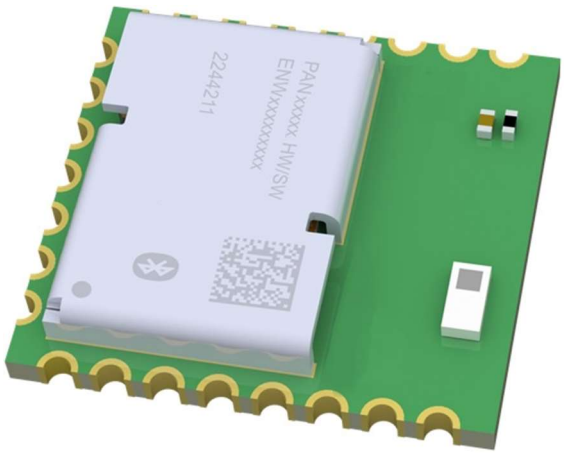
Panasonic
INDUSTRY

PAN B611-1x

Bluetooth® Low Energy Module

Product Specification

Rev. 1.0



Wireless Connectivity

Overview

The PAN B611-1x is a Bluetooth 6.0 qualified Low Energy (LE) module based on the Nordic nRF54L15 single chip controller.

Features

- Surface mount type with castellated holes, dimensions: 10.35 mm × 9.8 mm × 1.9 mm
- Nordic nRF54L15 featuring a 128 MHz Arm Cortex M33 processor, 1.5 MB non-volatile memory, and 256 KB RAM
- Bluetooth 6.0 LE including LE 2M and LE Coded PHY
- Supports 802.15.4 - ZigBee® and Thread
- 128-bit AES/ECB/CCM/AAR co-processor
- Up to 32× General Purpose I/Os (GPIO) at 1.7 V to 3.6 V, which are shared by SPI, I²C, UART, PWM, ADC (up to 14-bit), NFC, QSPI

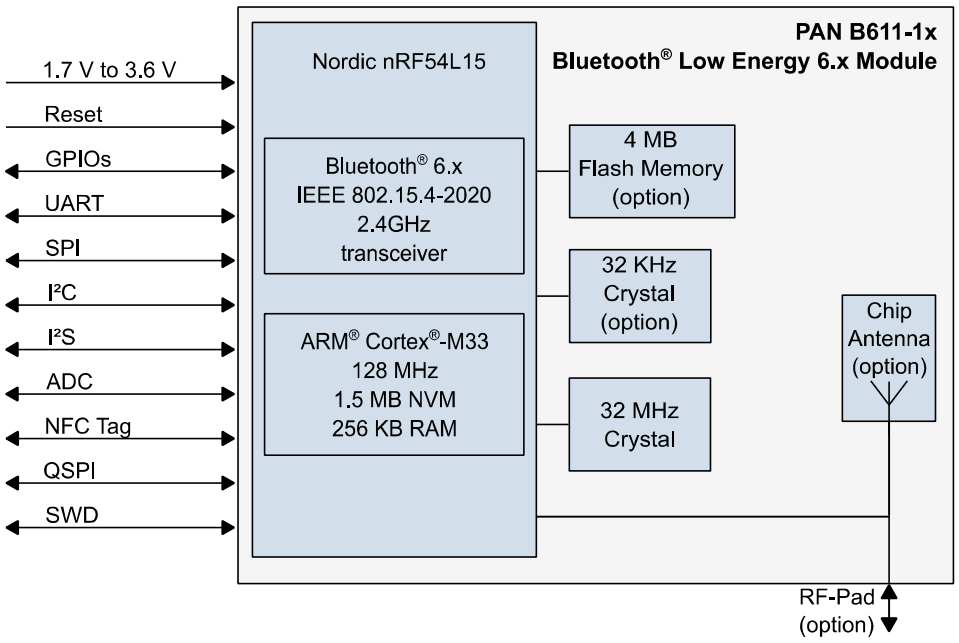
Bluetooth

- Channel Sounding
- LE 2M and LE Coded
- LE Audio and Isochronous Channels
- Extended Advertising and Channel Sounding
- Mesh Networking

Characteristics

- Typical sensitivity: 96 dBm (at 1 Mbps) and 104 dBm (at 125 kbps)
- Programmable from: -8 dBm to +8 dBm in 1 dB steps
- Typical Sleep current consumptions:
  0.6 µA (System OFF, Wake on pin, 0KB RAM retained)
  3.7 µA (System ON, Wake on pin + GRTC, LFRC, 256 KB RAM retained)
- Typical Radio current consumptions:
  3.3 mA (Radio RX @ 1 Mbps, HFXO
  4.8 mA (Radio TX @ 0 dBm, HFXO
  9.8 mA (Radio TX @ 8dBm, HFXO
- On module DC DC and LDO regulators with automated low current modes
- Wide temperature ranges from -40 °C to 85 °C
- Voltage range: 1.7 V to 3.6 V

Block Diagram



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Information on Software

The PAN B611-1x module does not contain any software ex works, i.e. software is provided by 3rd party suppliers only. The essential software resources can be found on the partner website of Nordic Semiconductor https://www.nordicsemi.com/.

PIDEU provides a factory software programming service for your customized firmware; for further information please reach out to your local sales contact this regarding ⇨ 7.2.1 Contact Us.

Table of Contents

1 About This Document

1.1 Purpose and Audience

This Product Specification provides details on the functional, operational, and electrical characteristics of the Panasonic PAN B611-1x module. It is intended for hardware design, application, and Original Equipment Manufacturers (OEM) engineers.

The product is referred to as “PAN B611-1x” and “module” within this document.

1.2 Revision History

Revision	Date	Modifications/Remarks
0.1	2024-10-21	First preliminary version
0.2	2025-03-12	Added electrical specifications Updated block diagram Updated Characteristics
0.3	2025-06-26	Changed PAN B511-1C to PAN B611-1x Updated block diagram Added information about RF-bottom pad module variant Updated Package Label Updated ⇨ 4.2 Absolute Maximum Ratings

1.3 Use of Symbols

Symbol	Description
	**Note** Indicates important information for the proper use of the product. Non-observance can lead to errors.
	**Attention** Indicates important notes that, if not observed, can put the product’s functionality at risk.
⇨ [chapter number] [chapter title]	**Cross reference** Indicates cross references within the document. **Example:** Description of the symbols used in this document ⇨ 1.3 Use of Symbols.

1.4 Related Documents

For related documents please refer to the Panasonic website ⇨ 7.2.2 Product Information.

2 Overview

The PAN B611-1x is a Bluetooth 6.0 qualified Low Energy (LE) module based on the Nordic nRF54L15 single chip controller. It is available with an on-board chip antenna and with a RF-bottom pad.

It supports a variety of wireless protocols in the 2.4 GHz spectrum including Bluetooth LE, Bluetooth Mesh and IEEE 802.15.4, and thus Zigbee and Thread, which make it effortless to develop products for smart home standards like Matter and Zigbee and even allow running multiple wireless protocols concurrently. For even more throughput and less latency, a new proprietary 4 Mbps data rate option is also available. The PAN B611-1x provides a Tx power of up to 8 dBm.

With the ARM® Cortex®-M33 processor running at 128 MHz, 256 KB RAM, and the built-in 1.5 MB NVM, PAN B611-1x can easily be used directly for complex applications, thereby eliminating the need for an external processor, saving complexity, space, and cost.

For applications with more need for memory or for battery-powered devices targeting ultra-low current consumption, multiple variants of the PAN B611-1x with additional 4 MB external flash memory and/or a 32 KHz crystal are available.

The PAN B611-1x was designed to fully support PSA Certified Level 3 by including security services like TrustZone isolation, secure boot, secure storage and secure firmware update. It has integrated tamper sensors and both the controller as well as the 128-bit AES/ECB/CCM/AAR cryptographic accelerator are hardened against side-channel attacks.

Up to 32× General Purpose I/Os are available which are shared by a rich set of interfaces including SPI, I²C, UART, PWM, 14-bit ADC and NFC that allow a multitude of peripherals to be connected in parallel. The newly available Global RTC (real-time clock) eliminates the need for an external RTC while the RISC-V co-processor is designed to provide flexible software-defined peripherals like QSPI.

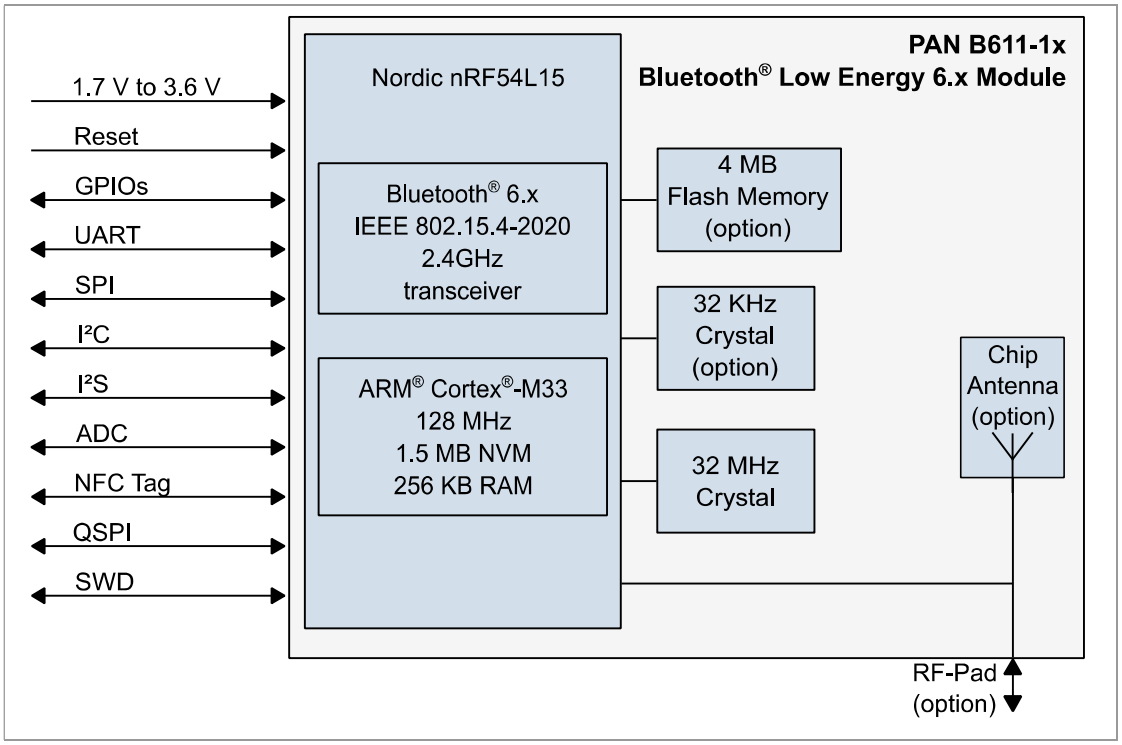
The PAN B611-1x also supports Type 2 Near Field Communication (NFC A) - with an external antenna - for use in simplified pairing and payment solutions and Bluetooth Channel Sounding for distance measurement and presence detection.

Applications can be developed with Nordic's nRF Connect SDK. It is based on the Zephyr RTOS and offers developers an extensible framework for building size-optimized software using a wide range of sample applications, protocol stacks, libraries and hardware drivers.

For related documents please refer to ⇨ 7.2.2 Product Information.

For further information on the variants and versions please refer to ⇨ 7.1 Ordering Information.

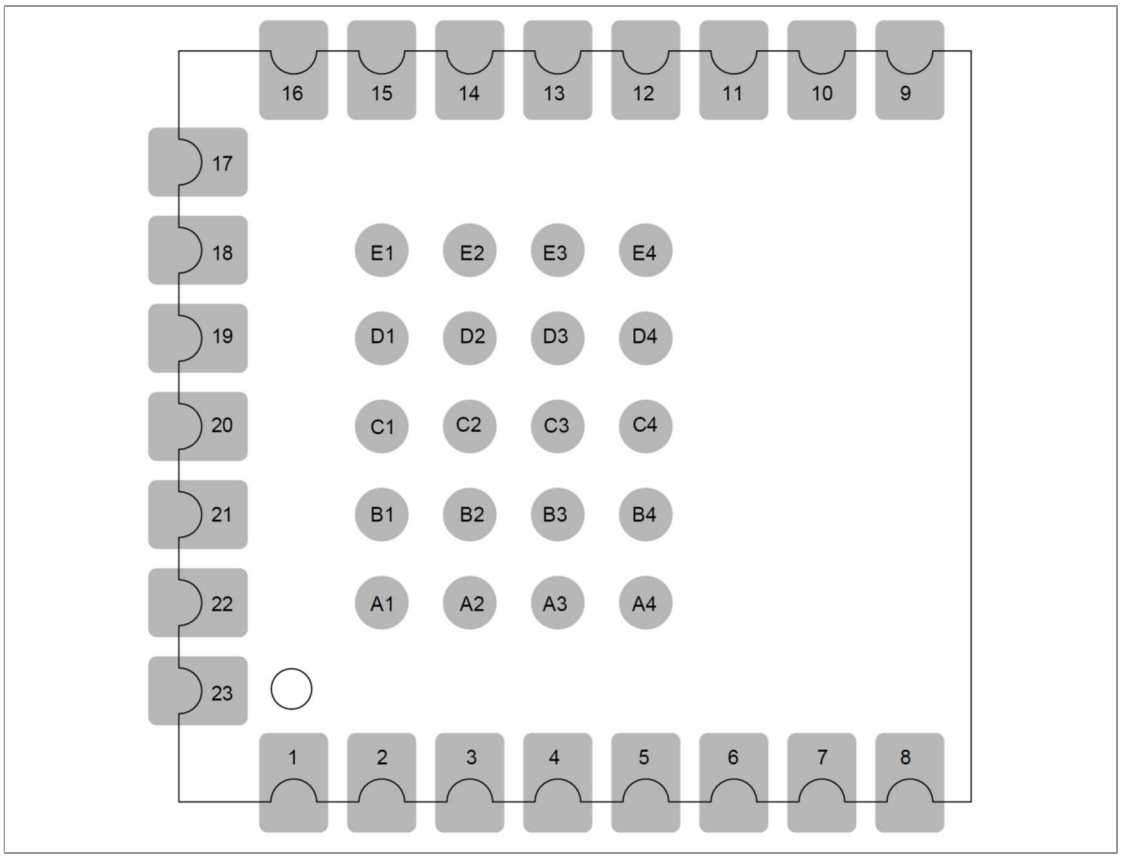
2.1 Block Diagram



2.2 Pin Configuration

Pin Assignment

Top View



Pin Functions

No.	Pin Name	Pin Type	Description
1	P0.01	Digital I/O	General purpose I/O
2	P0.02	Digital I/O	General purpose I/O
3	P0.03	Digital I/O	General purpose I/O GRTC PWM output
4	P0.04	Digital I/O	General purpose I/O
5	SWDCLK	Debug	Serial wire clock. Input with onchip pull-up.
6	SWDIO	Debug	Serial wire data. Bidirectional with standard-drive and on-chip pull-down.
7	RF	N/C	Do not connect for on-board chip antenna variant
		RF I/O	RF interface for RF-bottom pad variant
8	GND	Ground	Connect to ground

No.	Pin Name	Pin Type	Description
9	GND	Ground	Connect to ground
10	P1.07	Digital I/O / Analog input	General purpose I/O Analog input
11	P1.06	Digital I/O / Analog input	General purpose I/O Analog input
12	P1.05	Digital I/O / Analog input	General purpose I/O Analog input
13	P1.04	Digital I/O / Analog input	General purpose I/O Analog input
14	P1.03 / NFC2	Digital I/O NFC input	General purpose IO NFC antenna connection
15	P1.02 / NFC1	Digital I/O NFC input	General purpose IO NFC antenna connection
16	VCC	Power	Power supply
17	GND	Ground	Connect to ground
18	P2.06	Digital I/O	General purpose I/O
19	P2.07	Digital I/O	General purpose I/O
20	P2.08	Digital I/O	General purpose I/O
21	P2.09	Digital I/O	General purpose I/O
22	P2.10	Digital I/O	General purpose I/O
23	nRESET	Reset	Pin reset with on-chip pull-up
A1	P1.09	Digital I/O	General purpose I/O
A2	P1.10	Digital I/O	General purpose I/O
A3	P0.00	Digital I/O	General purpose I/O
A4	GND	Ground	Connect to ground
B1	P1.12	Digital I/O / Analog input	General purpose I/O Analog input
B2	P1.13	Digital I/O / Analog input	General purpose I/O Analog input
B3	P1.11	Digital I/O / Analog input	General purpose I/O Analog input
B4	P1.08	Digital I/O	General purpose I/O
C1	P1.15	Digital I/O	General purpose I/O
C2	P1.14	Digital I/O / Analog input	General purpose I/O Analog input
C3	P2.05 / QSPI_CS	Digital I/O QSPI CS	General purpose I/O

No.	Pin Name	Pin Type	Description
C4	P2.00 / QSPI_D3	Digital I/O QSPI D3	General purpose I/O
D1	P1.00	Digital I/O / Analog input	General purpose I/O Connection for external 32.768 kHz crystal only ENW89861A3KF
D2	GND	Ground	Connect to ground
D3	P2.04 / QSPI_D1	Digital I/O QSPI D1	General purpose I/O
D4	P2.02 / QSPI_D0	Digital I/O QSPI D0	General purpose I/O
E1	P1.01	Digital I/O / Analog input	General purpose I/O Connection for external 32.768 kHz crystal only ENW89861A3KF
E2	GND	Ground	Connect to ground
E3	P2.03 / QSPI_D2	Digital I/O QSPI D2	General purpose I/O
E4	P2.01 / QSPI_SCK	Digital I/O QSPI SCK	General purpose I/O

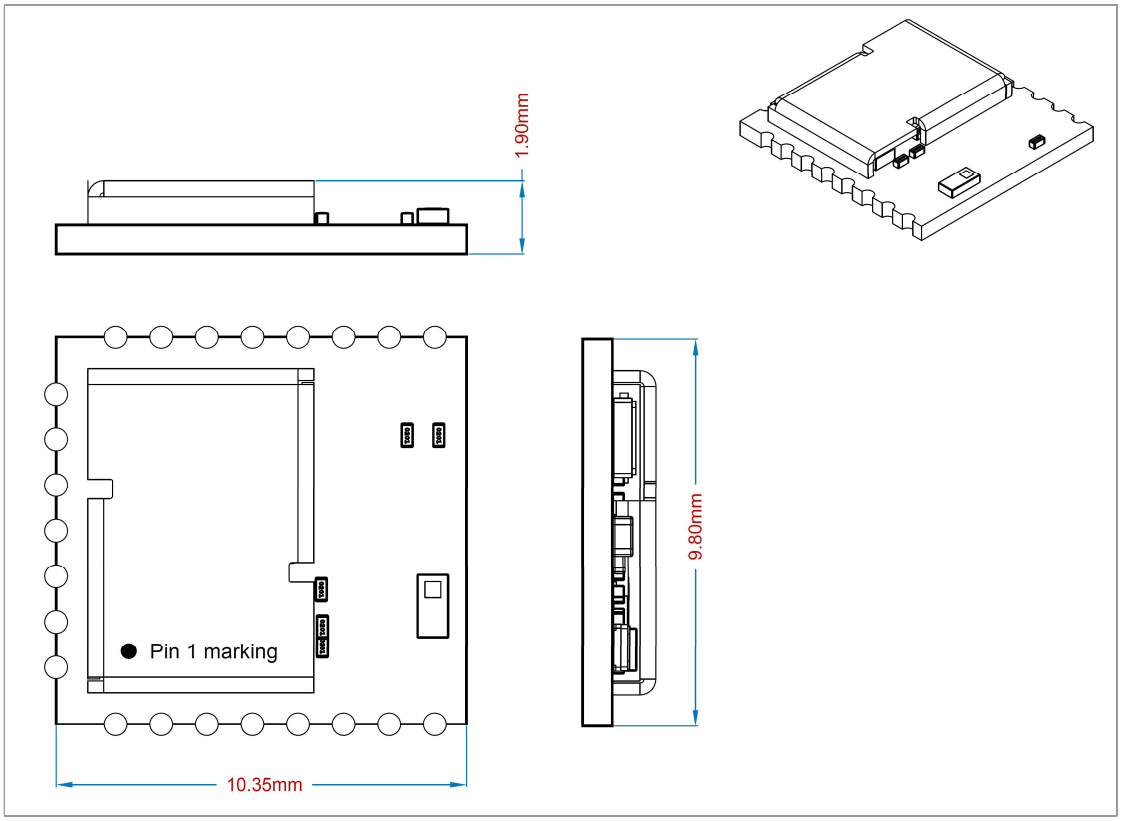
2.3 Peripherals

- RISC-V Coprocessor
- Global RTC (GRTC) that can run in System OFF mode and implement a shared system timer
- Seven 32-bit timers with counter mode
- Up to five fully featured serial interfaces with EasyDMA supporting I2C, SPI controller/peripheral, and UART
  - One high-speed SPIM up to 32 MHz, four up to 8 MHz
  - One high-speed UARTE up to 4 Mbps, four up to 1 Mbps
  - I2C up to 400 kHz
- Three pulse width modulator (PWM) units with EasyDMA
- I2S two channel Inter-IC sound interface
- ADC with up to eight programmable gain channels. 14-bit at 31.25 ksps, 12-bit at 250 ksps, and up to 10-bit at 2 Msps.
- Pulse density modulation (PDM) interface
- Near field communication (NFC)
- Up to two quadrature decoders (QDEC)
- Comparator and low-power comparator with wake-up from System OFF mode
- Temperature sensor

3 Detailed Description

3.1 Dimensions

The dimensions are in millimeters.

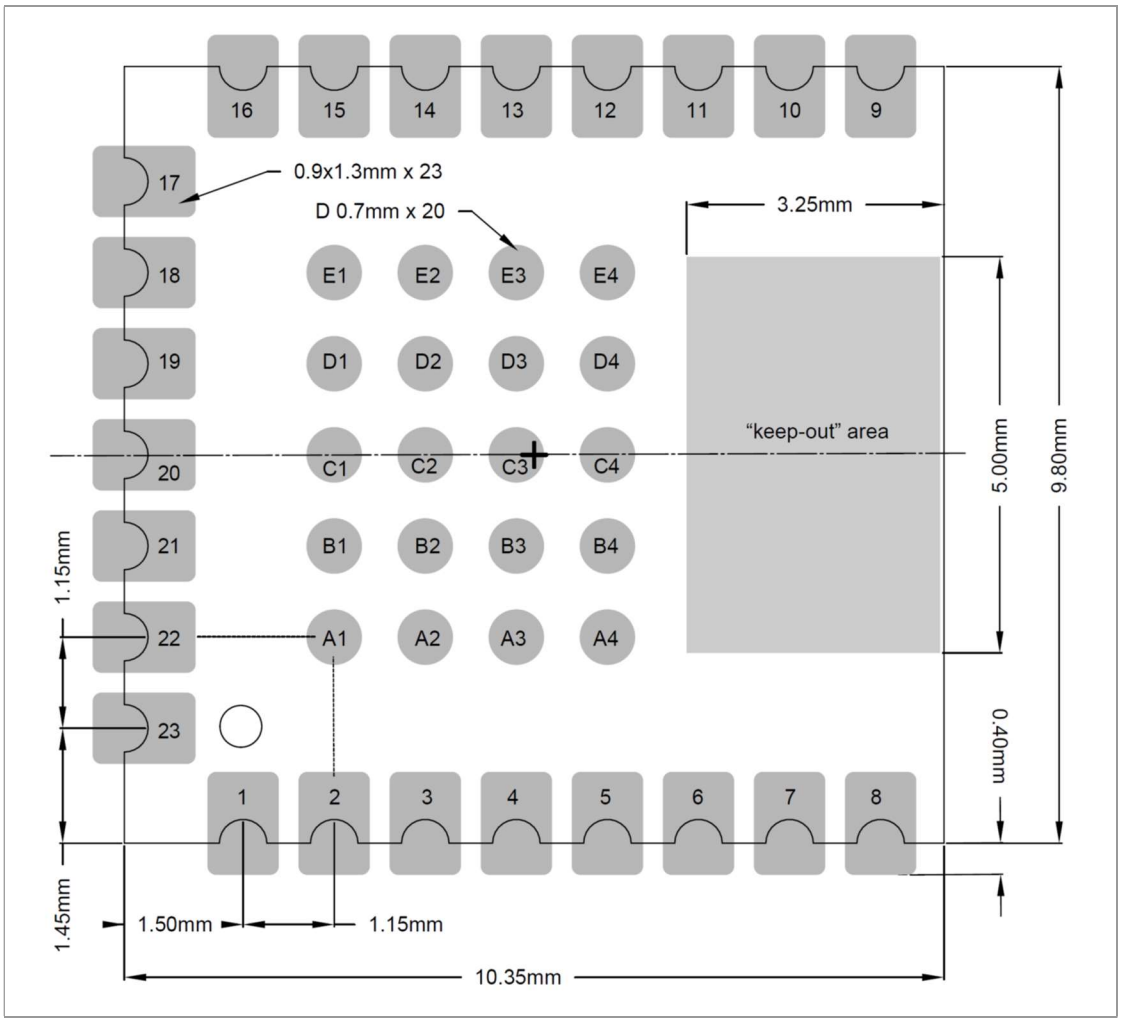


Item	Dimension	Tolerance	Remark
Width	9.80	±0.30	
Length	10.35	±0.30	
Height	1.90	±0.20	With case

3.2 Footprint

All dimensions are in millimeters.

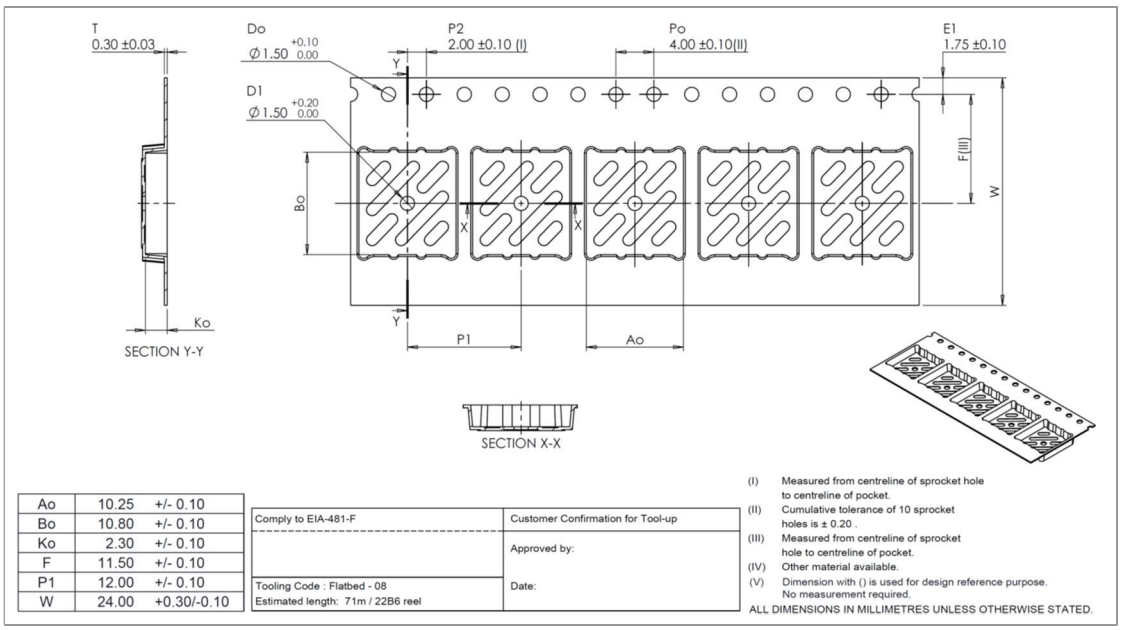
Top View



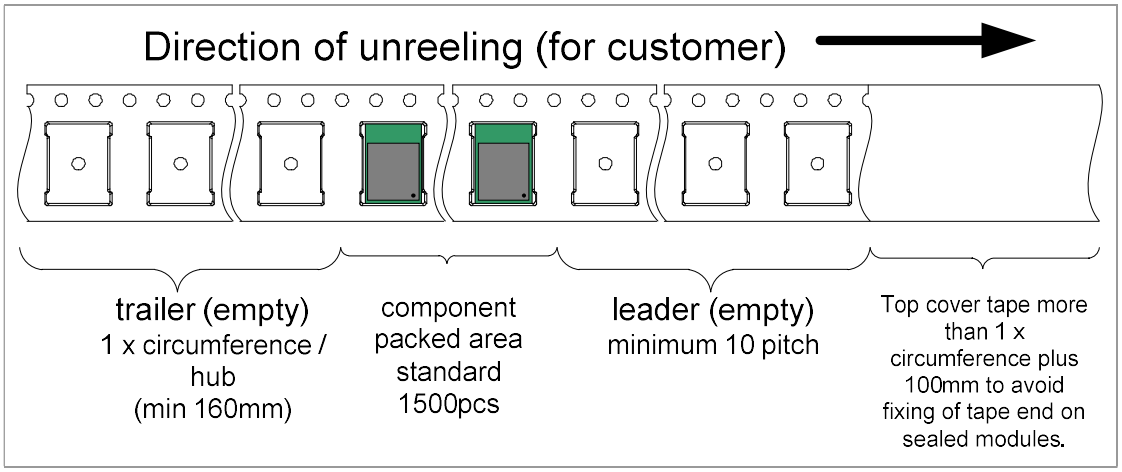
3.3 Packaging

The module will be delivered in the package described below.

3.3.1 Tape Dimensions



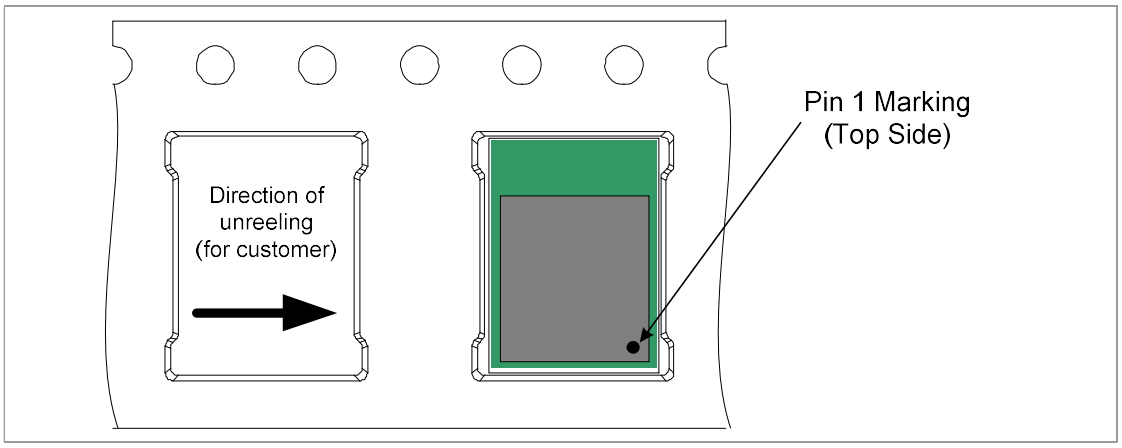
3.3.2 Packing in Tape



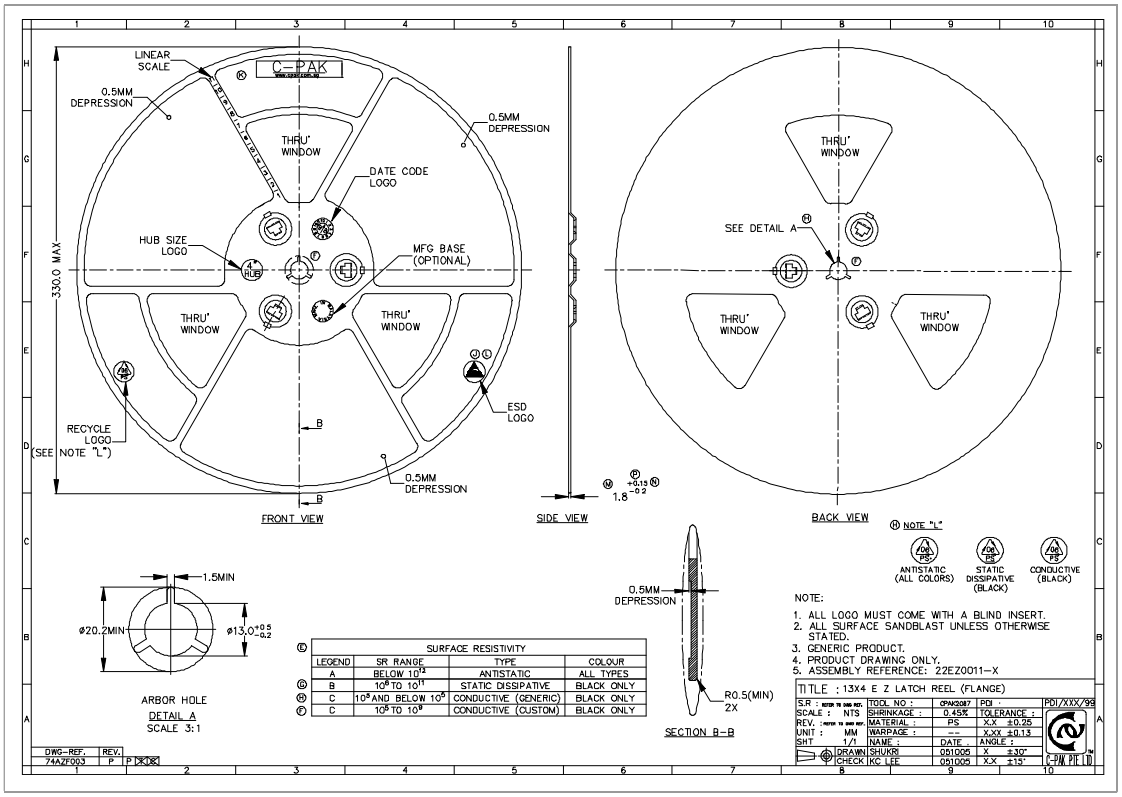
Empty spaces in the component packed area shall be less than two per reel and those spaces shall not be consecutive.

The top cover tape shall not be found on reel holes and it shall not stick out from the reel.

3.3.3 Component Direction

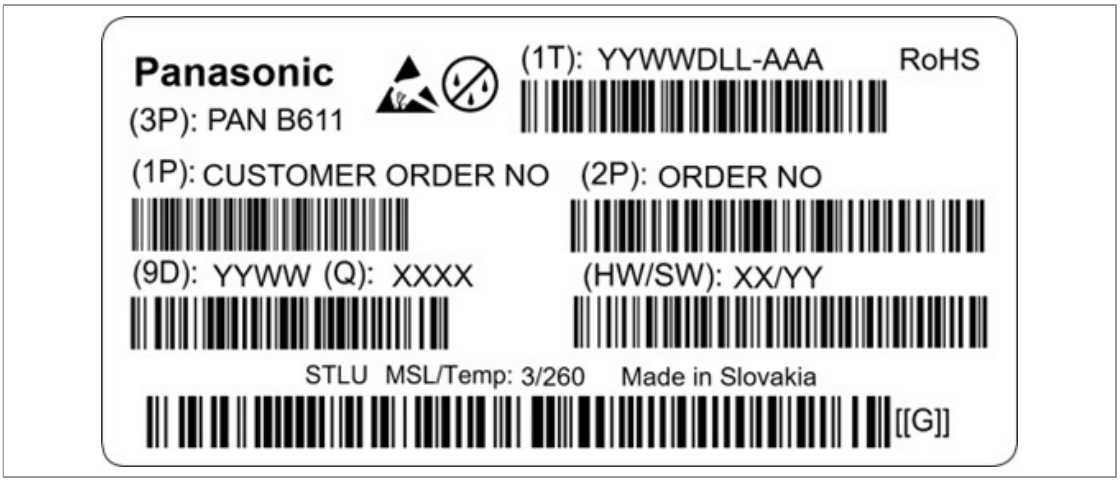


3.3.4 Reel Dimension



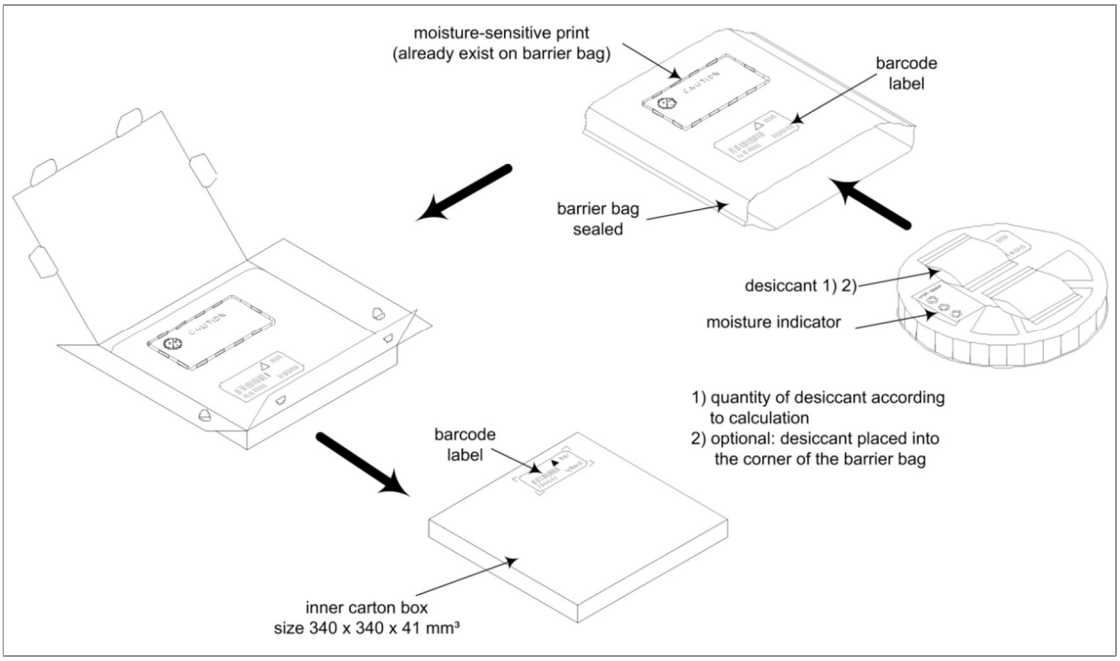
3.3.5 Package Label

Example:



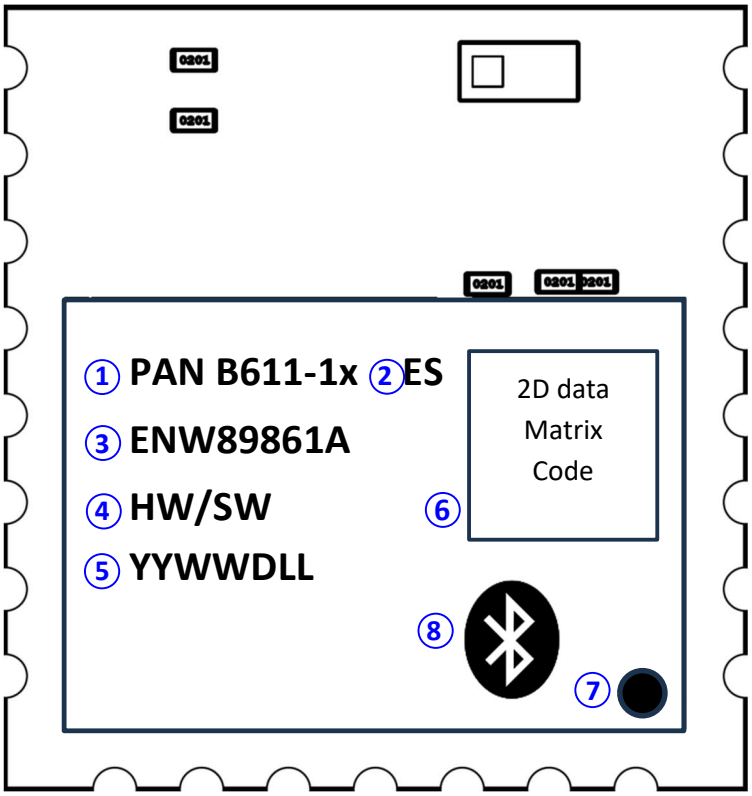
(1T)	Lot code
(1P)	Customer order number, if applicable
(2P)	Order number
(3P)	Brand name
(9D)	Date code
(Q)	Quantity
(HW/SW)	Hardware/software version

3.3.6 Total Package



3.4 Case Marking

Example:



1	Brand name
2	Status: ES or empty for MP
3	Order number
4	Hardware/software version
5	Lot code
6	2D barcode, for internal usage only
7	Marking for Pin 1
8	Bluetooth logo

4 Specification and Integration Recommendations

All specifications are over temperature and process, unless indicated otherwise.

4.1 Default Test Conditions

Temperature:	25 °C ± 10 °C
Humidity:	40 % to 85 % RH
Supply Voltage:	3 V

4.2 Absolute Maximum Ratings

The maximum ratings may not be exceeded under any circumstances, not even momentarily or individually, as permanent damage to the module may result.

Symbol	Parameter	Condition	Min.	Max.	Unit
V_{DD}	Normal Supply Voltage		-0.3	3.9	V
I/O Pin	Voltage on any Pin	$V_{DD} \leq 3.6$ V	-0.3	V_{DD} + 0.3	
I/O Pin	Voltage on any Pin	$V_{DD} > 3.6$ V		3.9	
ESD	ESD Robustness	HBM 1C		1000	
ESD	ESD Robustness	CDM		250	
I_{max}	NFC antenna pin current			130	mA
MSL	Moisture Sensitivity Level			3	
T_{STOR}	Storage Temperature		-40	+85	°C

4.3 Recommended Operating Conditions

The maximum ratings may not be exceeded under any circumstances, not even momentarily or individually, as permanent damage to the module may result.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
$V_{DD,POR}$	Supply Voltage	VDD supply voltage needed during power-on reset	1.75			V
V_{DD} (LV Mode)	Supply Voltage		1.7		3.6	V
TA	Operating Temperature		-40	25	85	°C

4.4 Current Consumption

The current consumption depends on the user scenario and on the setup and timing in the power modes.

Assume V_{DD} = 3 V, T_{amb} = 25 °C, Peripherals all idle, HFCLK = HFINT running at 128 MHz, LFCLK not running, if nothing else stated, DC-DC enabled.

Parameter	Condition	Min.	Typ.	Max.	Unit
Sleep Mode	System OFF, Wake on pin, 0 KB RAM retained		0.6		µA
	System ON, Wake on pin, 128 KB RAM retained		1.8		µA
	System ON, Wake on pin + GRTC, LFRC, 256 KB RAM retained		3.7		µA
CPU running Coremark	Coremark from NVM, Cache enabled		2.6		mA
	Coremark from RAM, Cache disabled		2.9		mA
Rx Current	Radio RX @ 1 Mbps, HFXO		3.4		mA
	Radio RX @ 2 Mbps, HFXO		3.6		mA
Tx Current	Radio TX @ 0 dBm, HFXO		4.8		mA
	Radio TX @ 4 dBm, HFXO		6.6		mA
	Radio TX @ 8 dBm, HFXO		9.8		mA

4.5 Bluetooth RF Characteristics

4.5.1 Transmitter RF Characteristics

Parameter	Condition		Min.	Typ.	Max.	Unit
Frequency Range			2 402		2 480	MHz
Output Power			-8		+8	dBm
Data Rate			125		2 000	kbps
Adjacent Channel Transmit Power	1 Mbps	1st Adjacent Channel		-48		dBc
		2nd Adjacent Channel		-54		dBc
	2 Mbps	1st Adjacent Channel		-51		dBc
		2nd Adjacent Channel		-56		dBc

4.5.2 Receiver RF Characteristics

Parameter	Condition		Min.	Typ.	Max.	Unit
Receiver Sensitivity	1 Mbps Bluetooth LE ideal transmitter, packet length ≤ 37 bytes			-96		dBm
	2 Mbps Bluetooth LE ideal transmitter, packet length ≤ 37 bytes			-94		dBm
	125 kbps Bluetooth LE mode			-104		dBm
	500 kbps Bluetooth LE mode			-99		dBm
Interference Characteristics	1 Mbps Signal Level = -67 dBm BER ≤ 0.1 %	C/I (Co-channel)		6		dB
		C/I (-1 MHz)		-2		dB
		C/I (+1 MHz)		-6		dB
		C/I (-2 MHz)		-29		dB
		C/I (+2 MHz)		-43		dB
		C/I (≥3 MHz)		-46		dB
		C/I (Image)		-29		dB
		C/I (Image,1 MHz)		-39		dB

4.6 Antenna Placement Recommendation

This antenna placement recommendation is related to the PAN B611-1x with the on-board chip antenna, ordering number: ENW89861A01F, ENW89861B01F and ENW89861C01F

Antenna "Keep out Area"

Do not place any ground plane under the marked restricted antenna area in any layer! This would be affecting the performance of the chip antenna in a critical manner.

Impact of Placement on the Antenna Radiation Pattern

The placement of the module, surrounding material, and customer components has an impact on the radiation pattern of the antenna.

The recommendation for the ground plane is based on a FR4 4-Layer PCB.

The following requirements must be met:

- ✓ Keep this product away from heat. Heat is the major cause of decreasing the life of these products.
- ✓ Keep this product away from other high frequency circuits.

The antenna requires a cutout area of 5.00 mm × 3.25 mm under the PAN B611-1x module. This "Keep out Area" shall be located in every layer under the module antenna. Note for example the "Keep out Area" in all four layers of the PAN B611-1x evaluation board.

It is recommended to verify the perfect position of the module in the target application before fixing the design.

Antenna Placement Recommendation

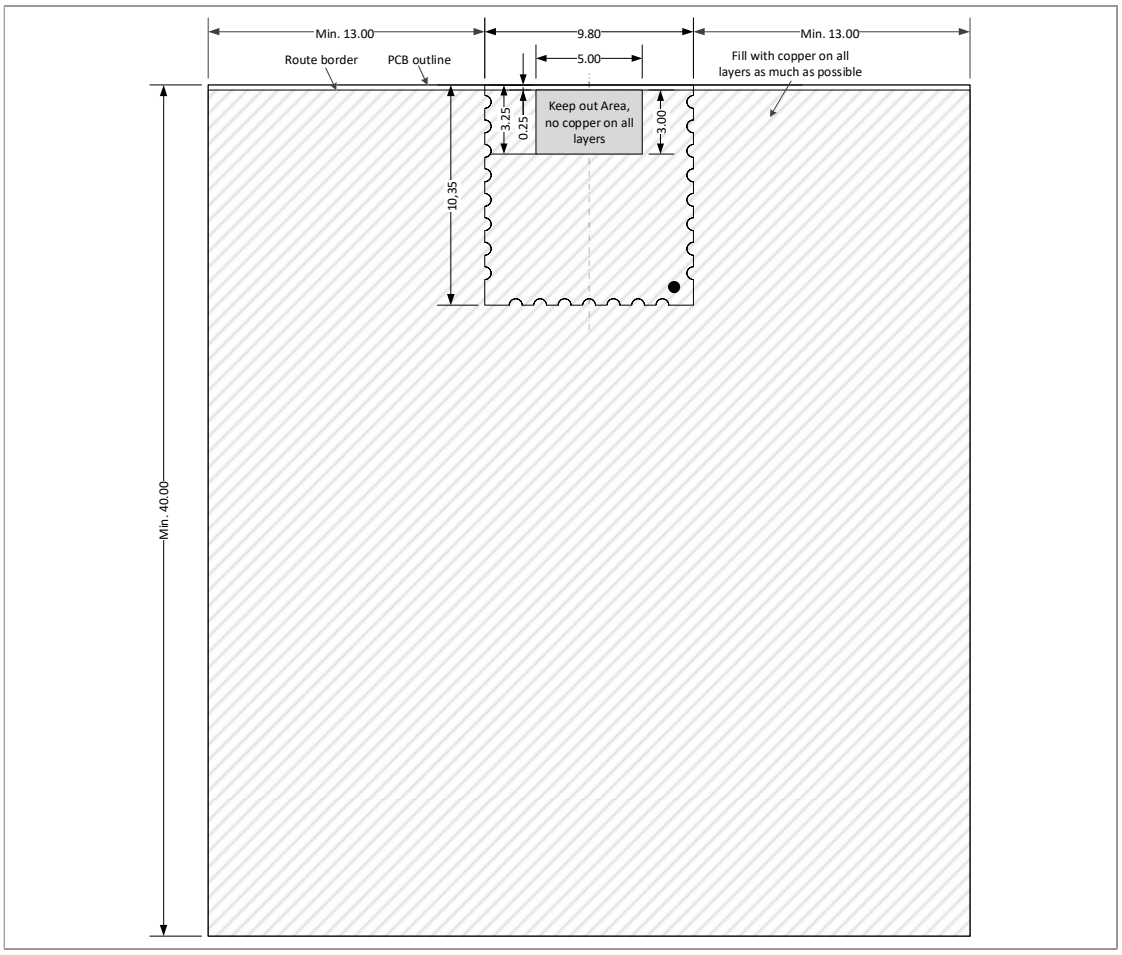
All dimensions are in millimeters.

Use a ground plane in the area surrounding the module wherever possible.

It is recommended to place the module:

- In the center (horizontal) of any mother PCB edge
- GND plane on the left and right of the module

Top View



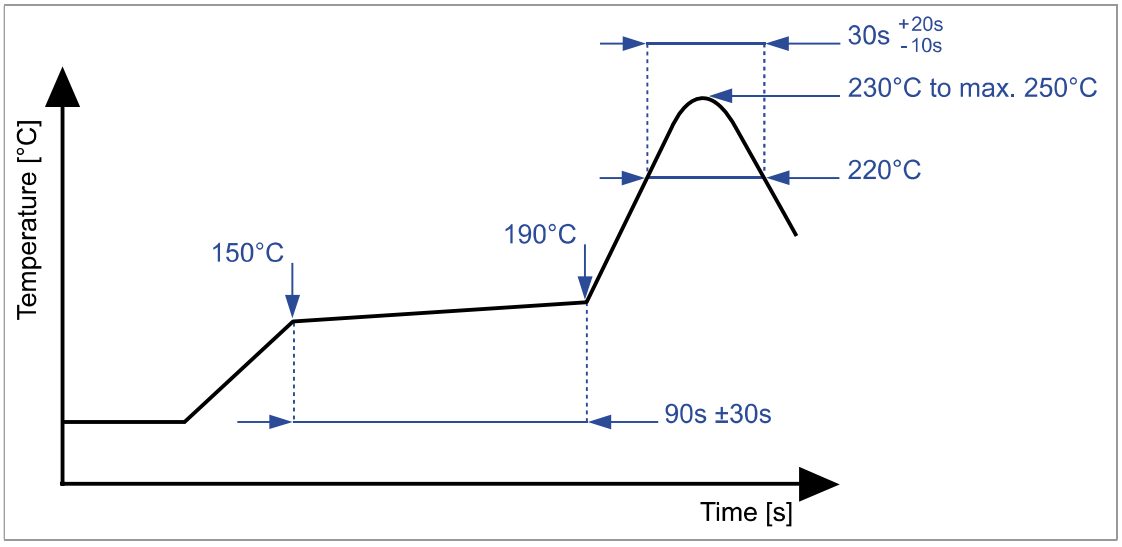
4.7 Reliability Tests

The measurement should be done after the test module has been exposed to room temperature and humidity for one hour.

No.	Item	Limit	Condition
1	Variable Vibration Test	Electrical parameters should be within specification	Freq.: 20~2 000 Hz, Acc.: 17-50 G, Sweep: 8 min, 2 hours, For: XYZ axis
2	Shock Drop Test		Drop parts on concrete from a height of 1 m for 3 times
3	Temperature Cycling Test		At -40 °C and 85 °C for 1 h/cycle Total = 300 cycles
4	Temperature Humidity Bias Test		At 60 °C, 85 % r.H., 300 h
5	Low Temperature Storage Life Test		At -40 °C, 300 h
6	High Temperature Storage Life Test		At 85 °C, 300 h

4.8 Recommended Soldering Profile

- Reflow permissible cycles: 2
- Opposite side reflow is prohibited due to module weight
- More than 75 percent of the soldering area shall be coated by solder
- The soldering profiles should be adhered to in order to prevent electrical or mechanical damage
- Soldering profile assumes lead-free soldering



5 Cautions

Failure to follow the guidelines set forth in this document may result in degrading of the module functions and damage to the module.

5.1 Design Notes

1. Follow the conditions written in this specification, especially the control signals of this module.
2. The supply voltage should abide by the maximum ratings (⇨ 4.2 Absolute Maximum Ratings).
3. The supply voltage must be free of AC ripple voltage (for example from a battery or a low noise regulator output). For noisy supply voltages, provide a decoupling circuit (for example a ferrite in series connection and a bypass capacitor to ground of at least 47 µF directly at the module).
4. This module should not be mechanically stressed when installed.
5. Keep this module away from heat. Heat is the major cause of decreasing the life time of these modules.
6. Avoid assembly and use of the target equipment in conditions where the module temperature may exceed the maximum tolerance.
7. Keep this module away from other high frequency circuits.
8. Refer to the recommended pattern when designing a board.

5.2 Installation Notes

1. Reflow soldering is possible twice based on the conditions set forth in ⇨ 4.8 Recommended Soldering Profile. Set up the temperature at the soldering portion of this module according to this reflow profile.
2. Carefully position the module so that the heat will not burn into printed circuit boards or affect other components that are susceptible to heat.
3. Carefully locate the module, to avoid an increased temperature caused by heat generated by neighboring components.
4. If a vinyl-covered wire comes into contact with the module, the wire cover will melt and generate toxic gas, damaging the insulation. Never allow contact between a vinyl cover and these modules to occur.
5. This module should not be mechanically stressed or vibrated when reflowed.
6. To repair the board by hand soldering, follow the conditions set forth in this chapter.
7. Do not wash this product.
8. Pressing on parts of the metal cover or fastening objects to the metal will cause damage to the module.

5.3 Usage Condition Notes

1. Take measures to protect the module against static electricity.
   If pulses or transient loads (a large load, which is suddenly applied) are applied to the modules, check and evaluate their operation before assembly of the final products.
2. Do not use dropped modules.
3. Do not touch, damage, or soil the pins.
4. Follow the recommended condition ratings about the power supply applied to this module.
5. Electrode peeling strength: Do not apply a force of more than 4.9 N in any direction on the soldered module.
6. Pressing on parts of the metal cover or fastening objects to the metal cover will cause damage.
7. These modules are intended for general purpose and standard use in general electronic equipment, such as home appliances, office equipment, information, and communication equipment.

5.4 Storage Notes

1. The module should not be stressed mechanically during storage.
2. Do not store these modules in the following conditions or the performance characteristics of the module, such as RF performance will be adversely affected:
   - Storage in salty air or in an environment with a high concentration of corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NO_X,
   - Storage in direct sunlight,
   - Storage in an environment where the temperature may be outside the range of 5 °C to 35 °C, or where the humidity may be outside the 45 % to 85 % range,
   - Storage of the modules for more than one year after the date of delivery storage period: Please check the adhesive strength of the embossed tape and soldering after 6 months of storage.
3. Keep this module away from water, poisonous gas, and corrosive gas.
4. This module should not be stressed or shocked when transported.
5. Follow the specification when stacking packed crates (max. 10).

5.5 Safety Cautions

These specifications are intended to preserve the quality assurance of products and individual components.

Before use, check and evaluate the operation when mounted on your products. Abide by these specifications without deviation when using the products. These products may short-circuit. If electrical shocks, smoke, fire, and/or accidents involving human life are anticipated when a short circuit occurs, provide the following failsafe functions as a minimum:

1. Ensure the safety of the whole system by installing a protection circuit and a protection device.
2. Ensure the safety of the whole system by installing a redundant circuit or another system to prevent a single fault causing an unsafe status.

5.6 Other Cautions

1. Do not use the module for other purposes than those listed in section ⇨ 5.3 Usage Condition Notes.
2. Be sure to provide an appropriate fail-safe function on your product to prevent any additional damage that may be caused by the abnormal function or the failure of the module.
3. This module has been manufactured without any ozone chemical controlled under the Montreal Protocol.
4. These modules are not intended for use under the special conditions shown below. Before using these modules under such special conditions, carefully check their performance and reliability under the said special conditions to determine whether or not they can be used in such a manner:
   - In liquid, such as water, salt water, oil, alkali, or organic solvent, or in places where liquid may splash,
   - In direct sunlight, outdoors, or in a dusty environment,
   - In an environment where condensation occurs,
   - In an environment with a high concentration of harmful gas (e. g. salty air, HCl, Cl_2, SO_2, H_2S, NH_3, and NO_X).
5. If an abnormal voltage is applied due to a problem occurring in other components or circuits, replace these modules with new modules, because they may not be able to provide normal performance even if their electronic characteristics and appearances appear satisfactory.

For further information please refer to the Panasonic website ⇨ 7.2.2 Product Information.

5.7 Restricted Use

5.7.1 Life Support Policy

This Panasonic Industrial Devices Europe GmbH product is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Panasonic customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panasonic Industrial Devices Europe GmbH for any damages resulting.

5.7.2 Restricted End Use

This Panasonic Industrial Devices Europe GmbH product is not designed for any restricted activity that supports the development, production, handling usage, maintenance, storage, inventory or proliferation of any weapons or military use.

Transfer, export, re-export, usage or reselling of this product to any destination, end user or any end use prohibited by the European Union, United States or any other applicable law is strictly prohibited.

The Chapter "Regulatory and Certification Information" is currently under development and will be included in a future release of the specification.

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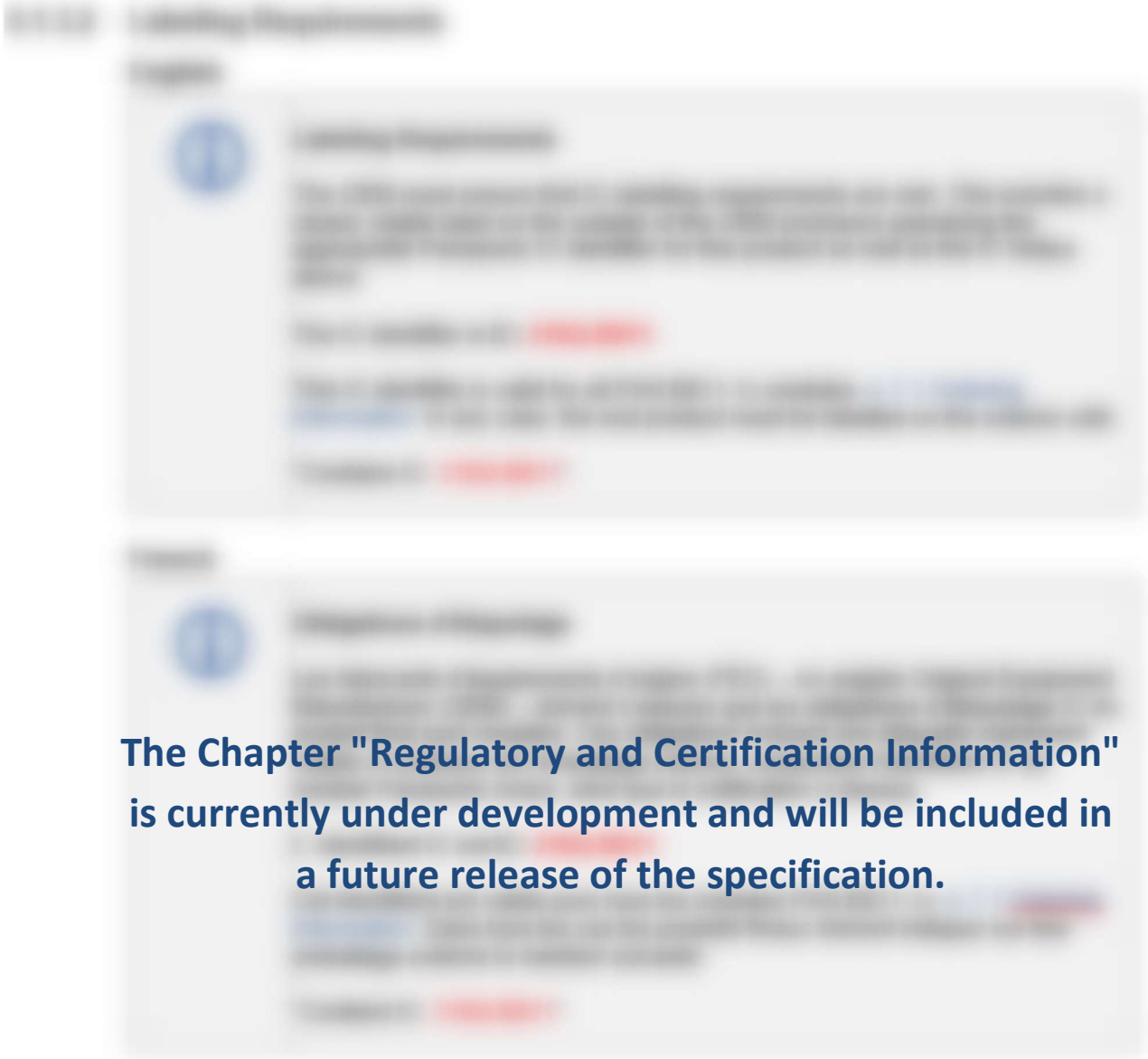

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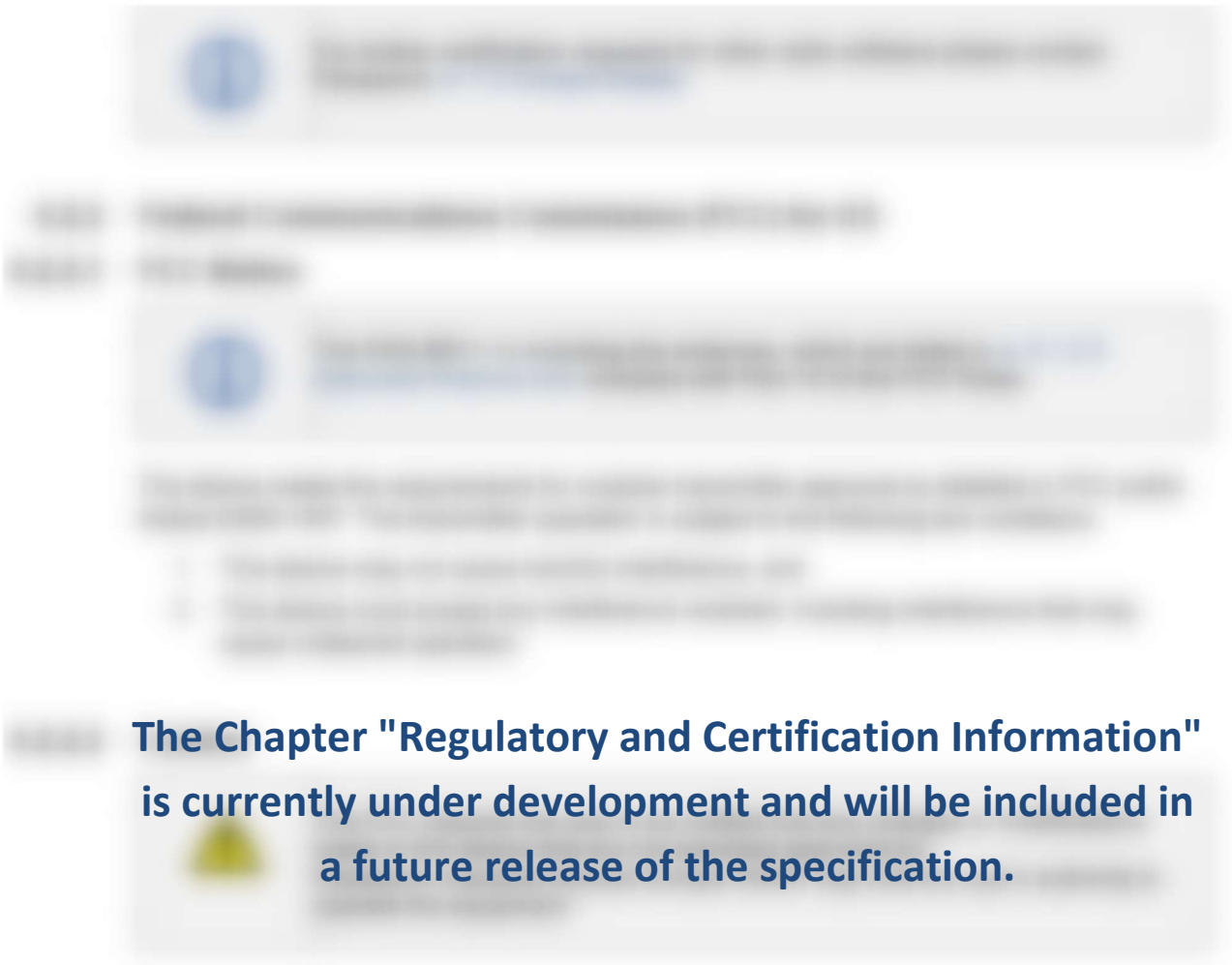

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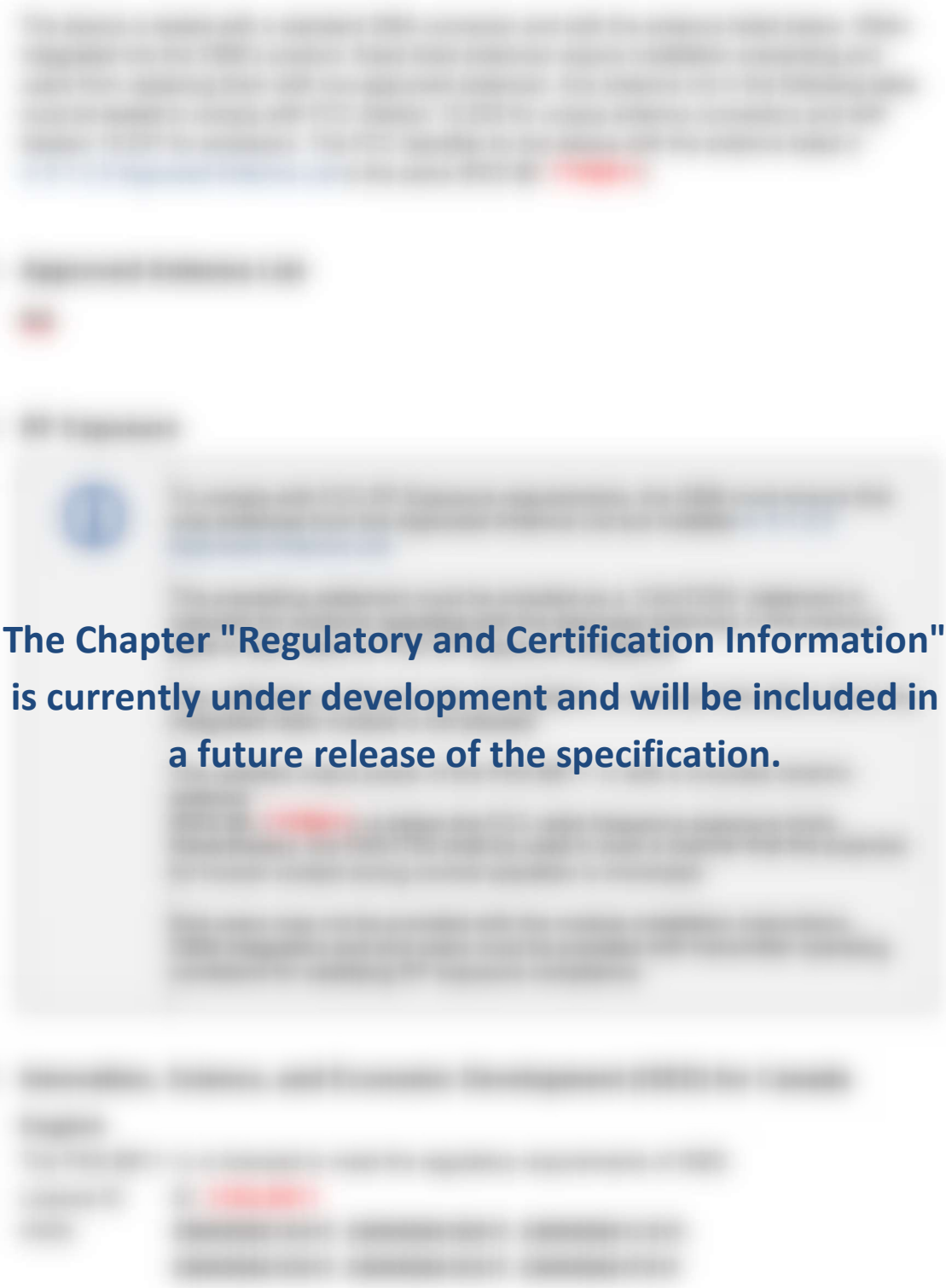

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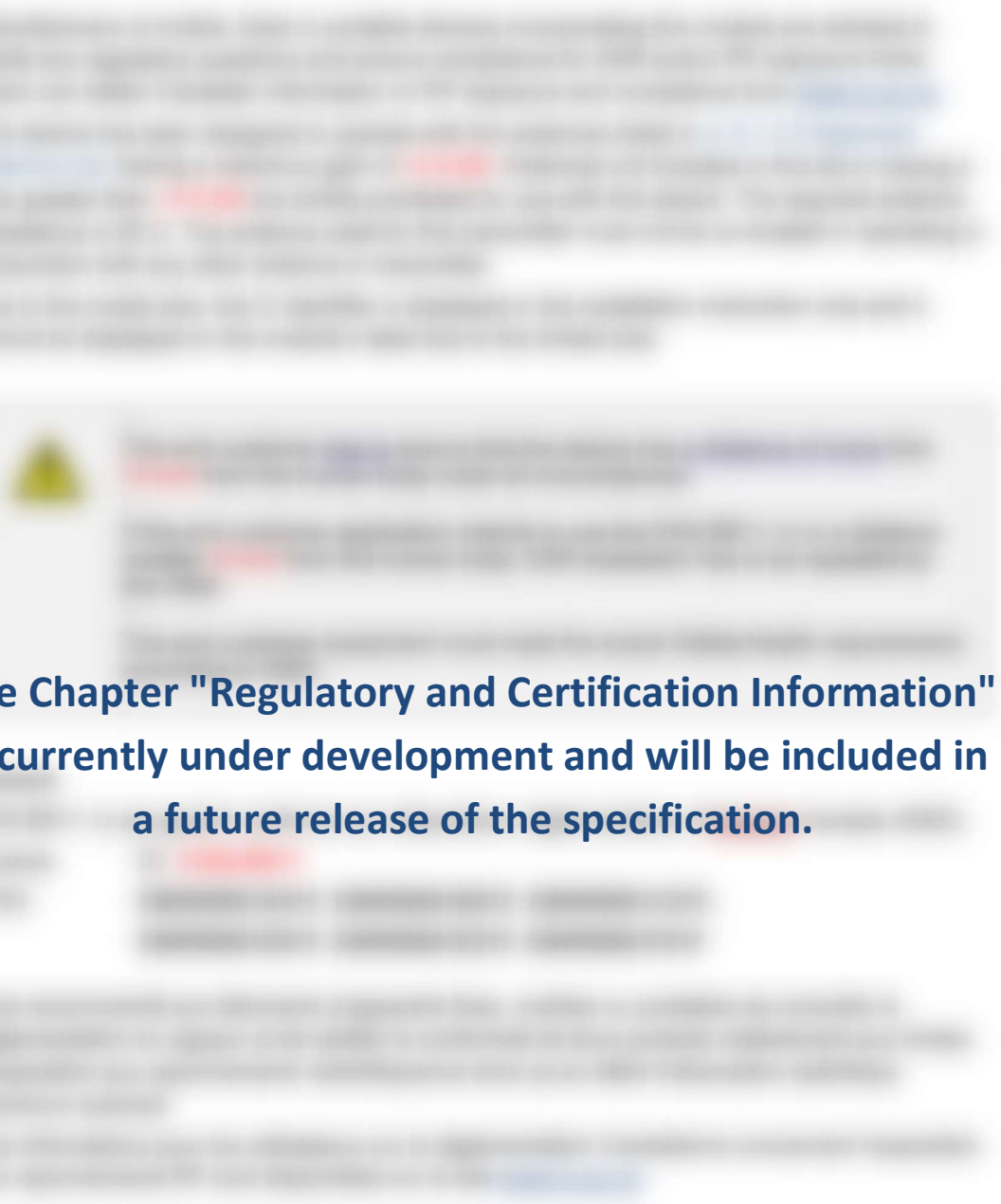

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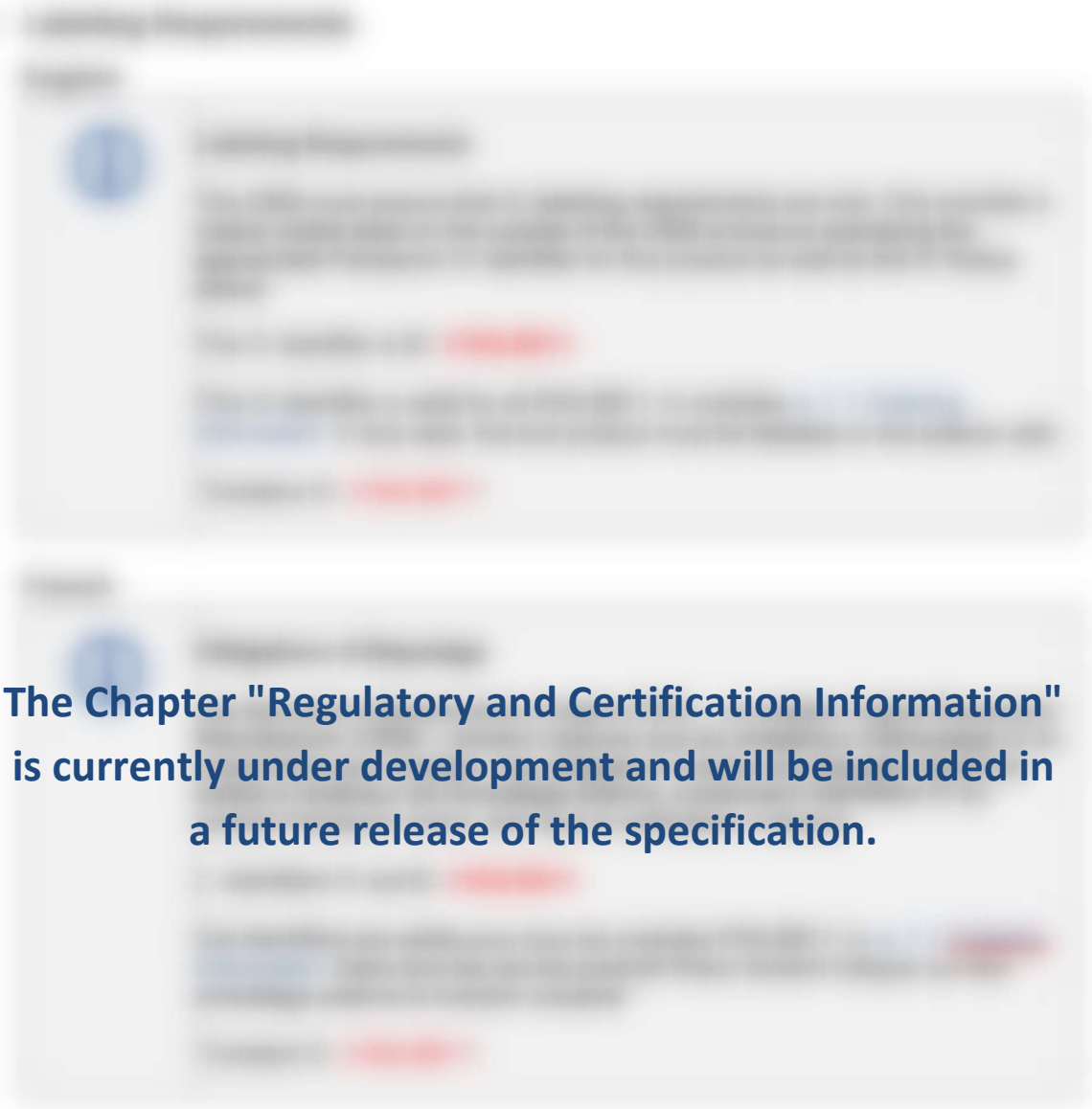

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6.3 RoHS and REACH Declaration

The latest declaration of environmental compatibility (Restriction of Hazardous Substances, RoHS and Registration, Evaluation, Authorisation and Restriction of Chemicals, REACH) for supplied products can be found on the Panasonic website in the “Downloads” section of the respective product ⇨ 7.2.2 Product Information.

7 Appendix

7.1 Ordering Information

Variants and Versions

Order Number	Brand Name	Description	MOQ[1]
ENW89861A01F [2]	PAN B611-1x	Bluetooth Low Energy Module with Antenna, additional 32M-Bit flash memory and 32kHz crystal	500
ENW89861B01F [2]	PAN B611-1x	Bluetooth Low Energy Module with Antenna and additional 32kHz crystal	500
ENW89861C01F [2]	PAN B611-1x	Bluetooth Low Energy Module with Antenna	500
ENW89861D01F [2]	PAN B611-1x	Bluetooth Low Energy Module with RF-bottom pad, additional 32M-Bit flash memory and 32kHz crystal	500
ENW89861E01F [2]	PAN B611-1x	Bluetooth Low Energy Module with RF-bottom pad and additional 32kHz crystal	500
ENW89861F01F [2]	PAN B611-1x	Bluetooth Low Energy Module with RF-bottom pad	500
ENW89861AXKF	PAN B611-1x EVB	Evaluation board with ENW89861C01F	1
ENW89861DXKF	PAN B611-1x EVB	Evaluation board with ENW89861F01F	1

[1] Abbreviation for Minimum Order Quantity (MOQ). The default MOQ for mass production is 500 pieces, fewer only on customer demand. Samples for evaluation can be delivered at any quantity via the distribution channels.

[2] Samples available on customer demand

7.2 Contact Details

7.2.1 Contact Us

Please contact your local Panasonic Sales office for details on additional product options and services:

For Panasonic Sales assistance in the **EU**, visit

https://eu.industrial.panasonic.com/about-us/contact-us

Email: wireless.connectivity@eu.panasonic.com

For Panasonic Sales assistance in **North America**, visit the Panasonic website "Sales & Support" to find assistance near you at

https://na.industrial.panasonic.com/distributors

For information about evaluation tools, schematics, software development, and more, please visit the "Panasonic Wireless Connectivity Development Hub" https://pideu.panasonic.de/development-hub/.

7.2.2 Product Information

Please refer to the Panasonic Wireless Connectivity website for further information on our products and related documents:

For complete Panasonic product details in the **EU**, visit

https://industry.panasonic.eu/

For complete Panasonic product details in **North America**, visit

http://www.panasonic.com/rfmodules