

# LBEE6ZZ1FD Installation Manual

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FCC ID of this product is as follows.

FCC ID:VPYLB1FD

For OEM integration only – device cannot be sold to general public.  
Therefore we will ask OEM to include the following statements required  
by FCC on the product and in the Installation manual Notice.

## Contents

- 1. Supply Voltage
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# 1. Supply Voltage



|                                 |     | min. | typ.     | max. | unit  |
|---------------------------------|-----|------|----------|------|-------|
| Specification Temperature Range |     | -40  | +25      | +85  | deg.C |
| Specification Voltage           | VDD | 3.2  | 3.6      | 4.5  | V     |
|                                 | VIO | 1.62 | 1.8or3.3 | 3.63 | V     |

## 2. Theory of Operation



| Frequency of operation |                            |              | Scan    | Ad-hoc mode |
|------------------------|----------------------------|--------------|---------|-------------|
| 2.4GHz                 | 11b/g/n (HT20)             | 2412-2462MHz | Active  | Yes         |
| W52                    | 11a/n (HT20) , 11ac(VHT20) | 5180-5240MHz | Active  | Yes         |
|                        | 11n (HT40) , 11ac(VHT40)   | 5190-5230MHz | Active  | Yes         |
|                        | 11ac(VHT80)                | 5210MHz      | Active  | Yes         |
| W53                    | 11a/n (HT20) , 11ac(VHT20) | 5260-5320MHz | Passive | No          |
|                        | 11n (HT40) , 11ac(VHT40)   | 5270-5310MHz | Passive | No          |
|                        | 11ac(VHT80)                | 5290MHz      | Passive | No          |
| W56                    | 11a/n (HT20) , 11ac(VHT20) | 5500-5720MHz | Passive | No          |
|                        | 11n (HT40) , 11ac(VHT40)   | 5510-5710MHz | Passive | No          |
|                        | 11ac(VHT80)                | 5530-5690MHz | Passive | No          |
| W58                    | 11a/n (HT20) , 11ac(VHT20) | 5745-5825MHz | Active  | Yes         |
|                        | 11n (HT40) , 11ac(VHT40)   | 5755-5795MHz | Active  | Yes         |
|                        | 11ac(VHT80)                | 5775MHz      | Active  | Yes         |

Compliance with FCC requirement 15.407(c)

Data transmission is always initiated by software, which is the passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinue transmission in case of either absence of information to transmit or operational failure.

Frequency Tolerance:  $\pm 20\text{ppm}$

End users can not modify the software because F/W & driver are installed in device.

### 3. Antenna

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- Please perform the antenna design that followed the specifications of the antenna.

The concrete contents to check are the following four points.

- 1 ) Antenna (A) is the “GW.59.3153” made by “Aoglas antenna solutions”  
or  
Antenna (B) is IFA made by “Preh Car Connect GmbH”.
- 2 ) Confirm the feed line the same as the Gerber file.
- 3 ) OEM should be designed so that end users can not change the antenna.  
Ex1) Use the connector of reversed polarity.  
Ex2) Cannot access to the antenna connector, because use the special screw .
- 4 ) The emission level is not getting worse.  
Measure the spurious, and confirm degradation of less than 3dB than spurious value of worst of report used for the application.

Please send those reports to Murata.

## 4. Antenna



■ Notes If you want to change the antenna.

The concrete contents to check are the following three points.

- 1 ) Please select the same type dipole antenna.
- 2 ) An antenna gain is lower than a gain given in antenna specifications.
- 3 ) Feed line should be designed in 50ohm  
Fine tuning of return loss etc. can be performed using a matching network.
- 4 ) The emission level is not getting worse.

| Antenna      |             |                                                      |
|--------------|-------------|------------------------------------------------------|
| Antenna type | Antenna (A) | 2.4GHz Dipole Antenna<br>5GHz Dipole Antenna         |
|              | Antenna (B) | 2.4GHz Inverted-F Antenna<br>5GHz Inverted-F Antenna |

## 5. Notice



For OEM integration only – device cannot be sold to general public.  
Therefore we will ask OEM to include the following statements required  
by FCC/IC on the product and in the Installation manual Notice.  
Please describe the following warning on the final product which contains this module.

|                                             |
|---------------------------------------------|
| Contains Transmitter Module FCC ID:VPYLB1FD |
|---------------------------------------------|

or

|                          |
|--------------------------|
| Contains FCC ID:VPYLB1FD |
|--------------------------|

● Please describe the following warning to the manual.

|                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                    |
|--------------------|
| <b>FCC CAUTION</b> |
|--------------------|

|                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. |
|---------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|
| This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter. |
|-----------------------------------------------------------------------------------------------------------|

※When the product is small, as for these words mentioned above, the posting to a manual is possible.

## 5. Notice



- When installing it in a mobile equipment. Please describe the following warning to the manual.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.

RF Exposure requirements are met when installed in mobile equipment.

This module cannot be installed in portable equipment without further testing and a change to FCC's grant of authorization.

Contact Murata regarding portable applications.

Note)

Portable equipment : Equipment for which the spaces between human body and antenna are used within 20cm.

Mobile equipment : Equipment used at position in which the spaces between human body and antenna exceeded 20cm.

## 5. Notice



**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.
- 3)The use of an antenna with gain less than 2.37dBi (2.4GHz) and 2.93dBi (5GHz).

As long as 3 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:VPYLB1FD". 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.

## 5. Notice

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### Professional installation instruction

#### 1. Installation personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

#### 2. Installation location

The product shall be installed at a location where the radiating antenna can be kept 20cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

#### 3. External antenna

Use only the antennas which have been approved by the applicant.

The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC/IC limit and is prohibited.

#### 4. Installation procedure

Please refer to user's manual for the detail.

#### 5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in relevant rules.

The violation of the rule could lead to serious federal penalty.