



WLAN+Bluetooth Module User Manual  
Part Number: LBEE5PK2AE

LBEE5PK2AE has been FCC/ISED certified as Single Modular Approval with the following IDs.

FCC ID: VPYLB2AE

IC ID: 772C-LB2AE

The module is limited to OEM installation ONLY. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

Therefore, the final host product must be submitted to Murata for confirmation that the installation for the module into the host is in compliance with regulations of FCC and IC Canada. Specially, if an antenna other than the model documented in the Filing is used, a Class 2 Permissive Change must be filed with the FCC.

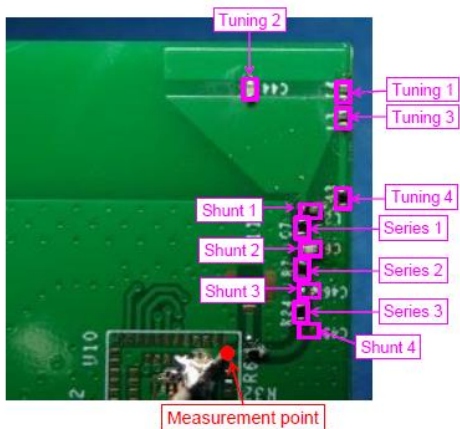
Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This module has been approved by FCC to operate with the antenna types 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. The following antennas have been certified in combination with the module. Refer to next pages for the antenna application guidance.

- (a) Monopole PCB antenna with peak gains of 3.0dBi (2.4GHz) and 3.3dBi (5GHz);
- (b) External dipole antenna with peak gains of 3.4dBi (2.4GHz) and 4.75dBi (5GHz);

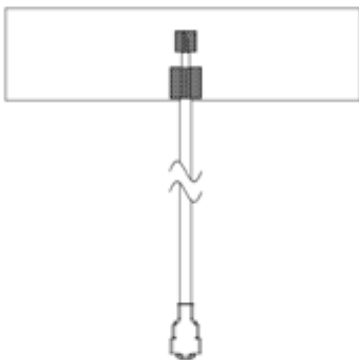
The operational temperature is -40°C~85°C.

Antenna Application Guidance – Monopole PCB antenna



Tuning 1	Tuning 2	Tuning 3	Tuning 4	Matching circuit						
				Shunt 1	Series 1	Shunt 2	Series 2	Shunt 3	Series 3	Shunt 4
1.2nH	0.1pF	2.0nH	0ohm	3.6nH	0ohm	0.2pF	0ohm	None	0ohm	None
				Size:1005 GRM15 / LQG15HS / Register			Size:1005 GJM15			

### Antenna Application Guidance – External dipole antenna



Maker	P/N	Form factor	Type	2.4Ghz Gain (dBi)	5Ghz Gain (dBi)
Molex	146187	<u>u.FL/flexible</u>	dipole	3.4	4.75

### FCC Statements

Please take attention that changes or modification 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 complies with FCC/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.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains FCC ID: VPYLB2AE" any similar wording that expresses the same meaning may be used.

This equipment complies with FCC 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. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### **FCC Statements (cont.)**

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

The device must be professionally installed The intended use is generally not for the general public. It is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required. The user has no access to the connector. Installation must be controlled. Installation requires special training This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247, DTS and DSS) and CFR 47 FCC Part 15 E (15.407, NII). It is applicable to the modular transmitter.

This radio transmitter FCC ID:VPYLB2AE 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.

The concrete contents to check are the following three points.

- 1 ) Must use antenna such as dipole antenna (with gain not exceeding 3.4dBi at 2.4GHz & 4.75dBi at 5GHz);
- 2 ) Should be installed so that the end user cannot modify the antenna;
- 3 ) Feed line should be designed in 50ohm

Fine tuning of return loss etc. can be performed using a matching network.

L'émetteur radio FCC id: VPYLB2AE a été approuvé par la FCC

Utilisez les types d'antennes énumérés ci - dessous et indiquez le gain maximal admissible. Le gain du type d'antenne non inclus dans cette liste est supérieur au gain maximal de l'un des types énumérés et ne doit pas être utilisé avec cet équipement.

Le contenu spécifique de l'inspection comprend les trois points suivants.

- 1) doit utiliser une antenne comme dipole antenne avec pifa gain n'excédant pas 3.4dBi(2.4GHz) & 4.75dBi(5GHz)
  - 2) Doit être installé là où l'utilisateur final ne peut pas modifier l'antenne;
  - 3) La ligne d'alimentation doit être conçue pour 50 ohms
- Le réseau correspondant peut être utilisé pour affiner la perte de retour, etc.

**BT/BLE/2.4G WIFI:**

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2402-2480	PCB Antenna	3.0
		External Dipole Antenna	3.4

**5G WIFI:**

Antenna	Frequency Band	Antenna Type	Maximum Antenna Gain
			(dBi)
1	UNII-1	PCB Antenna	3.3
		External Dipole Antenna	4.75
1	UNII-2A	PCB Antenna	3.3
		External Dipole Antenna	4.75
1	UNII-2C	PCB Antenna	3.3
		External Dipole Antenna	4.75
1	UNII-3	PCB Antenna	3.3
		External Dipole Antenna	4.75

The PCB Antenna is permanently attached, can't be replaced.

There is only one antenna port, which is shared by all the radios by time divided.

The module doesn't have a permanent antenna. The following antennas are certified to be FCC/ISED regulatory conformity.

- (a) Monopole PCB antenna with peak gains of 3.0dBi (2.4GHz) and 3.3dBi (5GHz);
- (b) External dipole antenna with peak gains of 3.4dBi (2.4GHz) and 4.75dBi (5GHz);

**IC Statements**

This device complies with Industry Canada licence-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 radioexempts 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.

*Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

*Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.*

### **IC Statements (cont.)**

This equipment complies with FCC/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.

ce matériel est conforme aux limites de dose d'exposition aux rayonnements, FCC / CNR-102 énoncée dans un autre environnement. cette équipement devrait être installé et exploité avec distance minimale de 20 entre le radiateur et votre corps.

Please notice that if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC: 772C-LB2AE" any similar wording that expresses the same meaning may be used.

Notez que si le numéro d'identification IC n'est pas visible lorsque le module est installé dans un autre appareil, une étiquette indiquant le module attaché doit également être affichée à l'extérieur de l'appareil où le module est installé. L'étiquette extérieure peut être libellée comme suit: « contient IC: 772C-LB2AE » toute expression similaire qui exprime le même sens.

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;

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;

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;

Les dispositifs fonctionnant dans la bande 5 150-5 250 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;

Le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et 5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.;

Le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5 725-5 825 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.

*This radio transmitter 772C-LB2AE 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.*

The concrete contents to check are the following three points.

- 1 ) Must use antenna such as dipole antenna (with gain not exceeding 3.4dBi at 2.4GHz & 4.75dBi at 5GHz) ;
- 2 ) Should be installed so that the end user cannot modify the antenna;
- 3 ) Feed line should be designed in 50ohm

Fine tuning of return loss etc. can be performed using a matching network.

Le présent émetteur radio 772C-LB2AE 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.

Le contenu concret à vérifier sont les trois points suivants.

- 1 ) doit utiliser une antenne comme dipole antenne avec pifa gain n'excédant pas 3.4dBi(2.4GHz) & 4.75dBi(5GHz)
- 2 ) doivent être installés de façon que l'utilisateur final ne peut pas modifier l'antenne
- 3 ) La ligne d'alimentation doit être conçue en 50ohm

Le réglage précis de la perte de rendement, etc. peut être effectué en utilisant un réseau correspondant.

BT/BLE/2.4G WIFI:

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- (b) External dipole antenna with peak gains of 3.4dBi (2.4GHz) and 4.75dBi (5GHz);

### Notice to OEM integrator

Must use the device only in host devices that meet the FCC/ISED RF exposure category of mobile, which means the device is installed and used at distances of at least 20cm from persons. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The end user manual shall include FCC Part 15 /ISED RSS GEN compliance statements related to the transmitter as show in this manual(FCC/ICanada statement). 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, ICES 003. Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.

Must have on the host device a label showing Contains FCC ID: VPYLB2AE, IC: 772C-LB2AE

The use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual.

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. Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247 and 15.209 &

15.207, 15B class B requirement, only if the test result comply with FCC part 15C: 15.247 and 15.209 & 15.207, 15B class B requirement. Then the host can be sold legally.

This modular transmitter is only FCC authorized for the specific rule parts ( 47CFR Part 15.247 and 15.407) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. Host manufacturer is strongly recommended to confirm compliance with FCC/ISED

requirements for the transmitter when the module is installed in the host. Must have on the host device a label showing Contains FCC ID: VPYLB2AE and Contains IC: 772C-LB2AE

l'hôte doit utiliser l'instrument uniquement dans des dispositifs qui répondent à la fcc / (catégorie d'exposition rf mobile, ce qui signifie le dispositif est installé et utilisé à une distance d'au moins 20 cm de personnes. le manuel de l'utilisateur final doit inclure la partie 15 / (fac rss gen dé clarations de conformité relatives à l'émetteur que de montrer dans ce manuel. le fabricant est responsable de la conformité de l'hôte, le système d'accueil avec le module installé avec toutes les autres exigences applicables du système comme la partie 15 b, ices - 003. accueillir le

fabricant est fortement recommandé de confirmer la conformité avec les exigences de la fcc / (émetteur lorsque le module est installé dans l'hôte. le dispositif d'accueil doivent avoir une étiquette indiquant contient FCC ID: VPYLB2AE, IC:772C-LB2AE

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. Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247 and 15.209 & 15.207, 15.407, 15B class B requirement, only if the test result comply with FCC part 15C: 15.247 and 15.209 & 15.207, 15.407, 15B class B requirement. Then the host can be sold legally.

This modular transmitter is only FCC authorized for the specific rule parts ( 47CFR Part 15.247 and 15.407) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.