

User Manual

Version	1.1
Product	LBAC0ZZ2TG (Wireless Vibration Sensor Unit)
Region / Certification	US / FCC
Variation model	LBAC0ZZ2TH-EK229 LBAC0ZZ2TF LBAC0ZZ2TJ

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REVISION HISTORY

Version	Date	Description
1.0	Mar.2025	Initial release
1.1	Apr. 2025	Correction of errors regarding IC numbers

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GLOSSARY

BLE	Bluetooth Low Energy, a wireless standard designed and maintained by Bluetooth Special Interest Group (SIG)
Sub GHz	Wireless telecommunication using frequencies below 1GHz
Gateway	A dedicated device/product that can receive or transmit data to sensor node(s)
G	g-force per unit mass, 1G = conventional value of gravitational acceleration on Earth, i.e. 9.8m/s ²
BPF	Band pass filter
Kurtosis	In statistical analysis, Kurtosis is a measure of whether the data is heavy-tailed or light-tailed relative to a normal distribution
PBT	Polybutylene Terephthalate, a thermoplastic engineering polymer

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1 Introduction

- LBAC0ZZ2TG is a wireless sensor unit that measures vibrations and sends data over Sub-1GHz radio.
- LBAC0ZZ2TH-EK229 is the explosion-proof version of LBAC0ZZ2TG. The circuit used is the same as LBAC0ZZ2TG.
- LBAC0ZZ2TF is a product with sensor circuit parameters tuned for a different measurement target than LBAC0ZZ2TG. The installation method has been changed from screws to magnets. The other wireless circuits and power circuits are the same as LBAC0ZZ2TG.
- LBAC0ZZ2TJ is the explosion-proof version of LBAC0ZZ2TF. The circuit used is the same as LBAC0ZZ2TF.
- It can be used in combination with a gateway (LBAC0ZZ1SU), sold separately, to collect vibration data.
- It is equipped with a sensor to detect acceleration and a sensor to detect the installation surface temperature.
- It calculates acceleration data and converts it to velocity data.
- This product has the function to send and receive data via OTA (Over-The-Air) using Bluetooth Low Energy.
- Operates on a dedicated Li battery that can be replaced. Replacement batteries (LBXXZZ1LZ-006) are sold separately.
- This product is used in general environments such as factories and buildings. This product is not intended to be used in environments that require high reliability such as aircraft, automobiles, and power plants.

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2 Specifications

2.1 Devices

Name		LBAC0ZZ2TG	LBAC0ZZ2TH-EK229	LBAC0ZZ2TF	LBAC0ZZ2TJ
Wireless communications		Proprietary low-power-wide-area telecommunication Bluetooth® Low Energy Class 3			
Acceleration Sensor	Detection frequency	10Hz…17kHz	10Hz…17kHz	10Hz…10kHz	10Hz…10kHz
	Rating	± 30G	± 30G	± 30G	± 30G
Temperature sensor	Rating	-20°C…+85°C			
	Resolution	0.1°C @ 25°C			
	Accuracy	± 1°C			
Power supply	Source	Li-metal battery ER-1/2AA, BR-1/2AA			
	Voltage	2.1Vdc (min.) 3.3Vdc (typ.) 3.6Vdc (max.)			
Operating environment	Temperature	-20°C…+60°C (installation surface +85°C max.)			
	Humidity	0%RH…90%RH (non-condensing)			
	Explosion proof	N/A	Ex ic IIC T4 Gc Ta = -10°C…+60°C	N/A	Ex ic IIC T4 Gc Ta = -10°C…+60°C
Package	Body material	PBT UL94 Classifications: HB			
	Fixed base	SUS Screw	SUS Screw	Neodymium magnet	Neodymium magnet
Storage environment	Temperature	-20°C…+60°C			
	Humidity	0%RH…90%RH (non-condensing)			

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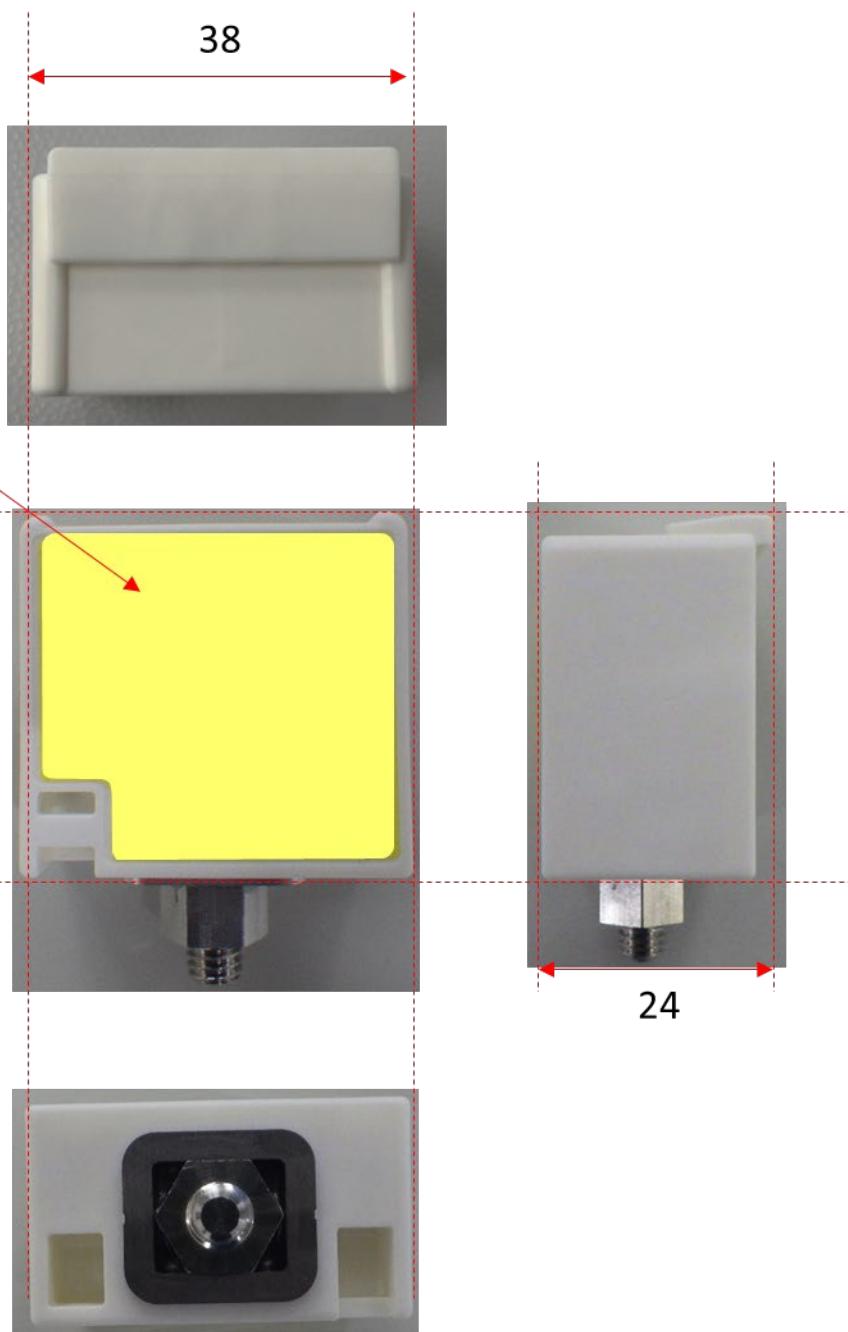
2.2 Physical size & dimensions

2.2.1 LBAC0ZZ2TG

Width 38mm

Height 38mm

Depth 24mm



*For label details, refer to separate attached file

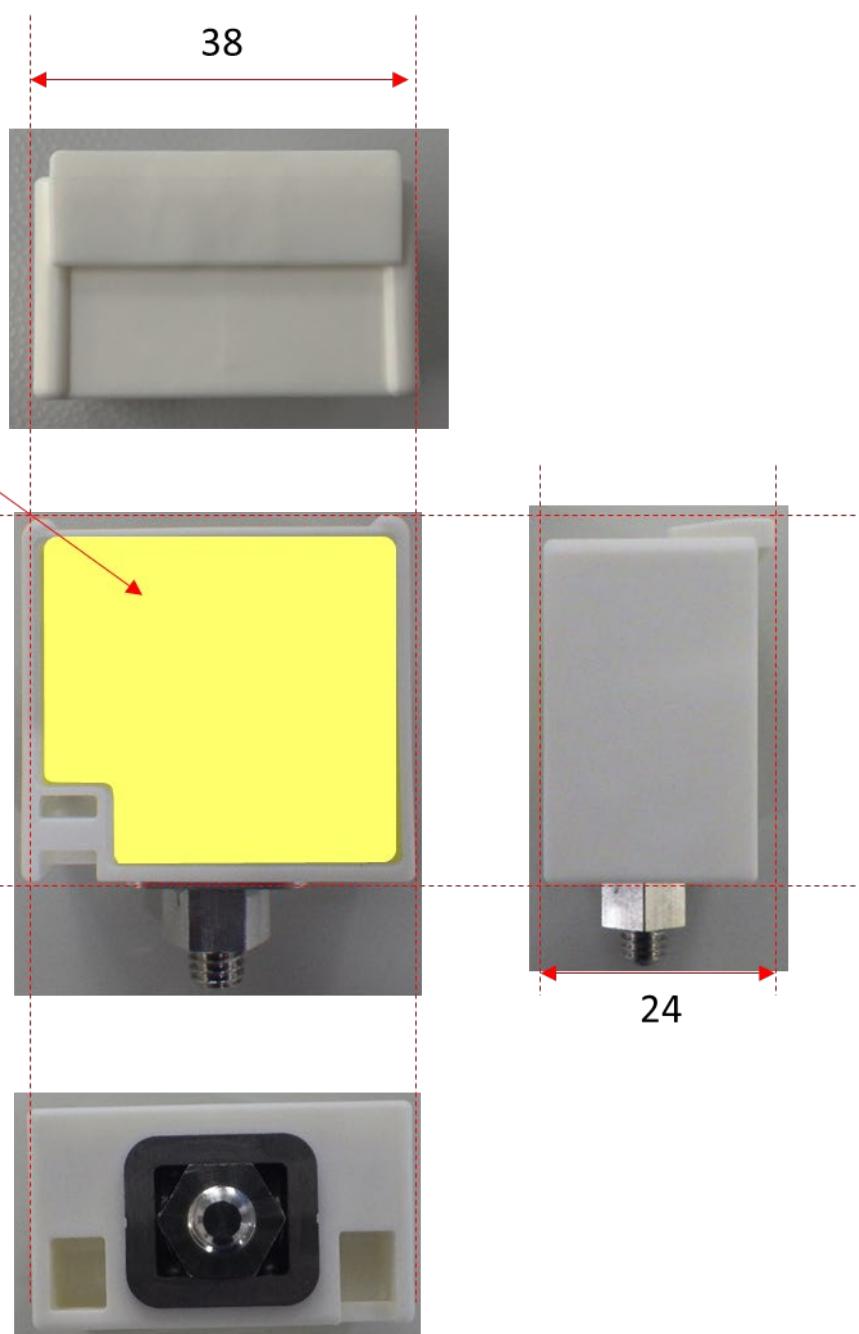
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2.2.2 LBAC0ZZ2TH-EK229

Width 38mm

Height 38mm

Depth 24mm



*For label details, refer to separate attached file

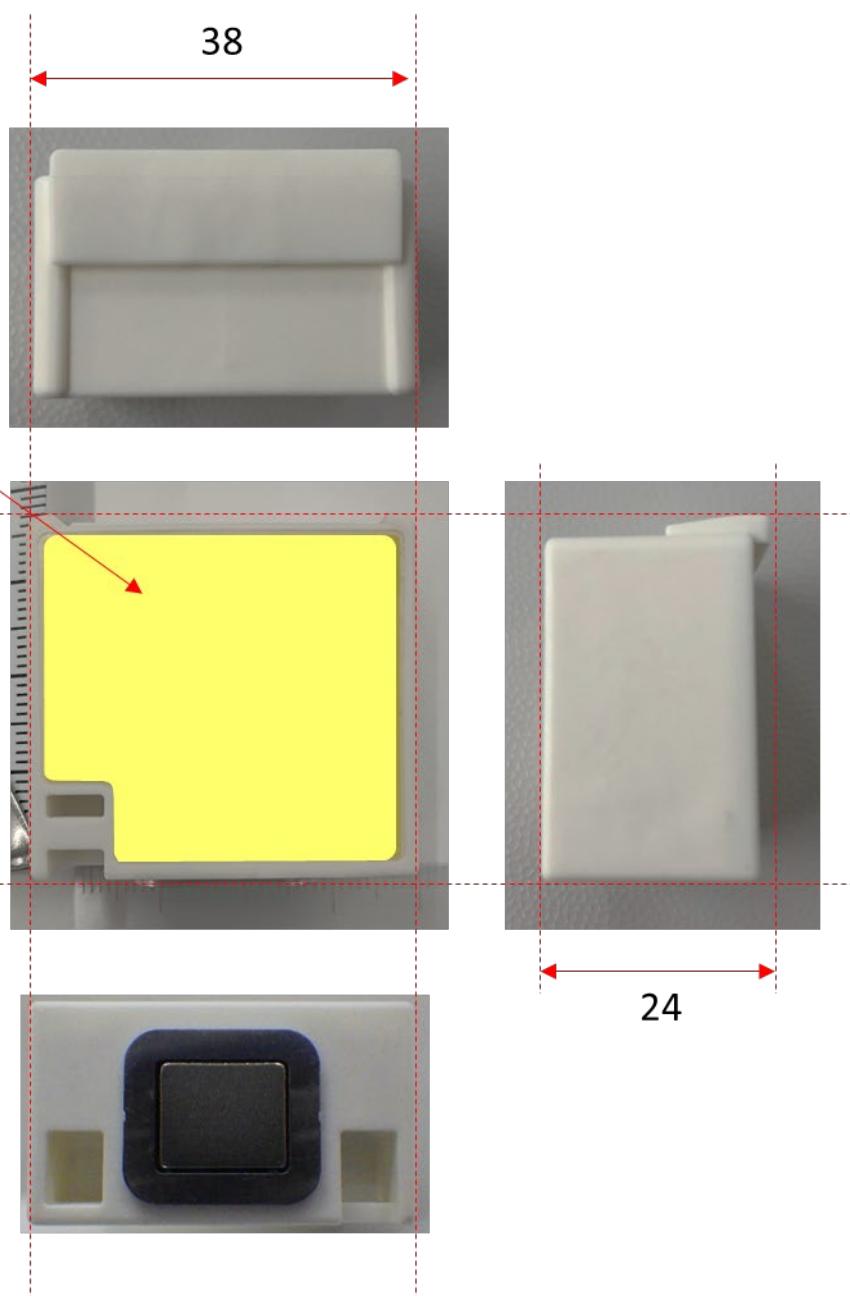
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2.2.3 LBAC0ZZ2TF

Width 38mm

Height 38mm

Depth 24mm



*For label details, refer to separate attached file

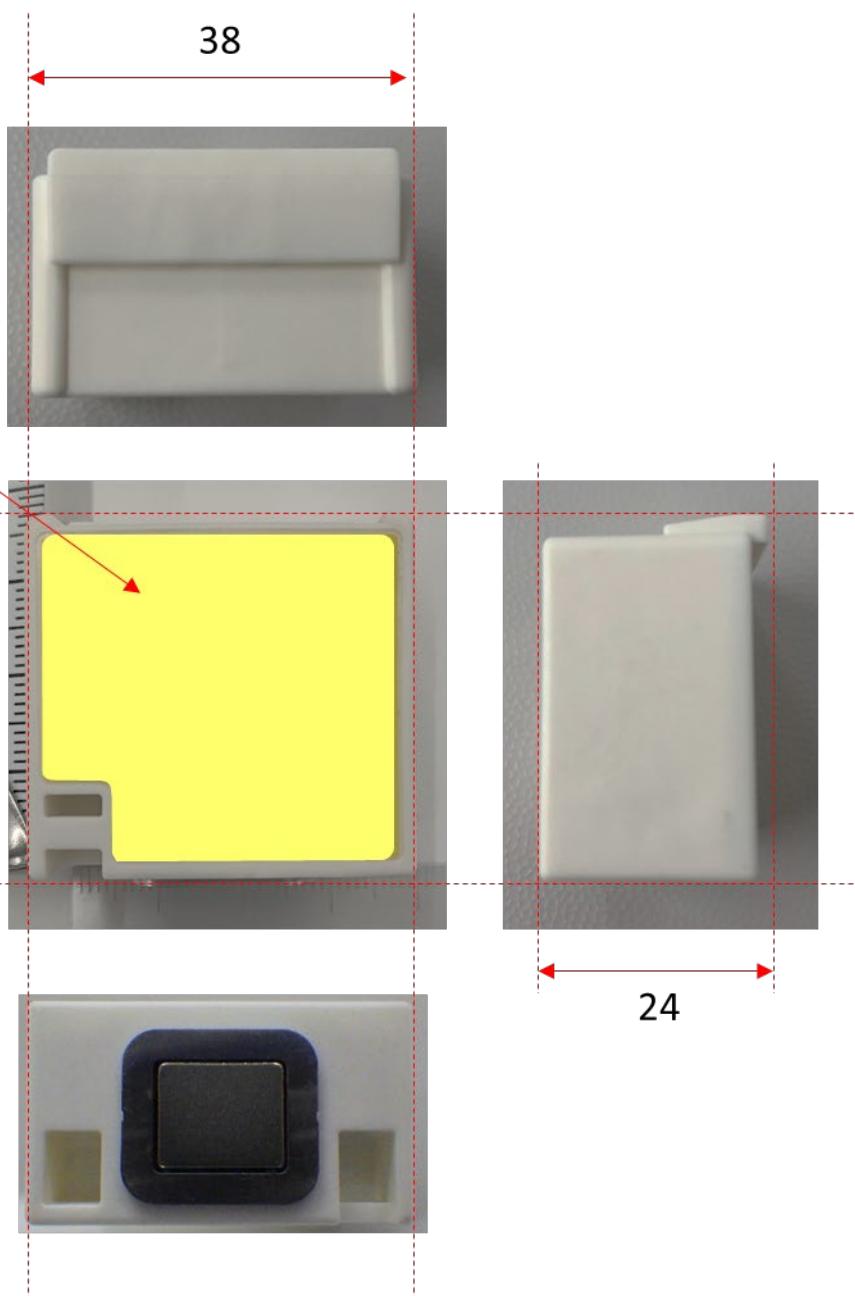
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2.2.4 LBAC0ZZ2TJ

Width 38mm

Height 38mm

Depth 24mm

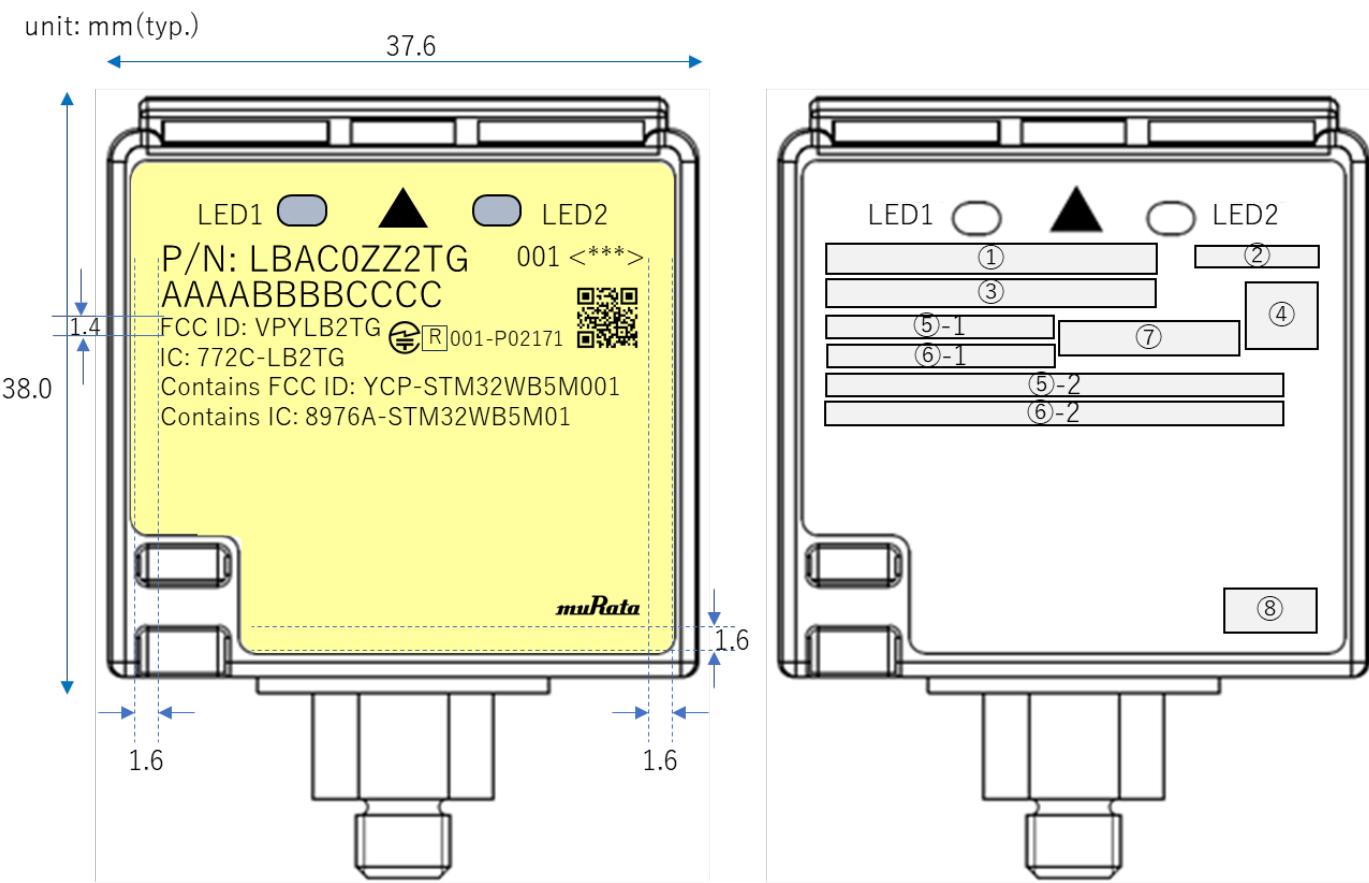


*For label details, refer to separate attached file

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2.3 Label

2.3.1 LBAC0ZZ2TG



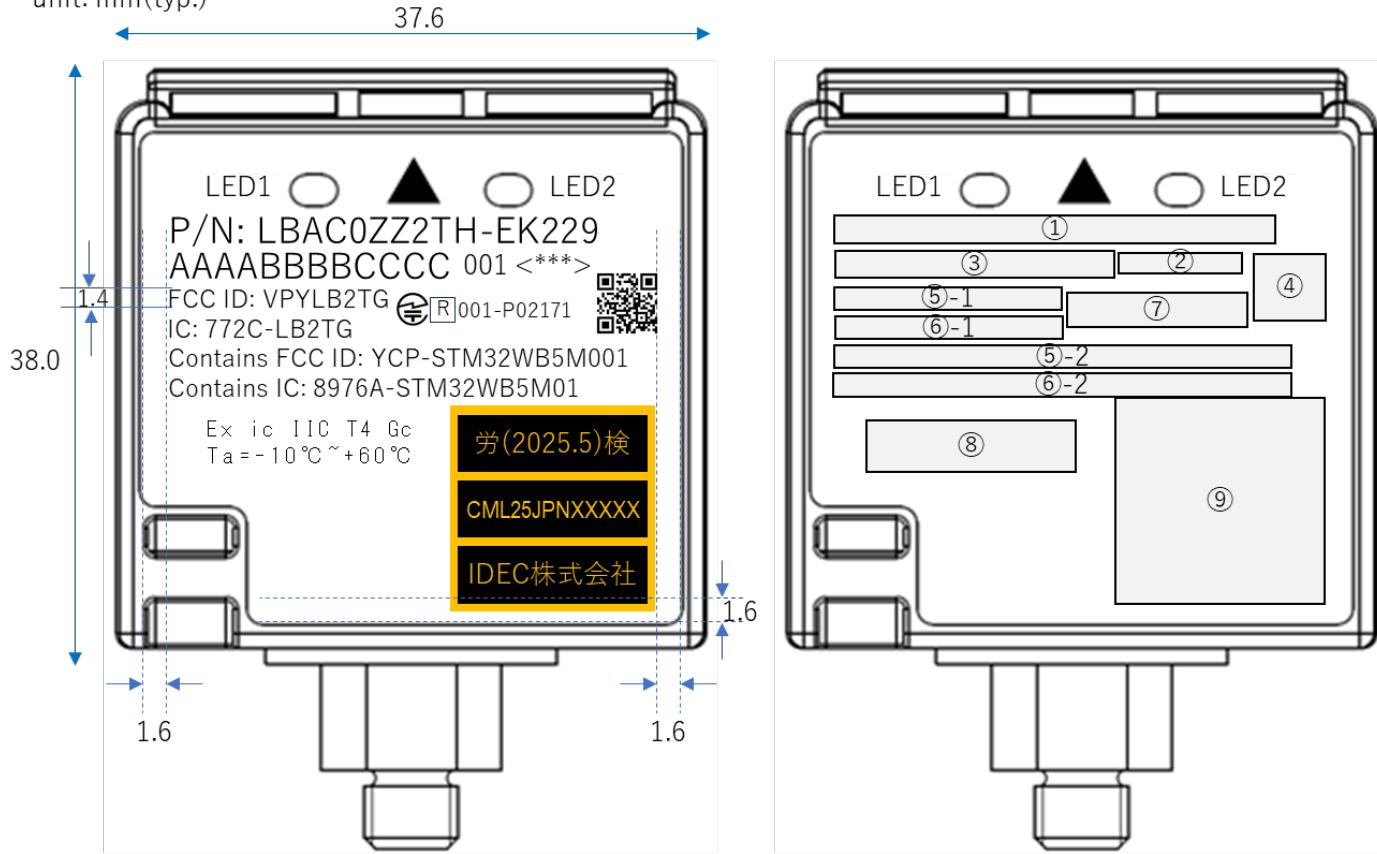
No	Item	Detail
①	Product Name (PMN and HVIN for ISED)	LBAC0ZZ2TG
②	Product Code	001<***> (*** varies depending on the production period)
③	Serial No.	AAAABBBBCCCC (hex)
④	2D barcode	Serial No.
⑤-1	FCC ID for the product	VPYLB2TG
⑤-2	FCC ID for the BLE module	YCP-STM32WB5M001
⑥-1	IC Number for the product	772C-LB2TG
⑥-2	IC Number for the BLE module	8976A-STM32WB5M01
⑦	TELEC Mark & code	001-P02171
⑧	Brand Logo	muRata

*The labels are protected with a water- and weather-resistant film so that they do not peel off easily or the writing does not fade.

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2.3.2 LBAC0ZZ2TH-EK229

unit: mm(typ.)

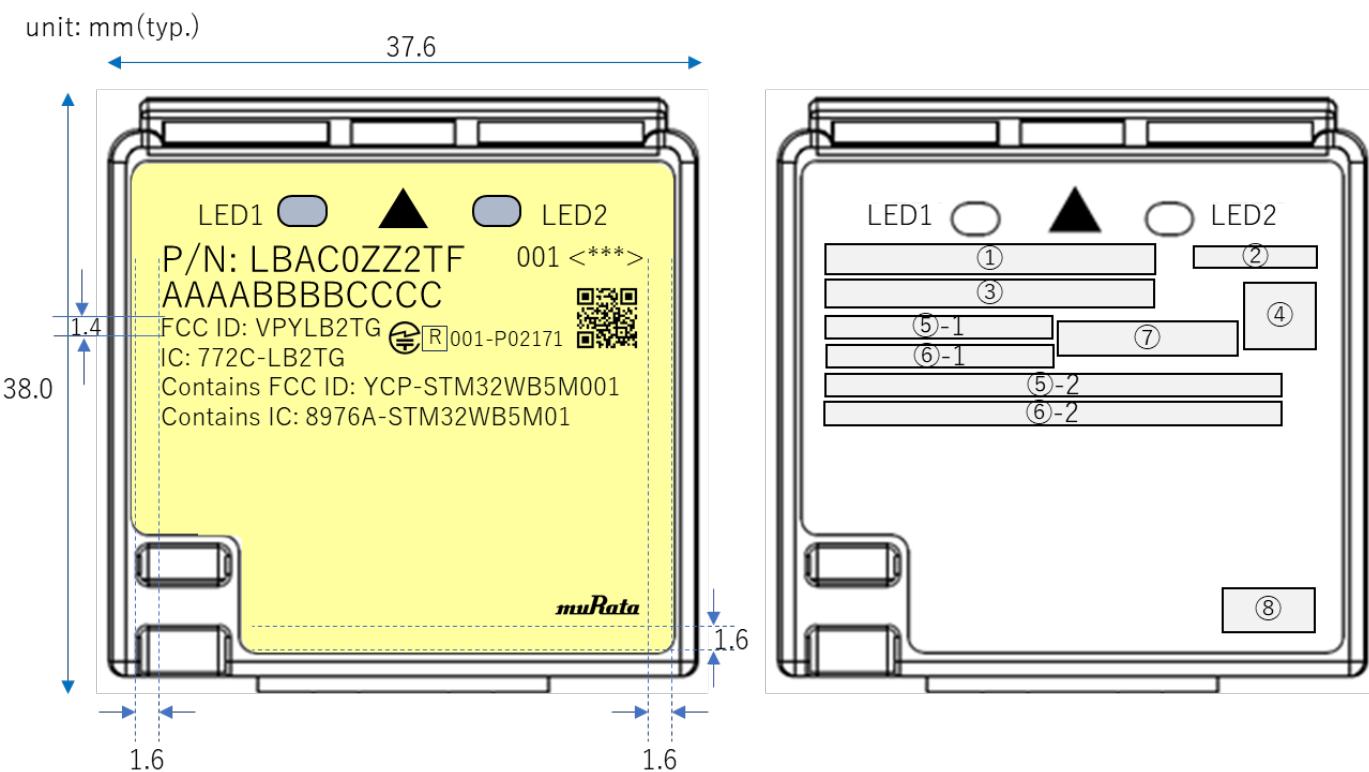


No	Item	Detail
①	Product Name (PMN and HVIN for ISED)	LBAC0ZZ2TH-EK229
②	Product Code	001<***> (** varies depending on the production period)
③	Serial No.	AAAABBBBCCCC (hex)
④	2D barcode	Serial No.
⑤-1	FCC ID for the product	VPYLB2TG
⑤-2	FCC ID for the BLE module	YCP-STM32WB5M001
⑥-1	IC Number for the product	772C-LB2TG
⑥-2	IC Number for the BLE module	8976A-STM32WB5M01
⑦	TELEC Mark & code	001-P02171
⑧	Explosion-proof conditions	Ex ic IIC T4 Gc Ta=-10°C~+60°C
⑨	Explosion-proof approval mark	The content will change each time the explosion-proof certification is renewed.

*The labels are protected with a water- and weather-resistant film so that they do not peel off easily or the writing does not fade.

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2.3.3 LBAC0ZZ2TF

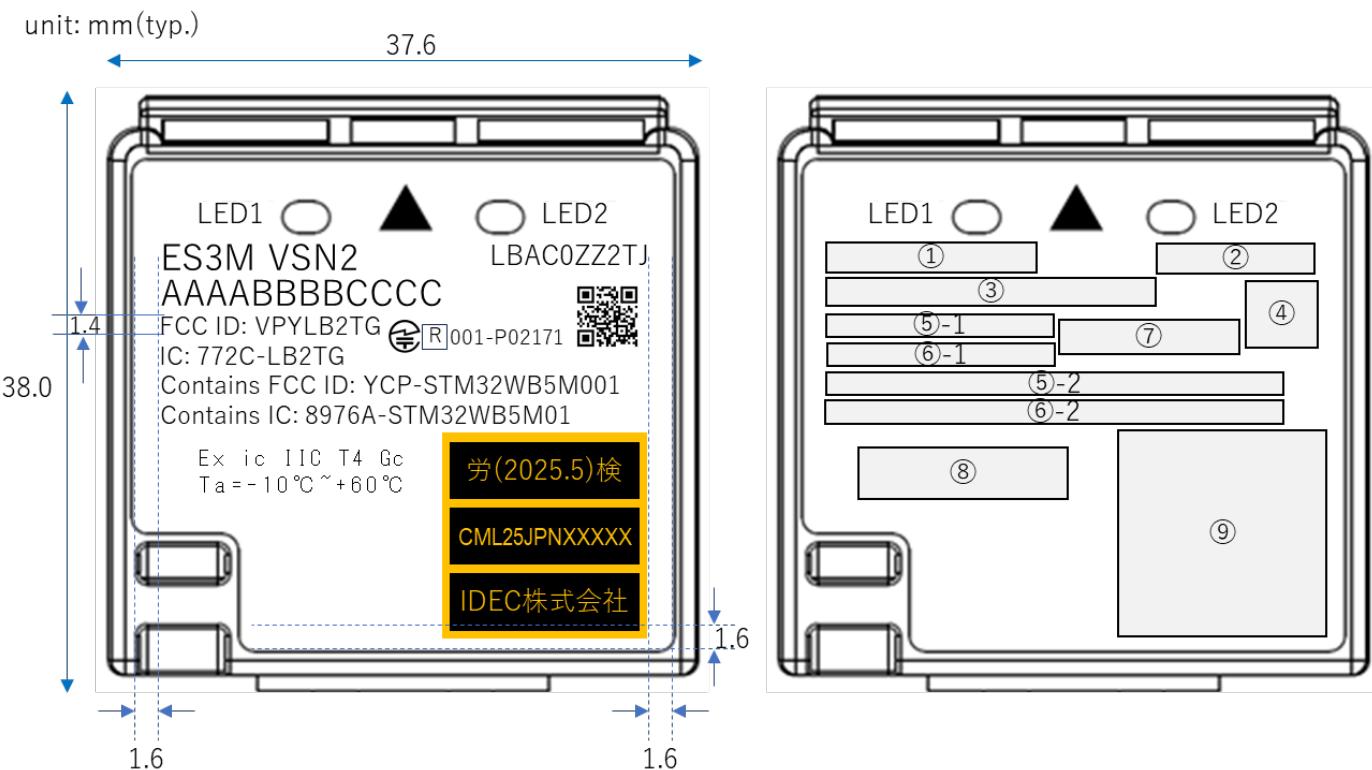


No	Item	Detail
①	Product Name (PMN and HVIN for ISED)	LBAC0ZZ2TF
②	Product Code	001<***> (*** varies depending on the production period)
③	Serial No.	AAAABBBBCCCC (hex)
④	2D barcode	Serial No.
⑤-1	FCC ID for the product	VPYLB2TG
⑤-2	FCC ID for the BLE module	YCP-STM32WB5M001
⑥-1	IC Number for the product	772C-LB2TG
⑥-2	IC Number for the BLE module	8976A-STM32WB5M01
⑦	TELEC Mark & code	001-P02171
⑧	Brand Logo	muRata

*The labels are protected with a water- and weather-resistant film so that they do not peel off easily or the writing does not fade.

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2.3.4 LBAC0ZZ2TJ

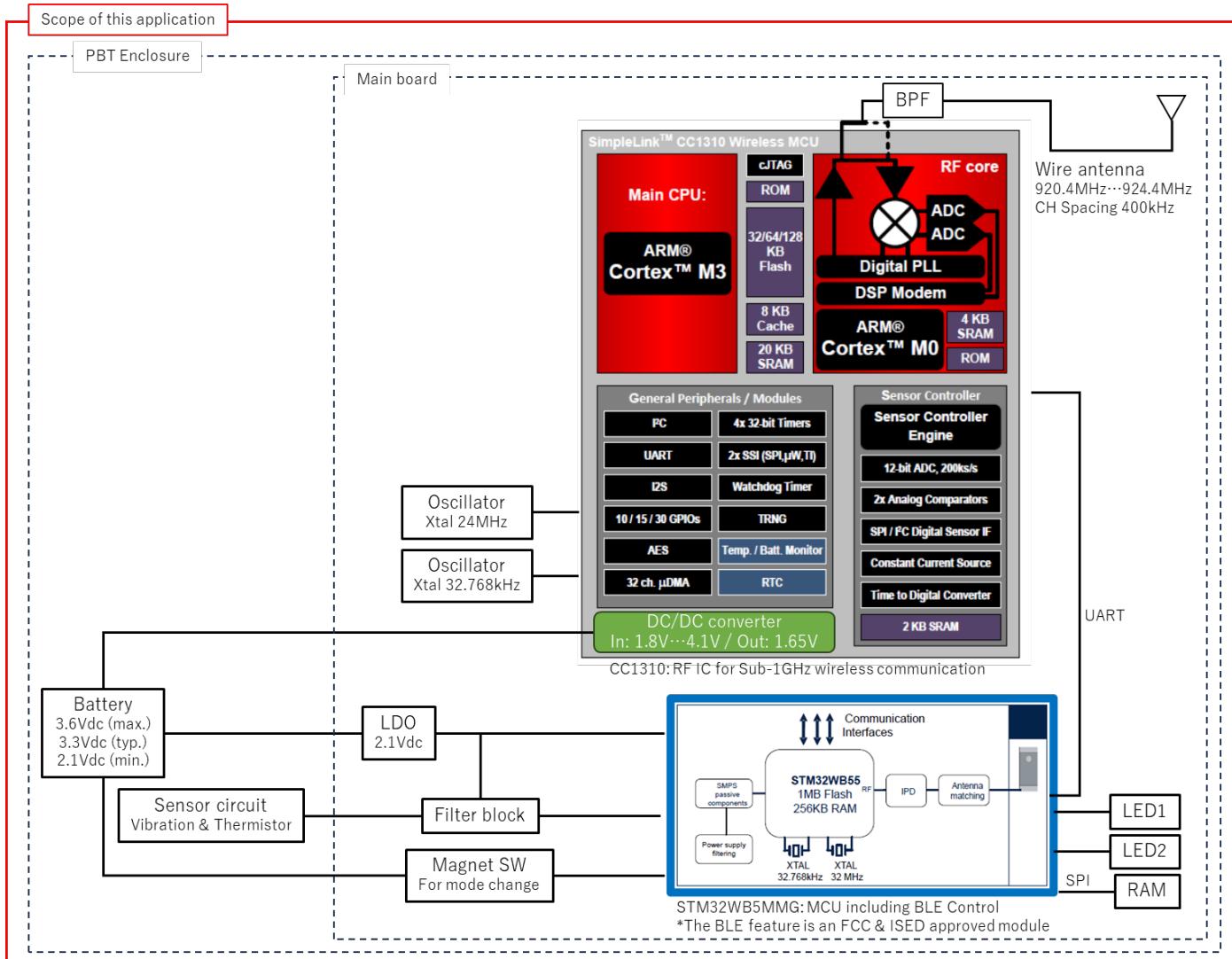


No	Item	Detail
①	Product Name	ES3M VSN2
②	Product Code (PMN and HVIN for ISED)	LBAC0ZZ2TJ
③	Serial No.	AAAABBBBCCCC (hex)
④	2D barcode	Serial No.
⑤-1	FCC ID for the product	VPYLB2TG
⑤-2	FCC ID for the BLE module	YCP-STM32WB5M001
⑥-1	IC Number for the product	772C-LB2TG
⑥-2	IC Number for the BLE module	8976A-STM32WB5M01
⑦	TELEC Mark & code	001-P02171
⑧	Explosion-proof conditions	Ex ic IIC T4 Gc Ta=-10°C~+60°C
⑨	Explosion-proof approval mark	The content will change each time the explosion-proof certification is renewed.

*The labels are protected with a water- and weather-resistant film so that they do not peel off easily or the writing does not fade.

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2.4 Block Diagram



*BLE and Sub-1GHz wireless are not transmitted simultaneously.

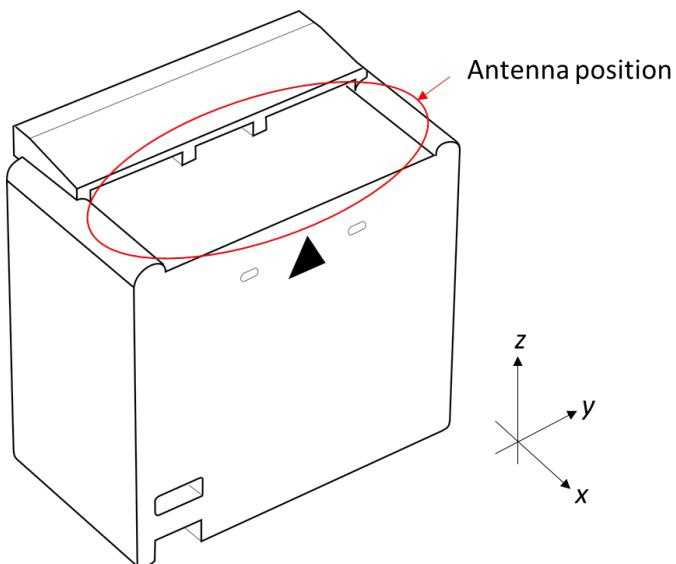
**The Zigbee function of the STM32WB5MMG is disabled by the host software.

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3 Antenna information

3.1 Antenna diversity

The null point of the antenna is the direction of the top (z-direction). The main lobe is in the xy plane.



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4 Manufacturing information

4.1 Manufacturer

Name	Murata Manufacturing Co., Ltd.
Location	1-10-1, Higashikotari, Nagaokakyo-shi, Kyoto 617-8555, JAPAN

4.2 Factory

Name	Komatsu Murata Manufacturing Co., Ltd.
Location	93 Hikari-machi, Komatsu-shi, Ishikawa 923-8626, JAPAN

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5 Applicable standards and certification

5.1 General

This product complies with the radio regulations described in the specification. Be sure to comply with following points upon usage.

- ✓ When using this product, use an application that is compatible with the country / region of use.
- ✓ DO NOT use applications from different regions.
- ✓ DO NOT disassemble or modify the product.
- ✓ DO NOT peel off the product label.

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5.2 FCC



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.

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

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 must be installed and operated keeping the radiator at least 20cm or more away from person's body.

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contact:

Murata Electronics North America, Inc.

3330 Cumberland Blvd., SE, Suite 700, Atlanta, GA 30339, USA

Mark Tucker

Tel +1 770 436 1300

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5.3 ISED

5.3.1 English

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

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the ISED radio frequency (RF) Exposure rules. This equipment must be installed and operated keeping the radiator at least 20cm or more away from person's body.

5.3.2 Français

L'émetteur/récepteur exempt de licence contenu dans 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 ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'ISDE. Cet équipement doit être installé et utilisé en gardant une distance de 20 cm ou plus entre le radiateur et le corps humain.

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5.4 Singapore

Complies with
IMDA Standards
DA*****

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5.5 Thailand

5.5.1 แบบไทย

“เครื่องโทรศัพท์มือถือและอุปกรณ์นี้ มีความสอดคล้องตามมาตรฐานหรือข้อกำหนดทางเทคนิคของ กสทช.”

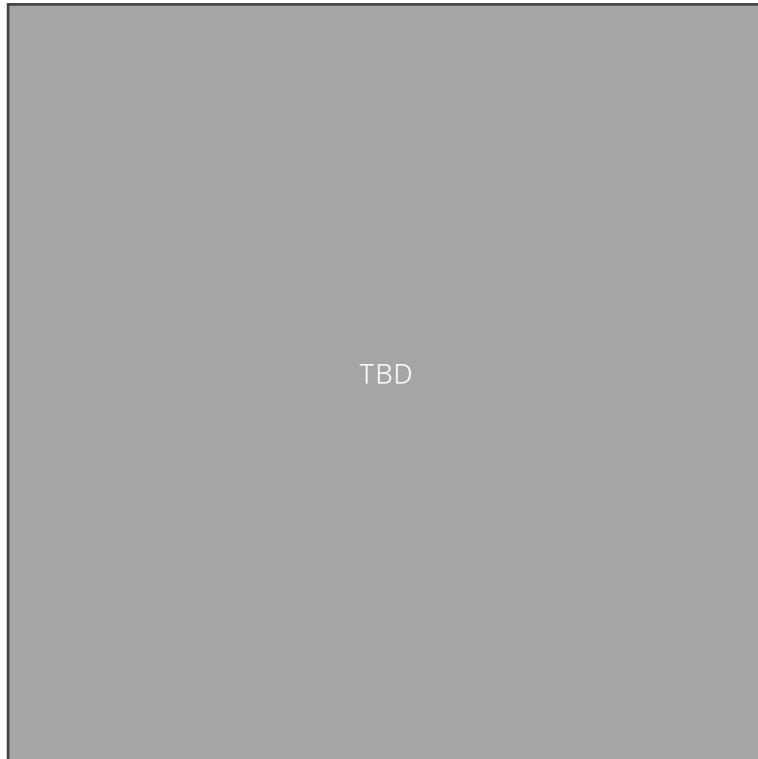
“เครื่องวิทยุมานาคมนี้มีระดับการแผ่คลื่นแม่เหล็กไฟฟ้าสอดคล้องตามมาตรฐานความปลอดภัยต่อสุขภาพของมนุษย์จากการใช้เครื่องวิทยุมานาคมที่คณะกรรมการกิจการโทรศัพท์มือถือและอุปกรณ์นี้ได้ประกาศกำหนด.”

5.5.2 English

This telecommunication equipment conforms to the standard or technical requirements of NBTC.

This radiocommunication equipment has the electromagnetic field strength in compliance with the Safety Standard for the Use of Radiocommunication Equipment on Human Health announced by the National Telecommunications Commission.

5.5.3 QR code



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5.6 Bahamas

Certification No.: VPYLB2TG

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6 Other information

6.1 Storage

The product,

- shall not be subjected to any excess mechanical shock,
- shall not be stored in environments containing,
 - Corrosive gas (Cl₂, NH₃, SO_x, NO_x, etc.),
 - Combustible and volatile gases,
 - Organic solvents,
 - Strong electromagnetic field and static electricity,
 - hot air or close to fire
 - Direct sunlight,
 - Water splashes,
 - High humidity levels that can cause condensation of water,
 - Freezing conditions.

If there is a possibility of operating the product under any of the aforementioned environments, the user shall consult Murata before the actual product operation.

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6.2 Usage caution

- Do not disassemble, modify or repair this product.
- Plug the battery into the battery box properly and connect with the battery connector completely.
- When removing the battery, take it out with care because removing it with excessive force may cause a cable failure.
- Battery terminals may have poor contact due to changes over time.
- In case of smoke, strange smell or strange sound from the product, pull out the battery and stop using the product.
- Stop use if the product is dropped.
- Battery life varies depending on the circumstances and battery performance.
- When used in a low or high temperature environment, the battery life decreases compared to nominal temperature.
- Do not touch the product during and after being used in a low or high temperature environment.
- Corrosive gas may generate harmful substances; do not use the product in an atmosphere containing corrosive gas.
- Do not cover the product with flammable materials.
- Do not place the product in an atmosphere containing flammable gases.

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6.3 Usage limitations

This product is designed to work under the environmental conditions described in the specification. Do not use the product in the following applications that require extreme high reliability to prevent defects which might directly cause damage to third party's life, body or property:

- Aircraft equipment
- Aerospace equipment
- Undersea equipment
- Power plant control equipment
- Medical equipment
- Transportation equipment (vehicles, trains, ships, etc.).
- Traffic single equipment
- Disaster prevention /crime prevention equipment.
- Applications that require similar complexity and/or reliability to those listed above

CAUTION

Do not exposed to excessive heat such as sunshine, fire or the like, that can result in an explosion or the leakage of flammable liquid or gas during use, storage or transportation or disposal.

CAUTION

Do not dispose battery into fire or oven, or mechanically crush or cut the battery. This can result in explosion.

CAUTION

Do not subjected to extremely low air pressures at high altitudes, as it may result in explosion or leakage of flammable liquid or gas.

CAUTION

There is a risk of explosion if the internal battery is replaced by an incorrect type.

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7 Product warranty

7.1 Warranty period and its scope

- ✓ Please note that the only warranty provided regarding the product is its conformance to the Product Specification provided herein for 12 months from the delivery date ("Warranty Period").
- ✓ During the Warranty Period, in the event of defective product, even if product is used for the purpose under the conditions, and in environments specified in this product specification, we will at our option (a) promptly replace with the Product without defect, or (b) accept the return of the defective Product. The above shall constitute our entire liability with respect to defective of our Product.

EXCEPT AS PROVIDED IN THE ABOVE, WE HEREBY DISCLAIM ALL OTHER WARRANTIES REGARDING THE PRODUCT AND ITS RELATED SOFTWARE, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, THAT THEY ARE DEFECT-FREE, OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS.

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7.2 Warranty exception

- ✓ You understand and agree that we have no liability for any defect or trouble of Products which caused by your mistake or fault in handling.
- ✓ Please note that you shall use the Product according to guide line for the safety described in this Product Specification and/or user manual which is provided to you separately ("Guide Line"). We are not liable for safety of the Product when it is used other than any way described in the Guide Line.
- ✓ We have no liability even in Warranty Period, for defective Product and/or damage caused by
 - use of the Product other than any way described in the Guide Line
 - repair, modification by you or any third party other than us without our prior consent
 - accidental fall and careless handling after delivery
 - natural disaster such as fire disaster, earthquake, pollution, wind, flood, lightning strike, and salt pollution, and physical or electric load over the normal condition
 - degradation and expendable part
 - product or device other than the Product
- ✓ You agree and understand that we are not liable to you or to any of your customers for any damages of system, life, body injury, and property of third party caused by defective Product, and for any damages caused by measurement data of our Product.

WE SHALL NOT BE LIABLE TO YOU OR TO ANY OF YOUR CUSTOMERS FOR ANY LOSS OF PROFIT, INDIRECT, INCIDENTAL, SPECIAL, PRODUCTIVE, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR RELATING TO THE USE OF THE PRODUCT OR FOR ANY ERROR OR DEFECT IN THE PRODUCT. OUR ENTIRE LIABILITY AND OUR SOLE AND EXLUSIVE REMEDY FROM ANY CAUSE OF THE PRODUCT INCLUDING, WITHOUT LIMITAION, NONPERFORMANCE OR MIS-REPRESENTAION AND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT, OR ANY OTHER LEGAL THOROY, IS LIMITED TO THE PRICE OF APPLICABLE PRODUCT.

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