

User Manual

Model Name: WN9722HAX22-DM (AIOS7.0-DH)

Brand Name : Arcadyan

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1 Specification

1-1 Basic Specification

2. Item	Contents		
Manufacture	Arcadyan		
Product Name	HEOS 7.0 Platform Module Type DH		
Model Name	WN9722HAX22-DM (AIOS7.0-DH)		
Chip	SOC	Vendor	Model name
	CPU	Mediatek	
	2.4GHz MAC/BB/RF	Mediatek	
	2.4GHz PA(Tx)	Mediatek	
	2.4GHz LNA(Rx)	Mediatek	
	2.4GHz BPF(Rx)	ACX	
	5GHz MAC/BB/RF	Mediatek	
	5GHz PA(Tx)	Mediatek	
	5GHz LNA(Rx)	Mediatek	
	5GHz BPF(Rx)	ACX	
	6GHz MAC/BB/RF	Mediatek	
	6GHz PA(Tx)	Mediatek	
	6GHz LNA(Rx)	Mediatek	
	6GHz BPF(Rx)	ACX	

2 Detail Specification

2-1 WLAN Specification

Item	Specification	Remark
Chip		
Interface	SDIO	
Frequency	2400~2483.5MHz(FCC, CE, JP) 2471~2497MHz(JP) 5150~5250MHz(W52, U-NII-1, Band 1) 5250~5350MHz(W53, U-NII-2A, Band 2) 5470~5725MHz(W56, U-NII-2C, Band 3) 5725~5850MHz(W58, U-NII-3, Band 4) DFS support 5945~6425MHz	
Data Rate	IEEE 802.11b: 11, 5.5, 2, 1Mbps IEEE 802.11a 54, 48, 36, 24, 18, 12, 9, 6Mbps IEEE 802.11n HT20 Up to 144Mbps IEEE 802.11n HT40 Up to 300Mbps IEEE 802.11ac VHT80 Up to 866.7Mbps IEEE 802.11ax HE80 Up to 1200Mbps	
MIMO	2T2R	

2-1-1 Bluetooth Specification

Item	Specification	Remark
Chip		
Interface	SDIO	
Operating Frequency	2.4 - 2.4835 GHz	
Modulation	GFSK 250kHz Adaptive Frequency Hopping, 24bit CRC 128bit AES CCM	
Channel Spacing	1MHz	
Receive Sensitivity	-86dBm at 0.1% BER	
Antenna	External U.FL connector Impedance: 50 Ohm	

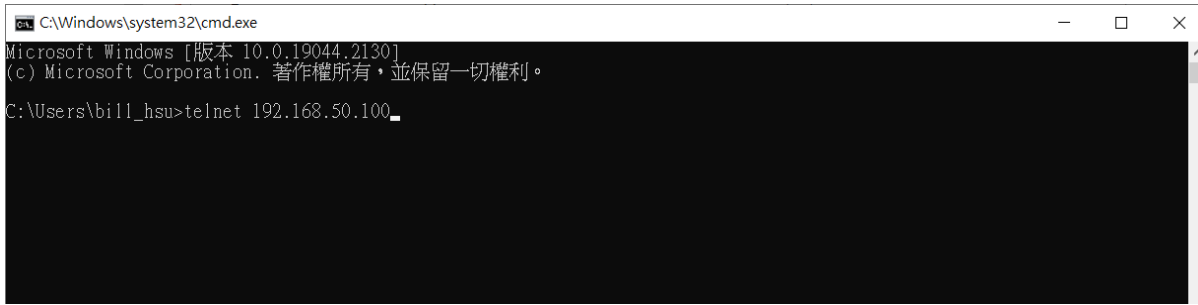
2-2 Antenna List

Set	Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)			
							2.4GHz	5GHz	6GHz	Bluetooth
1	1	1	WIESON	ARY196-0383-005-00	Dipole Antenna	I-PEX	-	-	-	2.1
	2	1	WIESON	ARY196-0383-006-00	Dipole Antenna	I-PEX	2.2	2.7	2.8	-
	3	2	WIESON	ARY196-0383-007-00	Dipole Antenna	I-PEX	1.7	1.6	1.7	-
2	1	1	WIESON	ARY196-0383-008-00	Dipole Antenna	I-PEX	-	-	-	1.7
	2	1	WIESON	ARY196-0383-009-00	Dipole Antenna	I-PEX	2.0	2.2	2.3	-
	3	2	WIESON	ARY196-0383-010-00	Dipole Antenna	I-PEX	1.1	1.0	0.9	-
3	1	1	WIESON	ARY196-0383-034-H0	PCB Antenna	I-PEX	-	-	-	2.84
	2	1	WIESON	ARY196-0383-035-H0	PCB Antenna	I-PEX	2.8	3.82	4.16	-
	3	2	WIESON	ARY196-0383-036-H0	PCB Antenna	I-PEX	2.66	3.78	4.23	-
4	1	1	WIESON	ARY196-0383-039-H0	PCB Antenna	I-PEX	-	-	-	2.75
	2	1	WIESON	ARY196-0383-037-H0	PCB Antenna	I-PEX	2.14	2.18	2.26	-
	3	2	WIESON	ARY196-0383-038-H0	PCB Antenna	I-PEX	2.54	3.38	3.75	-
5	1	1	WIESON	ARY196-0383-042-H0	PCB Antenna	I-PEX	-	-	-	1.82
	2	1	WIESON	ARY196-0383-040-H0	PCB Antenna	I-PEX	1.97	1.9	2.46	-
	3	2	WIESON	ARY196-0383-041-H0	PCB Antenna	I-PEX	1.15	2.85	3.5	-
6	1	1	INPAQ	WA-P-LA-01-106	PCB Antenna	I-PEX	-	-	-	2.98
	2	1	INPAQ	WA-P-LE-03-039	PCB Antenna	I-PEX	2.74	3.42	3.67	-
	3	2	INPAQ	WA-P-LE-02-353	PCB Antenna	I-PEX	4.78	5.45	4.64	-

7	1	1	INPAQ	WA-P-LA-01-107	PCB Antenna	I-PEX	-	-	-	3.4
	2	1	INPAQ	WA-P-LE-02-378	PCB Antenna	I-PEX	3.36	2.39	2.62	-
	3	2	INPAQ	WA-P-LE-03-041	PCB Antenna	I-PEX	2.53	5.87	4.69	-
8	1	1	INPAQ	WA-P-LA-01-108	PCB Antenna	I-PEX	-	-	-	3.04
	2	1	INPAQ	WA-P-LE-02-380	PCB Antenna	I-PEX	5.46	5.75	7.1	-
	3	2	INPAQ	WA-P-LE-03-042	PCB Antenna	I-PEX	5.41	6.09	6.67	-

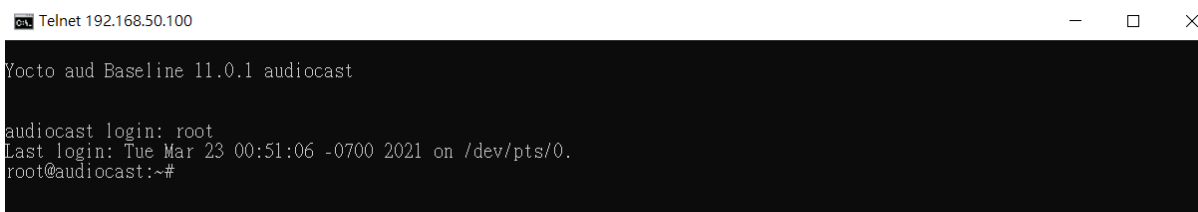
Normal Setup

- (EUT 1G ETH RJ45 link PC , IP domain set to 192.168.50.xxx , use telnet and set IP to 92.168.50.100 , input " root" then press "enter" button.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [版本 10.0.19044.2130]
(c) Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Users\bill_hsu>telnet 192.168.50.100_
```

Fig. Windows CMD



```
Telnet 192.168.50.100
Yocto aud Baseline 11.0.1 audiocast

audiocast login: root
Last login: Tue Mar 23 00:51:06 -0700 2021 on /dev/pts/0.
root@audiocast:~#
```

Fig. Login for telnet 192.168.50.100

- Setup EUT to link AP:

Prepare an AP device (with wi-fi 5G function) , set IP address to 192.168.0.102 , and set SSID of 5G to “5G” / password : 12345678 。

telnet command:

- `python3 arc_wifi.py -s 5G -p 12345678 -I 192.168.0.102`
#connect AP and EUT , set IP address of wlan0 to 192.168.0.102
- `ping 192.168.0.101 -I 192.168.0.102`
use wlan0 (192.168.0.102) of EUT to ping 192.168.0.101 which is the IP address of the PC/NB linked AP LAN port.


```

Telnet 192.168.50.100
root@audiocast:~#
root@audiocast:~#
root@audiocast:~# python3 arc_wifi.py -s 5G -p 12345678 -l 192.168.0.102
===== WIFI STA Connection test =====
[ARC/WIFI/INFO]: Interface = wlan0
[ARC/WIFI/INFO]: SSID = 5G
[ARC/WIFI/INFO]: PSK = 12345678
[ARC/WIFI/INFO]: IP = 192.168.0.102
[ARC/WIFI/INFO]: MASK = 24
[ARC/WIFI/INFO]: Kill wpa_supplicant process...
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Cleanup folder /tmp/arc/wifi ...
[ARC/WIFI/INFO]: Cleanup folder /tmp/arc/wifi/wpa_supplicant ...
[ARC/WIFI/INFO]: Stop the C4A Daemon
[ARC/WIFI/INFO]: Stop the C4A Init
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Shut down the ap0 for full antenna
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Copy conf file...
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Start wpa_supplicant...
Successfully initialized wpa_supplicant
rkill: Cannot open RFKILL control device
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Remove all network...
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Add new network...
[ARC/WIFI/INFO]: mode = 0
[ARC/WIFI/INFO]: Set network ssid...
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Set network psk...
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Enable network...
[ARC/WIFI/INFO]: OK
[ARC/WIFI/INFO]: Waiting 1 ...
[ARC/WIFI/INFO]: Waiting 2 ...
[ARC/WIFI/INFO]: Waiting 3 ...
[ARC/WIFI/INFO]: Waiting 4 ...
[ARC/WIFI/INFO]: Connect to the AP = 5G
[ARC/WIFI/INFO]: IP = 192.168.0.102
[ARC/WIFI/INFO]: MASK = 24
root@audiocast:~#

```

Fig. Set up Wi-Fi connection between DUT and AP

```

Telnet 192.168.50.100
root@audiocast:~# ping 192.168.0.101 -I 192.168.0.102
PING 192.168.0.101 (192.168.0.101) from 192.168.0.102 : 56(84) bytes of data.
64 bytes from 192.168.0.101: icmp_seq=1 ttl=128 time=8.24 ms
64 bytes from 192.168.0.101: icmp_seq=2 ttl=128 time=3.04 ms
64 bytes from 192.168.0.101: icmp_seq=3 ttl=128 time=2.94 ms
64 bytes from 192.168.0.101: icmp_seq=4 ttl=128 time=3.03 ms
64 bytes from 192.168.0.101: icmp_seq=5 ttl=128 time=4.94 ms
64 bytes from 192.168.0.101: icmp_seq=6 ttl=128 time=4.89 ms
64 bytes from 192.168.0.101: icmp_seq=7 ttl=128 time=3.05 ms
64 bytes from 192.168.0.101: icmp_seq=8 ttl=128 time=4.81 ms
64 bytes from 192.168.0.101: icmp_seq=9 ttl=128 time=2.94 ms
64 bytes from 192.168.0.101: icmp_seq=10 ttl=128 time=4.29 ms
64 bytes from 192.168.0.101: icmp_seq=11 ttl=128 time=3.00 ms
64 bytes from 192.168.0.101: icmp_seq=12 ttl=128 time=4.87 ms
64 bytes from 192.168.0.101: icmp_seq=13 ttl=128 time=3.13 ms
64 bytes from 192.168.0.101: icmp_seq=14 ttl=128 time=2.99 ms
64 bytes from 192.168.0.101: icmp_seq=15 ttl=128 time=4.33 ms
64 bytes from 192.168.0.101: icmp_seq=16 ttl=128 time=2.98 ms
64 bytes from 192.168.0.101: icmp_seq=17 ttl=128 time=4.68 ms
64 bytes from 192.168.0.101: icmp_seq=18 ttl=128 time=4.49 ms
64 bytes from 192.168.0.101: icmp_seq=19 ttl=128 time=3.00 ms
64 bytes from 192.168.0.101: icmp_seq=20 ttl=128 time=2.98 ms
64 bytes from 192.168.0.101: icmp_seq=21 ttl=128 time=2.99 ms
64 bytes from 192.168.0.101: icmp_seq=22 ttl=128 time=4.46 ms
64 bytes from 192.168.0.101: icmp_seq=23 ttl=128 time=2.99 ms
^C
--- 192.168.0.101 ping statistics ---
23 packets transmitted, 23 received, 0% packet loss, time 22039ms
rtt_min/avg/max/mdev = 2.942/3.876/8.247/1.231 ms
root@audiocast:~#

```

Fig. ping 192.168.0.101 from 192.168.0.102

FCC Statement

Federal Communication Commission Interference Statement

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 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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device is restricted for indoor use.

The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or Communications with unmanned aircraft systems.

IMPORTANT NOTE:

FCC 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 integrator only. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

OEM integrators are responsible for ensuring that the end-user has no manual instructions to remove or install module

The module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).

The host manufacturer should reference KDB Publication 996369 D04 Module Integration Guide.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be

satisfied.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

If the labelling area is small than the palm of the hand, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or Communications with unmanned aircraft systems.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: **RAXAIOS7** ".

If the labelling area is larger than the palm of the hand, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

FCC regulations restrict the operation of this device to indoor use only.

IC Statement

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.

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.

Dynamic Frequency Selection (DFS) for devices operating in the bands 5250- 5350 MHz, 5470-5600 MHz and 5650-5725 MHz.

Sélection dynamique de fréquences (DFS) pour les dispositifs fonctionnant dans les bandes 5250-5350 MHz, 5470-5600 MHz et 5650-5725 MHz.

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.

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.

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.

le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5250-5350 MHz et 5470-5725 MHz doit se conformer à la limite de p.i.r.e.

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 specified for point-to-point and non-point-to-point operation as appropriate.

le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5725-5850 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour l'exploitation point à point et non point à point, selon le cas.

For indoor use only.

Pour une utilisation en intérieur uniquement.

Devices shall not be used for control of or communications with unmanned aircraft systems.

Les appareils ne doivent pas être utilisés pour contrôler ou communiquer avec des systèmes d'aéronefs sans pilote.

Devices shall not be used on oil platforms.

Les appareils ne doivent pas être utilisés sur les plates-formes pétrolières.

Devices shall not be used on aircraft, except for the low-power indoor access points, indoor subordinate devices, low-power client devices, and very low-power devices operating in the 5925-6425 MHz band, that may be used on large aircraft as defined in the Canadian Aviation Regulations, while flying above 3,048 metres (10,000 feet).

Les appareils ne doivent pas être utilisés sur les avions, à l'exception des points d'accès intérieure à faible puissance, des dispositifs subordonnés intérieurs, des dispositifs clients de faible puissance et des dispositifs de très faible puissance fonctionnant dans la bande 5925-6425 MHz, qui peut être utilisée sur de grands avions tel que défini dans la réglementation de l'aviation canadienne, tout en volant au-dessus de 3 048 mètres (10 000 pieds).

Devices shall not be used on automobiles.

Les appareils ne doivent pas être utilisés sur les automobiles.

Devices shall not be used on trains.

Les appareils ne doivent pas être utilisés dans les trains.

Devices shall not be used on maritime vessels.

Les appareils ne doivent pas être utilisés sur les navires maritimes.

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 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.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This radio transmitter (IC: [4711A-AIOS7](#)) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: [4711A-AIOS7](#)) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains IC: [4711A-AIOS7](#) ".

The Host Model Number (HMN) must be indicated at any location on the exterior of the end product or product packaging or product literature which shall be available with the end product or online.

[Devices shall not be used for control of or communications with unmanned aircraft systems.](#)

Les appareils ne doivent pas être utilisés pour contrôler ou communiquer avec des systèmes d'aéronefs sans pilote.

CE Statement

For MPE Statement – Mobile device

This equipment complies with EU 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.

All operational modes:

2.4GHz: 802.11b, 802.11g, 802.11n (HT20), 802.11n (HT40) , 802.11n (VHT20),
802.11n (VHT40), ,802.11ax (HEW20),802.11ax (HEW40), Bluetooth(BR/EDR, LE),
5GHz: 802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT20), 802.11ac (VHT40),
802.11ac (VHT80) ,802.11ax (HEW80), 802.11ax(HEW20),802.11ax (HEW40)
6GHz: 802.11ax (HEW20), 802.11ax(HEW40),802.11ax (HEW80)

The frequency and the maximum transmitted power in EU are listed below:

2412-2472MHz: 20 dBm

2402-2480MHz (BR/EDR): 20 dBm

2402-2480MHz (LE): 20 dBm

5180-5240MHz: 23 dBm

5260-5320MHz: 20 dBm

5500-5700MHz: 20 dBm

5745-5825 MHz: 13.98 dBm

5955-6415MHz: 23 dBm

	AT	BE	BG	HR	CY	CZ	DK
	EE	FI	FR	DE	EL	HU	IE
	IT	LV	LT	LU	MT	NL	PL
	PT	RO	SK	SI	ES	SE	UK(NI)

WLAN: restricted to indoor use only when operating in 5150-5350 MHz band.

The device is restricted to indoor use only when operating in the 5945 to 6425MHz frequency range.

Telec Statement

5GHz band (W52, W53): Indoor use only (except communicate to high power radio)

NCC Statement

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。

應避免影響附近雷達系統之操作。

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，並要求平台廠商於平台上標示「本產品內含射頻模組」CC XX xx LP yy Z z。