



User Manual Initial Setup

FCM9000x series

Ultra-Low Power Wi-Fi Module for IoT Solution

Release version 1.1

Date of release: October 11, 2017

Contact information

For more information, please visit: <http://www.fci.co.kr>

For sales office addresses, please send an email to: fci_sales@fci.co.kr

All information provided in this document is subject to legal disclaimer. © FCI 2017. All rights reserved.

Revision History

Version	Date	Writer	Contents	Remarks
1.0	2017.08.11	WG-FAE		
1.1	2017.10.11	WG-FAE	Add warning statement	

All information provided in this document is subject to legal disclaimer © FCI 2016-2017. All rights reserved.

Contents

1. FCM9000x series Module Board	4
1.1. Board description	4
1.2. USB to serial Driver	6
2. Setup Serial Terminal Utility	7
3. FC9000 setup	8
3.1. Setup STA Mode	8
3.1.1. Normal Mode (None DPM).....	8
3.2. Setup Soft-AP Mode.....	12
4. Federal Communication Commission Interference Statement.....	16
5. Industry Canada statement.....	17

1. FCM9000x series Module Board

1.1. Board description

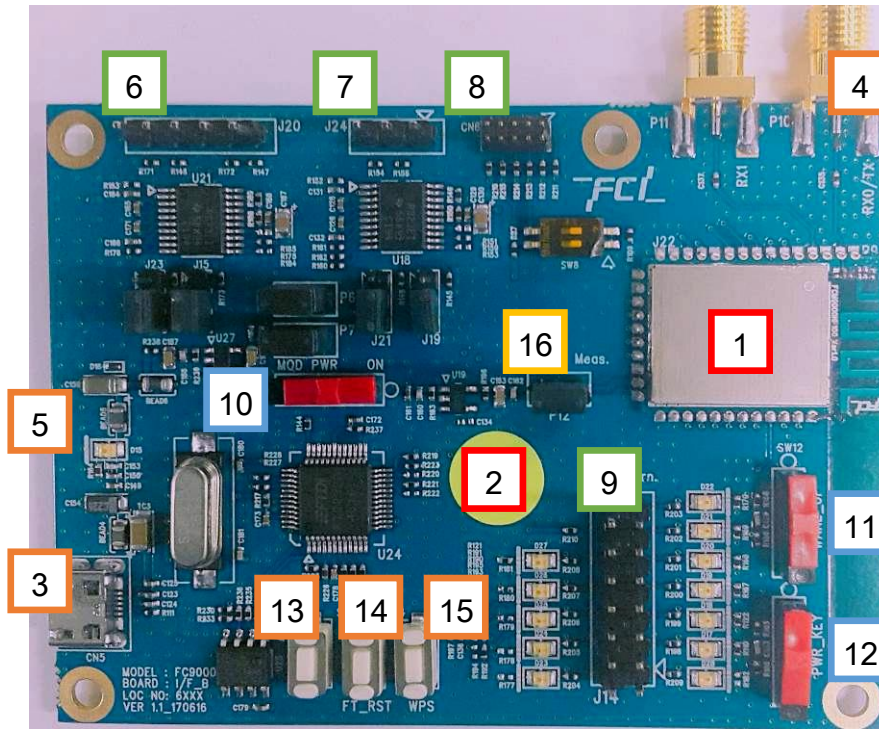


Fig 1. FCM9000NP1000 Module EVB w/ pattern antenna

- 1) FCM9000x module board, Two versions based on Antenna; Pattern Antenna, Wired external Antenna
- 2) Interface board for module
- 3) Micro USB connector to supply power and to control Board
- 4) RF input/output: path for R/Tx
- 5) LED indicator for USB power (5V)
- 6) Uart0 RS-232 Pinout
- 7) Uart1 RS-232 Pinout

All information provided in this document is subject to legal disclaimer © FCI 2016-2017. All rights reserved.

8) Jtag pin

9) GPIO pinout

10) Power switch for FC9000 module VDD

- The switch should be on for normal operation
- The switch should be off stage before micro USB cable is disconnected



Power off



Power on (Normal operation)

11) Wakeup Key of FCM9000N module



Normal operation



Wakeup Interrupt

12) RTC Power switch of FCM9000N module



RTC Power off



RTC Power ON (Normal operation)

13) FT2232 USB IC reset button

14) Factory reset button (not available, will be updated)

15) WPS button (not available, will be updated)

16) Pin header for Current measurement

- Pin header should be short for normal operation
- 3.3V operation

1.2. USB to serial Driver

This Board supports both serial port (UART) and USB (default USB)

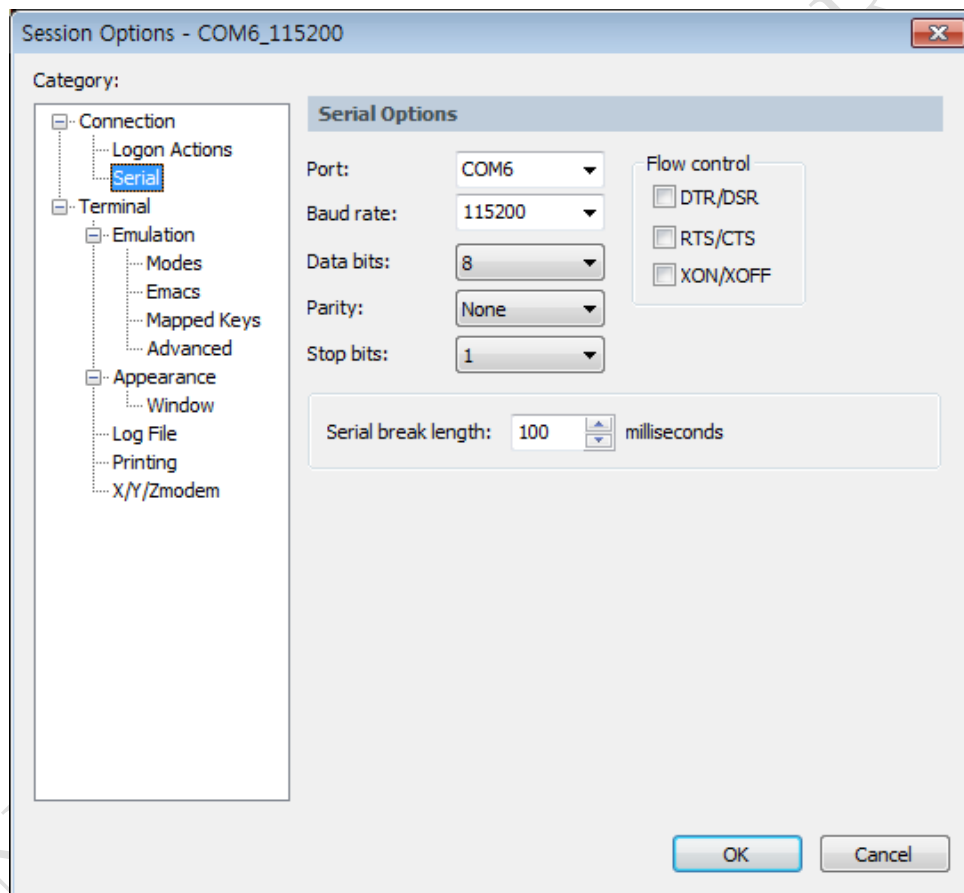
- If use a USB port, install the FT232 Driver for windows.
- In most cases, it will be installed automatically, but if not installed, you can get the driver from the following address.
- http://www.ftdichip.com/Drivers/CDM/CDM21224_Setup.zip

CONFIDENTIAL UNDER NDA

2. Setup Serial Terminal Utility

To connect to console of FCM9000x board, below configuration is required:

- Port: Com Port Number on Windows System
- Baud rate: 115,200 bps
- Data bits: 8 bits
- Parity: None
- Stop bits: 1 bit
- Flow control: None



3. FC9000 setup

The FC9000 device supports the Soft-AP, Station and Wi-Fi Direct modes

- Station: a device that has the capability to use the 802.11 protocol
- Soft-AP: Software enabled access point, This is software enabling FC9000 which hasn't been specifically made to be a router into a wireless access point
- Wi-Fi direct: called Wi-Fi P2P, is a Wi-Fi standard enabling devices to easily connect with each other without requiring a wireless access point

3.1. Setup STA Mode

3.1.1. Normal Mode (None DPM)

Step 1) Clear all saved configuration. (Using "factory" command)

```
[PRADA] factory
FACTORY RESET [N/y/?] y

Factory Reseting....

Rebooting....

*****
*      FCI  PRADA Project
*  Cortex-M0+ (XTAL 40000 KHz, CPU 80000 KHz)
*  OS : ThreadX 5.7 , IAR
*  SW Version Num.   : 1.0.3 (Build 0)
*  SVN Revision      : 14727
*  SVN Repository    : NULL
*  HW Version Num.   : fc900040
*  LMAC Version      : v4.8.0.0
*  RaLIB Version     : FC9K-20170731:144634
*  RoSDK Date & Time : Apr  7 2017 15:21:47
*  Build Date & Time : Aug 10 2017 13:28:57
*                   http://www.fci.co.kr
*****
System Mode : Station Only (0)

>>> Start FC9000 supplicant ...
>>> PRADA supplicant Ver1.00-20170213-01
>>> MAC address (sta0) : aa:ff:01:18:2a:00
>>> sta0 interface add OK
>>> Start STA mode...

[PRADA] |
```


Step 2) Boot FC9000 and run "setup" on console

```
[PRADA]  
[PRADA] setup
```

Step 3) Stop all services for the setting → Yes

```
Stop all services for the setting.  
Are you sure ? [Yes/No] : y
```

Step 4) Select Country Code. (Type national code as two Capital Character)

```
[ FC9000 EASY SETUP ]  
  
Country Code List:  
AT AU BR CA CH CY CZ DE DK EE  
ES FI GB GR HK HU IE IS IT LT  
LU LV NL NO NZ PL PT SE SI SK  
US USE USL USX FR BE CN ID KR MY  
TH TW ZA IL SG JP ILO PH IN  
  
COUNTRY CODE ? [Quit] (Default US) : KR
```

Step 5) Select running mode as "1. Station"

```
SYSMODE(WLAN MODE) ?  
  1. Station  
  2. Soft-AP  
MODE ? [1/2/Quit] (Default Station) : 1
```

Step 6) Select legacy-AP to connect and input index number and password (if required)

```
[ STATION CONFIGURATION ]
=====
[NO] [SSID] [SIGNAL] [CH] [SECURITY]
-----
[ 1] SG-AppleExtreme -45 1 WPA2
-----
[M] Manual Input
[Enter] Rescan
=====

Select SSID ? (1~01/Manual/Quit) : 1

PSK-KEY(ASCII characters 8~63 or Hexadecimal characters 64) ? [Quit]
[123456789|123456789|123456789|123456789|123456789|1234]
:1234567890
```

Step 7) Confirm Configuration

```
=====
SSID      : SG-AppleExtreme
AUTH      : WPA/WAP2
ENCRYPTION: TKIP/AES(CCMP)
PSK KEY   : 1234567890
KEY TYPE  : ASCII
Hidden AP : Not connect
=====
WIFI CONFIGURATION CONFIRM ? [Yes/No/Quit] : y
```

Step 8) Select IP address mode

- Automatic: DHCP Client mode
- Static IP: Static IP address mode

```
Network Connection Type ? [Automatic IP/Static IP/Quit] : a
```

Step 9) Select DPM mode

```
FCI Dynamic Power Management ? [Yes/No/Quit] : n

Factory Reseting...

Configuration OK
```

Step 10) Station mode ready

```
System Mode : Station Only (0)

>>> Start FC9000 supplicant ...
>>> PRADA supplicant Ver1.00-20170213-01
>>> MAC address (sta0) : aa:ff:01:18:2a:00
>>> sta0 interface add OK
>>> Start STA mode...
>>> Selected BSS 4c:32:75:c4:fd:20 ssid='SG-AppleExtreme' (-31)
[MAC DRV] TX POWER INDEX (-1 --> 3) Changed Event
[MAC DRV] PT Power = 0x3
associating with AP with corrupt beacon and probe response
>>> Network Interface (wlan0) : UP
>>> Associated with 4c:32:75:c4:fd:20
<wpa_supp_proc_3_of_4> RX message 3 of 4-Way Handshake from 4c:32:75:c4:fd:20 (ver=2)
[wpa_supp_send_4_of_4] Sending EAPOL-Key 4/4

-- DHCP Client WLAN0: SEL
-- DHCP Client WLAN0: REQ
-- DHCP Client WLAN0: BOUND
    Assigned addr : 10.0.1.2
    netmask       : 255.255.255.0
    gateway       : 10.0.1.1
    DNS addr      : 10.0.1.1

    DHCP Server IP : 10.0.1.1
    Lease Time     : 24h 00m 00s
    Renewal Time   : 12h 00m 00s

[PRADA]
```

3.2. Setup Soft-AP Mode

Step 1) Boot FC9000 and run "setup" on console

```
[PRADA]  
[PRADA] setup
```

Step 2) Stop all services for the setting → Yes

```
Stop all services for the setting.  
Are you sure ? [Yes/No] : y
```

Step 3) Select Country Code (Type national code as two Capital Character)

```
[ FC9000 EASY SETUP ]  
  
Country Code List:  
AT AU BR CA CH CY CZ DE DK EE  
ES FI GB GR HK HU IE IS IT LT  
LU LV NL NO NZ PL PT SE SI SK  
US USE USL USX FR BE CN ID KR MY  
TH TW ZA IL SG JP ILO PH IN  
COUNTRY CODE ? [Quit] (Default US) : KR
```

Step 4) Select running mode as “2. Soft-AP” (depending on the SDK package, you may see fewer options)

```
SYSMODE(WLAN MODE) ?  
  1. Station  
  2. Soft-AP  
MODE ? [1/2/Quit] (Default Station) : 2
```

Step 5) Input AP SSID / Channel number / Security mode

- SSID (Service set identifier): String (alphabet / Unicode / number)
- Channel: Running channel number
- Security: Default is “OPEN” mode for easy setup

```
[ SOFT-AP CONFIGURATION ]  
SSID(NETWORK NAME) ? : bright-ap  
CHANNEL ? [1~13, Auto:0/Quit] (Default Auto) : 1  
  
AUTHENTICATION ?  
  1. OPEN  
  2. WEP(Unsupported)  
  3. WPA-PSK  
  4. WPA2-PSK (Recommend)  
  5. WPA/WPA2-PSK  
AUTHENTICATION ? [1/3/4/5/Quit] : 1  
  
-----  
SSID: bright-ap  
CHANNEL: 1  
AUTH: OPEN  
-----  
WIFI CONFIGURATION CONFIRM ? [Yes/No/Quit] : y
```

Step 6) Input IP-address of Soft-AP. (This address will be used as “default gateway address”)

- IP address / Subnet mask / Default gateway / DNS address
- “Enter” key without new input address will be set as default value.

```
IP ADDRESS ? [Quit] (Default 10.0.0.1) :
SUBNET ? [Quit] (Default 255.255.255.0) :
GATEWAY ? [Quit] (Default 10.0.0.1) :
DNS ? [Quit] (Default 8.8.8.8) :
=====
[WLAN1]
IP ADDRESS    10.0.0.1
SUBNET        255.255.255.0
GATEWAY       10.0.0.1
DNS           8.8.8.8
=====
NETWORK CONFIGURATION CONFIRM ? [Yes/No/Quit] : y
```

Step 7) Configure DHCP server

```
DHCP SERVER LEASE IP Count(MAX 10) ? [Quit] (Default 10) :
DHCP SERVER LEASE TIME(60 ~ 86400 SEC) ? [Quit] (Default 1800) :
=====
DHCP SERVER
Start IP      10.0.0.2
END IP        10.0.0.11
DNS           8.8.8.8
LEASE TIME    1800
=====
DHCP SERVER CONFIGURATION CONFIRM ? [Yes/No/Quit] : y
```

Step 8) Confirm Soft-AP configuration

```

DHCP SERVER CONFIGURATION ? [Yes/No/Quit] : y

DHCP SERVER LEASE IP Count(MAX 10) ? [Quit] (Default 10) :

DHCP SERVER LEASE TIME(60 ~ 86400 SEC) ? [Quit] (Default 1800) :
=====
DHCP SERVER
Start IP   10.0.0.2
END IP    10.0.0.11
DNS       8.8.8.8
LEASE TIME 1800
=====

DHCP SERVER CONFIGURATION CONFIRM ? [Yes/No/Quit] : y

Factory Resetting...

Configuration OK

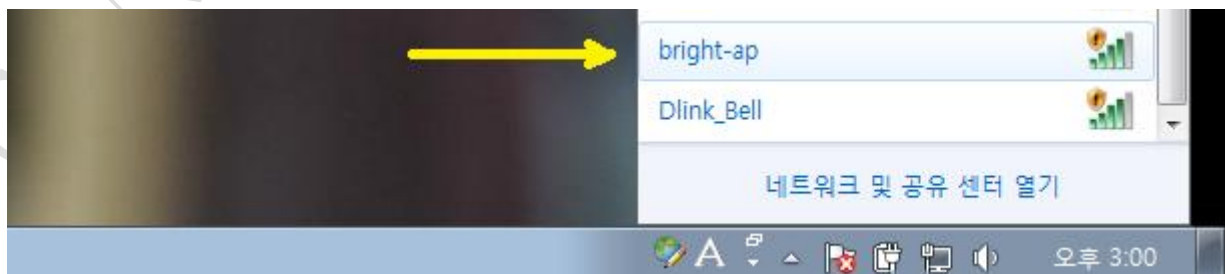
Reboot...
    
```

Step 9) Search Wi-Fi AP on your Window-PC, Tablet, Smart Phone or other Wi-Fi station device

```

>>> Start Soft-AP mode...
OK
[fc9k_acs_find_ideal_chan] ACS: Ideal channel is 1
[MAC DRV] TX POWER INDEX (-1 --> 3) Changed Event
[MAC DRV] PT Power = 0x3
>>> Network Interface (wlan1) : UP

Soft-AP is Ready (aa:ff:01:18:2a:01)
AP-STA-CONNECTED 28:b2:bd:bc:d2:ca
    
```



4. 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.

Radiation Exposure Statement:

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 the maximum antenna gain allowed for use with this device is 2.5 dBi.
- 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.

All information provided in this document is subject to legal disclaimer © FCI 2016-2017. All rights reserved.

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 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: 2AMRF-FCM9000N**". 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.

5. Industry Canada statement

- ❶ This device complies with Industry Canada license-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.
- ❶ 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.
- ❷ This Class B digital apparatus complies with Canadian ICES-003.

All information provided in this document is subject to legal disclaimer © FCI 2016-2017. All rights reserved.

- ② Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
- ⑤ The County Code Selection feature is disabled for products marketed in the US/ Canada.
- ⑤ La fonction de sélection de l'indicatif du pays est désactivée pour les produits commercialisés aux États-Unis et au Canada.

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 minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This device is intended only for OEM integrators under the following conditions: (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 cannot 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 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.

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: 22972-FCM9000N".

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: 22972-FCM9000N".

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 fa

çon 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.

CONFIDENTIAL UNDER NDA