Wireless Module YL43752

IEEE 802.11a/b/g/n/ac/ax Wireless LAN, Bluetooth and FM receiver Combo Stamp Module

1. General Description

With Bluetooth and dual band (2.4 GHz and 5 GHz) Wi Fi 2 × 2 MAC / baseband / radio module. YL43752 supports IEEE 802.11 a/b/g/n/ac/ax. It is a highly integrated wireless local area network (WLAN) solution that allows users to enjoy digital content through the latest wireless technology without using additional cables and jumpers. It combines with Bluetooth and provides a complete 2.4GHz Bluetooth system which is fully compliant to Bluetooth and SDIO v3.0 that supports EDR of 2Mbps and 3Mbps for data and audio communications. It enables a high performance, cost effective, low power, compact solution that easily fits onto the SDIO and UART stamp module.

Compliant with the IEEE 802.11a/b/g/n/ac/ax standard, YL43752 uses Direct Sequence Spread Spectrum (DSSS), Orthogonal Frequency Division Multiplexing (OFDM), BPSK, QPSK, CCK and QAM baseband modulation technologies.
A high level of integration and full implementation of the power management functions specified in the IEEE 802.11 standard minimize system power requirements by using YL43752.
YL43752 module adopts BCM43752 single chip solution. The module design is based on the BCM43752 solution.

2. Key Features

1.High speed wireless connection up to 1201Mbps for Wi-Fi

2. Wi-Fi MIMO and Bluetooth

3.Low power consumption and high performance

4.Enhanced wireless security

5.Fully qualified BLE 1M

6.Enhanced Data Rate(EDR) compliant for both 2Mbps and 3Mbps supported

3. Specifications Table

Model Name	**YL43752**
Description	Wireless LAN &Bluetooth Stamp Module
WLAN Standard	IEEE 802.11 a/b/g/n/ac/ax
Bluetooth Standard	Bluetooth 2.1+Enhanced Data Rate (EDR)+ BLE 1M
Major Chipset	BCM43752
Host Interface	Wi-Fi : SDIO, BT :UART
Dimensions	15.2mm * 12.2mm * 2.0mm
Wi-Fi VID/PID	TBD
BT VID/PID	TBD
Weight	TBD
Operating Conditions	
Voltage	3.3V
Temperature	-30℃~85℃
Storage temperature	-40℃~125℃
Electrical Specifications	
Frequency Range	WLAN: 2.4 GHz ISM Bands: 2412-2462MHz 5GHz: 5150-5250MHz; 5250-5350MHz; 5470-5725MHz; 5725-5850MHz (Note: 5600-5650MHz was disabled by software in Canada Market.) Bluetooth: 2402~2480MHz
Modulation	WLAN:BPSK,QPSK,16-QAM,64-QAM,256-QAM,1024-QAM DBPSK,DQPSK,CCK Bluetooth：GFSK (1Mbps), Π/4 DQPSK (2Mbps),8DPSK (3Mbps)
Receive Sensitivity	802.11b:-91.4 dBm (11Mbps) 802.11g: -78.7 dBm (54Mbps) 802.11n @2.4GHz: -77.2dBm (HT20 MCS7) 802.11ax @2.4GHz: -62.5dBm (VHT20 MCS11) 802.11a @5GHz: -76.3dBm (54Mbps) 802.11a @5GHz:-74.5 dBm (VHT20 MCS7) 802.11ac @5GHz:-74.5 dBm (VHT20 MCS7) 802.11ac @5GHz:-69.1 dBm (VHT40 MCS8) 802.11ac @5GHz:-64.2 dBm (VHT80 MCS9) 802.11ax @5GHz:-62.5 dBm (VHT20 MCS11) 802.11ax @5GHz:-59.7 dBm (VHT40 MCS11) 802.11ax @5GHz:-55.9 dBm (VHT80 MCS11) BT: BER < 0.1% (IQXEL80 Tx -70 Bm)
Data Rates	WLAN 802.11b: 1, 2, 5.5, 11Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54Mbps

	802.11n: up to 144.4Mbps (20MHz channel) 802.11n: up to 300Mbps (40MHz channel) 802.11ac:up to 173.4Mbps (20MHz channel) 802.11ac:up to 400Mbps (40MHz channel) 802.11ac:up to 866.6Mbps (80MHz channel) 802.11ax:up to 286.8Mbps (20MHz channel) 802.11ax:up to 573.5Mbps (40MHz channel) 802.11ax:up to 1201Mbps (80MHz channel) Bluetooth BLE 1M+EDR data rates of 1,2, and 3Mbps
Security	◆ WAPI ◆ WEP 64-bit and 128-bit encryption with H/W TKIP processing ◆ WPA/WPA2Personal (Wi-Fi Protected Access) ◆ WMM/WMM-SA/WMM-PS (U-APSD) ◆ AES-CCMP hardware implementation as part of 802.11i security standard
Operating System Compatibility	TBD

4. Electrical Characteristics

4.1 Absolute Maximum Ratings

Symbol	Parameter	Maximum	Unit
VBAT	3.3V power supply voltage	5.0	V
VDDIO	Voltage supply for GPIO	3.9	V

4.2 Recommended Operating Conditions

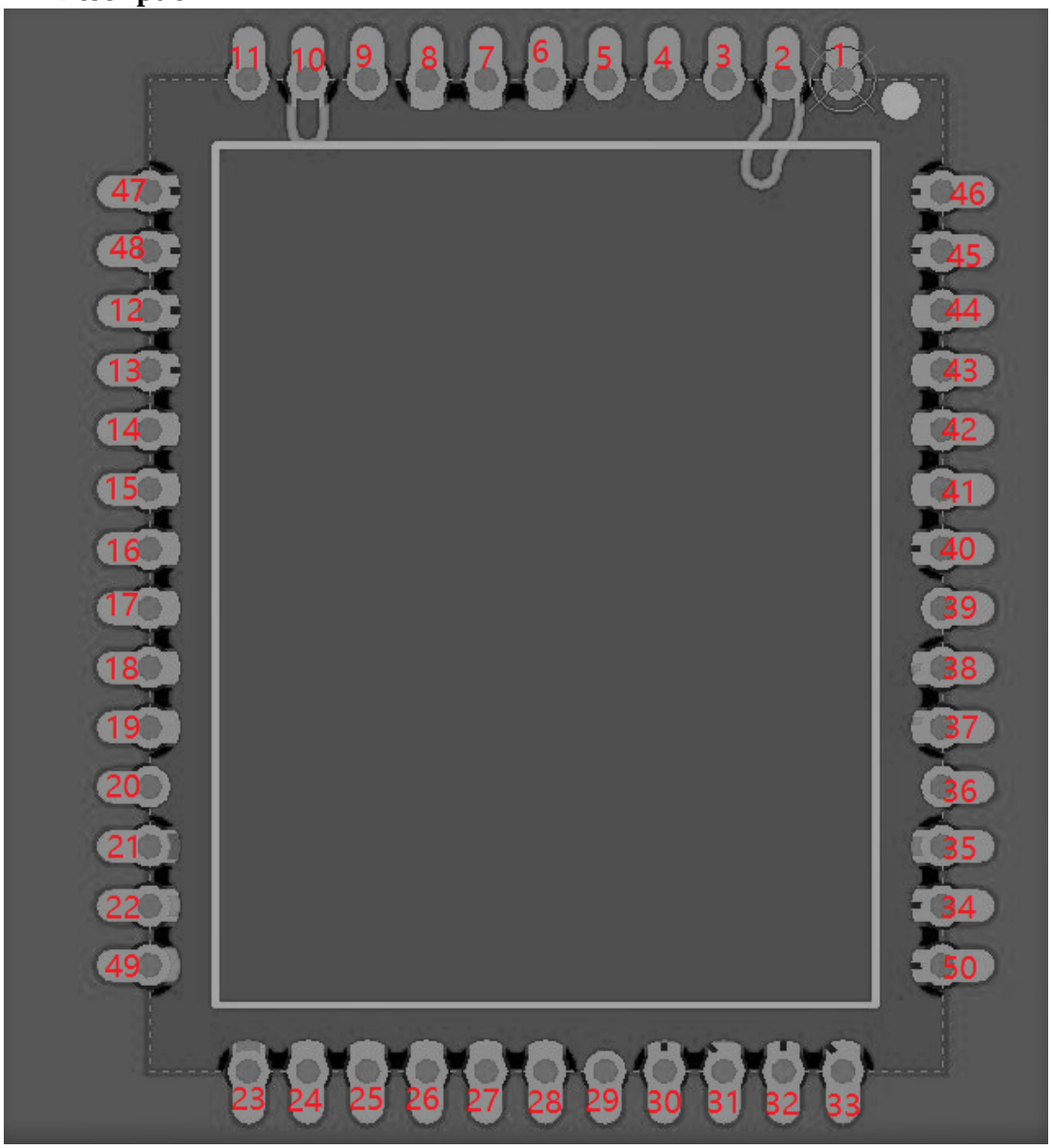
Symbol	Parameter	Rating	Unit
VBAT	3.3V power supply voltage	3.2~4.8	V
VDDIO	Voltage supply for GPIO	1.62~3.63	V

4.3 GPIODC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Unit
V_{IH}	Input high voltage	0.65×VIO	--	VIO+0.3	V
V_{IL}	Input low voltage	-0.3	--	0.35×VIO	V
V_{OH}	Output high voltage	VIO-0.4	--	VIO	V
V_{OL}	Output low voltage	0	--	0.4	V

5. Pin Definition

Pin Description



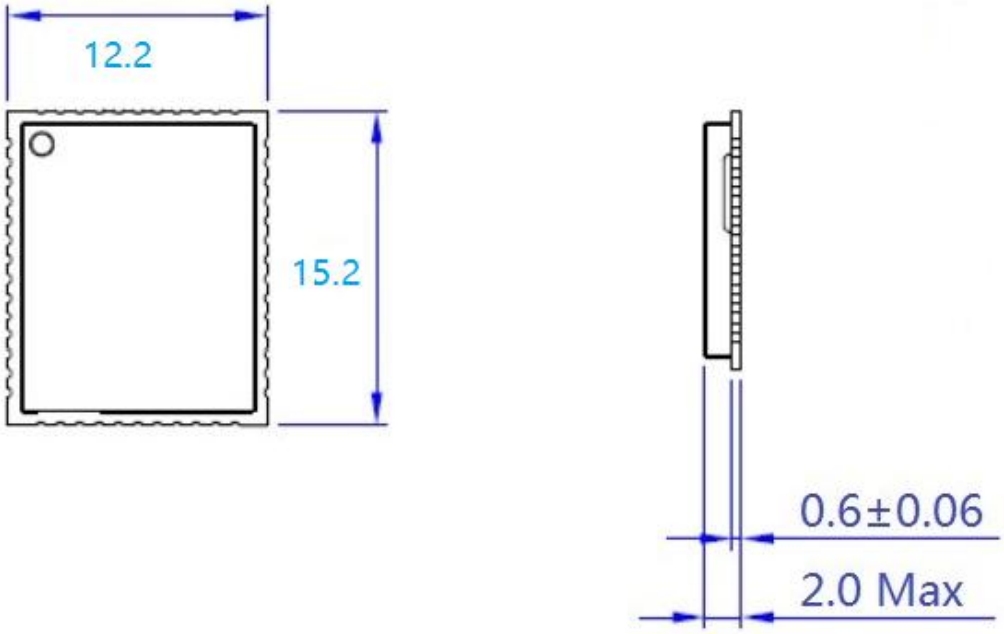
PinNo.	Definition	Basic Description Type	Type
1	GND	GROUND	GND
2	WL_BT_ANT1	Wi-Fi/BT RF signal	I/O
3	GND	GROUND	GND
4	GND	GROUND	GND
5	GND	GROUND	GND
6	BT_DEV_WAKE	Bluetooth device wake-up: Signal from the host to the BCM43752 indicating that the host requires attention.	I/O

		• Asserted: The Bluetooth device must wake-up or remain awake. • Deasserted: The Bluetooth device may sleep when sleep criteria are met. The polarity of this signal is software configurable and can be asserted high or low.	
7	BT_HOST_WAKE	Host wake up. Signal from the BCM43752 to the host indicating that the BCM43752 requires attention. • Asserted: Host device must wake-up or remain awake. • Deasserted: Host device may sleep when sleep criteria are met. The polarity of this signal is software configurable and can be asserted high or low.	I/O
8	VBAT	DC power supply +3.3V input	VCC
9	GND	GROUND	GND
10	WL_ANT2	Wi-Fi RF signal	I/O
11	GND	GROUND	GND
12	WL_REG_ON	GPIO pin to on/off the Wi-Fi function by software. Active high. Reserve pull high 100K resistor and shunt 100pF capacitor to GND on platform.	IN
13	WL_Host_WAKE	WLAN device wakeup host	OUT
14	SDIO_DATA2	SDIO Data Line 2	I/O
15	SDIO_DATA3	SDIO Data Line 3	I/O
16	SDIO_CMD	SDIO Command Input	I/O
17	SDIO_CLK	SDIO Clock Input	IN
18	SDIO_DATA0	SDIO Data Line 0	I/O
19	SDIO_DATA1	SDIO Data Line 1	I/O
20	GND	GROUND	GND
21	ABUCK_1P12_LX	ABUCK output to inductor	OUT
22	VDDIO	1.8V supply for WLAN I/O	VCC
23	ABUCK_1P12	Input for MISCLDO and sense pin for ABUCK	IN
24	LPO_IN	External low-power 32.768KHz clock input.	IN
25	BT_PCM_OUT	PCM synchronous data output, connected to PCM_IN on the host.	OUT
26	BT_PCM_CLK	PCM Clock	I/O
27	BT_PCM_IN	PCM synchronous data input, connected to	IN

		PCM_OUT on the host.	
28	BT_PCM_SYNC	PCM synchronous data SYNC	I/O
29	GND	GROUND	GND
30	PCIE_REFCLK_N	PCIe differential clock inputs (negative and positive). 100 MHz differential.	IN
31	PCIE_REFCLK_P	PCIe differential clock inputs (negative and positive). 100 MHz differential.	IN
32	PCIE_RD_P	Receiver differential pair (×1 lane)	IN
33	PCIE_RD_N	Receiver differential pair (×1 lane)	IN
34	PCIE_TD_P	Transmitter differential pair (×1 lane)	OUT
35	CBUCK_0P9	Sense pin for CBUCK	IN
36	GND	GROUND	GND
37	XTAL_OUT	XTAL oscillator output	OUT
38	XTAL_IN	XTAL oscillator input	IN
39	GND	GROUND	GND
40	PCIE_PERST_L	PCIe system reset. This input is the PCIe reset as defined in the PCIe base specification version 1.1.	IN
41	BT_UART_RTS_N	UART Ready To Send, connected to CTS on the host.	OUT
42	BT_UART_TXD	UART Transmit Data, connected to RXD of the host.	OUT
43	BT_UART_RXD	UART Receive Data, connected to TXD of the host.	IN
44	BT_UART_CTS_N	UART Clear To Send, connected to RTS on the host.	IN
45	GPIO15_SDIO_PCIe_SEL	WLAN host select 0: PCIe 1: SDIO	I/O
46	BT_REG_ON	GPIO pin to on/off the BT function by software. Active high.Reserve pull high 100K resistor and shunt 100pF capacitor toGND on host.	IN
47	PCIE_CLKREQ_L	PCIe clock request signal which indicates when the REFCLK to the PCIe interface can be gated. 1 = the clock can be gated. 0 = the clock is required.	OD
48	PCIE_PME_L	PCI power management event output. Used to request a change in the device or system power state. The assertion and deassertion of this signal are asynchronous to the PCIe reference clock.	OD

		This signal has an opendrain output structure, as per the PCI Bus Local Bus Specification, revision 2.3.	
49	CBUCK_0P9_LX	CBUCK output to inductor	OUT
50	PCIE_TD_P	Transmitter differential pair (×1 lane)	OUT

6 Mechanical Information



FCC WARNING:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the 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.

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 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 RF 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.

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

2.2 List of applicable FCC rules
CFR 47 FCC PART 15 SUBPART C/E has been investigated. It is applicable to the modular.

2.3 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.

2.4 Limited module procedures
Not applicable

2.5 Trace antenna designs
Not applicable

2.6 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.

2.7 Antennas
This radio transmitter FCC ID: T2C-YL43752 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.

No.	Antenna Type	ANT	Antenna Gain	Impedance	Frequency Range
1	PCB	BT/BLE/Wi-Fi ANT 1	2.61dBi	50Ω	2.4~2.5GHz
			3.08dBi	50Ω	5.15-5.85GHz
		Wi-Fi ANT 2	2.86dBi	50Ω	2.4~2.5GHz
			3.28dBi	50Ω	5.15-5.85GHz
2	Iron	BT/BLE/Wi-Fi ANT 1	3.32dBi	50Ω	2.4~2.5GHz
			4.18dBi	50Ω	5.15-5.85GHz
		Wi-Fi ANT 2	1.53dBi	50Ω	2.4~2.5GHz
			3.03dBi	50Ω	5.15-5.85GHz
3	FPC	BT/BLE/Wi-Fi ANT 1	3.30dBi	50Ω	2.4~2.5GHz
			3.25dBi	50Ω	5.15-5.85GHz
		Wi-Fi ANT 2	3.30dBi	50Ω	2.4~2.5GHz
			3.25dBi	50Ω	5.15-5.85GHz

2.8 Label and compliance information
The final end product must be labeled in a visible area with the following" Contains FCC ID: T2C-YL43752"

2.9 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.

2.10 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

ISEDC STATEMENT:

Operation of 5150-5350 MHz is restricted to indoor use only.

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, and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le fonctionnement de 5150-5350 MHz estlimité àuneutilisation en intérieuruniquement. Le présent appareil est conforme aux CNR d' Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil nedoit 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.

The device comply with RF exposure guidelines, users can obtain Canadian information on RF exposure and compliance.

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

Le présent appareil est conforme Après examen de ce matériel aux conformité ou aux limites d'intensité de champ RF,les utilisateurs peuvent sur l'exposition aux radiofréquences et la conformité and compliance d'acquérirles informations correspondantes.

La distance minimale du corps àutiliser le dispositive est de 20cm.

This Class B digital apparatus complies with Canadian ICES-003."

Cet appareil numérique de classe b est conforme àla norme nmb-003 du canada.

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 coïmplantéavec 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 ISED 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.
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' ISED 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: 10741A-YL43752.

Plaque signalétique du produit final
Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante:
Contient des IC: 10741A-YL43752.

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.

This radio transmitter [10741A-YL43752] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below:
Cet émetteur radio [10741A-YL43752] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous:

No.	Antenna Type	ANT	Antenna Gain	Impedance	Frequency Range
1	PCB	BT/BLE/Wi-Fi ANT 1	2.61dBi	50Ω	2.4~2.5GHz
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		Wi-Fi ANT 2	3.30dBi	50Ω	2.4~2.5GHz
			3.25dBi	50Ω	5.15-5.85GHz

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.
Les types d'antennes non inclus dans cette liste qui ont un gain supérieur au gain maximum indiqué pour tout type répertorié sont strictement interdits pour l'utilisation avec cet appareil.