

QCNFA765

**Product name: Wi-Fi 6E BT 5.2 M.2
2230 Module**

Revision History

Revision	Description of Changes
Oct 2021	Initial Release

Introduction

The QCNFA765 module is designed to support Wi-Fi 6 and Bluetooth applications that support 2.4/5GHz, 2 streams 802.11a/b/g/n/ac/ax, and Bluetooth 5.1. The card uses the Microsoft Windows Client Utility (ACU) which is a user-mode utility designed to edit and add profiles for selected network interface adapters.

This module requires professional installation and can be only assembled in a Microsoft Windows laptop/tablet by system manufacture.

System Requirements

- ✦ Laptop/ PC containing:
 - ✦ 32-bit PCI Express Bus
 - ✦ 32 MB memory or greater
 - ✦ 300 MHz processor or higher
- ✦ Microsoft Windows 10

Profile Management

Configure the wireless network adapter (wireless card) from the Profile Management tab of the Client Utility.

- | | |
|--------------------|--------------------------------|
| ✦ Add a profile | Order profiles |
| ✦ Edit a profile | Switch to a different profile |
| ✦ Import a Profile | Remove a profile |
| ✦ Export a Profile | Connect to a Different Network |

The wireless network adapter works in either [infrastructure mode](#) (which uses an access point) or [ad hoc mode](#) (a group of stations participating in the wireless LAN).

Create or Modify a Configuration Profile

To add a new configuration profile, click [New](#) on the Profile Management tab. To modify a configuration profile, select the configuration from the Profile list and click the [Modify](#) button.

The Profile Management dialog box displays the General tab. In profile

- management:  Edit the General tab.
-  Edit the Security tab.
-  Edit the Advanced tab.

To configure a profile for ad hoc or access point (infrastructure) mode, edit the Network Type field on the Advanced tab.

Note that the ACU only allows the creation of 16 configuration profiles. After the creation of 16 profiles, clicking the [New](#) button displays an error message. Remove an old profile or modify an existing profile for a new use.

Remove a Configuration Profile

1. Go to the Profile Management tab.
2. Select the profile to remove from the list of configuration profiles.
3. Click the [Remove](#) button.

Auto Profile Selection Management

Including a profile in the auto selection feature allows the wireless adapter to automatically select that profile from the list of profiles and use it to connect to the network.

Including a profile in auto profile selection:

1. On the Profile Management tab, click the [Order Profiles](#) button.
2. The Auto Profile Selection Management window appears, with a list of all created profiles in the [Available Profiles](#) box.
3. Highlight the profiles to add to auto profile selection, then click [Add](#). The profiles appear in the [Auto Selected Profiles](#) box.

Ordering the auto selected profiles:

1. Highlight a profile in the [Auto Selected Profiles](#) box.
2. Click [Move Up](#), [Move Down](#), or [Remove](#) as appropriate. The first profile in the Auto Selected Profiles box has highest priority, and the last profile has lowest priority.
3. Click [OK](#).
4. Check the [Auto Select Profiles](#) box.
5. Save the modified configuration file.

When auto profile selection is enabled by checking [Auto Select Profiles](#) on the Profile Management tab, the adapter scans for an available network. The profile with the highest priority and the same SSID as one of the found networks is the one that is used to connect to the network. If the connection fails, the adapter tries the next highest priority profile that matches the SSID, and so on.

With auto profile selection enabled, the wireless adapter scans for available networks. The highest priority profile with the same SSID as a found network is used to connect to the network. On a failed connection, the adapter tries with the next highest priority profile.

Switching to a Different Configuration Profile

1. To switch to a different profile, go to the Profile Management tab.
2. Click on the profile name in the Profile List.
3. Click the [Activate](#) button.

The Profile List provides icons that specify the operational state for that profile. The list also provides icons that specify the signal strength for that profile.

Import and Export Profiles

Importing a Profile

1. From the Profile Management tab, click the [Import](#) button. The Import Profile window appears.
2. Browse to the directory where the profile is located.
3. Highlight the profile name.
4. Click [Open](#). The imported profile appears in the profiles list.

Exporting a Profile

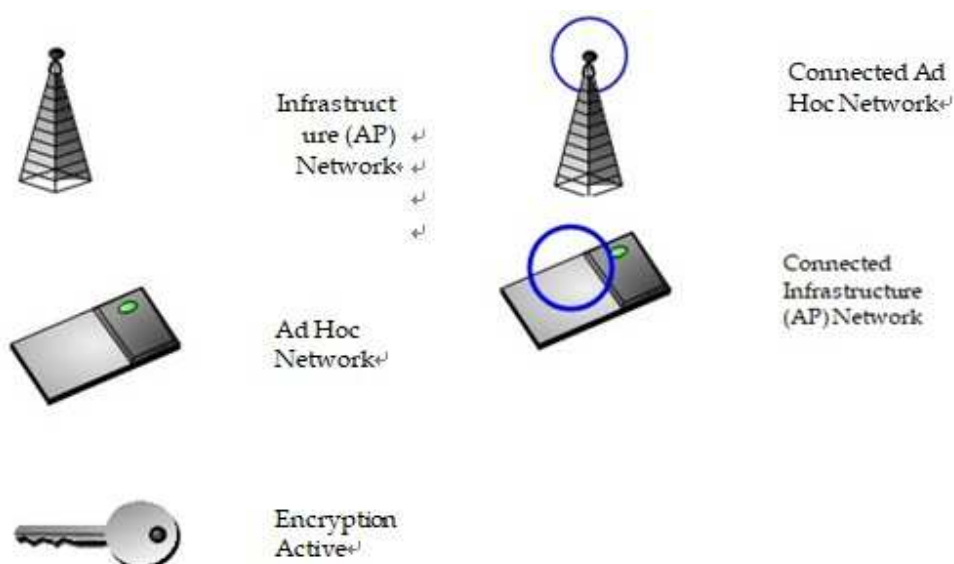
1. From the Profile Management tab, highlight the profile to export.
2. Click the [Export](#) button. The Export Profile window appears.
3. Browse to the directory to export the profile to.
4. Click [Save](#). The profile is exported to the specified location.

Scan Available Networks

Click the [Scan](#) button on the Profile Management tab to scan for available infrastructure and ad hoc networks. On this list, click [Refresh](#) to refresh the list at any time.

Connecting to a different network

- Highlight a network name and click the [Activate](#) button to connect an available network. If no configuration profile exists for that network, the Profile Management window opens to the General tab. Fill in the profile name and click [OK](#) to create the configuration profile for that network.



Tray Icon

The tray icon appears at the bottom of the screen, and shows the signal strength using colors and the received signal strength indication (RSSI).



Hold the mouse cursor over the tray icon to display the current configuration profile name and association, as well as transmit and receive speed and the wireless adapter name and IP address. Right-click on the tray icon to:

Help	Open the online help.																		
Open Client Utility	Launch the Client Utility (ACU). Use the ACU to configure a profile or view status and statistics information.																		
Troubleshooting	Run the Troubleshooting Utility.																		
Preferences	Set the ACU startup and menu options. Check to start the program automatically when Windows starts, and check menu items that should appear on the popup menu.																		
Enable/Disable Radio	Enable or disable the RF signal.																		
Manual LEAP Login	Log in to LEAP manually, if LEAP is set to manually prompt for user name and password on each login.																		
Reauthenticate	Reauthenticate to the access point.																		
Select Profile	Click a configuration profile name to switch to. If no configuration profile exists for a connection, add a profile.																		
Show Connection Status	This window displays connection information: <table> <tr> <td>Active Profile</td><td>Displays the active configuration profile name.</td></tr> <tr> <td>Auto Profile Selection</td><td>Shows whether auto profile selection is enabled.</td></tr> <tr> <td>Connection Status</td><td>Displays whether the adapter is connected to a wireless network.</td></tr> <tr> <td>Link Quality</td><td>Lists the quality of the link connection.</td></tr> <tr> <td>SSID</td><td>Displays the SSID of the associated network.</td></tr> <tr> <td>Access Point Name</td><td>Shows the name of the AP the wireless adapter is connected to.</td></tr> <tr> <td>Access Point IP Address</td><td>Shows the IP address of the access point the wireless adapter is connected to.</td></tr> <tr> <td>Link Speed</td><td>Lists the speed of the link connection.</td></tr> <tr> <td>Adapter IP Address</td><td>Displays the IP address of the wireless adapter.</td></tr> </table>	Active Profile	Displays the active configuration profile name.	Auto Profile Selection	Shows whether auto profile selection is enabled.	Connection Status	Displays whether the adapter is connected to a wireless network.	Link Quality	Lists the quality of the link connection.	SSID	Displays the SSID of the associated network.	Access Point Name	Shows the name of the AP the wireless adapter is connected to.	Access Point IP Address	Shows the IP address of the access point the wireless adapter is connected to.	Link Speed	Lists the speed of the link connection.	Adapter IP Address	Displays the IP address of the wireless adapter.
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Adapter IP Address	Displays the IP address of the wireless adapter.																		
Exit	Exit the Client Utility application.																		

The colors are defined as follows:

Color	Quality	RSSI*
Green	Excellent	20 dB +
Green	Good	10-20 dB +
Yellow	Poor	5-10 dB
Red	Poor	< 5 dB
Gray	No Connection	No Connection

*Received signal strength indication RSSI. Displayed in dB or percentage. Enable or disable the tray icon in the Action menu.

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.

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

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 15

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.

Antenna Set	RF Chain No.	Thread	Model	Antenna Ref. Coeff. (dB)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Channel1	10XN10103	2W042N04	0.43	2.4-2.4835 GHz	0.78	PIFA	I-peak(MHF 4L)	300mm
				0.06	5.15-5.25 GHz	1.18			
				0.07	5.25-5.825 GHz	1.10			
				4.81	5.47-5.725 GHz	1.2			
				4.2	5.725-5.825 GHz	1.27			
2	Channel1	H0N880	200 20083	5.04	5.000-5.095 GHz	1.09	PIFA	I-peak(MHF 4L)	300mm
				5.14	5.825-6.425 GHz	1.32			
				0.09	6.425-6.525 GHz	1.35			
				0.10	6.525-6.875 GHz	1.4			
				0.12	6.875-7.125 GHz	1.45			
3	Channel1	H0N880	200 20084	3.32	2.4-2.4835 GHz	0.9	Monopole	I-peak(MHF 4L)	300mm
				3.35	5.150-5.250 GHz	0.70			
				3.42	5.250-5.350 GHz	0.78			
				4.27	5.400-5.725 GHz	0.91			
				4.22	5.725-5.800 GHz	0.95			
				4.21	5.800-5.095 GHz	0.98			
				4.75	5.925-6.425 GHz	0.87			
				4.20	6.425-6.525 GHz	0.91			
				4.81	6.525-6.875 GHz	0.95			
				4.24	6.875-7.125 GHz	0.90			

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: “Contains FCC ID: **A5M-QCNFA765**”. 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

Prohibited for control of or communications with unmanned aircraft systems, including drones.

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.

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.

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.

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.

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.

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.

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 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: **5903G-QCNFA765**".

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: **5903G-QCNFA765**".

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.

Caution :

(i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

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(iii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate;

(iv) where applicable, antenna type(s), antenna models(s), and worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.

Avertissement:

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

(i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5 250 à 5 350 MHz et de 5 470 à 5 725 MHz doit être conforme à la limite de la p.i.r.e.;

(iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5 725 à 5 850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée, selon le cas;

(iv) lorsqu'il y a lieu, les types d'antennes (s'il y en a plusieurs), les numéros de modèle de l'antenne et les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, énoncée à la section 6.2.2.3, doivent être clairement indiqués

DETACHABLE ANTENNA USAGE

This radio transmitter [IC: **5903G-QCNFA765**] has been approved by Innovation, Science and Economic Development Canada 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.

Le présent émetteur radio [IC: **5903G-QCNFA765**] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types

d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna No.	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Chain01	HONGBO	2SD 25084	0.55	0.4-0.4015 GHz	0.78	PIFA	I-peak(NHF 4L)	300mm
				3.05	0.15-0.25 GHz	1.10			
				3.07	0.25-0.35 GHz	1.18			
				4.81	0.47-0.725 GHz	1.2			
				4.7	5.075-5.125 GHz	1.07			
2	Chain01	HONGBO	2SD 25084	3.32	2.4-2.4835 GHz	0.5	Monopole	I-peak(NHF 4L)	200mm
				3.35	0.150-0.250 GHz	0.70			
				3.42	0.250-0.350 GHz	0.78			
				4.77	5.470-5.725 GHz	0.81			
				4.77	5.075-5.125 GHz	0.85			

取得審驗證明之低功率射頻器材，非經核准，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。
低功率射頻器材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。前述合法通信，指依電信管理法規規定作業之無線電通信。低功率射頻器材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。

- 1. 應避免影響附近雷達系統之操作。
- 2. 高增益指向性天線只得應用於固定式點對點系統。

系統廠商應於平台上標示「本產品內含射頻模組：XXXyyyLPDzzzz-x」字樣。

系統廠商外包裝需標示 NCC LOGO