



X4M05 Datasheet

X4 radar sensor module

XeThru Datasheet **by Novelda AS**

C Preliminary - December 15, 2017

Summary

X4M05 is an assembly of the X4SIP02 and X4A02 products



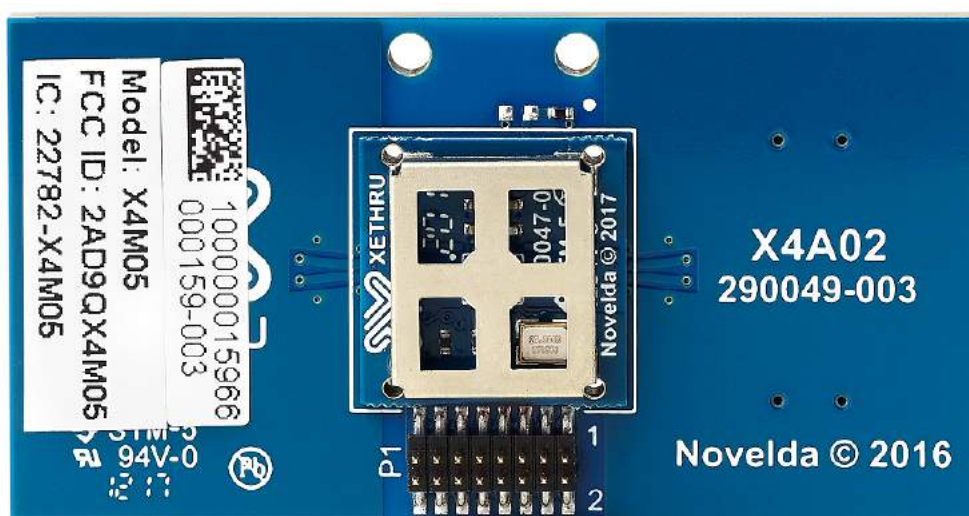
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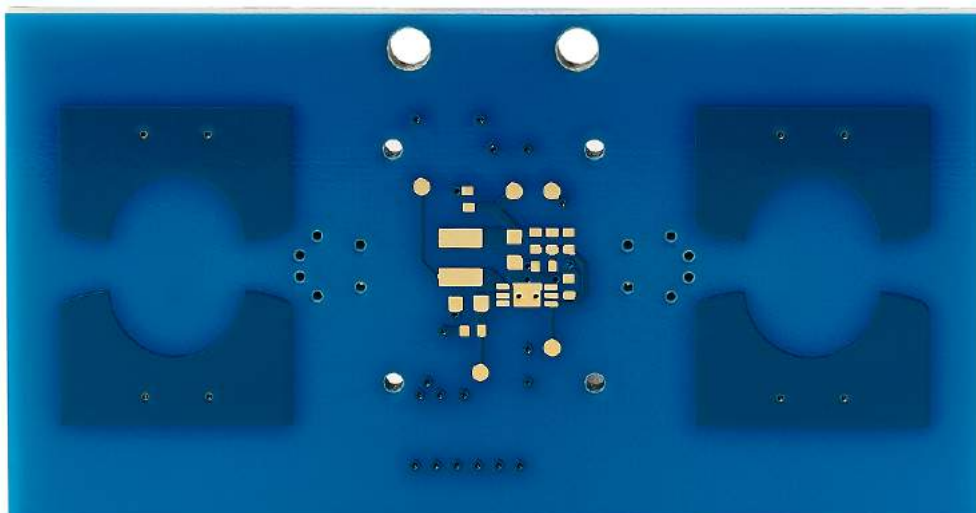


1 List of Features

- Assembly of X4SIP02 and X4A02
- Radar sensor module with antennas for X4 UWB radar SoC
- Designed for ETSI/FCC/IC compliant TX center frequency
- SPI interface to host
- Certifications
 - FCC for USA
 - CE for Europe
 - IC for Canada



X4M05 top view



X4M05 bottom view



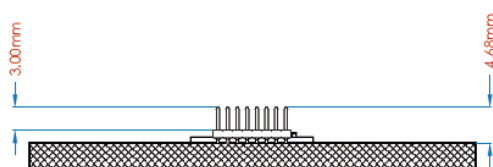
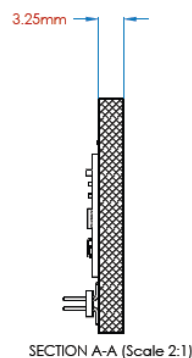
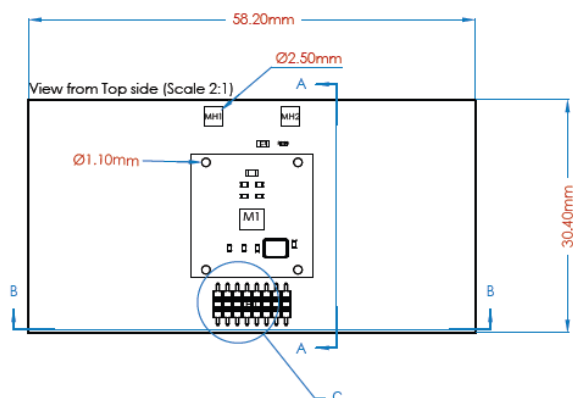
1.1 Order Information

Order Code	Item Description	MOQ	MPQ	Packaging
X4M05	X4M05 X4 Radar Sensor	1	1	1 unit in anti-static bag
X4M05-TR100	X4M05 X4 Radar Sensor	100	100	100 units in anti-static tray

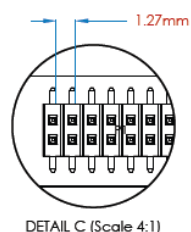
MOQ: Minimum Order Quantity

MPQ: Minimum Package Quantity

2 Physical Dimensions

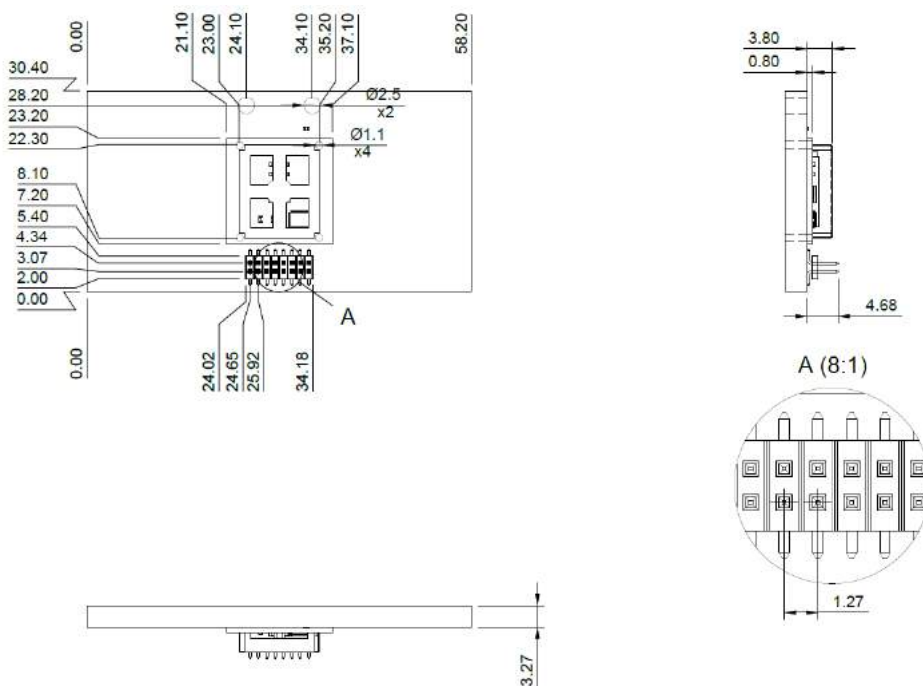


SECTION B-B (Scale 2:1)



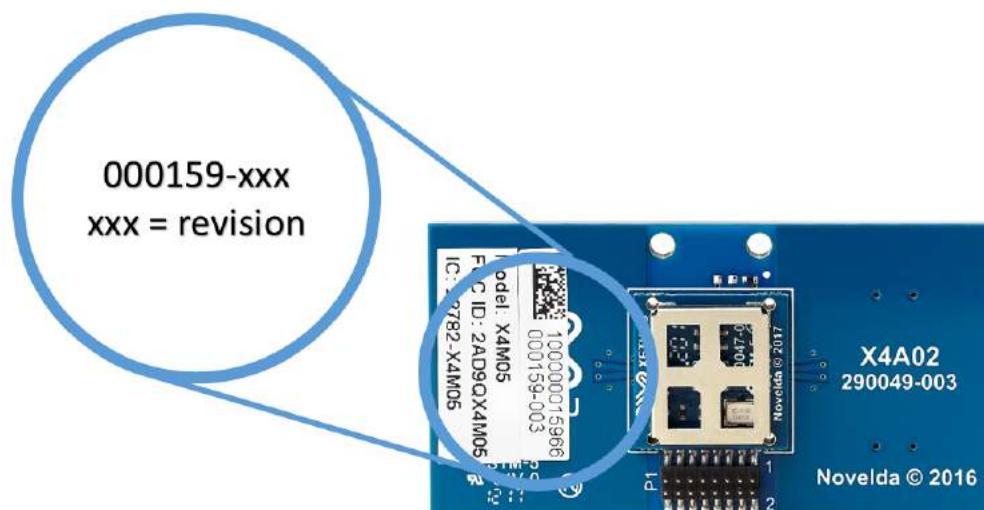
DETAIL C (Scale 4:1)

X4M05 rev.2 physical dimensions



3 Connector Descriptions

4 Hardware Revisions



4.1 X4M05 rev.2

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- X4SIP02 rev.3
- X4A02 rev.3

4.2 X4M05 rev.3

Uses the following boards:

- X4SIP02 rev.4 - Added shield box. Shield box is needed to comply with FCC modular approval.
- X4A02 rev.3

5 Schematics, Bill of Material and PCB Layout

Schematics, bill of material and PCB layout files for X4M05, X4SIP02 and X4A02 can be downloaded from www.xethru.com.

6 Regulatory Approval

X4M05 is designed to meet UWB RF specifications of ETSI (Europe), FCC (USA) and IC (Canada).

Some regulatory specifications also specify how the sensor is used. Users of X4M05 must check regulatory requirements for their own use case and determine whether the regulatory approvals obtained from Novelda are sufficient for their product.

6.1 CE / ETSI Approval

English:

Hereby, **Novelda AS** declares that the radio equipment type X4M05 is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available below.

Suomi:

Novelda AS vakuuttaa, että radiolaitetyyppi X4M05 on direktiivin 2014/53/EU mukainen. EU-vaatimustenmukaisuusvakuutuksen koko teksti on saatavilla alla.

Nederlands:

Hierbij verklaar ik, **Novelda AS**, dat het type radioapparatuur X4M05 conform is met Richtlijn 2014/53/EU. De volledige tekst van de EU-conformiteitsverklaring is hieronder beschikbaar.

Francais:

Le soussigné, **Novelda AS**, déclare que l'équipement radioélectrique du type X4M05 est conforme à la directive 2014/53/UE. Le texte intégral de la déclaration de conformité de l'UE est disponible ci-dessous.

Svenska:

Härmed försäkrar **Novelda AS** att denna typ av radioutrustning X4M05 överensstämmer med direktiv 2014/53/EU. Den fullständiga texten till EU-försäkran om överensstämmelse finns nedan.

Dansk:

Hermed erklærer **Novelda AS**, at radioudstyrstypen X4M05 er i overensstemmelse med direktiv 2014/53/EU. EU-overensstemmelseserklæringens fulde tekst kan findes nedenfor.

**Deutsch:**

Hiermit erklärt **Novelda AS**, dass der Funkanlagentyp X4M05 der Richtlinie 2014/53/EU entspricht. Der vollständige Text der EU-Konformitätserklärung finden Sie weiter unten.

Ελληνικά:

Με την παρούσα ο/η **Novelda AS**, δηλώνει ότι ο ραδιοεξοπλισμός X4M05 πληροί την οδηγία 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης της ΕΕ είναι διαθέσιμο παρακάτω.

Italiano:

Il fabbricante, **Novelda AS**, dichiara che il tipo di apparecchiatura radio X4M05 è conforme alla direttiva 2014/53/UE. Il testo integrale della dichiarazione di conformità dell'UE è disponibile sotto.

Espanol:

Por la presente, **Novelda AS** declara que el tipo de equipo radioeléctrico X4M05 es conforme con la Directiva 2014/53/UE. El texto completo de la declaración de conformidad de la UE está disponible a continuación.

Portugues:

O(a) abaixo assinado(a) **Novelda AS** declara que o presente tipo de equipamento de radio X4M05 esta em conformidade com a Diretiva 2014/53/UE. O texto completo da declaração de conformidade da UE está disponível abaixo.

Čeština:

Timto **Novelda AS** prohlašuje, že typ radioveho zařízení X4M05 je v souladu se směrnicí 2014/53/EU. Úplné znění prohlášení o shodě EU je k dispozici níže.

Eesti:

Kaesolevaga deklareerib **Novelda AS**, et kaesolev raadioseadme tuup X4M05 vastab direktiivi 2014/53/EL nouetele. ELi vastavusdeklaratsiooni täielik tekst on allpool.

Magyar:

Novelda AS igazolja, hogy a X4M05 típusu radioberendezés megfelel a 2014/53/EU irányelvnek. Az EU-megfelelőségi nyilatkozat teljes szövege az alábbiakban található.

Latviešu valoda:

Ar šo **Novelda AS** deklarē, ka radioiekārta X4M05 atbilst Direktīvai 2014/53/ES. ES atbilstības deklarācijas pilns teksts ir pieejams zemāk.

Lietuvių kalba:

Aš, **Novelda AS**, patvirtinu, kad radijo įrenginių tipas X4M05 atitinka Direktyvą 2014/53/ES. Visas ES atitikties deklaracijos tekstas pateikiamas toliau.

Malti:

B'dan, **Novelda AS**, niddikjara li dan it-tip ta' tagħmir tar-radju X4M05 huwa konformi mad-Direttiva 2014/53/UE. It-test shiħ tad-dikjarazzjoni ta 'konformità tal-UE huwa disponibbli hawn taħt.

Slovenčina:

Novelda AS týmto vyhlasuje, že rádiové zariadenie typu X4M05 je v súlade so smernicou 2014/53/EÚ. Úplné znenie vyhlásenia o zhode EÚ je k dispozícii nižšie.

Slovenščina:

Novelda AS potrjuje, da je tip radijske opreme X4M05 skladen z Direktivo 2014/53/EU. Celotno besedilo izjave EU o skladnosti je na voljo spodaj.

**Romană:**

Prin prezenta, **Novelda AS** declară că tipul de echipamente radio X4M05 este în conformitate cu Directiva 2014/53/UE. Textul integral al declarației UE de conformitate este disponibil mai jos.

Български:

С настоящото **Novelda AS** декларира, че този тип радиосъоръжение X4M05 е в съответствие с Директива 2014/53/ЕС. Пълният текст на декларацията за съответствие на ЕС е на разположение по-долу.

Polski:

Novelda AS niniejszym oświadcza, że typ urządzenia radiowego X4M05 jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodności UE jest dostępny poniżej.

Norsk:

Novelda AS erklærer herved at radioutstyr type X4M05 er i samsvar med direktiv 2014/53/EU. Den fullstendige teksten i EU-samsvarserklæringen er tilgjengelig nedenfor.

Islenska:

Hér með **Novelda AS** lýsir yfir að tegund þráðlausan búnað X4M05 er í samræmi við tilskipun 2014/53/ESB. Fullkominn texti ESB samræmisýfirlýsing er að finna hér að neðan.

Hrvatski:

Novelda AS ovime izjavlja da je radijska oprema tipa X4M05 u skladu s Direktivom 2014/53/EU. Cijeli tekst izjave o sukladnosti EU-a nalazi se u nastavku.

Türk:

Burada, **Novelda AS** radyo ekipmanı türünün X4M05 2014/53/EU direktiflerine uyumlu olduğunu beyan eder. AB uyumu beyanının tam metni aşağıda verilmektedir.



6.1.1 EU Declaration of Conformity



EU DECLARATION OF CONFORMITY

- 1 **XeThru X4M05** (product name)
- 2 Novelda AS, Garverivegen 2, NO-3850 Kviteseid, Norway (manufacturer, address)
- 3 This declaration of conformity is issued under the sole responsibility of the manufacturer
- 4 X4M05 Radar Sensor, HW version: 000173-003 (object of the declaration)
- 5 The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 2014/53/EU (RED) and European Directive 2011/65/EU
- 6 The conformity with the essential requirements of the 2014/53/EU has been demonstrated against the following standards:

Standard reference	Article of Directive 2014/53/EU
EN 62479:2010 EN 60950-1:2006	3.1 (a): Health and Safety of the User
EN 301 489-1 (V2.1.1) EN 301 489-33 (V2.1.1)	3.1 (b): Electromagnetic Compatibility
EN 302 065-1 (V2.1.1)	3.2 : Effective use of spectrum allocated

In addition the requirements in **Directive (2011/65/EU)** on the restriction of use of certain hazardous substances in electrical and electronic equipment is satisfied by application of EN 50581:2012

Thus, **CE** is placed on the product

- 7 The Technical Documentation (TD) relevant to the product described above and which supports this Declaration of Conformity, is held at: Novelda AS, Garverivegen 2, NO-3850 Kviteseid, Norway

Signed for and on behalf of Novelda AS

Kviteseid, 20.09.2017


Dag Arne Brænd, COO

Oslo
Novelda AS
Gjerdrumsvei 8
0484 Oslo
Norway

Kviteseid
Novelda AS
Garverivegen 2
3850 Kviteseid
Norway

Trondheim
Novelda AS
Rotvoll alle 2
7053 Trondheim
Norway



X4M05 EU Declaration of Conformity



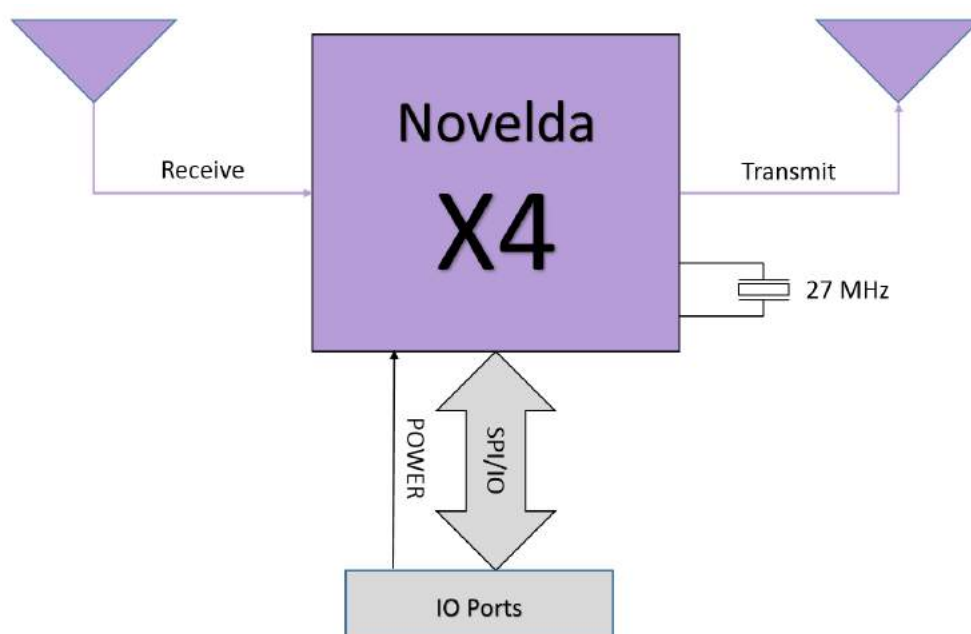
6.2 FCC Approval

X4M05 has Modular FCC approval. Modular approval means X4M05 can be used in an end product without obtaining new authorization for the end product with regard to use of UWB radar.

The X4M05 module meets FCC Part 15 requirements for UWB transmission equipment intended for unlicensed indoor use or outdoor use when not permanently installed as specified in FCC Part 15.519, 15.521 and 15.209.

FCC ID: 2AD9QX4M05.

6.2.1 X4M05 Block Diagram



Module clock and power system

Clocks:

The systems clock is a 27 MHz crystal connected to the Novelda X4 UWB impulse radar chip. The communication between the the X4 radar chip and a host system (typically with microcontroller) uses SPI protocol.

Mean output power of X4M05 depends on the Pulse Repetition Frequency (PRF) and tx_power settings in the X4 radar chip. PRF must be set to 15.875 MHz and tx_power must be set to Medium (2) from the host system. Both the PRF and tx_power can be changed by the host system, but cannot be changed to comply with FCC regulations. For further description of the radar chip, please refer to the X4 datasheet.

Power:

The module is powered externally through the 16-pin XeThru Radar Connector described in the X4A02 datasheet.

Antennas:



The antennas are embedded onto the PCB and cannot be changed by users. Please refer to the Antenna chapter in the X4A02 datasheet for details on the antennas.

6.2.2 Radar Functional Description

The module uses the Novelda X4 impulse radar chip. Please refer to the X4 datasheet for a detailed description.

6.2.3 FCC Regulatory Notices

Modification Statement

Novelda AS has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

Interference Statement

This device complies with Part 15 of the FCC Rules. 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.

RF Exposure Safety

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The X4M05 is a radio transmitter and receiver.

It is designed not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission.

FCC Class B Digital Device Notice

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.

Labelling Requirements for the Host Device



The host device shall be properly labelled to identify the modules within the host device. The certification label of the module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the FCC ID of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains FCC ID: 2AD9QX4M05

UWB devices may not be employed for the operation of toys. Operation on-board an aircraft, a ship or a satellite is prohibited.

6.3 Industry Canada Approval

X4M05 is approved by Industry Canada (IC).

IC Certification Number: 22782-X4M05

6.3.1 Regulatory Information Canada

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

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorisation de l'utilisateur d'utiliser l'équipement.

This device complies with Industry Canada's licence-exempt RSSs. 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.

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.

6.3.2 RF exposure safety

The X4M05 is a radio transmitter and receiver.

It is designed not to exceed the emission limits for exposure to radio frequency (RF) energy set by the ISDE.

Le X4M05 est un émetteur et un récepteur radio.

Il est conçu pour ne pas dépasser les limites d'émission pour l'exposition à l'énergie radiofréquence (RF) établie par l'ISDE.

6.3.3 Labelling Requirements for the Host Device

The host device shall be properly labelled to identify the modules within the host device. The certification label of the module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the IC of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains IC: 22782-X4M05



Le équipement hôte doit être correctement étiqueté pour identifier les modules dans l'équipement. L'étiquette de certification du module doit être clairement visible en tout temps lorsqu'il est installé dans l'hôte, l'équipement hôte doit être étiqueté pour afficher l'IC du module, précédé des mots "Contient le module émetteur", ou le mot "Contient", ou un libellé similaire exprimant la même signification, comme suit:

Contains IC: 22782-X4M05

CAN ICES-3 (B)/NMB-3(B)

7 Support and Resources

Development support, resources, links to development partners and resellers can be found on Novelda's web site www.xethru.com.

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