as follows: (模块托盘包装事项如下:)

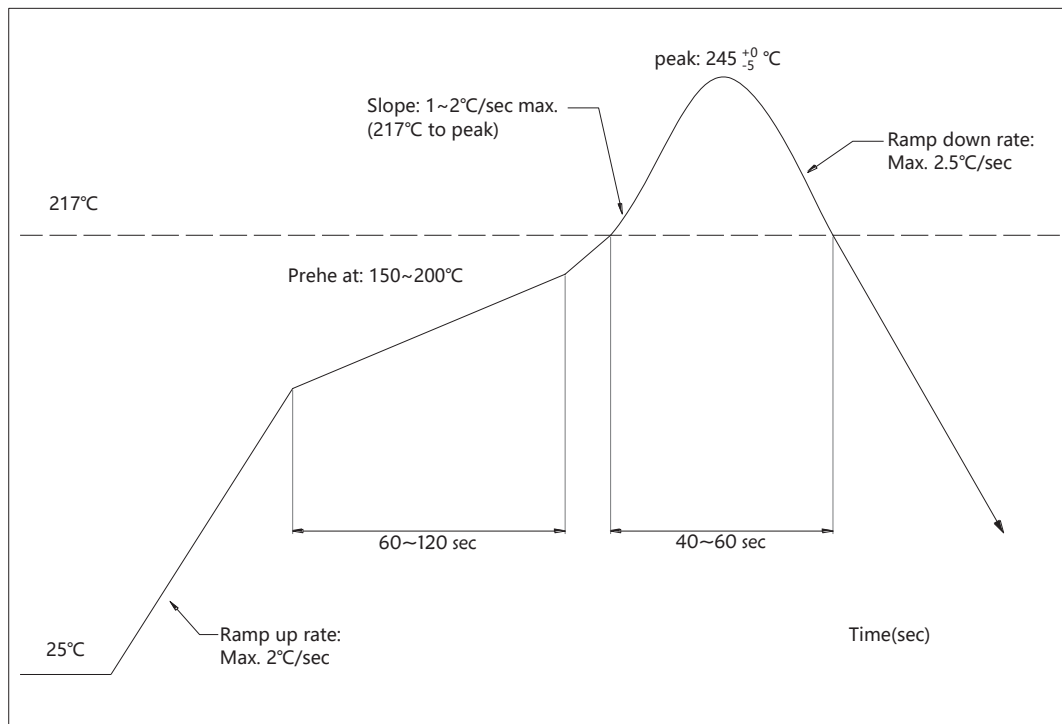
- a. Storage life: 3 months. Storage conditions:<40℃. Relative humidity:<90%R.H.
- b. (保存期限: 3 个月, 储存环境条件: 温度在: <40℃, 相对湿度: <90%R.H.)
- c. Module if not used within 48 hours, before launch the need for baking, baking temperature: 125℃ , 8 hours.
- d. (模块如在 48 小时内未使用, 在上线之前需要进行烘烤, 烘烤温度条件: 125℃, 8 小时。)
- e. Pallet packaging each plate is 100 PCS.The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.
- f. (托盘包装每盘为 100pcs, 模块托盘包装以客户要求的实际包装数量为准。)
- 注: 以上包装方式根据客户要求而定, 包装以实际出货为准.

9.2 Recommended Reflow Profile

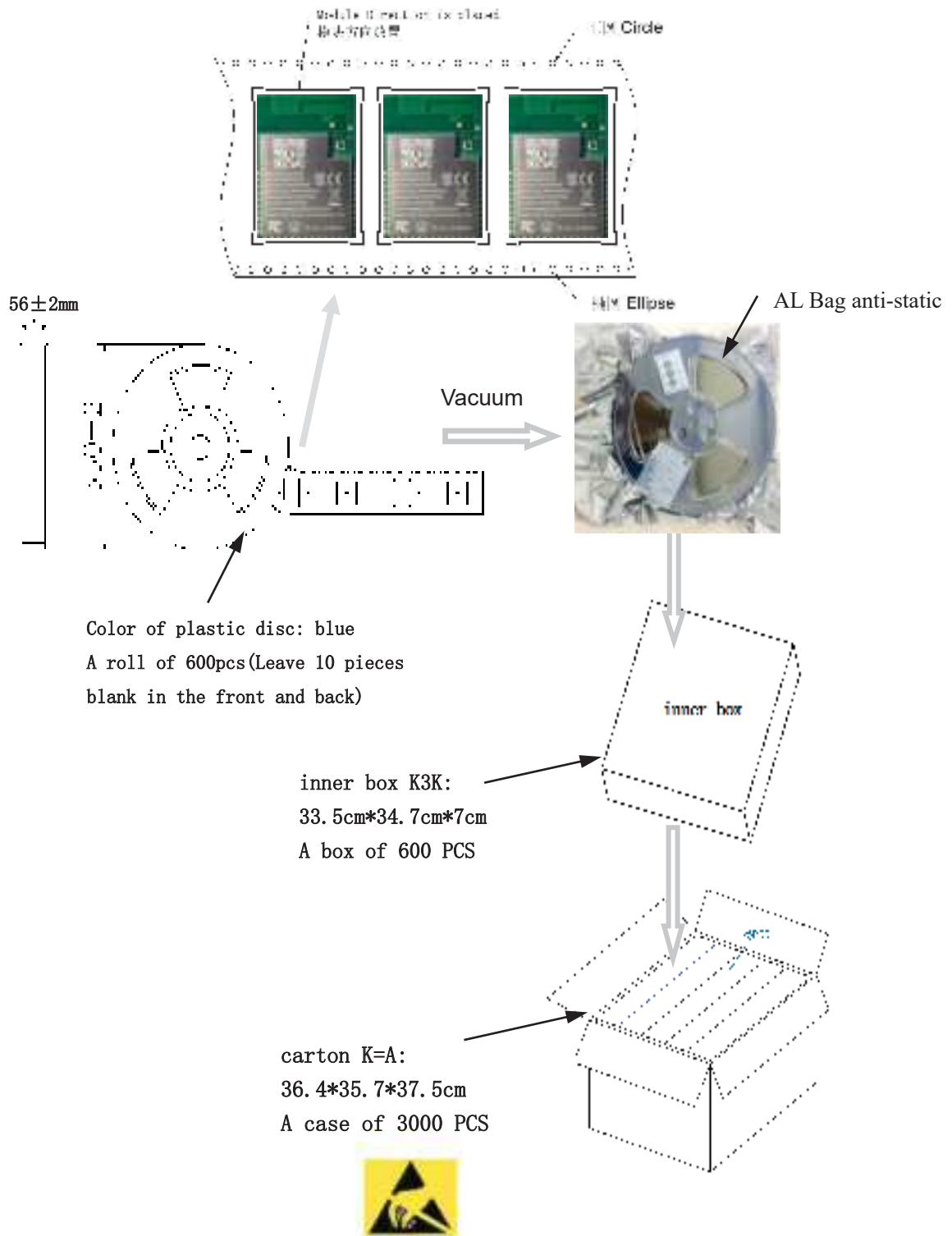
Referred IPC/JEDEC standard.

Peak Temperature : <250℃

Number of Times : ≤2 times



10. Packing information



The CDI-W30721DM is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although CDI-W30721DM is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

11. Appendix

Module integration Description

Integration instructions for host product manufacturers according to 996369 D03 OEM Manual v01r01 Manual v01

11.1 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C&E has been investigated. It is applicable to the modular.

11.2 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

11.3 Limited module procedures

Not applicable

11.4 Trace antenna designs

Not applicable

11.5 RF exposure considerations

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm from your body.

11.6 Antennas

This radio transmitter FCC ID:2BFLD-W30721DM has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna Type	Maximum antenna gain
PCB	BLE:1.68dBi 2.4G WiFi:1.68dBi 5.2G WiFi:1.95dBi 5.3G WiFi:1.93dBi 5.6G WiFi:3.24dBi 5.8G WiFi:3.24dBi

11.7 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2BFLD-W30721DM"

11.8 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

11.9 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B

This device is intended only for OEM integrators under the following condition:

The transmitter module may not be co-located with any other transmitter or antenna. As long as the condition above is 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:

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne. Tant que les 1 condition 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 cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the ISSED cannot 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 Canada authorization. Any company of the host device which install this modular with limit modular approval should perform the test of radiated emission and spurious emission according to RSS-247 and RSSGen requirement, only if the test result comply with RSS-247 and RSS-Gen requirement, then the host can be sold legally.

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' ISSED 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. toute entreprise de l'hôte qui installent ce dispositif modulaire avec limite approbation devrait effectuer l'essai des modules et des rayonnements non essentiels des émissions rayonnées selon RSS-247 et le cnr - gen, seulement si le résultat d'essai conforme RSS-247 et le cnr -gen, puis l'hôte peut être vendu légalement.

End Product Labeling

The final end product must be labeled in a visible area with the following: Contains IC:32294-W30721DM.

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC:32294-W30721DM.

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.

ISED Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

Cet appareil contient des émetteurs/récepteurs sans licence qui sont conformes aux RSS sans licence d'Innovation, Sciences et Développement économique Canada. L'exploitation est soumise aux deux conditions suivantes :

- (1) Cet appareil ne doit pas causer d'interférences.
- (2) Cet appareil doit accepter toute interférence, y compris les interférences qui pourraient causer un fonctionnement indésirable de l'appareil.

ISED Radiation Exposure Statement:

This equipment complies with ISED RF radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet appareil est

conforme aux limites d'exposition de rayonnement RF ISED établies pour un environnement non contrôlé.

Cet émetteur ne doit pas être co-implanté ou fonctionner en conjonction avec toute autre antenne ou transmetteur.

Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps.

The device for operation in the band 5150–5350MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems

L'appareil destiné à fonctionner dans la bande 5150-5350 MHz est uniquement destiné à une utilisation à l'intérieur afin de réduire le risque d'interférence nuisible aux systèmes mobiles par satellite dans le même canal.

FCC 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 use 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 connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment . This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.