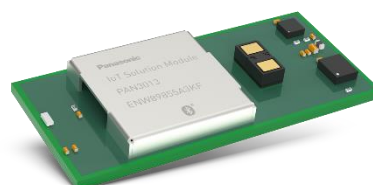


# PAN301x

## Bluetooth® Low Energy Module Module Integration Guide

Rev. 1.1



## Overview

The PAN301x is a Bluetooth 5.2 Low Energy (LE) module based on ST's BlueNRG-2 Bluetooth low energy single mode system-on-chip.

## Features

- Surface mount type (SMT) dimensions
  - PAN3011/PAN3012: 25 mm x 14 mm x 3 mm
  - PAN3013: 31 mm x 14 mm x 3 mm
- PAN3011 and PAN3012 have same form factor and pinning
- ARM® Cortex®-M0 microcontroller
- Embedded 256 kB flash memory and 24 kB internal RAM
- Interfaces: I<sup>2</sup>C, UART, PDM, GPIO, ADC, SWD
- Internal chip antenna

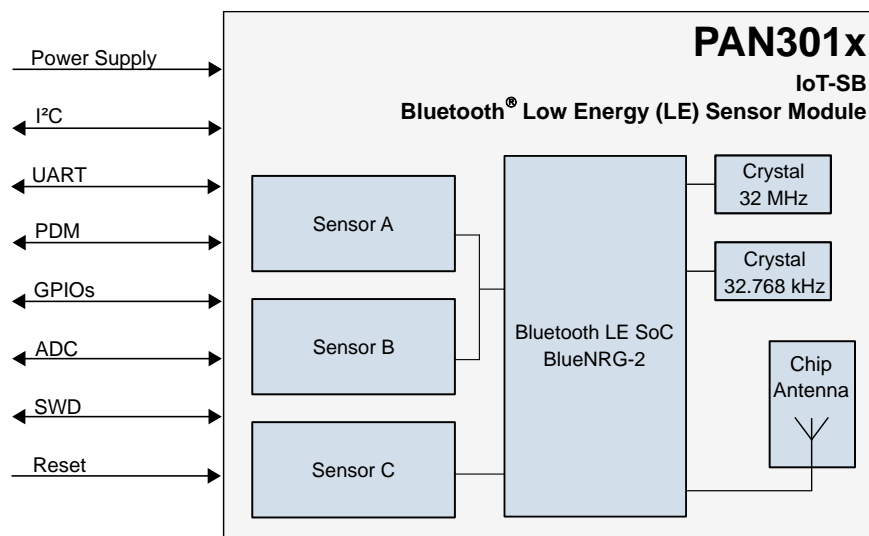
## Characteristics

- Typical sensitivity: -88 dBm
- Typical max. output power: 8 dBm
- Typical current consumption: 16 mA in Tx and 9 mA in Rx mode
- Typical current consumption in sleep-mode: 10 µA
- Voltage range
  - PAN3011/PAN3012: 1.7 V to 3.6 V
  - PAN3013: 2.6 V to 3.5 V
- Temperature range
  - PAN3011/PAN3012: -40 °C to 85 °C
  - PAN3013: -20 °C to 85 °C

## Sensor Application

- PAN3011
  - LSM6DSO: 3D accelerometer and 3D gyroscope
  - LIS2MDL: magnetometer
  - MP34DT05-A: digital microphone
- PAN3012
  - HTS221: humidity and temperature
  - LPS22HH: pressure sensor
  - MP34DT05-A: digital microphone
- PAN3013
  - VL53L1X: time of flight sensor (ToF)
  - LSM6DSO: 3D accelerometer and 3D gyroscope
  - LIS2MDL: magnetometer

## Block Diagram



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This Module Integration Guide does not lodge the claim to be complete and free of mistakes.

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# 1 About This Document

## 1.1 Purpose and Audience

This Module Integration Guide is intended to support the easy integration of the PAN301x into a product and to ensure the compliance with regulatory requirements.

This guide gives an overview about the hardware design requirements by providing a reference design, which is the evaluation board of the PAN301x. It describes how to use the PAN301x on the evaluation board with the software packages and tools provided by ST. In addition, it explains how to start up the evaluation board, get all the needed software sources, execute example code and build own implementations.




It is intended for hardware design, application, and Original Equipment Manufacturers (OEM) engineers.

The product is referred to as “the PAN301x” or “the module” within this document.

## 1.2 Revision History

Revision	Date	Modifications/Remarks
1.0	2021-04-28	First version
1.1	2021-11-16	Updated picture “Block Diagram” of the reference design. Updated chapter “Software: STEVAL BCN002V1B Development Kit”: added software reference. Updated Bluetooth version. Removed chapter “Restricted Use”.

## 1.3 Use of Symbols

Symbol	Description
	<b>Note</b> Indicates important information for the proper use of the product. Non-observance can lead to errors.
	<b>Attention</b> Indicates important notes that, if not observed, can put the product’s functionality at risk.
	<b>Tip</b> Indicates useful information designed to facilitate working with the module and software.
⇒ [chapter number] [chapter title]	<b>Cross reference</b> Indicates cross references within the document. <b>Example:</b> Description of the symbols used in this document ⇒ 1.3 Use of Symbols.
✓	<b>Requirement</b> Indicates a requirement that must be met before the corresponding tasks can be completed.

Symbol	Description
<b>→</b>	<b>Result</b> Indicates the result of a task or the result of a series of tasks.
<b>This font</b>	<b>GUI text</b> Indicates fixed terms and text of the graphical user interface. <b>Example:</b> Click <b>Save</b> .
<b>Menu &gt; Menu item</b>	<b>Path</b> Indicates a path, e.g. to access a dialog. <b>Example:</b> In the menu, select <b>File &gt; Setup page</b> .
<code>This font</code>	<b>File names</b> Indicates file names displayed on the screen or to be selected by the user. <b>Examples:</b> <code>pan1760.c</code> contains the actual module initialization.
<code>This font</code>	<b>Messages, user input, code</b> Indicates messages, information, and code displayed on the screen or to be entered by the user. <b>Examples:</b> The message <code>Failed to save your data</code> is displayed. Enter the value <code>Product 123</code> . Copy firmware binaries to firmware library: <code>\$&gt; cd \${TOP}/...</code> <code>\$&gt; ...</code>
<b>Key</b>	<b>Key</b> Indicates a key on the keyboard. <b>Example:</b> Press <b>F10</b> .

## 1.4 Related Documents

For related documents please refer to the Panasonic website ⇒ [7.2 Product Information](#).

## 2 Overview

Creating IoT Solution Modules like the PAN3011, PAN3012, and PAN3013, that clearly contribute to cutting down time-to-market in development processes in these rather fast paced times of innovation and automatization has been the clear priority for Panasonic Industry. Being based on and inspired by the ST BlueTile (STEVAL-BCN002V1B) multi-sensor development kit, customers are now able to test and evaluate their ideas easily and bring new IoT products appropriately fast and at a reduced BOM to the markets.

The IoT Solution Module features ST's latest BlueNRG Bluetooth 5.2 LE system-on-chip (SoC) paired with inertial, environmental, audio, and magnetic sensors. The onboard sensors enable the cost-effective delivery of a broad range of compact and valuable IoT applications for smart factory, smart home, and smart life scenarios.

The combination of different sensors in an efficient low-power design with Bluetooth communications enables OEM customers to dramatically slash time-to-market and reduce design expense and complexity using certified modules.

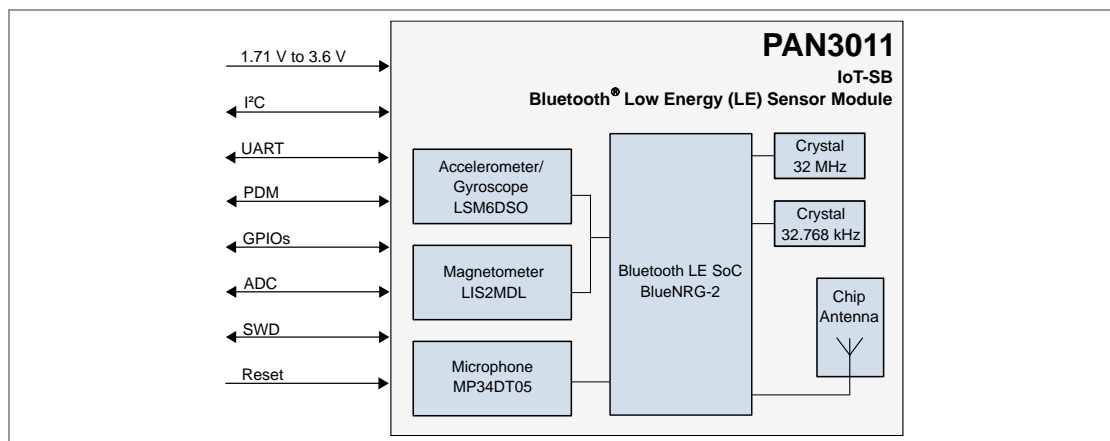
For related documents please refer to [⇒ 7.2 Product Information](#).



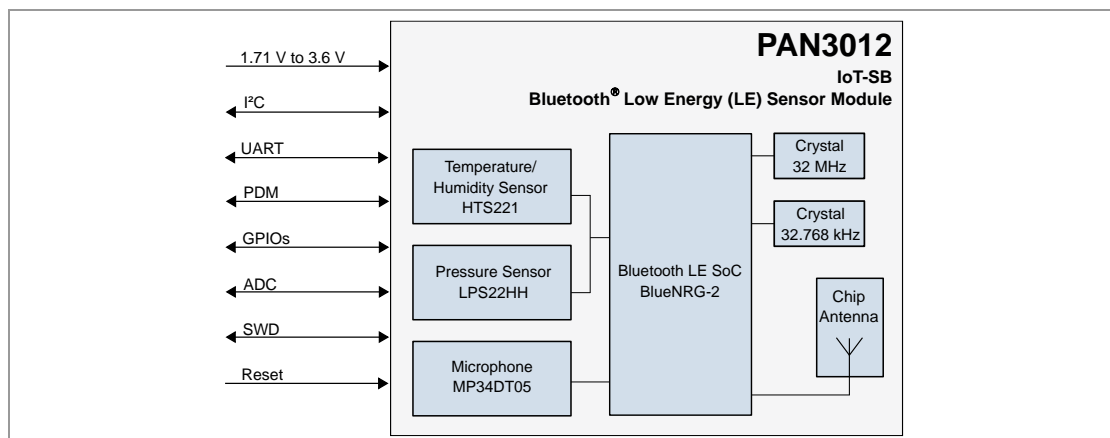
## 3 PAN301x Module

### 3.1 Block Diagrams

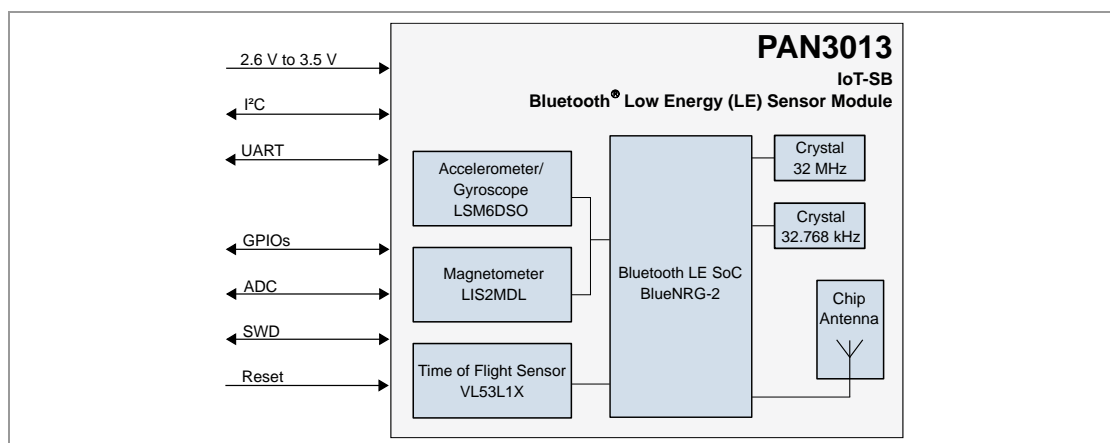
#### PAN3011



#### PAN3012



#### PAN3013



## 3.2 Footprints

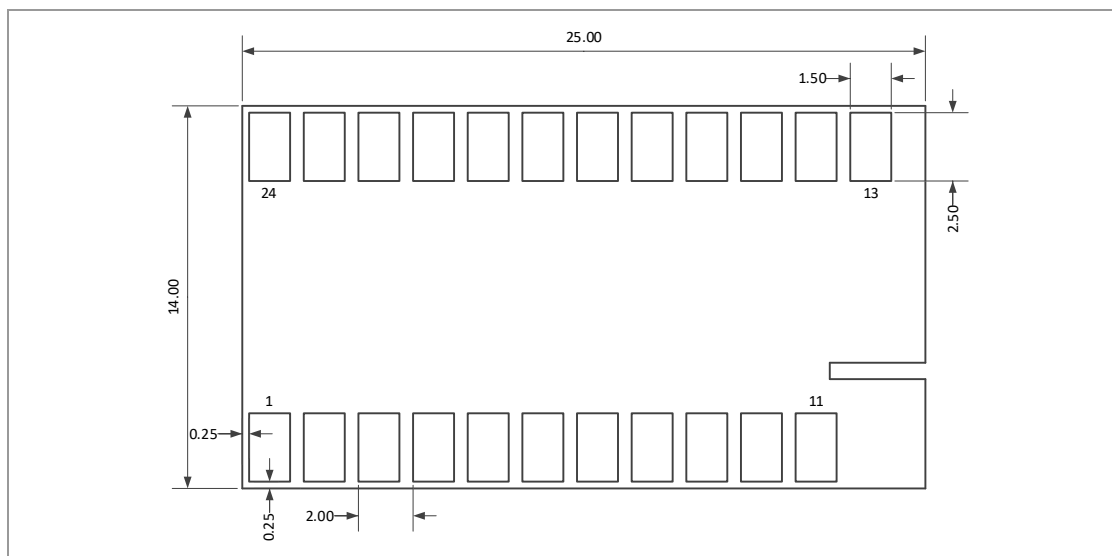


The dimensions are in millimeters.

The outer dimensions have a tolerance of  $\pm 0.3$  mm.

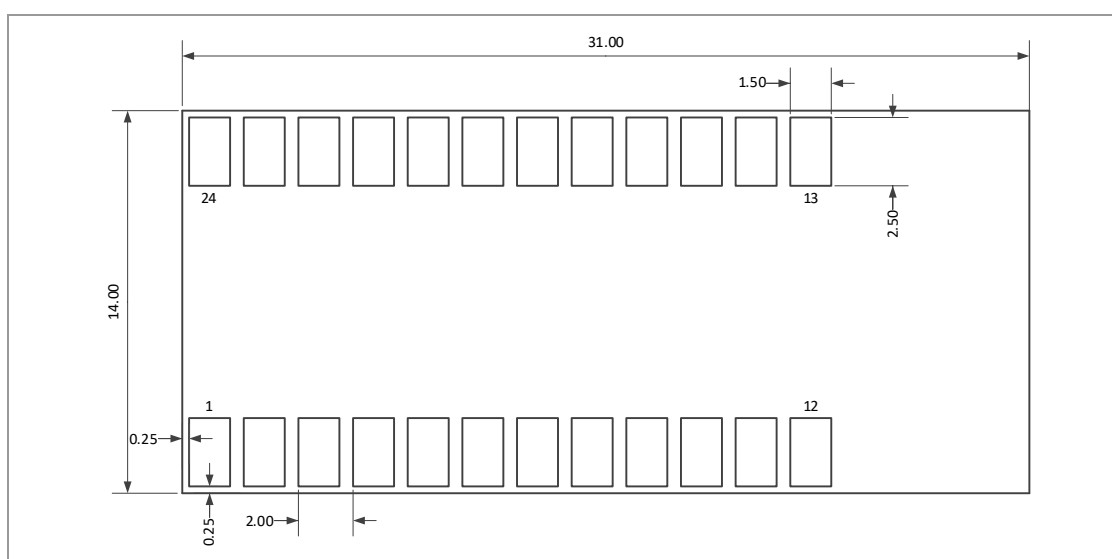
### PAN3011/PAN3012

#### Top View



### PAN3013

#### Top View



### 3.3 Placement

**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 2-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 mm × 3 mm under the PAN301x modules. This “Keep out Area” shall be located in every layer under the module antenna. Note for example the “Keep out Area” in all layers of the PAN301x evaluation board.

**Temperature- and Humidity Sensor (PAN3012)**

Reduce the temperature influence from surround circuits.

It is recommended to cut the copper and/or use vent aperture in the area “Temp/Hum Sensor”.

Avoid materials that can absorb humidity in the dead volume.

Large dead volume will increase the humidity response time significantly.

It is recommended to minimize the volume and trying to shape a tailored housing around the perimeter of the sensor.

**3-axis Magnetometer (PAN3011/PAN3013)**

Keep away any circuits or copper-lines with high currents from the magnetometer. It is recommended to cut the copper as much as possible under the magnetometer area.

**3D Accelerometer and 3D Gyroscope**

Avoid bending of the mother-PCB's. Deformations can have a significantly affect to the measurement results of the 3D accelerometer and 3D gyroscope.

## Time of Flight (ToF) Sensor (PAN3013)

It is recommended to use a cover window with the dimension of maximum 12 mm × 8.5 mm. It provides physical protection for the sensor, including protection for the dust ingress and it provides optical filtering for the sensor.

The ToF sensor maker ST recommends a Hornix cover window ("IR-T042C0-PM3D-A066") as an example of a very low crosstalk cover window.

However, the final cover window selection depends on the individual customer requirements. Please refer to the ST application note "AN5231".

In general, it is recommended to verify the perfect position of the module in the target application before fixing the design.

## Antenna Placement Recommendation



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

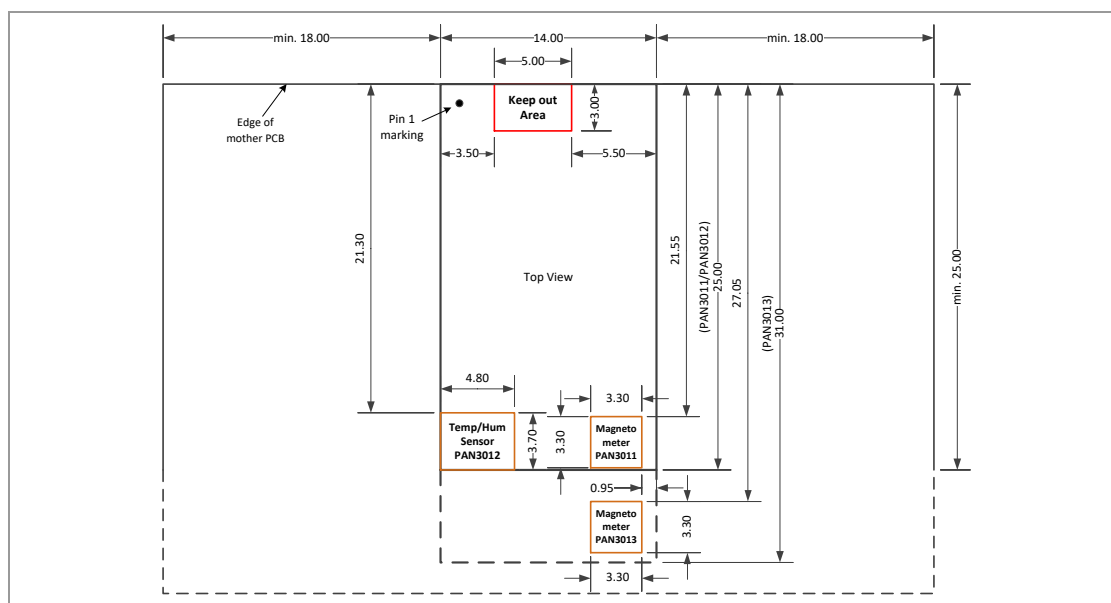


The dimensions are in millimeters.

It is recommended to place the module:

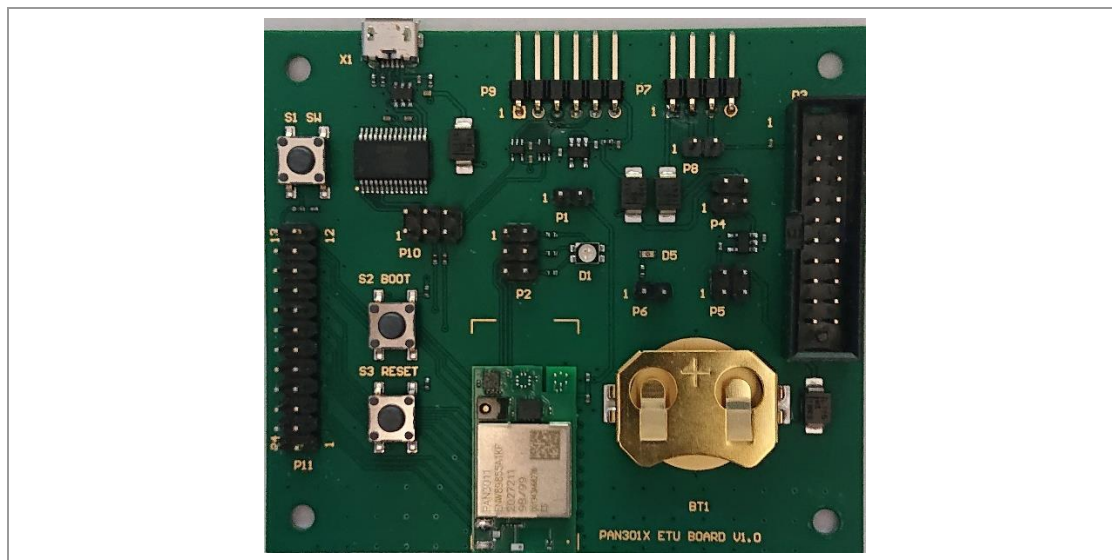
- In the center (horizontal) of mother PCB.
- At the edge (horizontal) of mother PCB.

### Top View

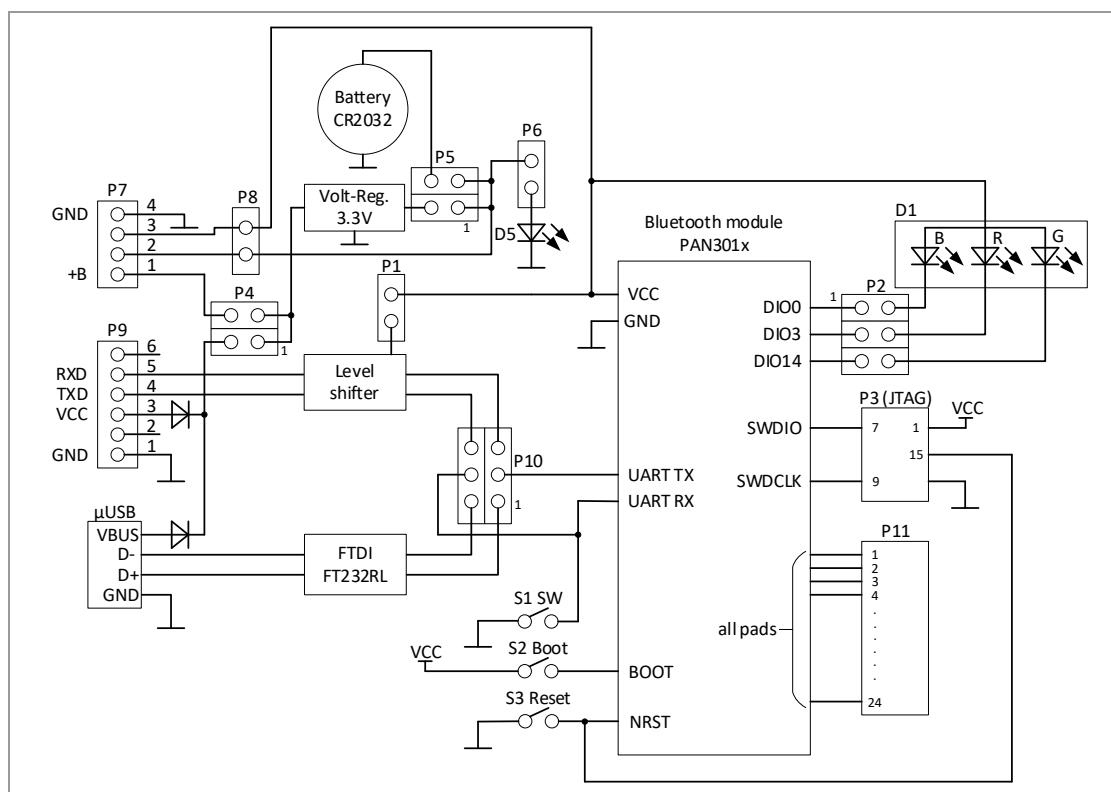


## 4 Reference Design

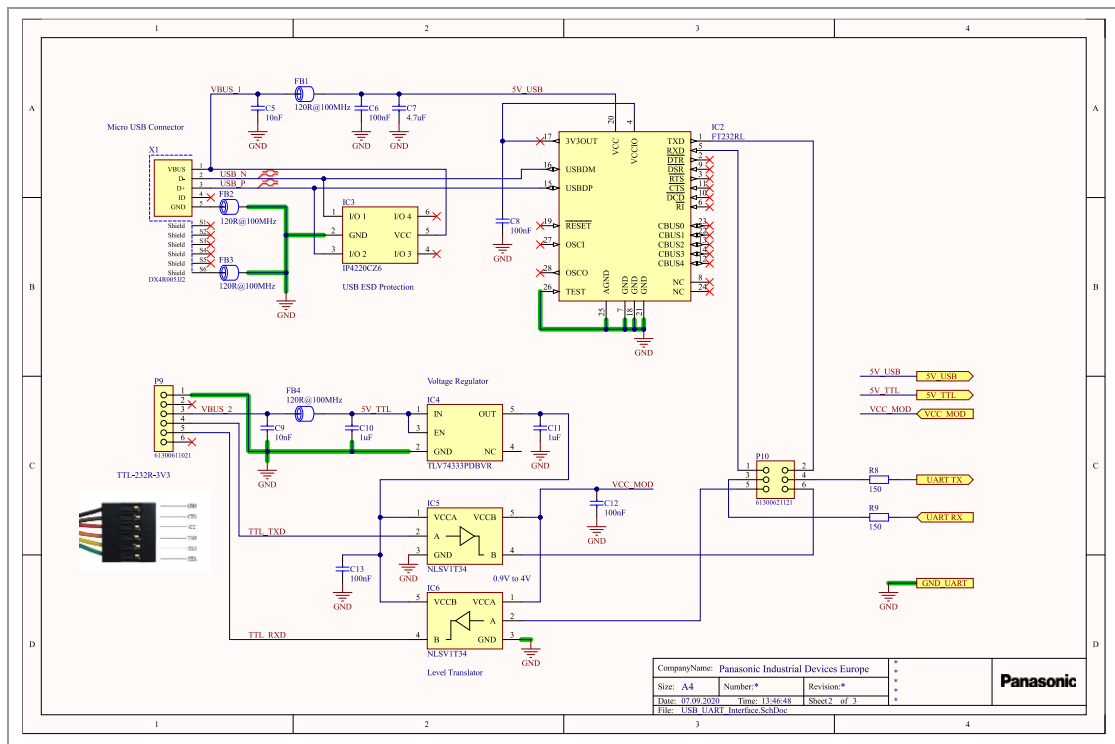
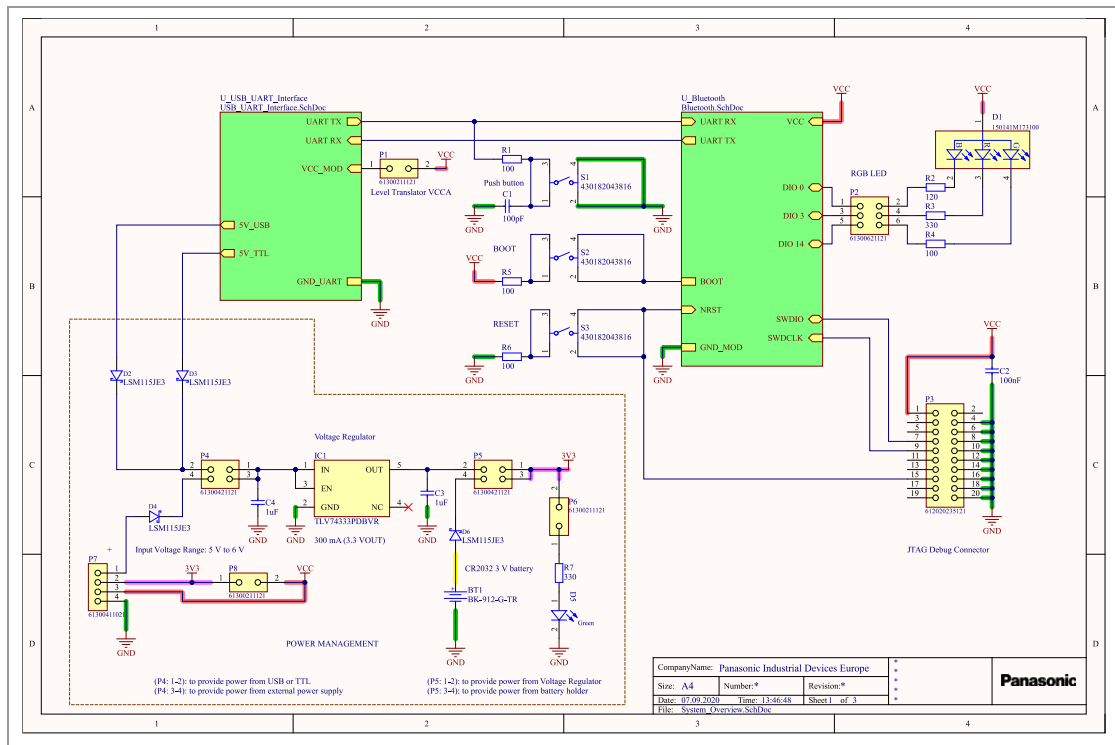
The reference design, shown in the block diagram below, gives an example of how to use the PAN301x, to get connection over FTDI UART and J-Link SWD.



### 4.1 Block Diagram

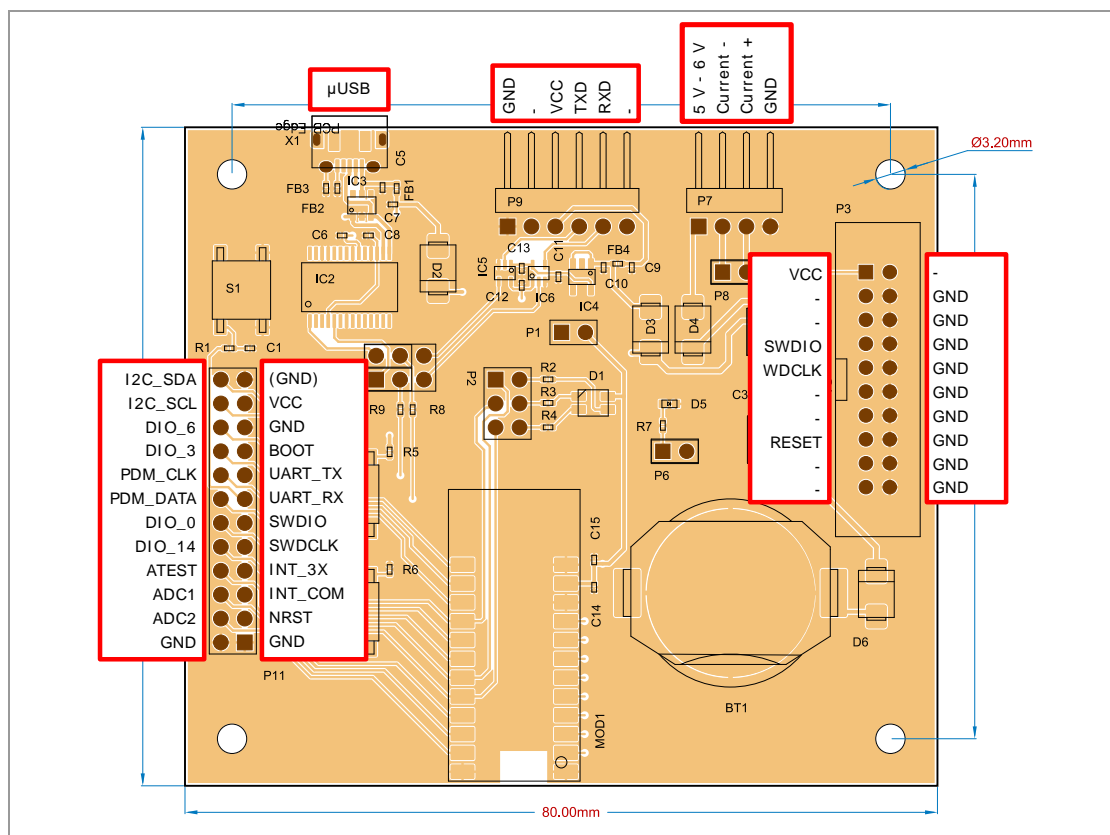


## 4.2 Schematic





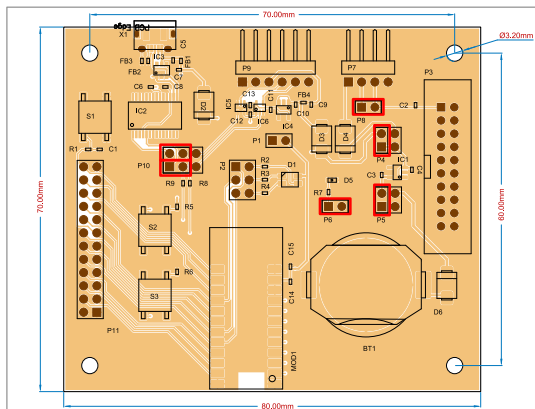
## 4.4 Breakout Pins



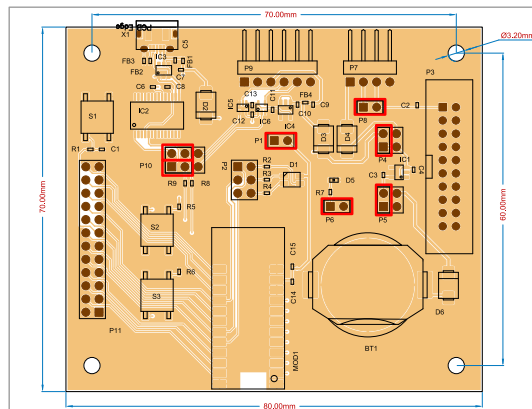


## 4.5 Configuration Settings

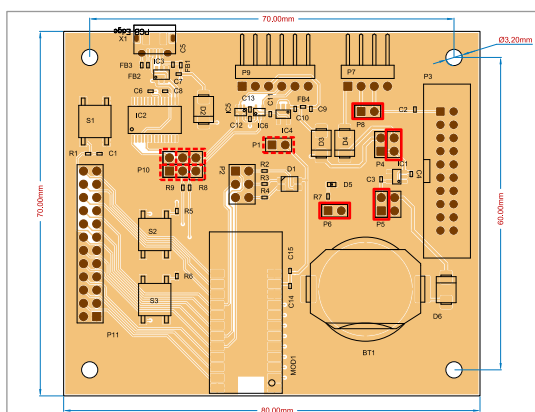
### Operation over X1 (Micro-USB)



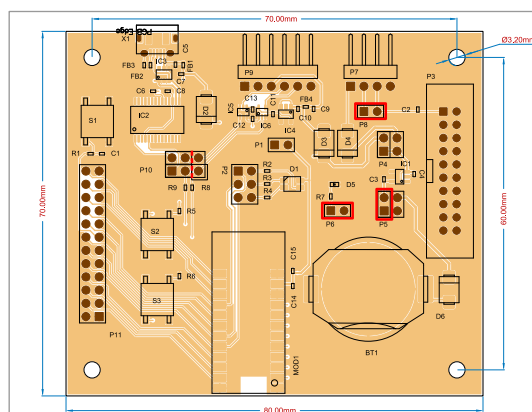
### Operation over P9 (TTL-232R-3V3 cable)



### Operation over P7 → Set jumper at P10 due to UART control (USB or P9)



### Operation over CR2032 battery (without UART control)



Use connector P9 only with the FTDI USB to UART cable “TTL-232R-3V3”.

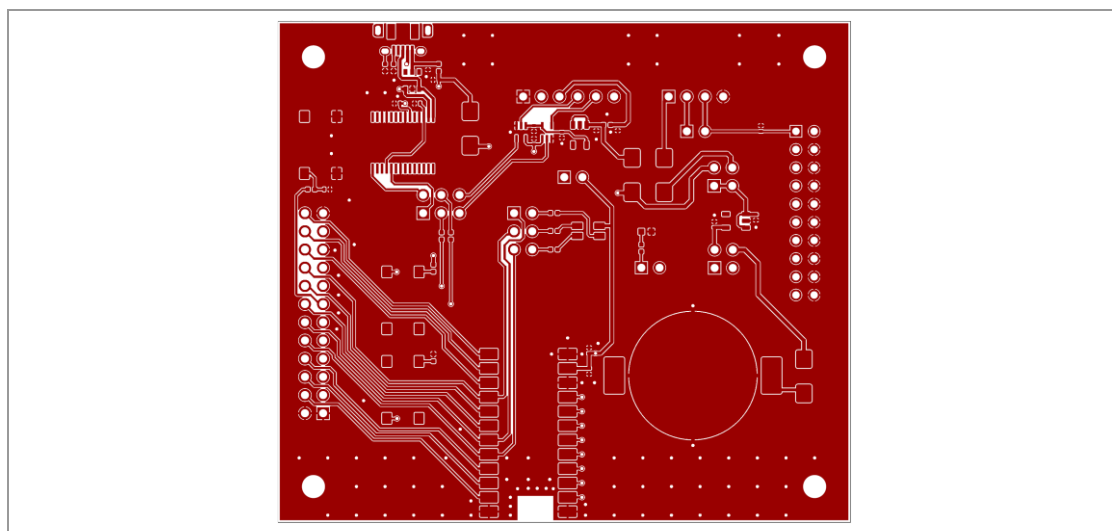
Jumper	Description
P1	Supply voltage for the level shifter at P9. Set this jumper if using serial communication over P9 (FTDI cable “TTL-232R-3V3”).
P2	Connects the RGB LED to DIO0, DIO3, and DIO14 of the sensor module.
P4	Supply voltage of the sensor module over $\mu$ USB/P9 or over P7
P5	Supply voltage of the sensor module over $\mu$ USB/P9/P7 or over CR2032 coin cell

Jumper	Description
P6	Power supply of LED D5 (operation control) Disconnect this jumper to reduce the supply current when using a CR2032 coin cell.
P8	Option to break the power supply to the sensor module. Jumper can be removed for current measurements at P7 or for direct power supply to the sensor module.
P10	Sensor module UART connection to $\mu$ USB or to P9 (FTDI cable "TTL-232R-3V3")

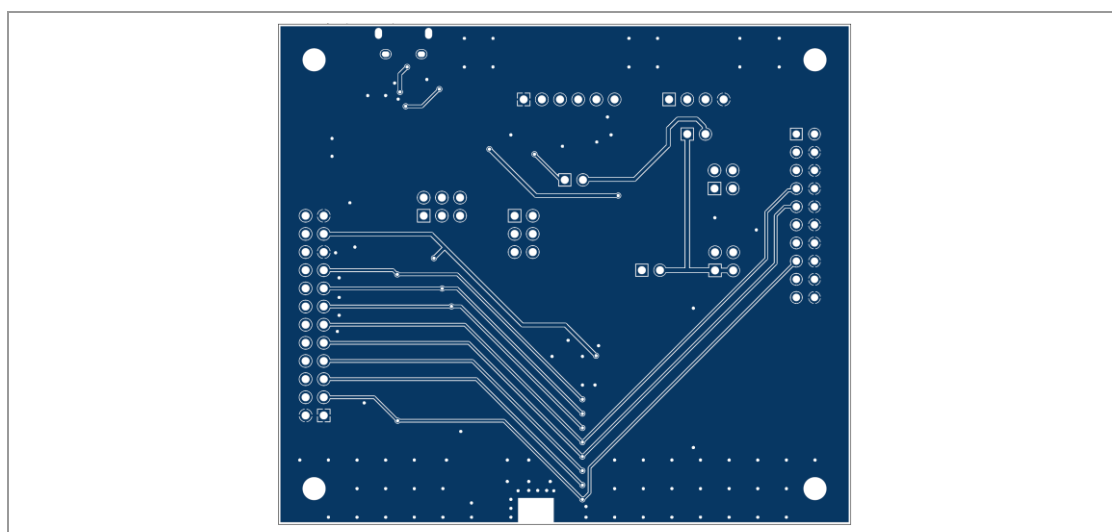
Regarding the jumper connection refer also to [⇒ 4.1 Block Diagram](#).

## 4.6 PCB Layout

### 4.6.1 Top Layer



### 4.6.2 Bottom Layer



## 5 Software: STEVAL-BCN002V1B Development Kit

The PAN301x sensor modules are based on and inspired by the ST BlueTile (STEVAL-BCN002V1B) multi-sensor development kit.

Testing and evaluation of the software can be done with this development kit. Due to the similar circuit, the software will also work on the PAN301x sensor modules.

The difference between the STEVAL-BCN002V1B multi-sensor development kit and the PAN301x sensor modules is the population of the sensors:

Sensor	Part No.	STEVAL-BCN002V1B	PAN3011	PAN3012	PAN3013
Time of Flight	VL53L1X	X			X
Digital Microphone	MP34DT05-A	X	X	X	
Pressure Sensor	LPS22HH	X		X	
Accelerometer/Gyroscope	LSM6DSO	X	X		X
Magnetometer	LIS2MDL	X	X		X
Humidity/Temperature	HTS221	X		X	

For the software tools and documentations please refer to:

<https://www.st.com/en/evaluation-tools/steval-bcn002v1b.html#overview>

For the demo software under Github please refer to:

<https://github.com/ArrowElectronics/Panasonic-IoT-Solution-Modules>

Software projects can be flashed to the PAN301x ETU board via the JTAG SWD programming and debugging connector (P3).

## 6 Regulatory and Certification Information

### 6.1 General Certification Information



Regulatory certifications are valid for the following radio relevant software:  
Stack 2.1c from STSW-BLUETILE DK 3.2.1.

### 6.2 Federal Communications Commission (FCC) for US

#### 6.2.1 FCC Statement

**The following FCC statement has to be printed in the OEM end product user information:**

This device complies with part 15 of the FCC Rules and meets the requirements for modular transmitter approval as detailed in FCC public Notice DA00-1407. The transmitter 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.

#### 6.2.2 Caution

**The following FCC caution has to be printed in the OEM end product user information:**



The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Panasonic Industrial Devices Europe GmbH may void the user's authority to operate the equipment.



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.

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.

### 6.2.3 Label Requirements

The following labelling requirements have to be implemented on the OEM end product:



The OEM must ensure that FCC labelling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Panasonic FCC identifier for this product as well as the FCC Notice above.

The FCC identifier is **FCC ID: T7V301X**.

This FCC identifier is valid for the PAN3011, PAN3012, and PAN3013. The end product must in any case be labelled on the exterior with:

"Contains FCC ID: T7V301X".

Due to the PAN301x model size, the FCC identifier is displayed in the installation instruction only and it cannot be displayed readable on the module's label due to the limited size.

### 6.2.4 Antenna Warning

The following Antenna has to be followed by the OEM:

This antenna warning refers to the test device with the model number PAN301x.

The device is tested with a standard UFL connector and with the antenna listed below. When integrated into the OEM's product, these fixed antennas require installation preventing end users from replacing them with non-approved antennas. Any antenna not in the following table must be tested to comply with FCC Section 15.203 for unique antenna connectors and with Section 15.247 for emissions. The FCC identifier for the device with the antenna listed in ⇒ [6.2.5 Approved Antenna List](#) is the same (**FCC ID: T7V301X**).

### 6.2.5 Approved Antenna List

Item	Part Number	Manufacturer	Frequency Band (GHz)	Type	Max. Gain (dBi)
1	ANT016008LCS2442MA1	TDK	2.4	Chip antenna	1.6

## 6.2.6 RF Exposure



To comply with FCC RF Exposure requirements, the OEM must ensure that only antennas from the Approved Antenna List are installed ⇒ [6.2.5 Approved Antenna List](#).

The preceding statement must be included as a “CAUTION” statement in manuals for products operating with the approved antennas in the previous table to alert users on FCC RF Exposure compliance.

Any notification to the end user of installation or removal instructions about the integrated radio module is not allowed.

The radiated output power of the PAN3011, PAN3012, and PAN3013 with a mounted ceramic antenna (**FCC ID: T7V301X**) is below the FCC radio frequency exposure limits. Nevertheless, the PAN3011, PAN3012, and PAN3013 shall be used in such a manner that the potential for human contact during normal operation is minimized.

End users may not be provided with the module installation instructions. OEM integrators and end users must be provided with transmitter operating conditions for satisfying RF exposure compliance.

## 6.2.7 Integration Instructions

This chapter gives integration instructions for host product manufacturers according to KDB “996369 D03 OEM Manual v01”.

Section	Topic and Comment	
<b>2.2</b>	<b>List of applicable FCC rules</b>	
	47 CFR Section	Part 15C
	Frequency Band (MHz)	2 400 to 2 483.5
	Systems	Digital Transmission Systems operating within the 2 400 MHz to 2 483.5 MHz Band
	Reference / Requirement	15.247
	Complied Module M/N	ENW89855A1KF, ENW89855A2KF, ENW89855A3KF
<b>2.3</b>	<b>Summarize the specific operational use conditions</b>	
	Please refer to ⇒ <a href="#">3.3 Placement</a> , ⇒ <a href="#">6.2.5 Approved Antenna List</a> , and chapter “Restricted Use” (in “PAN301x Arrow IoT-SB Product Specification”).	
<b>2.4</b>	<b>Limited module procedures</b>	
	Not applicable, the module has a single-modular transmitter approval.	
<b>2.5</b>	<b>Trace antenna designs</b>	
	Not applicable, the module has a ceramic chip antenna. For guidance regarding the PCB layout requirements for module integration refer to ⇒ <a href="#">3.3 Placement</a> .	

<b>2.6</b>	<b>RF exposure considerations</b>
	Mobile application, the end customer has to assure that the device has a distance of more than 20 cm from the human body under all circumstances.
<b>2.7</b>	<b>Antennas</b>
	Please refer to ⇒ <a href="#">6.2.4 Antenna Warning</a> and ⇒ <a href="#">6.2.5 Approved Antenna List</a> .
<b>2.8</b>	<b>Label and compliance information</b>
	Please refer to ⇒ <a href="#">6.2.3 Label Requirements</a> .
<b>2.9</b>	<b>Information on test modes and additional testing requirements</b>
	The documents for integration guidance and compliance testing are available here ⇒ <a href="#">7.2 Product Information</a> .
<b>2.10</b>	<b>Additional testing, Part 15 Subpart B disclaimer</b>
	<p>The single-modular transmitter is FCC authorized for the specific rule parts listed at ⇒ <a href="#">List of applicable FCC rules</a>.</p> <p>The host product manufacturer needs to also consider the FCC requirements for certified modular transmitter being used in the host product and maintain documentation on how the host product with the certified modular transmitter complies with the FCC rules. Host product manufacturers are responsible to follow the integration guidance and to perform a limited set of transmitter module verification testing, to ensure the end product is in compliance with the FCC rules. Also host product manufacturers are responsible for all additional equipment authorization and testing for technical requirements not covered by the module grant (e.g., unintentional radiator Part 15 Subpart B requirements, or transmitters used in the host that are not certified modules).</p>

## 6.3 Innovation, Science, and Economic Development (ISED) for Canada

The following IC rules have to be followed by end product OEM's:

### English

The PAN3011, PAN3012, and PAN3013 are licensed to meet the regulatory requirements of ISED.

License ID: **IC: 216Q-301X**

HVIN: **ENW89855A1KF, ENW89855A2KF, ENW89855A3KF**

Manufacturers of mobile, fixed or portable devices incorporating this module are advised to clarify any regulatory questions and ensure compliance for SAR and/or RF exposure limits. Users can obtain Canadian information on RF exposure and compliance from [www.ic.gc.ca](http://www.ic.gc.ca).

This device has been designed to operate with the antennas listed in ⇒ [6.2.5 Approved Antenna List](#), having a maximum gain of 1.6 dBi. Antennas not included in this list or having a gain greater than 1.6 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms. The antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Due to the model size, the IC identifier is displayed in the installation instruction and on the package label only. It cannot be displayed on the module's label due to the limited size.



The end customer has to assure that the device has a distance of more than 15 mm from the human body under all circumstances.

If the end customer application intends to use the PAN3011, PAN3012, and PAN3013 in a distance smaller 15 mm from the human body, SAR evaluation has to be repeated by the OEM.

The end customer equipment must meet the actual Safety/Health requirements according to ISED.

## French

PAN3011, PAN3012, PAN3013 est garanti conforme aux dispositions réglementaires d'Industry Canada (ISED).

License: **IC: 216Q-301X**

HVIN: **ENW89855A1KF, ENW89855A2KF, ENW89855A3KF**

Il est recommandé aux fabricants d'appareils fixes, mobiles ou portables de consulter la réglementation en vigueur et de vérifier la conformité de leurs produits relativement aux limites d'exposition aux rayonnements radiofréquence ainsi qu'au débit d'absorption spécifique maximum autorisé.

Des informations pour les utilisateurs sur la réglementation Canadienne concernant l'exposition aux rayonnements RF sont disponibles sur le site [www.ic.gc.ca](http://www.ic.gc.ca).

Ce produit a été développé pour fonctionner spécifiquement avec les antennes listées dans le tableau ⇒ [6.2.5 Approved Antenna List](#), présentant un gain maximum de 1.6 dBi. Des antennes autres que celles listées ici, ou présentant un gain supérieur à 1.6 dBi ne doivent en aucune circonstance être utilisées en combinaison avec ce produit. L'impédance des antennes compatibles est 50 Ohm. L'antenne utilisée avec ce produit ne doit ni être située à proximité d'une autre antenne ou d'un autre émetteur, ni être utilisée conjointement avec une autre antenne ou un autre émetteur.

En raison de la taille du produit, l'identifiant IC est fourni dans le manuel d'installation.





Le client final doit s'assurer que l'appareil se trouve en toutes circonstances à une distance de plus de 15 mm du corps humain.

Si le client final envisage une application nécessitant d'utiliser le PAN3011, PAN3012, PAN3013 à une distance inférieure à 15 mm du corps humain, alors le FEO doit répéter l'évaluation DAS.

L'équipement du client final doit répondre aux exigences actuelles de sécurité et de santé selon l'ISED.

### 6.3.1 IC Notice

The following IC notice has to be printed in English and French in the OEM end product user information:

#### English



The devices PAN3011, PAN3012, and PAN3013 including the antennas (⇒ [6.2.5 Approved Antenna List](#)), complies with Canada RSS-GEN Rules. The device meets the requirements for modular transmitter approval as detailed in RSS-Gen.

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.

#### French



Le présent appareil PAN3011, PAN3012, PAN3013, les antennes y compris (⇒ [6.2.5 Approved Antenna List](#)), est conforme aux CNR-Gen 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.

### 6.3.2 Labeling Requirements

The following IC labelling requirements have to be followed by end product OEM's:

#### English



##### Labeling Requirements

The OEM must ensure that IC labelling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Panasonic IC identifier for this product as well as the IC Notice above.

The IC identifier is **IC: 216Q-301X**.

This IC identifier is valid for all PAN301x modules. In any case, the end product must be labelled on the exterior with:

"Contains IC: 216Q-301X".

#### French



##### Obligations d'étiquetage

Les fabricants d'équipements d'origine (FEO) – en anglais Original Equipment Manufacturer (OEM) – doivent s'assurer que les obligations d'étiquetage IC du produit final sont remplies. Ces obligations incluent une étiquette clairement visible à l'extérieur de l'emballage externe, comportant l'identifiant IC du module Panasonic inclus, ainsi que la notification ci-dessus.

L'identifiant IC est **IC: 216Q-301X**.

Cet identifiant est valide pour tous les modules PAN301x. Dans tous les cas les produits finaux doivent indiquer sur leur emballage externe la mention suivante:

"Contient IC: 216Q-301X".

## 6.4 European Conformity According to RED (2014/53/EU)

All modules described in this Module Integration Guide comply with the standards according to the following LVD (2014/35/EU), EMC-D (2014/30/EU) together with RED (2014/53/EU) articles.

### Standards

- Due to the model size, the CE marking is displayed in the installation instruction and on the package label only. It cannot be displayed according to regulation (EU) No. 765/2008 in 5 mm height on the module's label due to the limited space.
- The end product OEM has to re-assess the conformity of the end product to EU regulations, but can use the PAN301x RED pre-assessment to shorten this procedure.
- The RED EU Type Examination Certificate No. **GOM-2009-9272-V01** issued by the Notified Body 0681 can be used for the OEM end product conformance assessment. If a Notified Body has been contracted for the end product conformity assessment, it should be noted that this EU Type Examination Certificate should be used for conformance assessment.

As a result of the OEM end product conformity assessment procedure described in 2014/53/EU Directive and other applicable EU directives, the end customer equipment should be labelled as follows:



The requirements for CE marking are described in regulation (EU) No. 765/2008 Annex II.



The end customer has to assure that the device has a distance of more than 5 mm from the human body under all circumstances.

If the end customer application intends to use the PAN3011, PAN3012, or PAN3013 in a distance smaller 5 mm from the human body, SAR evaluation has to be repeated by the OEM.

The end customer equipment must meet the actual Safety/Health requirements according to RED.

PAN3011, PAN3012, and PAN3013 and its model versions in the specified reference design can be used in all countries of the European Economic Area (Member States of the EU, European Free Trade Association States [Iceland, Liechtenstein, Norway]), Monaco, San Marino, Andorra, and Turkey.

## 6.5 Bluetooth

For Bluetooth end products which integrate the PAN301x the OEM needs to apply for an own end product listing (EPL) at the Bluetooth SIG. If the PAN301x is used on more than one OEM product, costs can be saved by applying for a family EPL.

For the end product EPL the following IDs can be used in order to avoid re-testing:

Bluetooth 5.2	Declaration ID	QDID
Component (Tested) BLE Stack	U050705	144731
Component (Tested) RF PHY	U052208	155331
End Product (Bluetooth LE LR Module)	D052422	164222

### Bluetooth Marks

According to the Bluetooth SIG, the PAN3011, PAN3012, and PAN3013 fulfilled the criteria to label your product as a Bluetooth device:



For further information please refer to the Bluetooth website [www.bluetooth.com](http://www.bluetooth.com).

## 7 Contact Details

### 7.1 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@eu.panasonic.com](mailto:wireless@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>

Please visit the **Panasonic Wireless Technical Forum** to submit a question at

<https://forum.na.industrial.panasonic.com>

### 7.2 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

<http://pideu.panasonic.de/products/wireless-modules.html>

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

<http://www.panasonic.com/rfmodules>