WNFQ-261ACNI(BT)

802.11ac/a/b/g/n 2T2R Industrial-graded Wi-Fi / Bluetooth 4.2 Combo M.2 2230 Module

Industrial-Grade WiFi +Bluetooth Combo Solution M.2 2230 Module

SparkLAN WNFQ-261ACNI(BT) is an 802.11ac/a/b/g/n Dual-Band Wi-Fi / Bluetooth M.2 230 module based on Qualcomm Atheros QCA6174A chipset. This highly integrated module supports most of WLAN capabilities with seamless roaming and advanced security for enterprise application. The wireless module complies with IEEE 802.11 ac/a/b/g/n 2x2 MIMO. The Bluetooth Supports BT 4.2 + HS, BLE and is backwards compatible with BT 1.X, 2.X Enhanced Data Rate. The integrated module provides PCIE Interface for Wi-Fi and USB interface for Bluetooth. The download speed are 300Mbps on N networks and 867Mbps on AC network.

Adopting the latest 802.11ac solution. WNFQ-261ACNI(BT) is ideal for next-generation high throughput enterprise networking and Industrial-graded (-40°C ~ +85°C) solution. Incorporated with advanced security encryption, such as WEP, WPA, WPA2, WPS, and 802.1x, it helps prevent user's devices from malicious attacks.

Embedded Application

Applications include IPC/ Advertising machine/ OTT/ IPTV/ DVB/ STB / DV/ Mini Driving Recorder/ Intelligent Projector Pico/ VR/ AR terminal/ POS machine/ Vehicle mounted front/ Rear Terminal UAV/ Robot/ Intelligent Gateway/ Smart city and other electronic products

Key Feature

- Supports low power PCIe (w/L1 substate) interfaces for WLAN and USB1.1 interface for Bluetooth.
- Support Bluetooth 4.2 + HS, BLE, ANT+ and be backwards compatible with Bluetooth 1.2, 2.X + enhanced data rate.
- Supports 20/40 MHz at 2.4 GHz and supports 20/40/80 MHz at 5 GHz (SW PL determines 2.4 GHz HT40/VHT40 support)
- NGFF (M.2) Form factor which is compliant with ROHS requirements.

Specification

Standards	IEEE 802.11ac/a/b/g/n (2T2R) Bluetooth V4.2,V4.1,V4.0 LE, V3.0+HS, V2.1+EDR
Chipset	Qualcomm Atheros QCA6174A
Data Rate	802.11b: 11Mbps / 802.11a/g: 54Mbps / 802.11n: MCS0~15/ 802.11ac: MCS0~9 Bluetooth: 1 Mbps, 2Mbps and Up to 3Mbps
Operating Frequency	IEEE 802.11 ac/a/b/g/n ISM Band, 2.400GHz~2.497GHz, 4900GHz~5.845GHz *Subject to local regulations
Interface	PCIe: WLAN / USB: Bluetooth
Form Factor	M.2 2230
Antenna	2xIPEX MHF4 connectors
Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11a/g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
Power Consumption	TX: 610mA / RX: 285mA
Operating Voltage	DC 3.3V
Operating Temperature Range	-40°C~+85°C
Storage Temperature Range	-40°C~+85°C
Humidity **(Non-Condensing)**	10%~95% (Operating) 10%~95% (Storing)
Dimension (in mm)	L x W x H: 30(±0.15) x 22(±0.15) x1.95(±0.2) mm
Weight (g)	≦ 7g
Driver Support	Win7 / Win8.1 / Win10 and Linux 4.9+
Security	64/128-bits WEP, WPA, WPA2, 802.1x

OUTPUT POWER & SENSITIVITY		
802.11b		
Data Rate	**Tx ± 2dBm**	**Rx Sensitivity**
11Mbps	15dBm	≦-91dBm

802.11g		
Data Rate	**Tx ± 2dBm**	**Rx Sensitivity**
54Mbps	15dBm	≦-75dBm

802.11n / 2.4GHz			
HT20	**Data Rate**	**Tx ± 2dBm (2TX)**	**Rx Sensitivity**
	MCS7	16dBm	≦-71dBm
HT40	MCS7	16dBm	≦-69dBm

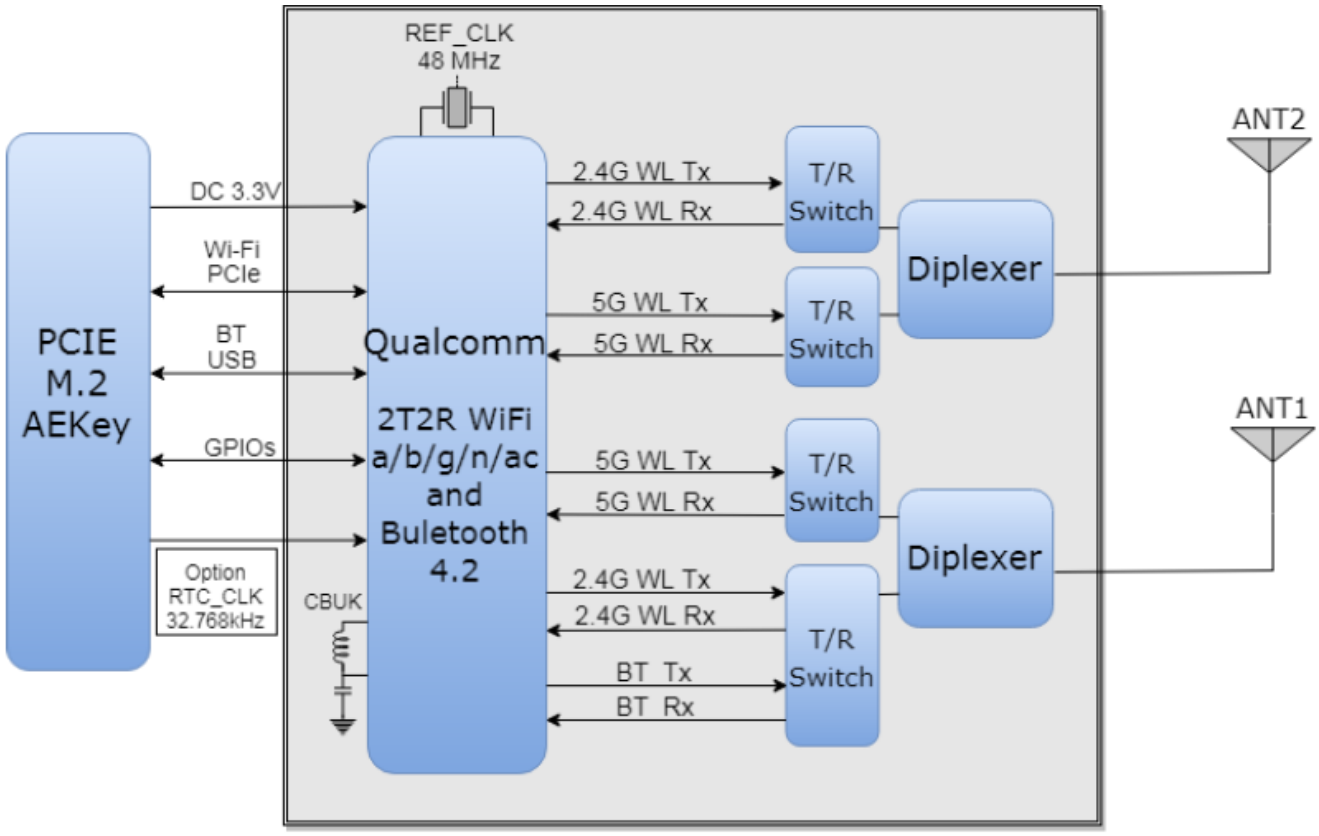
802.11a		
Data Rate	**Tx ± 2dBm**	**Rx Sensitivity**
54Mbps	13dBm	≦-65dBm

802.11n / 5GHz			
HT20	**Data Rate**	**Tx ± 2dBm (2TX)**	**Rx Sensitivity**
	MCS7	13dBm	≦-74dBm
HT40	MCS7	13dBm	≦-71dBm

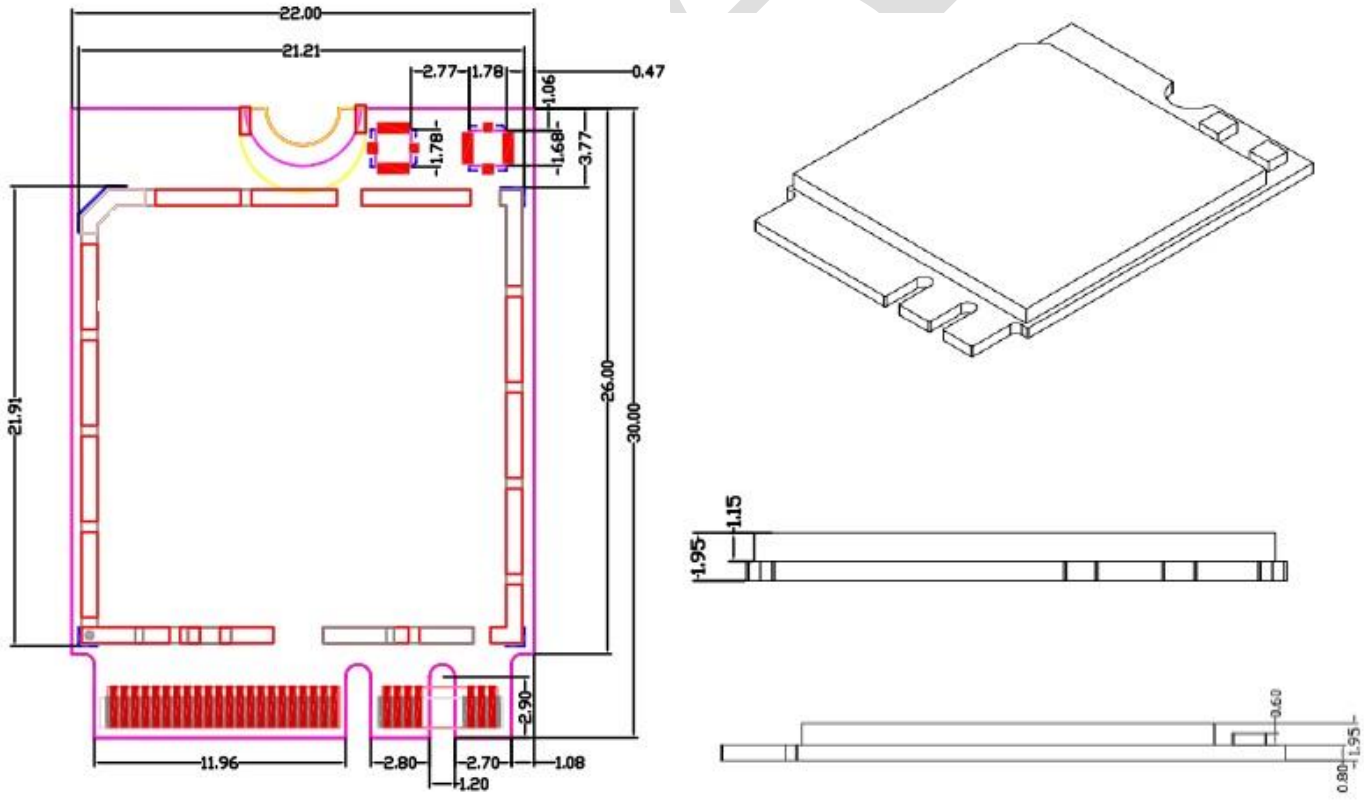
802.11ac			
VHT80	**Data Rate**	**Tx ± 2dBm (2TX)**	**Rx Sensitivity**
	MCS9	13dBm	≦-63dBm

Bluetooth		
Data Rate	**Tx ± 2dBm (Class 1 Device)**	**Rx Sensitivity**
3Mbps	+2≦ Output Power ≦+6dBm	<0.1% BR, BER at -83dBm

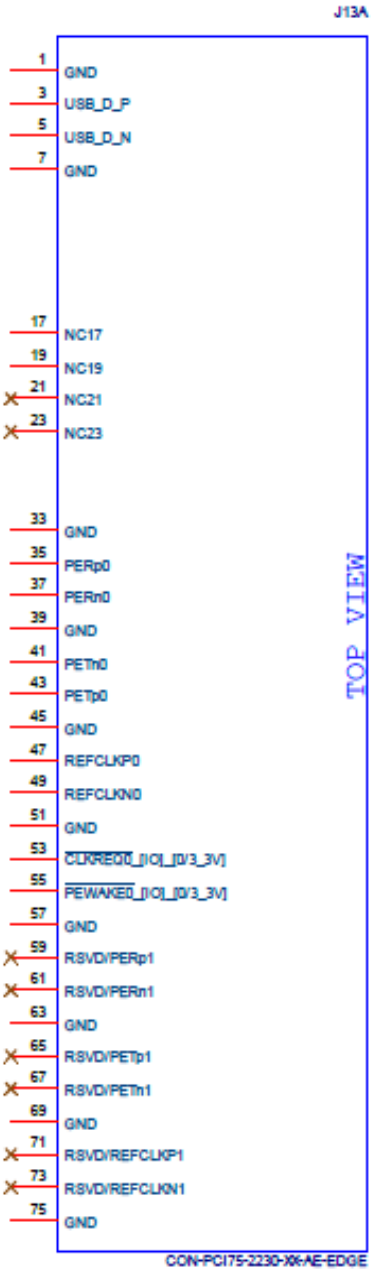
Block Diagram

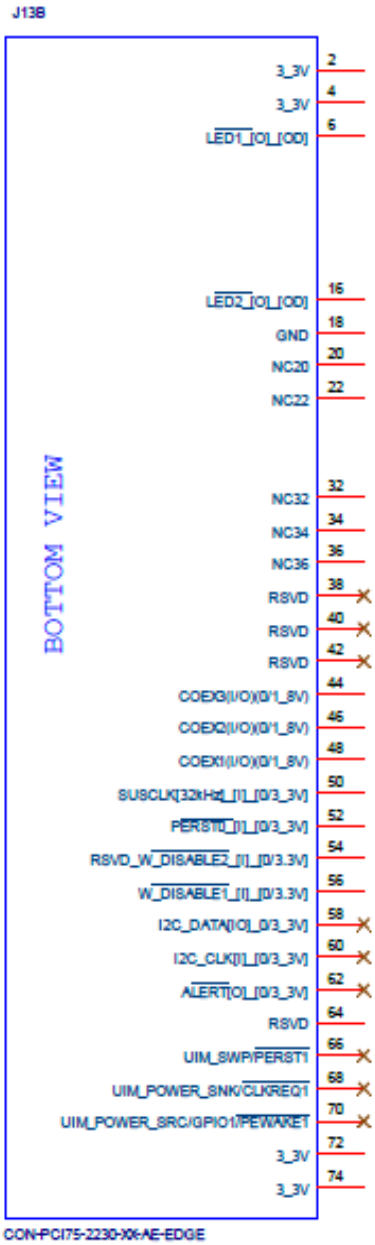


Mechanical Dimension (mm)



Pin Assignment





Pin Assignment

NO	Name	Type	Description
		TOP	
1	GND	—	Ground connections
3	USB_D_P	I/O	USB serial differential data Positive
5	USB_D_N	I/O	USB serial differential data Negative
7	GND	—	Ground connections
17	NC	-	No connect
19	NC	-	No connect
21	NC	-	No connect
23	NC	-	No connect
33	GND	—	Ground connections
35	PCIE_RX_P	I	PCI Express receive data-Positive
37	PCIE_RX_N	I	PCI Express receive data-Negative
39	GND	—	Ground connections
41	PCIE_TX_N	O	PCI Express transmit data- Negative
43	PCIE_TX_P	O	PCI Express transmit data- Positive
45	GND	—	Ground connections
47	PCIE_RCLK_P	I	PCI Express differential clock input- Positive
49	PCIE_RCLK_N	I	PCI Express differential clock input- Negative
51	GND	—	Ground connections
53	PCIE_CLKREQ_L	I/O	PCIe clock request
55	PCIE_WAKE_L	O	PCIe wake signal
57	GND	—	Ground connections
59	NC	—	No connect
61	NC	—	No connect
63	GND	—	Ground connections
65	NC	—	No connect
67	NC	—	No connect
69	GND	—	Ground connections
71	NC	—	No connect
73	NC	—	No connect
75	GND	—	Ground connections

Pin Assignment

NO	Name	Type	Description
BOT			
2	VDD_3V3	I	VDD system power supply input
4	VDD_3V3	I	VDD system power supply input
6	WLAN_LED	OD	WLAN LED
16	BT_LED	OD	Bluetooth LED
18	GND	—	Ground connections
20	NC	—	No connect
22	NC	—	No connect
32	NC	—	No connect
34	NC	—	No connect
36	NC	—	No connect
38	NC	—	No connect
40	NC	—	No connect
42	NC	—	No connect
44	NC	—	No connect
46	NC	—	No connect
48	NC	—	No connect
50	32KHz_CLK_IN	I	32.768KHz CLOCK INPUT
52	PCIE_PERST_L	I	PCIe host indication to reset the device Active low.
54	BT_RF_KILL_L	I	Turn off BT RF analog and front-end. Active low.
56	WLAN_RF_KILL_L	I	Turn off WLAN RF analog and front-end. Active
58	NC	—	No connect
60	NC	—	No connect
62	NC	—	No connect
64	NC	—	No connect
66	NC	—	No connect
68	NC	—	No connect
70	NC	—	No connect
72	VDD_3V3	I	VDD system power supply input
74	VDD_3V3	I	VDD system power supply input

Certification

Dipole Ant.

- ■ **FCC**
- ■ **CE** (RED EN 300 328 V2.1.1 / EN 301 893 V2.1.1)
- ■ **IC**
- ■ **MIC**
- □ **NCC**
- □ **ASNZS**

Ordering Information

Product Name	Part Number	Description
WNFQ-261ACNI(BT)	R9701810007	802.11ac/abgn 2T2R Industrial-graded WiFi + BT 4.2 Combo M.2 2230 Module

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 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 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: RYK-WNFQ261ACNIBT**”. 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.

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 22cm 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 22 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 22cm 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 installé et exploité avec plus de 22 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 22cm between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC:

6158A-FQ261ACNIBT".

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 22 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: **6158A-FQ261ACNIBT**".

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;

(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: **6158A-FQ261ACNIBT** / Model: WNFQ-261ACNI(BT)) has been approved by ISED to operate with the antenna type listed below with 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: **6158A-FQ261ACNIBT** / Model: WNFQ-261ACNI(BT)) a été approuvé par ISED 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, sont strictement interdits pour l'exploitation de l'émetteur.

Approved antenna(s) list

Ant. Set.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
1	Chain (0)	WNC	81-EBJ15.005	PIFA	3.00	Band 1&2: 2.56 Band 3: 4.76 Band 4: 4.76	1.15	Band 1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300
	Chain (1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08 Band 3: 3.31 Band 4: 2.42	1.15	Band 1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300
Ant. Set.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
2	Chain (0)	INPAQ	DAM-I6-H-DB-800-10-17	Dipole	1.13	Band 1&2: 1.33 Band 3: -0.63 Band 4: -0.97	NA	NA	SMA RP Plug	900
	Chain (1)	INPAQ	DAM-I6-H-DB-800-10-17	Dipole	1.29	Band 1&2: 1.94 Band 3: -0.49 Band 4: -0.93	NA	NA	SMA RP Plug	900

Ant. Set.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	Connector Type	Cable Length (mm)
3	Chain (0) Chain (1)	Sparklan	AD-301N	Dipole	4.4	Band 1&2: 5.2 Band 3&4: 5.8	RP-SMA (M)	150
4	Chain (0) Chain (1)	Sparklan	AD-103AG	Dipole	2.02	Band 1&2: 1.93 Band 3&4: 2.03	RP-SMA (M)	150
5	Chain (0) Chain (1)	Sparklan	AD-305N	Dipole	5.0	5.0	RP-SMA (M)	150
6	Chain (0) Chain (1)	Sparklan	AD-303N	Dipole	3.0	3.0	RP-SMA (M)	150
7	Chain (0) Chain (1)	Sparklan	AD-302N	Dipole	3.0	2.0	RP-SMA (M)	150