

Transmitter Module PTM 33x / PTM 33xC / PTM 330U

May 16, 2013



Observe precautions! Electrostatic sensitive devices!

Patent protected:

WO98/36395, DE 100 25 561, DE 101 50 128,
WO 2004/051591, DE 103 01 678 A1, DE 10309334,
WO 04/109236, WO 05/096482, WO 02/095707,
US 6,747,573, US 7,019,241

REVISION HISTORY

The following major modifications and improvements have been made to the first version of this document:

No	Major Changes
0.81	CFG Pin: For test purposes only
0.85	Antenna length 868 MHz changed to 86 mm; upper limit of operating temperature reduced to 65 °C
0.90	Equivalent energy pulse definition added
1.00	Max. supply voltage for programming interface added in 2.4. Digital input parameters added in 2.3. FCC / IC grants added in 4.2 and 4.3.
1.01	TX power increased to 3 dBm at antenna input; Chapter Related Documents added; misleading table removed in 3.3
1.02	Figure corrected in 3.4
1.03	3.4 modified
1.10	Meander structures increased; PTM 330U added
1.2	Included certification information for PTM 330U

**Published by EnOcean GmbH, Kolpingring 18a, 82041 Oberhaching, Germany
 www.enocean.com, info@enocean.com, phone ++49 (89) 6734 6890**

© EnOcean GmbH
 All Rights Reserved

Important!

This information describes the type of component and shall not be considered as assured characteristics. No responsibility is assumed for possible omissions or inaccuracies. Circuitry and specifications are subject to change without notice. For the latest product specifications, refer to the EnOcean website: <http://www.enocean.com>.

As far as patents or other rights of third parties are concerned, liability is only assumed for modules, not for the described applications, processes and circuits.

EnOcean does not assume responsibility for use of modules described and limits its liability to the replacement of modules determined to be defective due to workmanship. Devices or systems containing RF components must meet the essential requirements of the local legal authorities.

The modules must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

Components of the modules are considered and should be disposed of as hazardous waste. Local government regulations are to be observed.

Packing: Please use the recycling operators known to you.

TABLE OF CONTENT

1	RELATED DOCUMENTS	4
2	GENERAL DESCRIPTION	4
	2.1 Basic Functionality	4
	2.2 Technical Data	4
	2.3 Physical Dimensions.....	5
	2.4 Environmental Conditions	6
	2.5 Ordering Information	6
3	FUNCTIONAL DESCRIPTION	7
	3.1 Block diagram	7
	3.2 Pin out	7
	3.3 Pin Description and operational characteristics	8
	3.4 Configuration Interface	9
	3.5 Absolute maximum ratings (non operating)	9
	3.6 Maximum Ratings (operating)	10
	3.7 Radio telegram.....	11
	3.7.1 Normal operation.....	11
	3.7.2 User defined operation	12
	3.8 Transmit timing.....	12
4	APPLICATIONS INFORMATION.....	13
	4.1 How to connect an energy harvester.....	13
	4.2 How to generate an equivalent energy pulse.....	13
	4.3 Antenna	14
	4.4 Layout recommendations	15
	4.5 Soldering information PTM 332/332C	16
	4.6 Transmission range	17
5	AGENCY CERTIFICATIONS	18
	5.1 CE approval	18
	5.2 FCC (United States) Certification	19
	5.2.1 PTM 330C and PTM 332C FCC LIMITED MODULAR APPROVAL.....	19
	5.2.2 PTM 330C and PTM 332C FCC LIMITED MODULAR APPROVAL Certificate.....	21
	5.2.3 PTM 330U FCC (United States) Single Transmitter Approval	22
	5.2.4 FCC (United States) Regulatory Statements	23
	5.3 IC (Industry Canada) Certification	24
	5.3.1 PTM 330C and PTM 332C IC (Industry Canada) Certification	24
	5.3.2 PTM 330C / PTM 332C Industry Canada Certification Document.....	25
	5.3.3 PTM 330U IC (Industry Canada) Certification	26
	5.3.4 Industry Canada Regulatory Statements.....	27

1 RELATED DOCUMENTS

In addition to this document additional information is available on our [web site](#):

- Proposal for mechanical integration with ECO 200 in 2D and 3D format
- Footprint with positions of pads available in Protel and Gerber format
- AN102: Antenna Basics – Basic antenna design considerations for EnOcean based products

2 GENERAL DESCRIPTION

2.1 Basic Functionality

The radio transmitter module PTM 330 from EnOcean enables the implementation of wireless sensors and switches without batteries.

Key applications are handheld remote controls or industrial switches.

Functional Principle

When an energy pulse is supplied (e.g. by ECO 200 from EnOcean) an RF telegram is transmitted including a unique 32-bit module ID, the polarity of the energy pulse, and the operating status of 4 digital inputs. The RPS telegram content can be configured if other content is needed.



PTM 330 can be connected to ECO 200 via a contact spring. There are two meander structures on the PCB which allow usage of a rubber pad to set the level of two digital inputs. Alternatively PTM 330 can be mounted as an SMD component onto a host PCB. In this case energy supply pins and digital input pins are accessible via contact pads.

Product variants

- PTM 330: 868 MHz variant, pre-installed whip antenna, delivery in card board box
- PTM 332: 868 MHz variant, no pre-installed antenna, delivery as tape & reel
- PTM 330C: 315 MHz variant, pre-installed whip antenna, delivery in card board box
- PTM 332C: 315 MHz variant, no pre-installed antenna, delivery as tape & reel
- PTM 330U: 902 MHz variant, pre-installed whip antenna, delivery in card board box

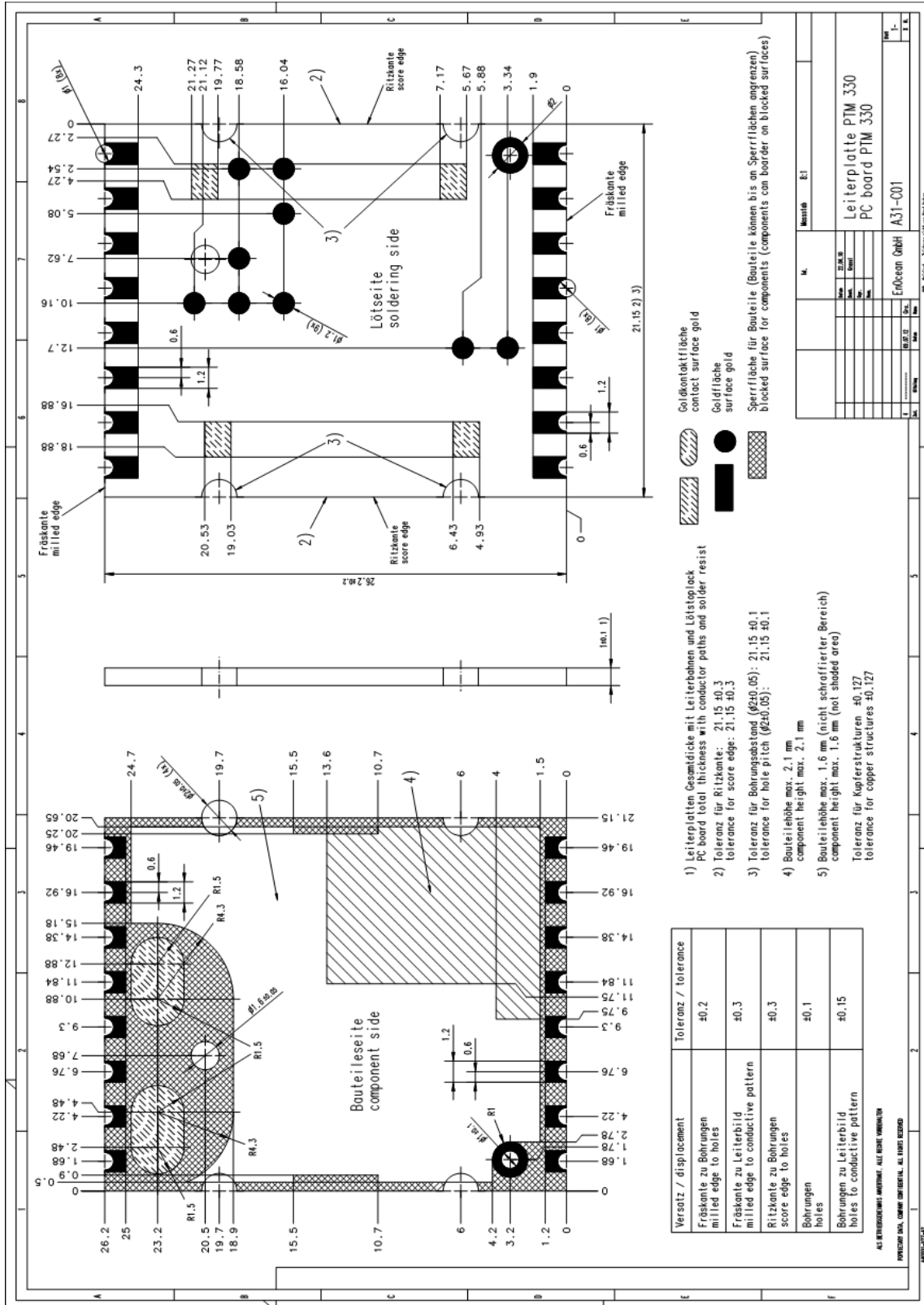
2.2 Technical Data

Power supply	ECO 200 or equivalent energy pulse
Antenna	pre-installed whip antenna PTM 330/330C/330U external 50 Ohm or whip antenna PTM 332/332C
Frequency	868.3 MHz (PTM 33x) / 315.0 MHz (PTM 33xC) / 902.875 MHz (PTM 330U)
Transmission power	typ. 3 dBm at antenna base
Data rate / Modulation type	125 kbps / ASK(315MHz, 868MHz), FSK(902MHz)
Telegram type	RPS of type 2 (allows interpretation of operating two buttons simultaneously)
Digital inputs	4
Transmission range	up to 200 m free field, up to 30 m indoor

2.3 Physical Dimensions

PCB dimensions

26.2 x 21.15 x 3.5 mm



2.4 Environmental Conditions

Operating temperature	-25 °C ... +65 °C
Storage temperature	-40 °C ... +85 °C
Storage temperature in Tape&Reel	-20 °C ... +50 °C
Humidity	0% ... 93% r.h., non-condensing

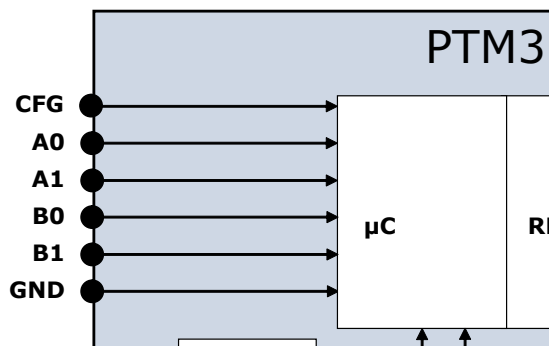
2.5 Ordering Information

Type	Ordering Code	Frequency	Note
PTM 330	S3001-A330	868.3 MHz	Whip antenna mounted Card board box
PTM 332	S3001-A332	868.3 MHz	No antenna mounted Tape & Reel
PTM 330C	S3031-A330	315.0 MHz	Whip antenna mounted Card board box
PTM 332C	S3031-A332	315.0 MHz	No antenna mounted Tape & Reel
PTM 330U	S3051-A330	902.875 MHz	Whip antenna mounted Card board box

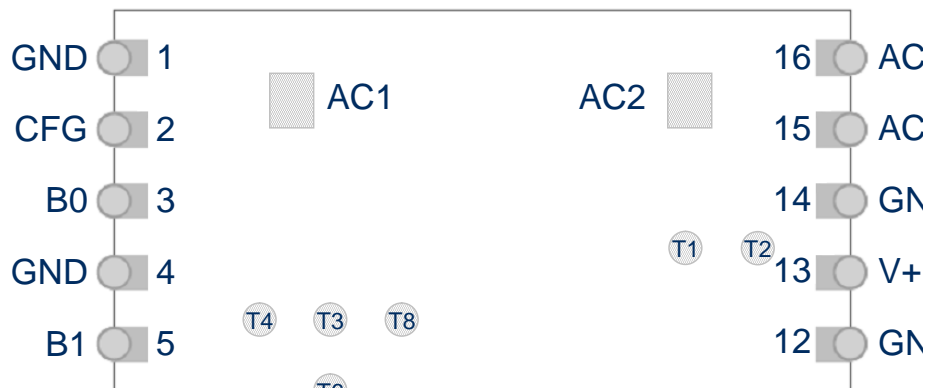
3 FUNCTIONAL DESCRIPTION

3.1 Block diagram

At power-up by an energy pulse at AC1, AC2 a DC voltage is provided to the internal micro controller. The microcontroller reads the polarity of the supply voltage pulse and the status of the digital inputs A0, A1, B0, B1. After that 3 identical radio telegrams calculated from the status of these inputs are transmitted.



3.2 Pin out

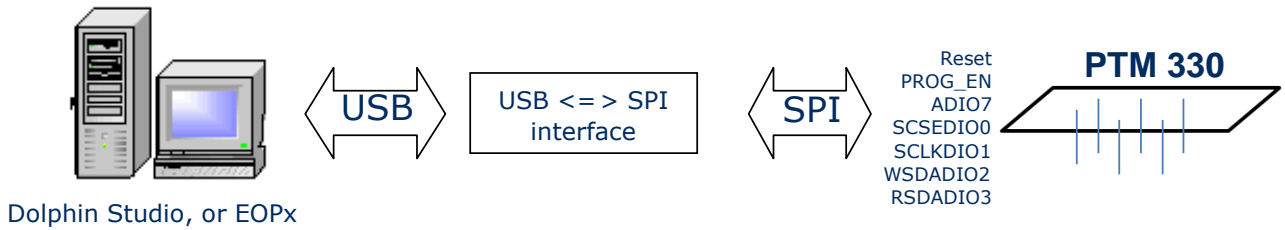


3.3 Pin Description and operational characteristics

Symbol	Function	Characteristics
GND	Ground connection	Must be connected to GND
V+	For test purposes only	Do not connect
B0	O-Button Rocker B	Digital input, leave open or connect to GND Internal pull-up
B1	I-Button Rocker B	Digital input, leave open or connect to GND Internal pull-up
A0	O-Button Rocker A	Digital input, leave open or connect to GND Internal pull-up
A1	I-Button Rocker A	Digital input, leave open or connect to GND Internal pull-up
CFG	For test purposes only	Internal pull-up
AC1	Input for ECO 200	ECO 200 or equivalent energy pulse
AC2	Input for ECO 200	ECO 200 or equivalent energy pulse
RF_WHIP	RF output	Output for whip antenna
RF_50	RF output	50 Ohm output for external antenna, not available for PTM 330U
T1-9	Configuration Interface	See 3.4

3.4 Configuration Interface

Via the programming interface the telegram content can be modified. The interface is shown in the figure below:



EnOcean provides EOPx (EnOcean Programmer, a command line program) and Dolphin Studio (Windows application for chip configuration, programming, and testing) and the USB/SPI programmer device as part of the EDK 300 developer’s kit. In order to contact PTM 330 programming and testing points a needle bed adapter is needed.

Pad	Symbol	Function	Characteristics
T1	VDD	Supply voltage	Interface to programmer; Max. 3.3 V
T2	GND	Ground connection	Interface to programmer
T3	SCSEDIO0	SPI chip select	Interface to programmer
T4	SCLKDIO1	SPI serial clock	Interface to programmer
T5	WSDADIO2	SPI input	Interface to programmer
T6	RSDADIO3	SPI output	Interface to programmer
T7	RESET	Reset	Interface to programmer, internal pull down
T8	ADIO7	Sync output	
T9	PROG_EN	Enable programming mode	Interface to programmer HIGH: programming mode active LOW: operating mode Internal pull-down

3.5 Absolute maximum ratings (non operating)

Symbol	Parameter	Min	Max	Units
AC1	Supply voltage	0	6.4	V
AC2				
GND	Ground connection	0	0	V
A0	Voltage digital input pins	0	0	V
A1				
B0				
B1				

3.6 Maximum Ratings (operating)

Symbol	Parameter	Min	Max	Units
AC1 AC2	Supply voltage	0	6.0	V
GND	Ground connection	0	0	V
A0 A1 B0 B1	Voltage digital input pins	0	0	V

3.7 Radio telegram

3.7.1 Normal operation

In default configuration PTM 33x transmits the same telegrams as a PTM 200 radio switch:

- Telegram type RPS: There are two message types depending on how many buttons (A0, A1, B0, B1) have been pressed (connected to GND)
 - N-message: Only one or two buttons have been pressed.
 - U-message: No pushbutton was pressed when activating the energy generator, or more than two pushbuttons have been pressed.
- Unique factory programmed 32 bit ID
- DATA_BYTE2, DATA_BYTE1, DATA_BYTE0=0
- DATA_BYTE3 and STATUS as follows:

N-message:

DATA_BYTE3:

7						0
RID	UD	PR	SRID	SUD	SA	

RID	(2 bit)	Rocker ID, A=0, B=1
UD	(1 bit)	UD=1 → O-button, UD=0 → I-button
PO	(1 bit)	Polarity, see table below
SRID	(2 bit)	Second Rocker ID
SUD	(1 bit)	(Second) SUD=1 → O-button, SUD=0 → I-button
SA	(1 bit)	SA=1 → Second action (2 buttons pressed simultaneously), SA=0 → No second action

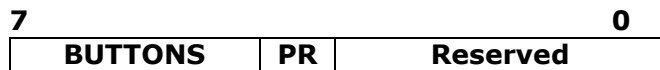
STATUS:

7						0
Reserved	T21	NU	RP_COUNTER			

Reserved	(2 bit)	For future use
T21	(1 bit)	1
NU	(1 bit)	NU=1 → N-message.
RP_COUNTER	(4 bit)	Repeater level: 0 is original message (not repeated)

U-message:

DATA_BYTE3:

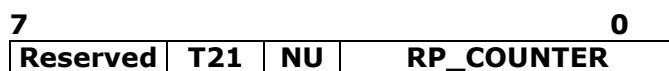


BUTTONS (3 bit) Number of simultaneously pressed buttons, as following:

- 0 = 0 Button
- 1 = not possible
- 2 = not possible
- 3 = 3 or 4 buttons
- 4 = not possible
- 5 = not possible
- 6 = not possible
- 7 = not possible

PO (1 bit) Polarity, see table below
Reserved (4 bit)

STATUS:



Reserved (2 bit) For future use
T21 (1 bit) 1
NU (1 bit) NU=0 → U-message.
RP_COUNTER (4 bit) Repeater level: 0 is original message (not repeated)

The polarity PO is defined as follows:

AC1	AC2	PO
-	+	1
+	-	0

3.7.2 User defined operation

Via the configuration interface it is possible to define different content of DATA_BYTE3 and define if a N-message or U-message shall be sent. This allows for example to transmit other RORG=F6 telegrams, e.g. "Mechanical handle", as described in the EnOcean Equipment Profiles defined by EnOcean Alliance.

For details please refer to the EnOcean Equipment Profiles 2.1 specification.

http://www.enocean-alliance.org/fileadmin/redaktion/enocean_alliance/pdf/EnOcean_Equipment_Profiles_EEP2.1.pdf

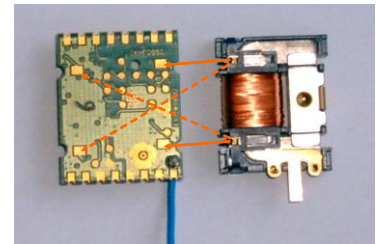
3.8 Transmit timing

The setup of the transmission timing allows avoiding possible collisions with data packages of other EnOcean transmitters as well as disturbances from the environment. With each transmission cycle, 3 identical subtelegrams are transmitted within 40 ms. The transmission of a subtelegram lasts approximately 0.7 ms. The delay between the three transmission bursts is affected at random.

4 APPLICATIONS INFORMATION

4.1 How to connect an energy harvester

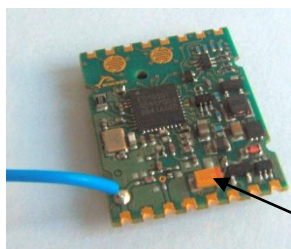
PTM 330 can be connected to ECO 200 without soldering. ECO 200 provides contact springs which can directly be connected to contact pads of PTM 330. The contact pads on the bottom of the PCB are shown below (left). A second orientation where PTM 330 is rotated 180° with respect to ECO 200 is also possible as shown with dashed lines.



4.2 How to generate an equivalent energy pulse

PTM330 can also be operated from an external equivalent energy pulse. As the source impedance is not known a procedure is defined how to find the needed duration of the pulse.

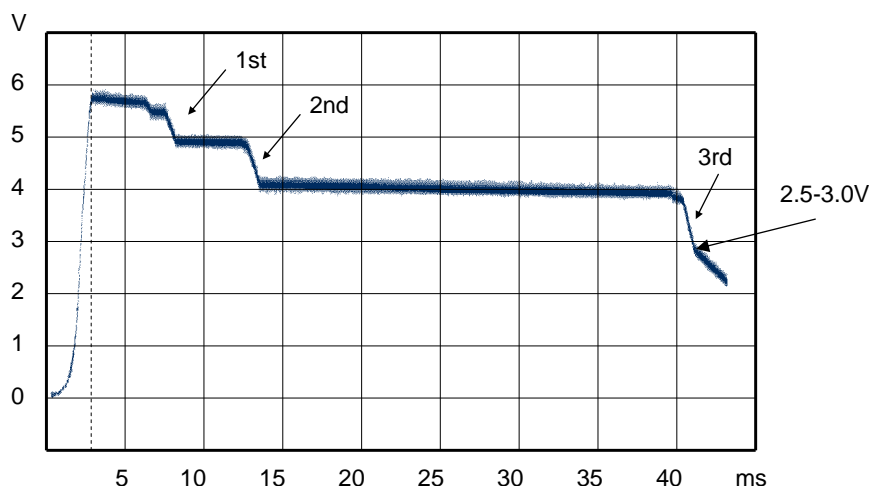
The pulse must provide a voltage between 5 V and 6 V for maximum 10 ms time.



storage capacitor

The length of this supply pulse needs to be defined by measuring the remaining voltage on the storage capacitor after the 3rd subtelegram, according to the following procedure:

- 1) Discharge the storage capacitor (see photo) completely
- 2) Apply a short pulse, voltage between 5 V to 6 V which charges the capacitor
- 3) Measure the voltage drop at the storage capacitor to ground (between pin 13 and pin 12) while the sub-telegrams are being transmitted with an oscilloscope
- 4) The remaining voltage shortly after the 3rd sub-telegram should be 2.5 to 3.0 V



4.3 Antenna

315 MHz

Option 1: 150 mm wire, connect to RF_WHIP

Option 2: A 50 Ω antenna can be connected to RF_50.

In this case the limited modular FCC/IC approval is not valid!

An FCC/IC approval is then needed for the end device!

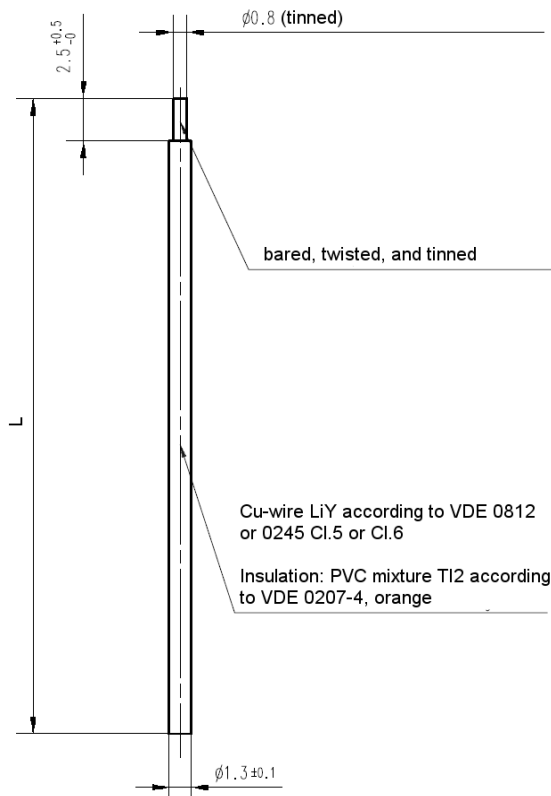
868 MHz

Option 1: 86 mm wire, connect to RF_WHIP

Option 2: A 50 Ω antenna can be connected to RF_50

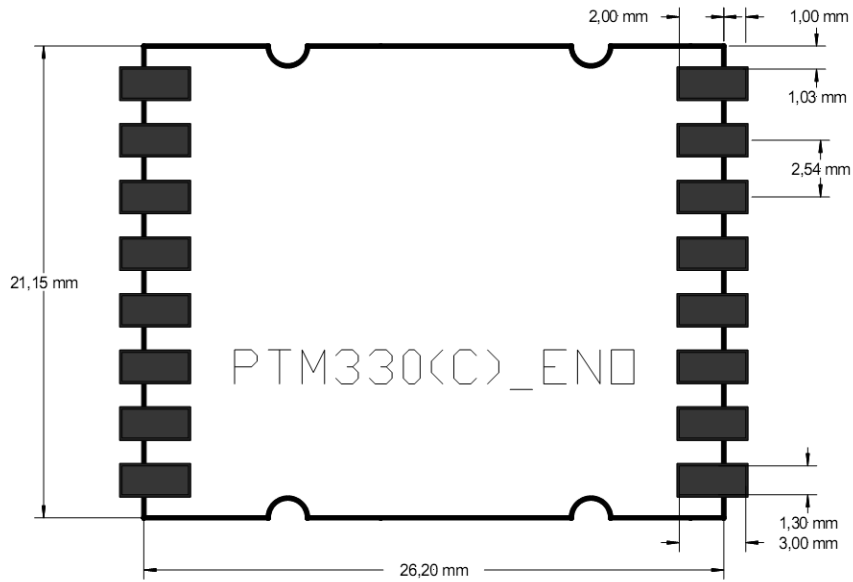
902 MHz

64 mm wire, connect to RF_WHIP

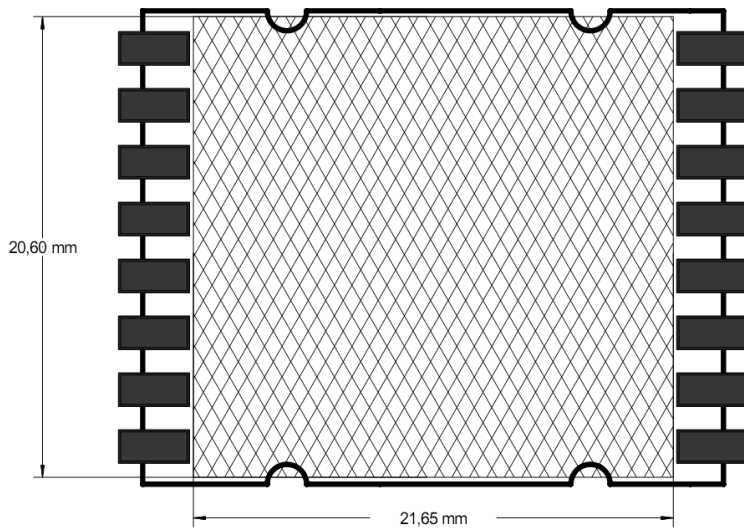


**Specification of the whip antenna; L=150 mm @ 315 MHz,
L=86 mm @ 868 MHz, L=64 mm @ 902 MHz**

4.4 Layout recommendations



Proposal for foot print on host PCB



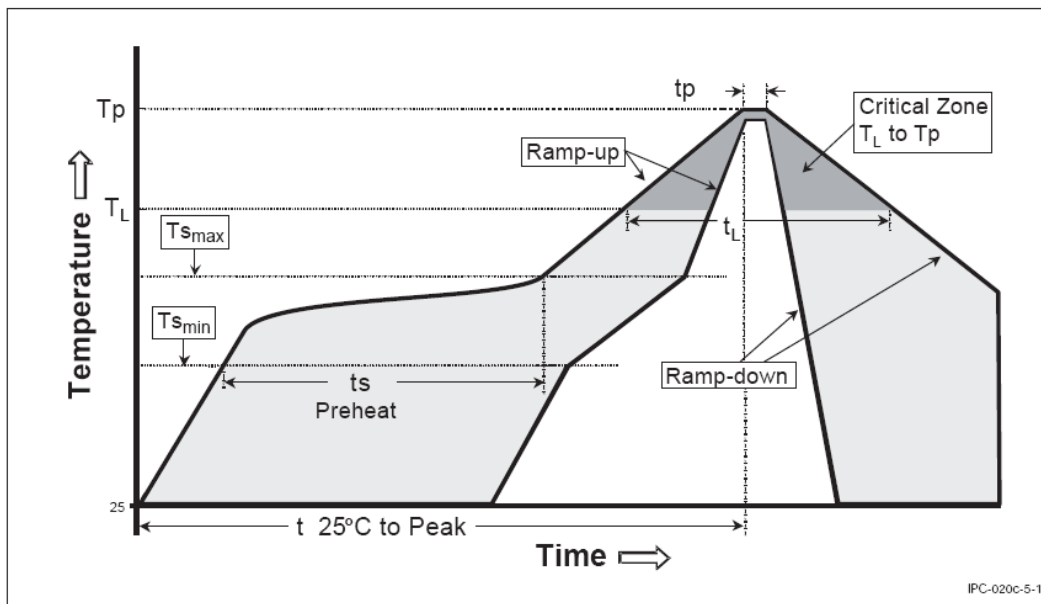
Keep out area on host PCB. No copper surface area allowed!

4.5 Soldering information PTM 332/332C

PTM 332 has to be soldered according to IPC/JEDEC J-STD-020C standard.

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (TS _{max} to Tp)	3° C/second max.
Preheat	
- Temperature Min (TS _{min})	150 °C
- Temperature Max (TS _{max})	200 °C
- Time (ts _{min} to ts _{max})	60-180 seconds
Time maintained above:	
- Temperature (TL)	217 °C
- Time (tL)	60-150 seconds
Peak/Classification Temperature (Tp)	260 °C
Time within 5 °C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

Note 1: All temperatures refer to topside of the package, measured on the package body surface.



PTM 332 shall be handled according to Moisture Sensitivity Level MSL4 which means a floor time of 72 h. PTM 332 may be soldered only once, since one time is already consumed at production of the module itself.

Once the dry pack bag is opened, the desired quantity of units should be removed and the bag resealed within two hours. If the bag is left open longer than 30 minutes the desiccant should be replaced with dry desiccant. If devices have exceeded the specified floor life time of 72 h, they may be baked according IPC/JEDEC J-STD-033B.

Devices packaged in moisture-proof packaging should be stored in ambient conditions not exceeding temperatures of 40 °C or humidity levels of 90% r.h.

PTM 332 modules have to be soldered within 6 months after delivery!

4.6 Transmission range

The main factors that influence the system transmission range are type and location of the antennas of the receiver and the transmitter, type of terrain and degree of obstruction of the link path, sources of interference affecting the receiver, and “Dead” spots caused by signal reflections from nearby conductive objects. Since the expected transmission range strongly depends on this system conditions, range tests should categorically be performed before notification of a particular range that will be attainable by a certain application.

The following figures for expected transmission range are considered by using a PTM, a STM or a TCM radio transmitter device and the TCM radio receiver device with preinstalled whip antenna and may be used as a rough guide only:

- Line-of-sight connections: Typically 30 m range in corridors, up to 100 m in halls
- Plasterboard walls / dry wood: Typically 30 m range, through max. 5 walls
- Line-of-sight connections: Typically 30 m range in corridors, up to 100 m in halls
- Ferroconcrete walls / ceilings: Typically 10 m range, through max. 1 ceiling
- Fire-safety walls, elevator shafts, staircases and supply areas should be considered as screening.

The angle at which the transmitted signal hits the wall is very important. The effective wall thickness – and with it the signal attenuation – varies according to this angle. Signals should be transmitted as directly as possible through the wall. Wall niches should be avoided. Other factors restricting transmission range:

- Switch mounted on metal surfaces (up to 30% loss of transmission range)
- Hollow lightweight walls filled with insulating wool on metal foil
- False ceilings with panels of metal or carbon fiber
- Lead glass or glass with metal coating, steel furniture

The distance between EnOcean receivers and other transmitting devices such as computers, audio and video equipment that also emit high-frequency signals should be at least 0.5 m

A summarized application note to determine the transmission range within buildings is available as download from www.enocean.com.

5 AGENCY CERTIFICATIONS

The modules have been tested to fulfil the approval requirements for CE (PTM 33x) and FCC/IC (PTM 33xC, PTM 330U) based on the built-in firmware.

5.1 CE approval

The modules bear the EC conformity marking CE and conform to the R&TTE EU-directive on radio equipment. The assembly conforms to the European and national requirements of electromagnetic compatibility. The conformity has been proven and the according documentation has been deposited at EnOcean. The modules can be operated without notification and free of charge in the area of the European Union, and in Switzerland. The following provisos apply:

- EnOcean RF modules must not be modified or used outside their specification limits.
- EnOcean RF modules may only be used to transfer digital or digitized data. Analog speech and/or music are not permitted.
- The final product incorporating EnOcean RF modules must itself meet the essential requirement of the R&TTE Directive and a CE marking must be affixed on the final product and on the sales packaging each. Operating instructions containing a Declaration of Conformity has to be attached.
- If the transmitter is used according to the regulations of the 868.3 MHz band, a so-called "Duty Cycle" of 1% per hour must not be exceeded. Permanent transmitters such as radio earphones are not allowed.
- The module must be used with only the following approved antenna(s).

Type	Parameter	Value
Wire/Monopole at RF_WHIP	Maximum gain	1.0 dBi
External antenna at RF_50	Antenna type	Passive
	Impedance	~50 Ohm
	Maximum gain	≤ 0 dBd

5.2 FCC (United States) Certification

5.2.1 PTM 330C and PTM 332C FCC LIMITED MODULAR APPROVAL

This is an RF module approved for Limited Modular use operating as an intentional transmitting device with respect to 47 CFR 15.231(a-c) and is limited to OEM installation. The module is optimized to operate using small amounts of energy, and may be powered by a battery.

The module transmits short radio packets comprised of control signals, (in some cases the control signal may be accompanied with data) such as those used with alarm systems, door openers, remote switches, and the like.

The module does not support continuous streaming of voice, video, or any other forms of streaming data; it sends only short packets containing control signals and possibly data. The module is designed to comply with, has been tested according to 15.231(a-c), and has been found to comply with each requirement.

Thus, a finished device containing the PTM 330C/PTM 332C/PTM 330U radio module can be operated in the United States without additional Part 15 FCC approval (approval(s) for unintentional radiators may be required for the OEM's finished product), under EnOcean's FCC ID number.

This greatly simplifies and shortens the design cycle and development costs for OEM integrators. The module can be triggered manually or automatically, which cases are described below.

Manual Activation

The radio module can be configured to transmit a short packetized control signal if triggered manually. The module can be triggered, by pressing a switch, for example.

The packet contains one (or more) control signals that is(are) intended to control something at the receiving end. The packet may also contain data.

Depending on how much energy is available from the energy source, subsequent manual triggers can initiate the transmission of additional control signals. This may be necessary if prior packet(s) was(were) lost to fading or interference. Subsequent triggers can also be initiated as a precaution if any doubt exists that the first packet didn't arrive at the receiver.

Each packet that is transmitted, regardless of whether it was the first one or a subsequent one, will only be transmitted if enough energy is available from the energy source.

Automatic Activation

The radio module also can be configured to transmit a short packetized control signal if triggered automatically. Again, the packet contains a control signal that is intended to control something at the receiving end and may also contain data.

As above, it is possible for the packet to get lost and never reach the receiver. However, if enough energy is available from the energy source, and the module has been configured to do so, then another packet or packets containing the control signal may be transmitted at a later time.



OEM Requirements

In order to use EnOcean’s FCC ID number, the OEM must ensure that the following conditions are met:

- End users of products, which contain the module, must not have the ability to alter the firmware that governs the operation of the module. The agency grant is valid only when the module is incorporated into a final product by OEM integrators.
- The end-user must not be provided with instructions to remove, adjust or install the module.
- The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the final product. Attaching a label to a removable portion of the final product, such as a battery cover, is not permitted. The label must include the following text:

PTM330C/PTM332C

Contains FCC ID: SZV-PTM33XC

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

When the device is so small or for such use that it is not practicable to place the statement above on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

The user manual for the end product must also contain the text given above.

- The module must be used with only the following approved antenna(s).

Part Number	Type	Gain
N.A.	Wire/Monopole	1.0 dBi

- The OEM must ensure that timing requirements according to 47 CFR 15.231(a-c) are met.
- The OEM must sign the OEM Limited Modular Approval Agreement with EnOcean

5.2.2 PTM 330C and PTM 332C FCC LIMITED MODULAR APPROVAL Certificate

TCB

**GRANT OF EQUIPMENT
AUTHORIZATION**

TCB

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

PHOENIX TESTLAB GmbH
Koenigswinkel 10
D-32825 Blomberg,
Germany

Date of Grant: 07/22/2010
Application Dated: 07/22/2010

EnOcean GmbH
Kolpingring 18a
Oberhaching, 82041
Germany

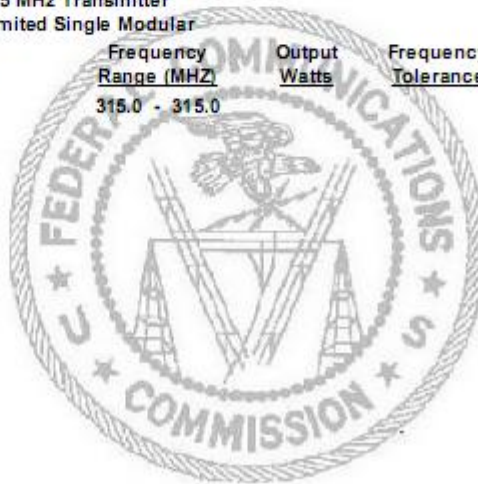
Attention: Armin Anders , Director Product Marketing

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: SZV-PTM33XC
Name of Grantee: EnOcean GmbH
Equipment Class: Part 15 Security/Remote Control Transmitter
Notes: 315 MHz Transmitter
Modular Type: Limited Single Modular

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHZ)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
	15.231	315.0 - 315.0			



5.2.3 PTM 330U FCC (United States) Single Transmitter Approval

PTM 330U is an RF module approved by the FCC as Single Transmitter with the following ID:

FCC ID:	SZV-PTM330U
---------	-------------

The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the final product. Attaching a label to a removable portion of the final product, such as a battery cover, is not permitted. The label must include the following text:

PTM330U

Contains FCC ID: SZV-PTM330U

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

When the device is so small or for such use that it is not practicable to place the statement above on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

The user manual for the end product must also contain the text given above.

IMPORTANT! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

5.2.4 FCC (United States) Regulatory Statements

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

IMPORTANT! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

NOTE: 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.

5.3 IC (Industry Canada) Certification

5.3.1 PTM 330C and PTM 332C IC (Industry Canada) Certification

PTM 330C and PTM 332C have been granted an IC number as outlined below:

IC:	5713A-PTM33XC
-----	---------------

In order to use EnOcean's IC number, the OEM must ensure that the following conditions are met:

Labeling requirements for Industry Canada are similar to those required by the FCC. The Original Equipment Manufacturer (OEM) must ensure that IC labeling requirements are met. A clearly visible label on the outside of a non-removable part of the final product must include the following text:

PTM 330C / PTM 332C:

Contains IC: 5713A-PTM33XC

The OEM must sign the OEM Limited Modular Approval Agreement with EnOcean.

IMPORTANT! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Pour utiliser le numéro IC EnOcean, le OEM doit s'assurer que les conditions suivantes sont remplies:

- Les exigences d'étiquetage pour Industrie Canada sont similaires à ceux exigés par la FCC. Le fabricant d'équipement d'origine (OEM) doit s'assurer que les exigences en matière d'étiquetage IC sont réunies. Une étiquette clairement visible à l'extérieur d'une partie non amovible du produit final doit contenir le texte suivant:

PTM 330C / PTM 332C:

Contains IC: 5713A-PTM33XC

Contient le module d'émission IC: 5713A-PTM33XC

- L'OEM doit signer l'accord OEM limitée Approbation modulaire avec EnOcean
- **IMPORTANT!** Tous les changements ou modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner cet équipement.

5.3.2 PTM 330C / PTM 332C Industry Canada Certification Document



TECHNICAL APPROVAL CERTIFICATE

based on the Agreement on Mutual Recognition
between the European Community and Canada

CERTIFICAT D'APPROBATION TECHNIQUE

en se basant l'accord de reconnaissance mutuelle
entre la Communauté Européenne et le Canada

CERTIFICATE NUMBER <i>NUMÉRO DE CERTIFICAT</i>	10-111340
CERTIFICATION NUMBER <i>NUMÉRO DE CERTIFICATION</i>	IC: 5713A-PTM33XC
TYPE OF SERVICE <i>TYPE DE SERVICE</i>	New Family Certification / Limited Modular Approval
CERTIFICATE HOLDER <i>TITULAIRE DU CERTIFICAT</i>	EnOcean GmbH Kolpingring 18a 82041 Oberhaching Germany
TYPE OF EQUIPMENT <i>GENRE DE MATÉRIEL</i>	Transmitter Module
TRADE NAME AND MODEL NUMBER <i>MARQUE ET NUMÉRO DE MODÈLE</i>	EnOcean PTM330C / PTM332C
FREQUENCY RANGE <i>BANDE DE FRÉQUENCES</i>	315MHz
EMISSION DESIGNATION (TRC-43) <i>DÉSIGNATION D'ÉMISSION (CRT-43)</i>	315KA1D
R.F. POWER RATING (WATT) <i>PUISSANCE NOMINALE H.F (WATT)</i>	/
ANTENNA INFORMATION <i>INFORMATION D'ANTENNE</i>	Wire Antenna 15cm
CONTACT INFORMATION OF TESTING LABORATORY <i>COORDONNÉES DU LABORATOIRE DESSAI</i>	Center for Quality Engineering SGS Germany GmbH Hoffmannstraße 50 81379 München Germany
CERTIFIED TO <i>CERTIFIÉ SELON LE</i>	SPECIFICATION / ISSUE <i>CAHIER DES CHARGES / ÉDITION</i>
	RSS-210 Issue 7, RSS-GEN Issue 2 RSS-102 Issue 4

Certification of equipment means only that the equipment has met the requirements of the above noted specification. License applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the radio standards specifications and procedures issued by the Department.

La certification du matériel signifie seulement que le matériel satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences aux procédures d'Industry Canada.

Labelling of Certified Radio Equipment: Equipment that has received certification but is not labelled with the applicant's name, model number and the certification number as outlined above is not considered certified.

Étiquetage du matériel radio homologué: Le matériel pour lequel une certification a été obtenue mais qui n'est pas étiqueté conformément aux exigences ci-dessus (nom du requérant, numéro de modèle et numéro de certification) n'est pas considéré comme certifié.

Certification Body Code: DE0003

recognised by



Bundesnetzagentur

Signed by / Signataire Uwe Dollitz

Blomberg, 23 July 2010

Foreign Certification Body (FCB)

BNetzA-CAB-04/22-53

5.3.3 PTM 330U IC (Industry Canada) Certification

PTM 330U has been granted an IC number as outlined below:

IC:	5713A-PTM330U
-----	---------------

Labeling requirements for Industry Canada are similar to those required by the FCC. The Original Equipment Manufacturer (OEM) must ensure that IC labeling requirements are met.

A clearly visible label on the outside of a non-removable part of the final product must include the following text:

PTM 330U:
Contains IC: 5713A-PTM330U

Pour utiliser le numéro IC EnOcean, le OEM doit s'assurer que les conditions suivantes sont remplies:

Les exigences d'étiquetage pour Industrie Canada sont similaires à ceux exigés par la FCC. Le fabricant d'équipement d'origine (OEM) doit s'assurer que les exigences en matière d'étiquetage IC sont réunies.
Une étiquette clairement visible à l'extérieur d'une partie non amovible du produit final doit contenir le texte suivant:

PTM 330U:
Contains IC: 5713A-PTM330U
Contient le module d'émission IC: 5713A-PTM330U

5.3.4 Industry Canada Regulatory 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.

IMPORTANT! Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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

Le présent appareil est conforme aux CNR d'Industrie 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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IMPORTANT! Tous les changements ou modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner cet équipement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.