



Digi XBee Wi-SUN Hardware Reference Guide

User Guide

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- Product serial number (s)
- Firmware version
- Operating system/browser (if applicable)
- Logs (from time of reported issue)
- Trace (if possible)
- Description of issue
- Steps to reproduce

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About the Digi XBee Wi-SUN

Digi XBee® is a family of wireless communication modules designed for embedded solutions. Using the Wi-SUN® protocol, the Digi XBee for Wi-SUN solution forms a low-power, wide-area network (LPWAN) designed for mesh networking in large-scale outdoor and urban environments, such as smart cities, smart grids, and other Industrial IoT (Internet of Things) applications.

Its mesh-based, low-power communications make Digi XBee for Wi-SUN the ideal solution for smart energy, smart cities, industrial and agricultural use cases.

Open Wi-SUN protocol Wi-SUN (Wireless Smart Ubiquitous Network) is an open standard protocol developed by the Wi-SUN Alliance. With over 300 alliance members and over 100 million devices deployed, the Digi XBee solution for Wi-Sun, is scalable, secure and standards-based. Wi-SUN mesh networking works over long ranges and supports both battery operated and mains-powered devices.

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Applicable firmware and hardware

This user guide supports the following firmware:

- v

It supports the following hardware:

-

Digi RF resources

There are many resources to further your understanding of Digi's RF devices. You can:

- Read the [XBee Buying Guide](#).
- Ask questions on the [Digi Support Forum](#).
- Search the [Knowledge Base](#).
- Search the [Resource Library](#).
- Read XBee-related posts on the [Digi Blog](#).
- Explore hardware [certifications](#).

One way to communicate with the XBee device is by using a software library. The libraries available for use with the Digi XBee Wi-SUN include:

- [XBee Java library](#)
- [XBee Python library](#)
- [XBee ANSI C library](#)

The XBee Java Library is a Java API. The package includes the XBee library, its source code and a collection of samples that help you develop Java applications to communicate with your XBee devices.

The XBee Python Library is a Python API that dramatically reduces the time to market of XBee projects developed in Python and facilitates the development of these types of applications, making it an easy process.

The XBee ANSI C Library project is a collection of portable ANSI C code for communicating with the devices in API mode.

Use cases

The following are recommended use cases for the Digi XBee Wi-SUN module:

- Agriculture
- Irrigation
- Utilities
- Geologic monitoring

The Digi XBee Wi-SUN radio modules are not designed for these use cases:

- Uses requiring failsafe performance in which failure of a product could lead to death, serious personal injury, or severe physical or environmental damage.
- Life support or medical devices.
- Nuclear applications.
- Automotive.
- Explosive or flammable atmospheres.

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Safety instructions

XBee modules

- The XBee radio module cannot be guaranteed operation due to the radio link and so should not be used for interlocks in safety critical devices such as machines or automotive applications.
- The XBee radio module has not been approved for use in (this list is not exhaustive):
 - medical devices
 - nuclear applications
 - explosive or flammable atmospheres
- There are no user serviceable components inside the XBee radio module. Do not remove the shield or modify the XBee in any way. Modifications may exclude the module from any warranty and can cause the XBee radio to operate outside of regulatory compliance for a given country, leading to the possible illegal operation of the radio.
- Use industry standard ESD protection when handling the XBee module.
- Take care while handling to avoid electrical damage to the PCB and components.
- Do not expose XBee radio modules to water or moisture.
- Use this product with the antennas specified in the XBee module user guides.
- The end user must be told how to remove power from the XBee radio module or to locate the antennas 20 cm from humans or animals.

Инструкции за безопасност

XBee модули

- Радио модулят XBee не може да бъде гарантиран за работа поради радиовръзката и затова не трябва да се използва за блокировки в критични за безопасността устройства като машини или автомобилни приложения.
- Радио модулят XBee не е одобрен за използване в (този списък не е изчерпателен):
 - медицински изделия
 - ядрени приложения
 - експлозивна или запалима атмосфера
- В радиомодула XBee няма компоненти, които могат да се обслужват от потребителя. Не премахвайте щита и не модифицирайте XBee по никакъв начин. Модификациите могат да изключат модула от всякаква гаранция и да накарат радиото XBee да работи извън регулаторното съответствие за дадена държава, което води до възможна незаконна работа на радиото.
- Използвайте стандартна ESD защита при работа с XBee модула.
- Внимавайте, докато боравите, за да избегнете електрически повреди на печатната платка и компонентите.
- Не излагайте радиомодулите XBee на вода или влага.

- Използвайте този продукт с антените, посочени в ръководствата за потребителя на модула XBee.
- Крайният потребител трябва да бъде казано как да премахне хранването от радиомодула XBee или да разположи антените на 20 cm от хора или животни.

Sigurnosne upute

XBee moduli

- Radio modulu XBee ne može se jamčiti rad zbog radio veze i stoga se ne smije koristiti za blokade u sigurnosnim kritičnim uređajima kao što su strojevi ili automobilske aplikacije.
- XBee radio modul nije odobren za upotrebu u (ovaj popis nije konačan):
 - medicinskih uređaja
 - nuklearne primjene
 - eksplozivne ili zapaljive atmosfere
- Unutar XBee radio modula nema komponenti koje može servisirati korisnik. Nemojte uklanjati štit i ni na koji način modificirati XBee. Izmjene mogu isključiti modul iz bilo kakvog jamstva i mogu uzrokovati rad XBee radija izvan usklađenosti s propisima za određenu zemlju, što može dovesti do mogućeg nezakonitog rada radija.
- Koristite standardnu ESD zaštitu pri rukovanju XBee modulom.
- Budite oprezni tijekom rukovanja kako biste izbjegli električna oštećenja PCB-a i komponenti.
- Ne izlažite XBee radio module vodi ili vlazi.
- Koristite ovaj proizvod s antenama navedenim u korisničkim vodičima za XBee modul.
- Krajnjem korisniku se mora reći kako da isključi napajanje iz XBee radio modula ili da locira antene 20 cm od ljudi ili životinja.

Bezpečnostní instrukce

moduly XBee

- Rádiový modul XBee nemůže zaručit provoz kvůli rádiovému spojení, a proto by neměl být používán pro blokování v zařízeních kritických z hlediska bezpečnosti, jako jsou stroje nebo automobilové aplikace.
- Rádiový modul XBee nebyl schválen pro použití v (tento seznam není vyčerpávající):
 - zdravotnické prostředky
 - jaderné aplikace
 - výbušné nebo hořlavé atmosféry
- Uvnitř rádiového modulu XBee nejsou žádné uživatelsky opravitelné součásti. Neodstraňujte štít ani nijak neupravujte XBee. Úpravy mohou vyjmout modul z jakékoli záruky a mohou způsobit, že rádio XBee bude fungovat mimo zákonnou shodu pro danou zemi, což povede k možnému nezákonnému provozu rádia.

- Při manipulaci s modulem XBee používejte standardní ochranu ESD.
- Při manipulaci buďte opatrní, aby nedošlo k elektrickému poškození desky plošných spojů a součástí.
- Nevystavujte rádiové moduly XBee vodě nebo vlhkosti.
- Používejte tento produkt s anténami uvedenými v uživatelských příručkách modulu XBee.
- Koncový uživatel musí být informován, jak odpojit napájení rádiového modulu XBee nebo jak umístit antény 20 cm od lidí nebo zvířat.

Sikkerhedsinstruktioner

XBee moduler

- XBee-radiomodulet kan ikke garanteres drift på grund af radioforbindelsen og bør derfor ikke bruges til aflåsninger i sikkerhedskritiske enheder såsom maskiner eller bilapplikationer.
- XBee-radiomodulet er ikke godkendt til brug i (denne liste er ikke udtømmende):
 - medicinsk udstyr
 - nukleare applikationer
 - eksplosive eller brandfarlige atmosfærer
- Der er ingen komponenter, der kan repareres af brugeren, inde i XBee-radiomodulet. Fjern ikke skjoldet eller modificer XBee på nogen måde. Ændringer kan udelukke modulet fra enhver garanti og kan få XBee-radioen til at fungere uden for lovgivningsoverholdelse for et givet land, hvilket kan føre til den mulige ulovlige drift af radioen.
- Brug industristandard ESD-beskyttelse, når du håndterer XBee-modulet.
- Vær forsigtig under håndteringen for at undgå elektrisk beskadigelse af printet og komponenterne.
- Udsæt ikke XBee-radiomoduler for vand eller fugt.
- Brug dette produkt med de antenner, der er specificeret i XBee-modulets brugervejledninger.
- Slutbrugeren skal fortælles, hvordan man fjerner strømmen fra XBee-radiomodulet eller placerer antennerne 20 cm fra mennesker eller dyr.

Veiligheidsinstructies

XBee-modules

- De werking van de XBee-radiomodule kan niet worden gegarandeerd vanwege de radioverbinding en mag daarom niet worden gebruikt voor vergrendelingen in veiligheidskritieke apparaten zoals machines of autotoepassingen.
- De XBee-radiomodule is niet goedgekeurd voor gebruik in (deze lijst is niet uitputtend):

- o medische apparaten
 - o nucleaire toepassingen
 - o explosieve of ontvlambare atmosferen
- Er zijn geen door de gebruiker te onderhouden componenten in de XBee-radiomodule. Verwijder het schild niet en wijzig de XBee op geen enkele manier. Modificaties kunnen de module uitsluiten van enige garantie en kunnen ertoe leiden dat de XBee-radio werkt buiten de regelgeving voor een bepaald land, wat kan leiden tot de mogelijke illegale werking van de radio.
 - Gebruik industriestandaard ESD-bescherming bij het hanteren van de XBee-module.
 - Wees voorzichtig bij het hanteren om elektrische schade aan de printplaat en componenten te voorkomen.
 - Stel XBee-radiomodule niet bloot aan water of vocht.
 - Gebruik dit product met de antennes die zijn gespecificeerd in de gebruikershandleidingen van de XBee-module.
 - De eindgebruiker moet worden verteld hoe de voeding van de XBee-radiomodule moet worden losgekoppeld of hoe de antennes op 20 cm van mensen of dieren moeten worden geplaatst.

Ohutusjuhised

XBee moodulid

- XBee raadiomooduli tööd ei saa raadiolingi tõttu garanteerida ja seetõttu ei tohiks seda kasutada ohutuse seisukohalt oluliste seadmete (nt masinad või autorakendused) blokeerimiseks.
- XBee raadiomoodulit ei ole heaks kiidetud kasutamiseks (see loetelu ei ole ammendav):
 - meditsiiniseadmed
 - tuumarakendused
 - plahvatusohtlik või tuleohtlik keskkond
- XBee raadiomoodulis ei ole kasutaja poolt hooldatavaid komponente. Ärge eemaldage kaitset ega muutke XBee mingil viisil. Muudatused võivad mooduli garantiist välja jätta ja XBee raadio töötab väljaspool antud riigi regulatiivseid vastavusi, põhjustades raadio võimaliku ebaseadusliku kasutamise.
- Kasutage XBee mooduli käsitsemisel tööstusharu standardset ESD-kaitset.
- Olge käsitsemisel ettevaatlik, et vältida PCB ja komponentide elektrikahjustusi.
- Ärge jätke XBee raadiomoduleid vee või niiskuse kätte.
- Kasutage seda toodet XBee mooduli kasutusjuhendis kirjeldatud antennidega.
- Lõppkasutajale tuleb öelda, kuidas XBee raadiomoodulilt toide eemaldada või antennid inimestest või loomadest 20 cm kaugusele paigutada.

Turvallisuusohjeet

XBee moduulit

- XBee-radiomoduulin toimintaa ei voida taata radiolinkin vuoksi, joten sitä ei tule käyttää turvallisuuden kannalta kriittisten laitteiden, kuten koneiden tai autosovellusten, lukitsemiseen.
- XBee-radiomoduulia ei ole hyväksytty käytettäväksi (tämä luettelo ei ole tyhjentävä):
 - lääketieteelliset laitteet
 - ydinvoimasovellukset
 - räjähdysvaarallisiin tai syttyviin tiloihin
- XBee-radiomoduulin sisällä ei ole käyttäjän huollettavia osia. Älä poista suojusta tai muokkaa XBeetä millään tavalla. Muutokset voivat sulkea moduulin takuun ulkopuolelle ja aiheuttaa sen, että XBee-radio toimii tietyn maan säädöstenmukaisuuden ulkopuolella, mikä johtaa radion mahdolliseen laittomaan käyttöön.
- Käytä alan standardia ESD-suojauksista käsitellessäsi XBee-moduulia.
- Ole varovainen käsitellessäsi, jotta vältät piirilevyn ja komponenttien sähkövauriot.
- Älä altista XBee-radiomoduuleja vedelle tai kosteudelle.
- Käytä tätä tuotetta XBee-moduulin käyttöoppaissa määriteltyjen antennien kanssa.
- Loppukäyttäjälle on kerrottava, kuinka XBee-radiomoduulin virta katkaistaan tai antennit sijoitetaan 20 cm:n etäisyydelle ihmisistä tai eläimistä.

Consignes de sécurité

Modules XBee

- Le fonctionnement du module radio XBee ne peut pas être garanti en raison de la liaison radio et ne doit donc pas être utilisé pour les verrouillages dans des dispositifs critiques pour la sécurité tels que des machines ou des applications automobiles.
- Le module radio XBee n'a pas été approuvé pour une utilisation dans (cette liste n'est pas exhaustive) :
 - dispositifs médicaux
 - applications nucléaires
 - atmosphères explosives ou inflammables
- Il n'y a aucun composant réparable par l'utilisateur à l'intérieur du module radio XBee. Ne retirez pas la protection et ne modifiez en aucune façon le XBee. Les modifications peuvent exclure le module de toute garantie et peuvent entraîner le fonctionnement de la radio XBee en dehors de la conformité réglementaire pour un pays donné, ce qui peut entraîner un fonctionnement illégal de la radio.
- Utilisez la protection ESD standard de l'industrie lors de la manipulation du module XBee.
- Soyez prudent lors de la manipulation afin d'éviter des dommages électriques au circuit imprimé et aux composants.

- N'exposez pas les modules radio XBee à l'eau ou à l'humidité.
- Utilisez ce produit avec les antennes spécifiées dans les guides d'utilisation du module XBee.
- L'utilisateur final doit savoir comment couper l'alimentation du module radio XBee ou placer les antennes à 20 cm des humains ou des animaux.

Sicherheitshinweise

XBee-Module

- Der Betrieb des XBee-Funkmoduls kann aufgrund der Funkverbindung nicht garantiert werden und sollte daher nicht für Verriegelungen in sicherheitskritischen Geräten wie Maschinen oder Automobilanwendungen verwendet werden.
- Das XBee-Funkmodul ist nicht zugelassen für den Einsatz in (diese Liste ist nicht vollständig):
 - Medizinprodukte
 - nukleare Anwendungen
 - explosive oder brennbare Atmosphären
- Das XBee-Funkmodul enthält keine vom Benutzer zu wartenden Komponenten. Entfernen Sie nicht die Abschirmung oder modifizieren Sie das XBee in irgendeiner Weise. Modifikationen können das Modul von jeglicher Garantie ausschließen und dazu führen, dass das XBee-Funkgerät außerhalb der gesetzlichen Vorschriften für ein bestimmtes Land betrieben wird, was zu einem möglichen illegalen Betrieb des Funkgeräts führen kann.
- Verwenden Sie beim Umgang mit dem XBee-Modul ESD-Schutz nach Industriestandard.
- Seien Sie vorsichtig bei der Handhabung, um elektrische Schäden an der Leiterplatte und den Komponenten zu vermeiden.
- XBee-Funkmodule nicht Wasser oder Feuchtigkeit aussetzen.
- Verwenden Sie dieses Produkt mit den in den Benutzerhandbüchern des XBee-Moduls angegebenen Antennen.
- Dem Endbenutzer muss mitgeteilt werden, wie er das XBee-Funkmodul von der Stromversorgung trennt oder die Antennen 20 cm von Menschen oder Tieren entfernt aufstellt.

Οδηγίες ασφαλείας

Μονάδες XBee

- Η μονάδα ραδιοφώνου XBee δεν μπορεί να εγγυηθεί τη λειτουργία της λόγω της ραδιοζεύξης και επομένως δεν πρέπει να χρησιμοποιείται για ασφάλειες σε κρίσιμες για την ασφάλεια συσκευές, όπως μηχανήματα ή εφαρμογές αυτοκινήτου.
- Η μονάδα ραδιοφώνου XBee δεν έχει εγκριθεί για χρήση σε (αυτή η λίστα δεν είναι εξαντλητική):

- ιατροτεχνολογικά προϊόντα
 - πυρηνικές εφαρμογές
 - εκρηκτικές ή εύφλεκτες ατμόσφαιρες
- Δεν υπάρχουν εξαρτήματα που να μπορούν να επισκευαστούν από το χρήστη μέσα στη μονάδα ραδιοφώνου XBee. Μην αφαιρείτε την ασπίδα και μην τροποποιείτε το XBee με κανέναν τρόπο. Οι τροποποιήσεις ενδέχεται να αποκλείουν τη μονάδα από οποιαδήποτε εγγύηση και μπορεί να προκαλέσουν τη λειτουργία του ραδιοφώνου XBee εκτός της συμμόρφωσης με τους κανονισμούς για μια δεδομένη χώρα, οδηγώντας σε πιθανή παράνομη λειτουργία του ραδιοφώνου.
 - Χρησιμοποιήστε βιομηχανική προστασία ESD κατά το χειρισμό της μονάδας XBee.
 - Προσέχετε κατά το χειρισμό για να αποφύγετε ηλεκτρική βλάβη στο PCB και στα εξαρτήματα.
 - Μην εκθέτετε τις μονάδες ραδιοφώνου XBee σε νερό ή υγρασία.
 - Χρησιμοποιήστε αυτό το προϊόν με τις κεραίες που καθορίζονται στους οδηγούς χρήσης της μονάδας XBee.
 - Πρέπει να ενημερωθεί ο τελικός χρήστης πώς να αφαιρέσει την τροφοδοσία από τη μονάδα ραδιοφώνου XBee ή να εντοπίσει τις κεραίες σε απόσταση 20 cm από ανθρώπους ή ζώα.

Biztonsági utasítások

XBee modulok

- Az XBee rádiómodul működése nem garantálható a rádiókapcsolat miatt, ezért nem használható biztonsági szempontból kritikus eszközök, például gépek vagy autóiipari alkalmazások reteszelésére.
- Az XBee rádiómodul nem engedélyezett a következő területeken való használatra (ez a lista nem teljes):
 - orvosi eszközök
 - nukleáris alkalmazások
 - robbanásveszélyes vagy gyúlékony légkör
- Az XBee rádiómodulban nincsenek felhasználó által javítható alkatrészek. Ne távolítsa el a pajzsot, és semmilyen módon ne módosítsa az XBee-t. A módosítások kizárhatják a modult a jótállásból, és az XBee rádió működését az adott ország jogszabályi előírásaitól eltérően okozhatják, ami a rádió esetleges illegális működéséhez vezethet.
- Az XBee modul kezelésekor használjon ipari szabványos ESD védelmet.
- A kezelés során ügyeljen arra, hogy elkerülje a PCB és az alkatrészek elektromos károsodását.
- Ne tegye ki az XBee rádiómodulokat víznek vagy nedvességnek.
- Használja ezt a terméket az XBee modul használati útmutatójában meghatározott antennákkal.

- A végfelhasználót tájékoztatni kell arról, hogyan távolítsa el az XBee rádiómodul áramellátását, vagy hogyan helyezze el az antennákat az emberektől vagy állatoktól 20 cm-re.

Istruzioni di sicurezza

Moduli XBee

- Il funzionamento del modulo radio XBee non può essere garantito a causa del collegamento radio e quindi non deve essere utilizzato per gli interblocchi in dispositivi critici per la sicurezza come macchine o applicazioni automobilistiche.
- Il modulo radio XBee non è stato approvato per l'uso in (questo elenco non è esaustivo):
 - dispositivi medici
 - applicazioni nucleari
 - atmosfere esplosive o infiammabili
- Non ci sono componenti riparabili dall'utente all'interno del modulo radio XBee. Non rimuovere lo scudo o modificare in alcun modo l'XBee. Le modifiche possono escludere il modulo da qualsiasi garanzia e possono causare il funzionamento della radio XBee al di fuori della conformità normativa per un determinato paese, portando al possibile funzionamento illegale della radio.
- Utilizzare la protezione ESD standard del settore durante la manipolazione del modulo XBee.
- Prestare attenzione durante la manipolazione per evitare danni elettrici al PCB e ai componenti.
- Non esporre i moduli radio XBee all'acqua o all'umidità.
- Utilizzare questo prodotto con le antenne specificate nelle guide per l'utente del modulo XBee.
- L'utente finale deve sapere come togliere l'alimentazione al modulo radio XBee o come posizionare le antenne a 20 cm da persone o animali.

Drošības instrukcijas

XBee moduli

- Radio moduļa XBee darbība nevar tikt garantēta radio savienojuma dēļ, tāpēc to nevajadzētu izmantot bloķēšanai drošības ziņā kritiskās ierīcēs, piemēram, mašīnās vai automobiļos.
- XBee radio modulis nav apstiprināts lietošanai (šis saraksts nav pilnīgs):
 - medicīniskās ierīces
 - kodolprogrammas
 - sprādzienbīstamā vai uzliesmojošā vidē

- XBee radio moduļa iekšpusē nav neviena komponenta, ko lietotājs varētu apkopt. Nenoņemiet vairogu un nekādā veidā nepārveidojiet XBee. Modifikācijas rezultātā modulis var tikt izslēgts no jebkādas garantijas un var izraisīt XBee radio darbību, kas neatbilst noteiktās valsts normatīvajiem aktiem, izraisot iespējamu nelegālu radio darbību.
- Strādājot ar XBee moduli, izmantojiet nozares standarta ESD aizsardzību.
- Rīkojoties, rīkojieties uzmanīgi, lai izvairītos no PCB un komponentu elektriskiem bojājumiem.
- Nepakļaujiet XBee radio moduļus ūdens vai mitruma iedarbībai.
- Izmantojiet šo izstrādājumu ar antenām, kas norādītas XBee moduļa lietotāja rokasgrāmatās.
- Galalietotājam ir jāpaskaidro, kā atvienot XBee radio moduļa strāvu vai novietot antenas 20 cm attālumā no cilvēkiem vai dzīvniekiem.

Saugos instrukcijas

XBee moduliai

- Negalima garantuoti, kad „XBee“ radijo modulis veiks dėl radijo ryšio, todėl jo neturėtų būti naudojamas blokuoti saugai svarbiuose įrenginiuose, pvz., mašinose ar automobiliuose.
- XBee radijo modulis nebuvo patvirtintas naudoti (šis sąrašas nėra baigtinis):
 - medicinos prietaisai
 - branduolinės programos
 - sprogioje ar degioje aplinkoje
- XBee radijo modulio viduje nėra komponentų, kuriuos vartotojas galėtų prižiūrėti. Jokių būdu nenuimkite skydo ir nekeiskite XBee. Dėl modifikacijų moduliui gali būti netaikoma jokia garantija, o „XBee“ radijas gali veikti ne pagal tam tikros šalies norminius reikalavimus, o tai gali sukelti neteisėtą radijo naudojimą.
- Dirbdami su XBee moduliu naudokite pramonės standartinę ESD apsaugą.
- Dirbdami būkite atsargūs, kad nepažeistumėte PCB ir komponentų.
- Saugokite XBee radijo modulius nuo vandens ar drėgmės.
- Naudokite šį gaminį su antenomis, nurodytomis XBee modulio vartotojo vadove.
- Galutiniam vartotojui turi būti paaiškinta, kaip atjungti XBee radijo modulio maitinimą arba nustatyti antenas 20 cm atstumu nuo žmonių ar gyvūnų.

Sikkerhetsinstruksjoner

XBee-moduler

- XBee-radiomodulen kan ikke garantere drift på grunn av radiolinken, og bør derfor ikke brukes til forriglinger i sikkerhetskritiske enheter som maskiner eller bilapplikasjoner.
- XBee-radiomodulen er ikke godkjent for bruk i (denne listen er ikke uttømmende):

- medisinsk utstyr
 - kjernefysiske applikasjoner
 - eksplosive eller brennbare atmosfærer
- Det er ingen komponenter som kan repareres av brukeren inne i XBee-radiomodulen. Ikke fjern skjoldet eller modifier XBee på noen måte. Endringer kan ekskludere modulen fra enhver garanti og kan føre til at XBee-radioen fungerer utenfor regelverket for et gitt land, noe som kan føre til ulovlig drift av radioen.
 - Bruk industristandard ESD-beskyttelse når du håndterer XBee-modulen.
 - Vær forsiktig ved håndtering for å unngå elektrisk skade på PCB og komponenter.
 - Ikke utsett XBee radiomoduler for vann eller fuktighet.
 - Bruk dette produktet med antennene spesifisert i XBee-modulens brukerveiledninger.
 - Sluttbrukeren må bli fortalt hvordan man fjerner strømmen fra XBee-radiomodulen eller plasserer antennene 20 cm fra mennesker eller dyr.

Instrukcje bezpieczeństwa

Moduły XBee

- Moduł radiowy XBee nie może zagwarantować działania ze względu na łącze radiowe, dlatego nie należy go używać do blokad w urządzeniach o krytycznym znaczeniu dla bezpieczeństwa, takich jak maszyny lub aplikacje motoryzacyjne.
- Moduł radiowy XBee nie został dopuszczony do użytku w (lista ta nie jest wyczerpująca):
 - wyroby medyczne
 - zastosowania nuklearne
 - atmosferach wybuchowych lub łatwopalnych
- Wewnątrz modułu radiowego XBee nie ma żadnych elementów, które mogłyby być serwisowane przez użytkownika. Nie zdejmuj osłony ani nie modyfikuj XBee w żaden sposób. Modyfikacje mogą wykluczyć moduł z jakiegokolwiek gwarancji i spowodować, że radio XBee będzie działać niezgodnie z przepisami obowiązującymi w danym kraju, co może prowadzić do nielegalnego działania radia.
- Podczas obsługi modułu XBee należy stosować standardową ochronę ESD.
- Podczas obsługi należy zachować ostrożność, aby uniknąć uszkodzeń elektrycznych PCB i komponentów.
- Nie wystawiaj modułów radiowych XBee na działanie wody lub wilgoci.
- Używaj tego produktu z antenami określonymi w podręcznikach użytkownika modułu XBee.
- Użytkownik końcowy musi zostać poinformowany, jak odłączyć zasilanie modułu radiowego XBee lub zlokalizować anteny w odległości 20 cm od ludzi lub zwierząt.

Instruções de segurança

Módulos XBee

- O módulo de rádio XBee não pode ter operação garantida devido ao link de rádio e, portanto, não deve ser usado para intertravamentos em dispositivos críticos de segurança, como máquinas ou aplicações automotivas.
- O módulo de rádio XBee não foi aprovado para uso em (esta lista não é exaustiva):
 - o dispositivos médicos
 - o aplicações nucleares
 - o atmosferas explosivas ou inflamáveis
- Não há componentes que possam ser reparados pelo usuário dentro do módulo de rádio XBee. Não remova a blindagem nem modifique o XBee de forma alguma. As modificações podem excluir o módulo de qualquer garantia e fazer com que o rádio XBee opere fora da conformidade regulatória de um determinado país, levando à possível operação ilegal do rádio.
- Use proteção ESD padrão da indústria ao manusear o módulo XBee.
- Tome cuidado ao manusear para evitar danos elétricos à PCB e aos componentes.
- Não exponha os módulos de rádio XBee à água ou umidade.
- Use este produto com as antenas especificadas nos guias do usuário do módulo XBee.
- O usuário final deve ser informado sobre como remover a energia do módulo de rádio XBee ou localizar as antenas a 20 cm de humanos ou animais.

Instructiuni de siguranta

module XBee

- Nu se poate garanta funcționarea modulului radio XBee din cauza conexiunii radio și, prin urmare, nu trebuie utilizat pentru interblocări în dispozitive critice pentru siguranță, cum ar fi mașini sau aplicații auto.
- Modulul radio XBee nu a fost aprobat pentru utilizare în (această listă nu este exhaustivă):
 - dispozitive medicale
 - aplicații nucleare
 - atmosfere explozive sau inflamabile
- Nu există componente care să poată fi reparate de utilizator în interiorul modulului radio XBee. Nu îndepărtați scutul și nu modificați XBee în niciun fel. Modificările pot exclude modulul din orice garanție și pot face ca radioul XBee să funcționeze în afara conformității cu reglementările pentru o anumită țară, ceea ce duce la o posibilă funcționare ilegală a radioului.
- Folosiți protecția ESD standard în industrie când manipulați modulul XBee.
- Aveți grijă în timpul manipulării pentru a evita deteriorarea electrică a PCB-ului și a componentelor.

- Nu expuneți modulele radio XBee la apă sau umezeală.
- Utilizați acest produs cu antenele specificate în ghidurile utilizatorului modulului XBee.
- Utilizatorului final trebuie să i se spună cum să scoată alimentarea de la modulul radio XBee sau să găsească antenele la 20 cm de oameni sau animale.

Bezpečnostné inštrukcie

moduly XBee

- Rádiový modul XBee nemôže byť zaručený kvôli rádiovému spojeniu, a preto by sa nemal používať na blokovanie v zariadeniach kritických z hľadiska bezpečnosti, ako sú stroje alebo automobilové aplikácie.
- Rádiový modul XBee nebol schválený na použitie v (tento zoznam nie je úplný):
 - zdravotnícke pomôcky
 - jadrové aplikácie
 - výbušné alebo horľavé atmosféry
- Vo vnútri rádiového modulu XBee sa nenachádzajú žiadne používateľsky opraviteľné komponenty. Neodstraňujte štít ani žiadnym spôsobom neupravujte XBee. Úpravy môžu vyňať modul zo záruky a môžu spôsobiť, že rádio XBee bude fungovať mimo zhody s predpismi pre danú krajinu, čo vedie k možnej nezákonnej prevádzke rádia.
- Pri manipulácii s modulom XBee používajte štandardnú ochranu pred ESD.
- Pri manipulácii buďte opatrní, aby ste predišli elektrickému poškodeniu dosky plošných spojov a komponentov.
- Rádiové moduly XBee nevystavujte vode ani vlhkosti.
- Tento produkt používajte s anténami špecifikovanými v používateľských príručkách modulu XBee.
- Koncový používateľ musí byť informovaný o tom, ako odpojiť napájanie rádiového modulu XBee alebo ako umiestniť antény 20 cm od ľudí alebo zvierat.

Varnostna navodila

XBee moduli

- Radijskega modula XBee ni mogoče zagotoviti delovanja zaradi radijske povezave in ga zato ne smete uporabljati za zaklepanje v varnostno kritičnih napravah, kot so stroji ali avtomobilske aplikacije.
- Radijski modul XBee ni bil odobren za uporabo v (ta seznam ni izčrpen):
 - medicinskih pripomočkov
 - jedrske aplikacije
 - eksplozivne ali vnetljive atmosfere
- V radijskem modulu XBee ni komponent, ki bi jih lahko popravil uporabnik. Ne odstranjujte ščita in na noben način ne spreminjajte XBee. Spremembe lahko modul izključijo iz kakršne

koli garancije in lahko povzročijo, da radio XBee deluje zunaj zakonske skladnosti za dano državo, kar vodi do možnega nezakonitega delovanja radia.

- Pri ravnanju z modulom XBee uporabite standardno industrijsko zaščito pred ESD.
- Pri rokovanju pazite, da se izognete električnim poškodbam tiskanega vezja in komponent.
- Radijskih modulov XBee ne izpostavljajte vodi ali vlagi.
- Ta izdelek uporabljajte z antenami, navedenimi v uporabniških priročnikih modula XBee.
- Končnemu uporabniku je treba povedati, kako odstraniti napajanje z radijskega modula XBee ali naj locira antene 20 cm od ljudi ali živali.

Instrucciones de seguridad

Módulos XBee

- No se puede garantizar el funcionamiento del módulo de radio XBee debido al enlace de radio y, por lo tanto, no debe usarse para enclavamientos en dispositivos críticos para la seguridad, como máquinas o aplicaciones automotrices.
- El módulo de radio XBee no ha sido aprobado para su uso en (esta lista no es exhaustiva):
 - dispositivos médicos
 - aplicaciones nucleares
 - atmósferas explosivas o inflamables
- No hay componentes reparables por el usuario dentro del módulo de radio XBee. No quite el escudo ni modifique el XBee de ninguna manera. Las modificaciones pueden excluir el módulo de cualquier garantía y pueden hacer que la radio XBee funcione fuera del cumplimiento normativo de un país determinado, lo que puede provocar una operación ilegal de la radio.
- Utilice la protección ESD estándar de la industria al manipular el módulo XBee.
- Tenga cuidado al manipularlo para evitar daños eléctricos en la PCB y los componentes.
- No exponga los módulos de radio XBee al agua ni a la humedad.
- Utilice este producto con las antenas especificadas en las guías de usuario del módulo XBee.
- Se debe indicar al usuario final cómo desconectar la alimentación del módulo de radio XBee o ubicar las antenas a 20 cm de personas o animales.

Säkerhets instruktioner

XBee-moduler

- XBee-radiomodulen kan inte garanteras funktion på grund av radiolänken och bör därför inte användas för förreglingar i säkerhetskritiska enheter som maskiner eller biltillämpningar.
- XBee-radiomodulen har inte godkänts för användning i (denna lista är inte uttömmande):

- medicinsk utrustning
 - kärnkraftstillämpningar
 - explosiv eller brandfarlig atmosfär
- Det finns inga komponenter som användaren kan reparera inuti XBee-radiomodulen. Ta inte bort skölden eller modifiera XBee på något sätt. Ändringar kan utesluta modulen från alla garantier och kan göra att XBee-radion fungerar utanför bestämmelserna för ett visst land, vilket kan leda till att radion kan användas olagligt.
 - Använd industristandard ESD-skydd när du hanterar XBee-modulen.
 - Var försiktig vid hanteringen för att undvika elektriska skador på kretskortet och komponenterna.
 - Utsätt inte XBee radiomoduler för vatten eller fukt.
 - Använd den här produkten med antennerna som specificeras i XBee-modulens användarguider.
 - Slut användaren måste informeras om hur man kopplar bort strömmen från XBee-radiomodulen eller för att placera antennerna 20 cm från människor eller djur.

Specifications

The following tables provide general specifications for the hardware.

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Regulatory conformity summary

Approval	Digi XBee Wi-SUN	ID number
USA (FCC)	Yes	FCC ID: MCQ-XBSG
Canada (ISED)	Yes	IC: 1846A-XBSG
Europe (CE)	Yes	CE
India (WPC)	TBD	

General specifications

The following table describes the general specifications for the devices.

Specification	Digi XBee Wi-SUN
Form factor	Micro-mount, surface mount, through hole
Dimensions	Micro-mount: 1.36 cm x 1.93 cm x 0.241 cm (0.534 in x 0.760 in x 0.095 in) Surface mount: 2.2 cm x 3.38 cm x 0.325 cm (0.866 in x 1.33 in x 0.128 in) Through hole: 2.44 cm x 2.76 cm x 0.688 cm (0.96 in x 1.088 in x 0.271 in)
Weight	1.2 g
MMT weight	1.2 grams
SMT weight	3.0 grams
TH RPSMA weight	6.1 grams
TH U.FL weight	3.0 grams
Operating temperature	-40 to 85 °C (industrial)
Antenna options	RF pad, chip antenna, or U.FL connector
Analog-to-digital converter (ADC)	4 10-bit analog inputs (RPSMA)

Electrical characteristics

The following table lists the electrical characteristics for the Digi XBee Wi-SUN module. Digi XBee Wi-SUN modules have 15 General Purpose Input / Output (GPIO) ports available. The exact list depends on the device configuration as some GPIO pads are used for purposes such as serial communication.

Symbol	Parameter	Condition	Min	Typical	Max	Units
VCC	Voltage - supply		2.1		3.6	V
V _I	Input pins		-0.3		VCC +0.3	V
V _{IL}	Input low voltage				0.3 * VCC	V
V _{IH}	Input high voltage		0.7 * VCC			V
V _{OL}	Output low voltage	Sinking 3 mA VCC = 3.3 V			0.2 * VCC	V
V _{OH}	Output high voltage	Sourcing 3 mA VCC = 3.3 V	0.8 * VCC			V
I _{IN}	Input leakage current	High Z state I/O connected to Ground or VCC		0.1	100	nA
RPU	Internal pull-up resistor	Enabled		40		kΩ
RPD	Internal pull-down resistor	Enabled		40		kΩ
I _{OL}	Output source/sink current				50	mA
I _{OLT}	Total output current (for GPIO pads)				200	mA
* XBee power supply should be designed to operate at 1.8V or above.						

Power, sensitivity, and performance specifications

The following table describes the power, sensitivity, and performance specifications for the Digi XBee Wi-SUN module.

Specification	Digi XBee Wi-SUN	Units
Supply voltage	1.8 – 3.6	VDC
Max RF power at 3.3 V (802.15.4)	Up to XX dBm ERP with 2.1 dBi antenna	dBm
	16	mW
Receiver sensitivity at 80 kb/s (802.15.4)	-107	dBm
Receiver sensitivity at 10 kb/s (802.15.4)	-112	dBm

Specification	Digi XBee Wi-SUN	Units
TX current	76	mA
RX current	26	mA
Sleep current	185	μA
RF data rate (802.15.4)	80 or 10 (software selectable)	kb/s
Indoor/urban range (802.15.4)	Up to 2.5 km (1.5 mi)	
Outdoor RF line-of-sight range (802.15.4)	Up to 14.5 km (9 mi)	

Note Range figure estimates are based on free-air terrain with limited sources of interference. Actual range will vary based on transmitting power, orientation of transmitter and receiver, height of transmitting antenna, height of receiving antenna, weather conditions, interference sources in the area, and terrain between receiver and transmitter, including indoor and outdoor structures such as walls, trees, buildings, hills, and mountains.

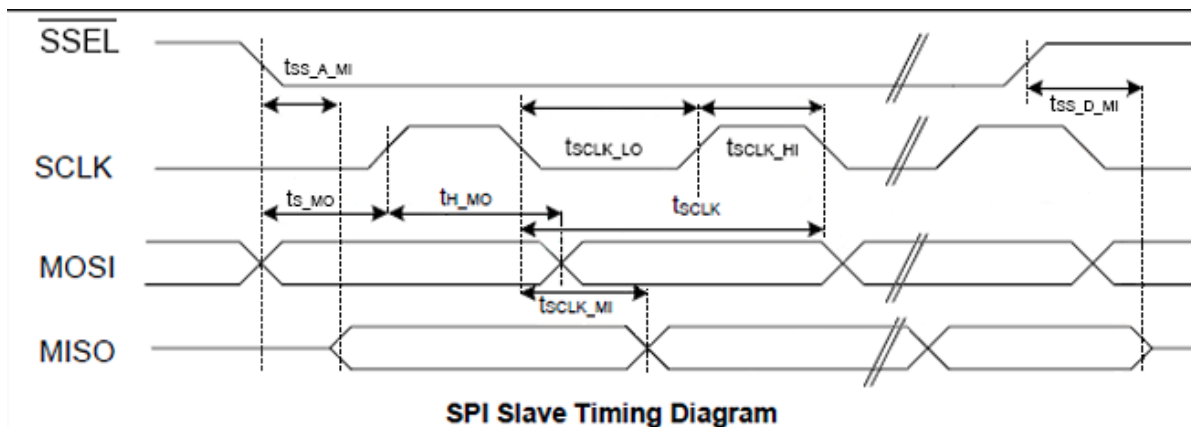
Serial interface specifications

This product supports two serial interfaces:

- UART (Universal Asynchronous Receiver Transmitter)
- SPI (Serial Peripheral Interface)

SPI Timing	Min	Max	Unit
SCLK Speed		5	MHz
SCLK Period (t_{SCLK})	200		nS
SCLK High Time (t_{SCLK_HI})	63		nS
SCLK Low Time (t_{SCLK_LO})	63		nS
SSEL to MISO Active * ($t_{SS_A_MI}$)		70	nS
SSEL to MISO Disabled ($t_{SS_D_MI}$)		50	nS
MOSI Setup Time (t_{S_MO})	12.5		nS
MOSI Hold Time (t_{H_MO})	13		nS

SPI Timing	Min	Max	Unit
SCLK Edge to MISO Update ($t_{\text{SCLK_MI}}$)	43	108	nS



RF communications specifications

Specification	Condition	Digi XBee Wi-SUN	Units
UART	Standard Baud Rate	921,600	b/s
	Non-Standard Baud Rate	967,680	b/s
Frequency range	United States/Canada	902 to 928	MHz
	European Union	863 to 870	MHz
	India	865 to 868	MHz
RF data rate (software selectable)	Low data rate	10	kb/s
	Middle data rate	110	kb/s
	High data rate	250	kb/s
Supply voltage		2.1 – 3.6	VDC
Transmit power (software selectable) at 3.3 V	United States/Canada	XX	dBm
		XX	mW
TX current	At 19 dBm	110	mA
	At 13 dBm	79	mA
RX current		28	mA

Specification	Condition	Digi XBee Wi-SUN	Units
Sleep current		1.5	μA
RF data rate		250, 110, and 10	kb/s
Maximum data throughput	High data rate	120	kb/s
Channels		10 hopping sequences share 50 frequencies	
Available channel frequencies: low/middle data rate	United States/Canada	101 ¹	
	European Union	XX	
	India	XX	
Available channel frequencies: high data rate	United States/Canada	50	
	European Union	XX	
	India	XX	
Rural range line of sight	Low data rate at 13 dBm	Up to 14.5	km
		Up to 9	mi
	Low data rate at 19 dBm	Up to 30	km
		Up to 18	mi
Urban range line of sight	Low data rate at 13 dBm	Up to 2.5	km
		Up to 1.5	mi
	Low data rate at 19 dBm	Up to 3.5	km
		Up to 2	mi
Receiver sensitivity	Low data rate	-113	dBm
	Middle data rate	-108	dBm
	High data rate	-104	dBm
Receiver RF selectivity	Low data rate ± 250 kHz	40	dB
	Low data rate ± 500 kHz	50	dB
	Middle data rate ± 250 kHz	30	dB

¹The device hops on 50 channels selected using the **CM** command, from 101 available frequencies. For more details, see [CM \(Channel Mask\)](#).

Specification	Condition	Digi XBee Wi-SUN	Units
	Middle data rate ± 500 kHz	40	dB
	High data rate ± 500 kHz	30	dB
	High data rate ± 1000 kHz	45	dB
Receiver RF selectivity	Below 900 MHz and above 930 MHz	> 50	dB

Electro Static Discharge (ESD)

Digi XBee Wi-SUN pins are tolerant to human-body model ± 1.0 kV.

Note Take care to limit all electrostatic discharges to the device.

Regulatory information

United States (FCC)	32
Canada (ISED)	42
Europe (CE)	51
India (WPC)	52

United States (FCC)

Digi XBee Wi-SUN modules comply with Part 15 of the FCC rules and regulations. Compliance with the labeling requirements, FCC notices and antenna usage guidelines is required.

To fulfill FCC Certification, the OEM must comply with the following regulations:

1. The system integrator must ensure that the text on the external label provided with this device is placed on the outside of the final product.
2. RF Modules may only be used with antennas that have been tested and approved for use with the modules.

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.

OEM labeling requirements



WARNING! As an Original Equipment Manufacturer (OEM) you must ensure that FCC labeling requirements are met. You must include a clearly visible label on the outside of the final product enclosure that displays the following content:

Required FCC Label for OEM products containing the Digi XBee Wi-SUN

Contains FCC ID: MCQ-XBSG

This device complies with Part 15 of the FCC Rules and 2.1091, 2.1093 of the FCC guidelines. 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.

FCC notices

IMPORTANT: Digi XBee Wi-SUN modules have not been certified by the FCC for use with other products without any further certification (as per FCC section 2.1091). Modifications not expressly approved by Digi could void the user's authority to operate the equipment.

IMPORTANT: OEMs must test final product to comply with unintentional radiators (FCC section 15.107 & 15.109) before declaring compliance of their final product to Part 15 of the FCC Rules.

IMPORTANT: The RF module has been certified for mobile and fixed radio applications. If the module will be used for portable applications, the device must undergo SAR testing.

IMPORTANT: Professional installation adjustment is required for setting module power and antenna gain to meet EIRP compliance for high gain antenna(s).

IMPORTANT: No external power amplifier can be used with this part 15 modular radio.

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:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect equipment and receiver to outlets on different circuits.
- Consult the dealer or an experienced radio/TV technician for help.

FCC-approved antennas

The Digi XBee Wi-SUN can be installed using antennas and cables constructed with non-standard connectors (RPSMA, RPTNC, etc.) An adapter cable may be necessary to attach the XBee connector to the antenna connector.

The modules are FCC approved for fixed base station and mobile applications for the channels indicated in the tables below. If the antenna is mounted at least 20 cm (8 in) from nearby persons, the application is considered a mobile application or a base station. Antennas not listed in the table must be tested to comply with FCC Section 15.203 (Unique Antenna Connectors) and Section 15.247 (Emissions).

The antennas in the tables below have been approved for use with this module. Correct cable loss or power reduction is required when using gain antennas as shown in the tables.

Digi does not carry all of these antenna variants. Contact Digi Sales for available antennas.

1. If using the RF module in a portable application (for example, if the module is used in a hand-held device and the antenna is less than 20 cm from the human body when the device is in operation), the integrator is responsible for passing additional Specific Absorption Rate (SAR) testing based on FCC rules 2.1091, 2.1093 and [FCC KDB 447498 D01 General RF Exposure Guidance](#). The testing results will be submitted to the FCC for approval prior to selling the integrated unit. The required SAR testing measures emissions from the module and how they affect the person.

FCC-approved antennas

The following tables cover the antennas that are approved for use with the Digi XBee Wi-SUN module. If applicable, the tables show the required cable loss between the device and the antenna.

Digi does not carry all of these antenna variants. Contact Digi Sales for available antennas.

Note An antenna not listed in the equipment authorization that is the same type with equal or lower gain (same physical arrangement; generates the same in-band and out-of-band characteristics in all spatial directions) may be marketed and used with a part 15 transmitter.

Dipole antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Connector	Gain	Required antenna cable loss	Application
A09-HASM-675 (MPD: SATAC-915NF)	Articulated half-wave	RPSMA	2.96 dBi	0.3	Fixed/mobile

Omni-directional base station antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-F8NF-M* (TE Connectivity: FG9026)	Fiberglass Base Station	8.0 dBi	N	0.62	Fixed

Dome antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-D3NF* (Laird: TRA8903)	Phantom (Dome) Antenna	3.0 dBi	NMO	0.62	Fixed/mobile

Note The best performance of the TRA8903 "dome" antenna is given when mounted on a ground plane.

Ceramic chip antenna

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

This antenna type is mounted on the surface mount carrier.

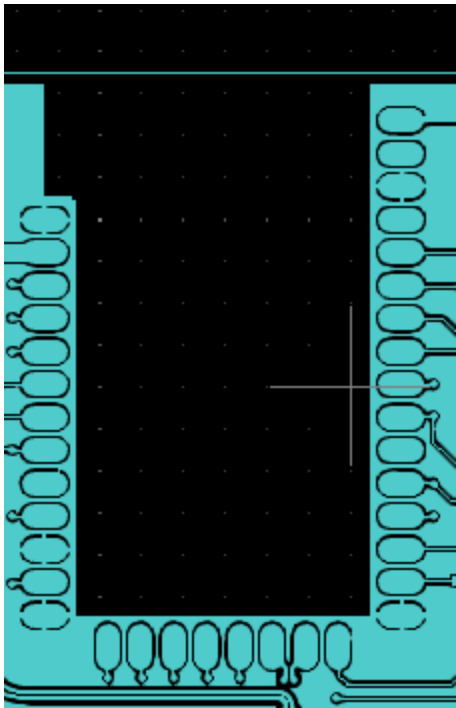
Follow all directions for use of this product.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
29001056*	Ceramic chip antenna (SMT module only)	0.8 dBi	N/A	0	Fixed/mobile

Recommended use of the XBee Wi-SUN module with ceramic chip antenna

The XBee Wi-SUN module (SMT, with ceramic antenna) should be mounted on a host board with the following ground plane cutouts (dimensions and other information requested):

- Recommended ground cutout:



- Minimum ground cutout:



The SMT module with the ceramic chip antenna should be placed flat, or horizontally, on the surface it's mounted to. The module can be placed vertically, as long as the module's antenna is mounted towards other radios in the network.

Flexible (flat) antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A07W27-PU18-7x* (Taoglas: FXUB65.07.0180C)	Flexible multiband antenna	2.0 dBi	RPSMA	0	Fixed/mobile

Part number	Type	Gain	Connector	Required antenna cable loss	Application
HXT-211140-010* (Molex: 211140-0100)	Flexible monopole	1.0 dBi	RPSMA	0	Fixed/mobile

Recommended usage of Taoglas

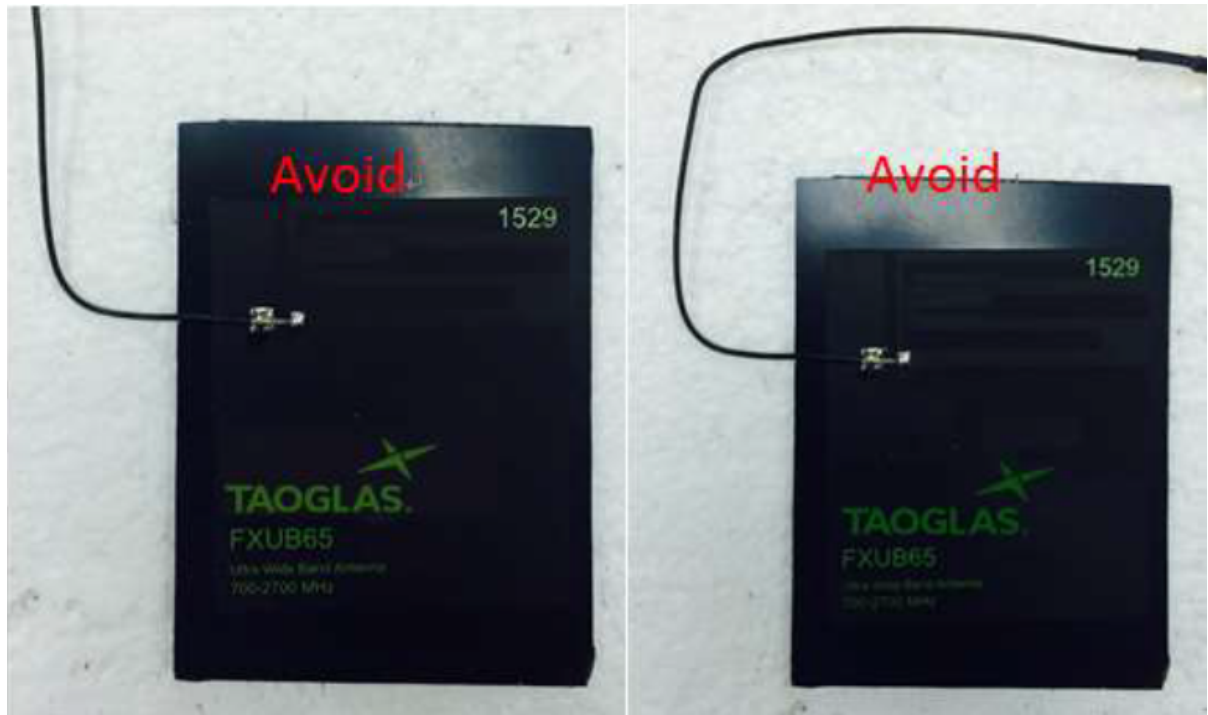
Taoglas (PN: FXUB65.07.0180C) performs best when it's positioned flat and horizontally. The Taoglas antenna can be fastened to glass or plastic surfaces.



The Taoglas FXUB65 datasheet provides these preferred orientations. Place the cable as shown:



The Taoglas datasheet does not recommend the following cable orientations:

***Recommended usage of Molex antenna***

Orient this antenna upright. This gives an antenna pattern similar to a dipole. The Molex antenna can be fastened to a glass or plastic surface.



The cable should be bent as shown in the first two figures below. Do not place the cable to the side of the antenna, as shown in the third figure.



FIGURE 5.2.1 CABLE BENDING

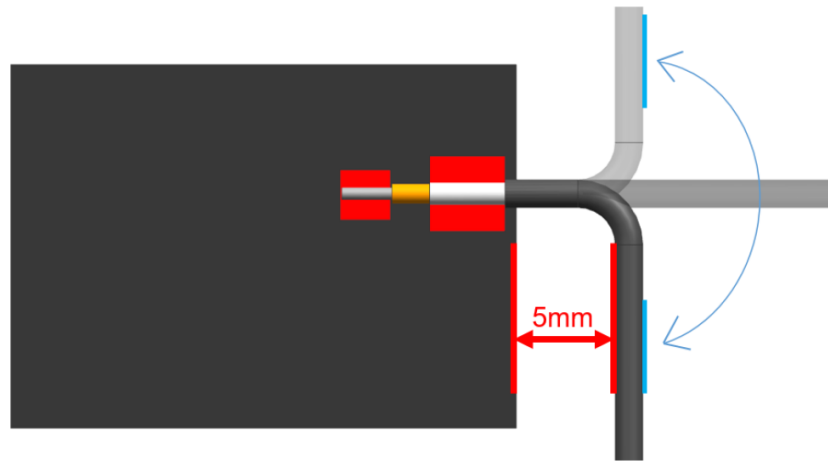


FIGURE 5.2.2 CABLE ACTIVITY RANGE

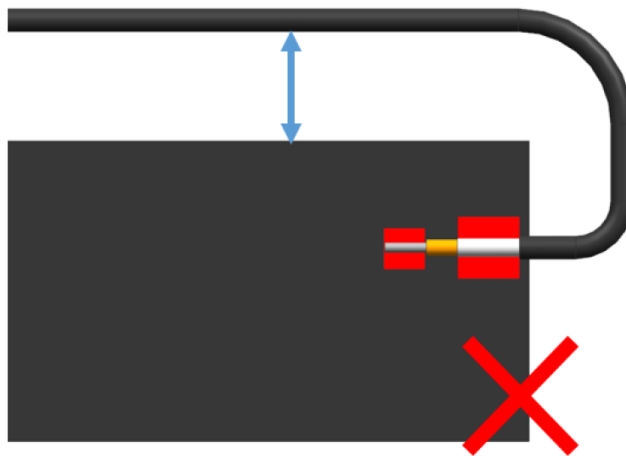


FIGURE 5.2.3 CABLE BENDING

RF exposure

If you are integrating the Digi XBee Wi-SUN module into another product, you must include the following Caution statement in OEM product manuals to alert users of FCC RF exposure compliance:



CAUTION! To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance are not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

FCC publication 996369 related information

In [Publication 996369 section D03](#), the FCC requires information concerning a module to be presented by OEM manufacturers. This section assists in answering or fulfilling these requirements.

2.1 General

No requirements are associated with this section.

2.2 List of applicable FCC rules

This module conforms to FCC Part 15.247.

2.3 Summarize the specific operational use conditions

Certain approved antennas require attenuation for operation. For the Digi XBee Wi-SUN module, see [FCC-approved antennas](#).

Host product user guides should include the antenna table if end customers are permitted to select antennas.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

While it is possible to build a trace antenna into the host PCB, this requires at least a Class II permissive change to the FCC grant which includes significant extra testing and cost. If an embedded trace antenna is desired, refer to literature for trace antenna designs.

For the FCC requirements to use trace antennas, note the following:

- Modules certified with trace antennas or trace to an antenna or RF connector design shall follow the requirements of Question 11 of [996369 D02 Module Q&A](#). See Question and Answer 11.
- If you decide to use a trace antenna, you must request assistance from Digi to obtain a “change in FCC ID”. You will then work with a lab of your choice to obtain the testing and documentation needed to file for your product with the trace antenna in a Class II Permissive filing.

2.6 RF exposure considerations

For RF exposure considerations see [RF exposure](#) and [FCC-approved antennas](#).

Host product manufacturers need to provide end-users a copy of the “RF Exposure” section of the manual: [RF exposure](#).

The FCC Grant for the XBee product only allows only “MOBILE” and “FIXED” applications at distances greater than 26 cm from a person’s body.

No “PORTABLE” use is allowed by the FCC Grant.

Please request assistance from Digi to obtain a “change in FCC ID”. You will then work with a lab of your choice to obtain the testing and documentation needed to file for your product for the specific “PORTABLE” use using a Class II Permissive filing.

Host manufacturers must:

- Integrate the XBee module per the instructions in this user guide
- Follow the directions in [“FCC publication KDB 996369 related information”](#) of this guide.
- If your product is to be used in a “PORTABLE” application, please request assistance from Digi to obtain the request for “change in FCC ID”.
- You are responsible for having the integrated host product tested according to the instructions in the most recent revision of [FCC KDB 996369 “TRANSMITTER MODULE EQUIPMENT AUTHORIZATION GUIDE”](#). This FCC KDB also directs you to obtain proof of compliance with RF Exposure as directed in the FCC KDB [“447498 D04 Interim General RF Exposure Guidance v01”](#).
- You must direct your customer in the use of your product. Include text similar to this:
 - “This product must be used according to the user guide. The product can (or cannot) be used within 26 cm (10.2 in) from any human, pet, plant, or agricultural animal.”

2.7 Antennas

A list of approved antennas is provided for the Digi XBee Wi-SUN product. [See FCC-approved antennas](#).

2.8 Label and compliance information

Host product manufacturers need to follow the sticker guidelines outlined in [OEM labeling requirements](#).

OEM labeling requirements

WARNING! As an Original Equipment Manufacturer (OEM) you must ensure that FCC labeling requirements are met. You must include a clearly visible label on the outside of the final product enclosure that displays the following content:

Required FCC Label for OEM products containing the Digi XBee Wi-SUN models:

- Contains FCCID: MCQ-XBSG

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.

CAUTION! Changes or modifications not expressly approved by Digi International Inc. could void the user’s authority to operate the equipment.

2.9 Information on test modes and additional testing requirements

Contact a Digi sales representative for information on how to configure test modes for the Digi XBee Wi-SUN product.

2.10 Additional testing, Part 15 Subpart B disclaimer

All final host products must be tested to be compliant to FCC Part 15 Subpart B standards. While the Digi XBee Wi-SUN unit was tested to be compliant to FCC unintentional radiator standards, FCC Part 15 Subpart B compliance testing is still required for the final host product. This testing is required for all end products, and Digi XBee Wi-SUN Part 15 Subpart B compliance does not affirm the end product's compliance.

See [FCC notices](#) for more details.

2.11 EMI Considerations

If the Digi XBee Wi-SUN radio module is the only radio module used in a host device, refer to the guidance provided in [KDB 996369 D04](#).

If the Digi XBee Wi-SUN radio module is being integrated into a host device with more than one radio module (i.e., "simultaneous mode"), see the answer to [KDB 996369](#), Question 12 for a method to perform host product evaluation.

2.12 How to make changes

Only Digi, the original FCC grantee, is allowed to make changes to the Digi XBee Wi-SUN radio module. If the host manufacturer expects to make changes when the Digi XBee Wi-SUN module is to be used in other than as granted to Digi ("Single Modular"), you must request assistance from Digi to obtain a "change in FCC ID". You will then work with a lab of your choice to obtain the testing and documentation needed to file for your product in a Class II Permissive filing.

Over-voltage detection

Over-voltage detection sends out a modem status of **0x0D** indicating that the voltage supply limit has been exceeded. The device will still operate but limits the RF power level **PL** setting to a value of **3** when the operating voltage reaches 3.7 volts or higher to meet regulatory RF power requirements. While the device is in this mode of operation it will be forced into API mode for the over-voltage modem status to be sent out the serial port every 15 seconds when API mode is set to 1 or 2.

Canada (ISED)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This radio transmitter IC: 1846A-XBSG has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Le présent émetteur radio IC: 1846A-XBSG a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

ISED-approved antennas

The Digi XBee Wi-SUN module can be installed using antennas and cables constructed with nonstandard connectors (RPSMA, RPTNC, etc.) An adapter cable may be necessary to attach the XBee connector to the antenna connector.

The antennas in the tables below have been approved for use with this module. Correct cable loss or power reduction is required when using gain antennas as shown in the tables.

Digi does not carry all of these antenna variants. Contact Digi Sales for available antennas.

1. If using the RF module in a portable application (for example, if the module is used in a hand-held device and the antenna is less than 20 cm from the human body when the device is in operation), the integrator is responsible for passing additional Specific Absorption Rate (SAR) testing based on ISED rule [RSS-Gen](#) and [ISED Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields](#). The testing results will be submitted to the ISED for approval prior to selling the integrated unit. The required SAR testing measures emissions from the module and how they affect the person.

ISED-approved antennas

The following tables cover the antennas that are approved for use with the Digi XBee Wi-SUN module. If applicable, the tables show the required cable loss between the device and the antenna.

Digi does not carry all of these antenna variants. Contact Digi Sales for available antennas.

Note An antenna not listed in the equipment authorization that is the same type with equal or lower gain (same physical arrangement; generates the same in-band and out-of-band characteristics in all spatial directions) may be marketed and used with a part 15 transmitter.

This radio transmitter IC: 1846A-XBSG has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Dipole antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Connector	Gain	Required antenna cable loss	Application
A09-HASM-675 (MPD: SATAC-915NF)	Articulated half-wave	RPSMA	2.96 dBi	0.3	Fixed/mobile

Omni-directional base station antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-F8NF-M* (TE Connectivity: FG9026)	Fiberglass Base Station	8.0 dBi	N	0.62	Fixed

Dome antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A09-D3NF* (Laird: TRA8903)	Phantom (Dome) Antenna	3.0 dBi	NMO	0.62	Fixed/mobile

Note The best performance of the TRA8903 "dome" antenna is given when mounted on a ground plane.

Ceramic chip antenna

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

This antenna type is mounted on the surface mount carrier.

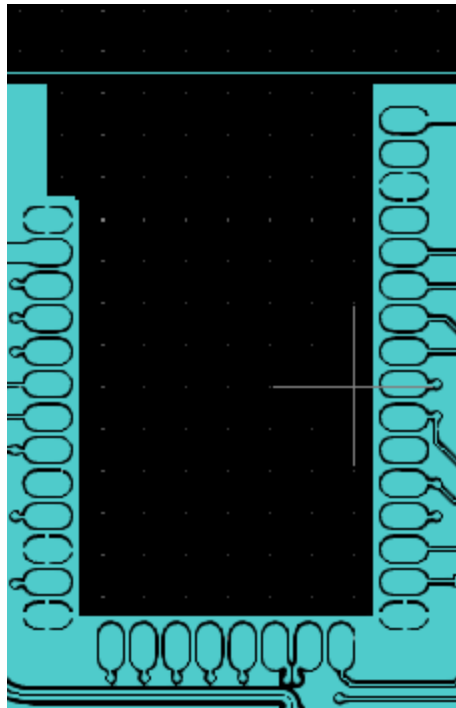
Follow all directions for use of this product.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
29001056*	Ceramic chip antenna (SMT module only)	0.8 dBi	N/A	0	Fixed/mobile

Recommended use of the XBee Wi-SUN module with ceramic chip antenna

The XBee Wi-SUN module (SMT, with ceramic antenna) should be mounted on a host board with the following ground plane cutouts (dimensions and other information requested):

- Recommended ground cutout:



- Minimum ground cutout:



The SMT module with the ceramic chip antenna should be placed flat, or horizontally, on the surface it's mounted to. The module can be placed vertically, as long as the module's antenna is mounted towards other radios in the network.

Flexible (flat) antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
A07W27-PU18-7x* (Taoglas: FXUB65.07.0180C)	Flexible multiband antenna	2.0 dBi	RPSMA	0	Fixed/mobile

Part number	Type	Gain	Connector	Required antenna cable loss	Application
HXT-211140-010* (Molex: 211140-0100)	Flexible monopole	1.0 dBi	RPSMA	0	Fixed/mobile

Recommended usage of Taoglas

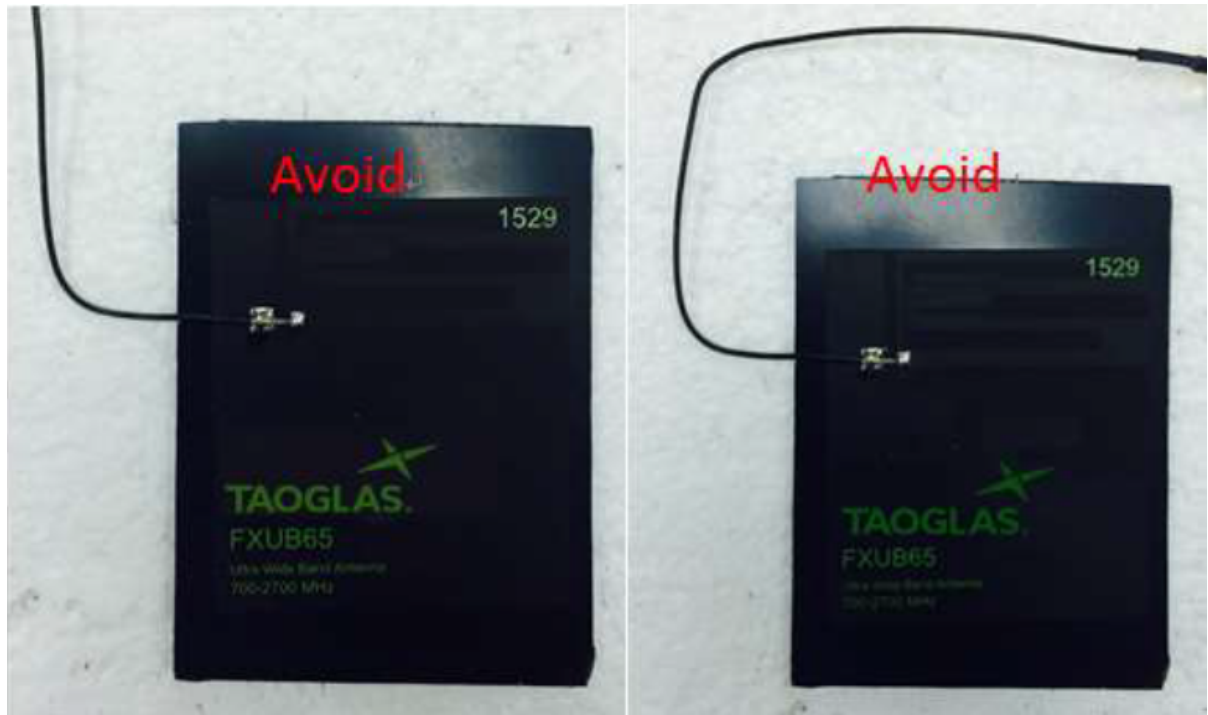
Taoglas (PN: FXUB65.07.0180C) performs best when it's positioned flat and horizontally. The Taoglas antenna can be fastened to glass or plastic surfaces.



The Taoglas FXUB65 datasheet provides these preferred orientations. Place the cable as shown:



The Taoglas datasheet does not recommend the following cable orientations:

***Recommended usage of Molex antenna***

Orient this antenna upright. This gives an antenna pattern similar to a dipole. The Molex antenna can be fastened to a glass or plastic surface.



The cable should be bent as shown in the first two figures below. Do not place the cable to the side of the antenna, as shown in the third figure.



FIGURE 5.2.1 CABLE BENDING

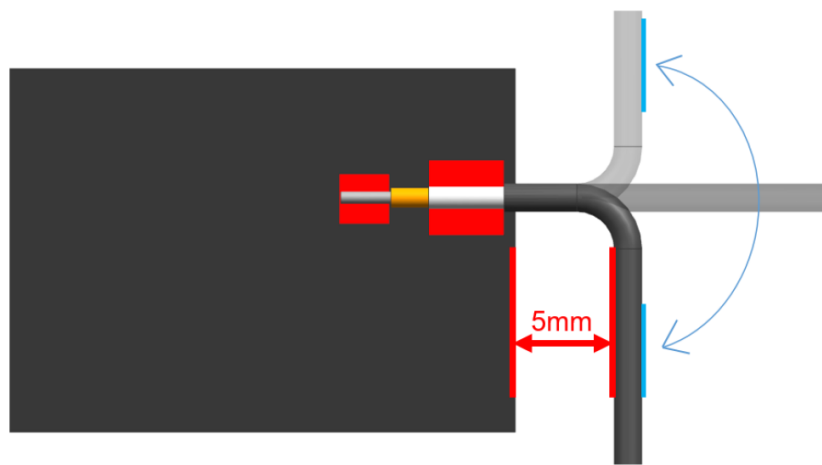


FIGURE 5.2.2 CABLE ACTIVITY RANGE

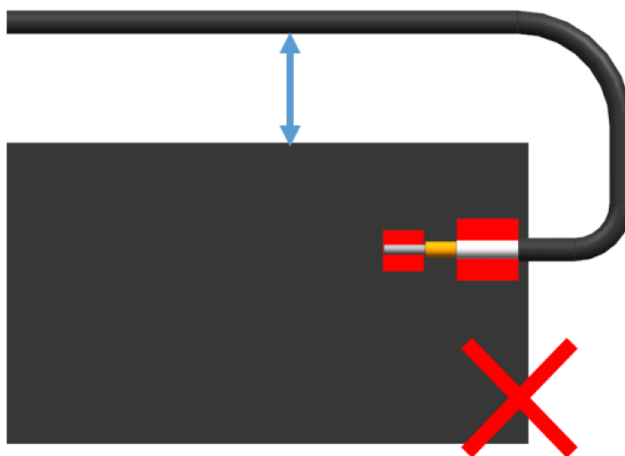


FIGURE 5.2.3 CABLE BENDING

Labeling requirements

Digi XBee Wi-SUN

Labeling requirements for Innovation, Science and Economic Development Canada are similar to those of the ISED. A clearly visible label on the outside of the final product must display the following text:

Contains IC: 1846A-XBSG

The integrator is responsible for its product to comply with IC ICES-003 and FCC Part 15, Sub. B - Unintentional Radiators. ICES-003 is the same as FCC Part 15 Sub. B and Innovation, Science and Economic Development Canada accepts FCC test report or CISPR 22 test report for compliance with ICES-003.

Transmitters for detachable antennas

This radio transmitter IC: 1846A-XBSG has been approved by Industry Canada to operate with the antenna types listed in the tables in above in [ISED-approved antennas](#) with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Le présent émetteur radio IC : 1846A-XBSG a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur. L'impédance d'antenne requise est de 50 ohms.

Detachable antennas

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RF exposure

If you are integrating the XBee into another product, you must include the following Caution statement in OEM product manuals to alert users of ISED RF exposure compliance:



CAUTION! To satisfy ISED RF exposure requirements for mobile transmitting devices, a separation distance of 26 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer



than this distance are not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

Europe (CE)

The Digi XBee Wi-SUN module has been tested for use in several European countries. For a complete list, refer to www.digi.com/resources/certifications.

If Digi XBee Wi-SUN modules are incorporated into a product, the manufacturer must ensure compliance of the final product with articles 3.1a and 3.1b of the Radio Equipment Directive. A Declaration of Conformity must be issued for each of these standards and kept on file as described in the Radio Equipment Directive.

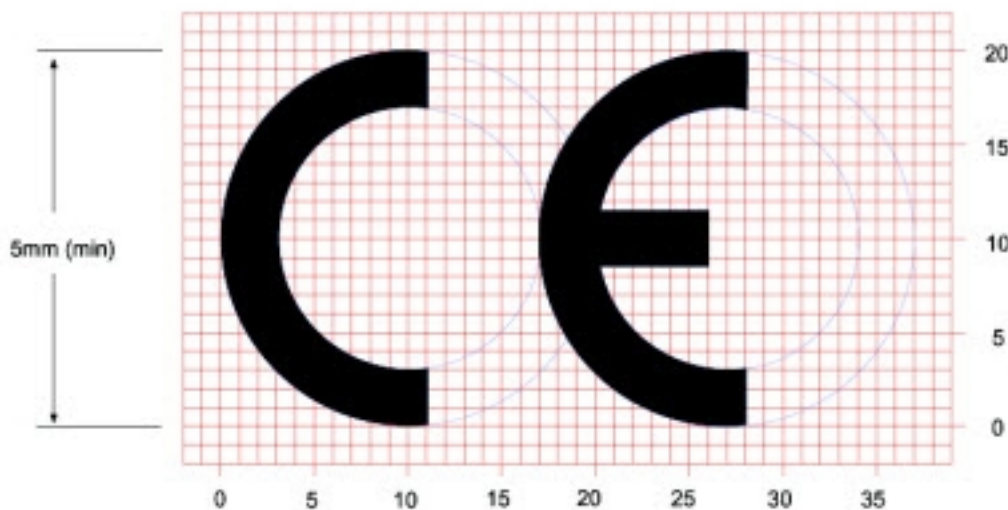
Furthermore, the manufacturer must maintain a copy of the Digi XBee Wi-SUN module user guide documentation and ensure the final product does not exceed the specified power ratings, antenna specifications, and/or installation requirements as specified in the user guide.

CE OEM labeling requirements

The CE markings must be clearly visible and legible when you affix it to the product. If this is not possible, you must attach these marks to the packaging (if any) or accompanying documents.

CE labeling requirements

The “CE” marking must be affixed to a visible location on the OEM product. The following figure shows CE labeling requirements.



The CE mark shall consist of the initials “CE” taking the following form:

- If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
- The CE marking must have a height of at least 5 mm except where this is not possible on

account of the nature of the apparatus.

- The CE marking must be affixed visibly, legibly, and indelibly.

Important note

Digi customers assume full responsibility for learning and meeting the required guidelines for each country in their distribution market. Refer to the radio regulatory agency in the desired countries of operation for more information.

Declarations of conformity

Digi has issued Declarations of Conformity for the Digi XBee Wi-SUN module concerning emissions, EMC, and safety. For more information, see www.digi.com/resources/certifications.

Approved antennas

Testing for use of the Digi XBee Wi-SUN module in the European markets was performed with a 2.1 dBi dipole antenna. Use of an antenna with a gain of 2.1 dBi or less will ensure compliance with the spectrum requirements of the RED.

The following antennas can be used with the Digi XBee Wi-SUN module. All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Dipole antennas

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

Part number	Type	Connector	Gain	Application
A08-HABUF-P5I*	Articulated dipole	UFL	2.1 dBi	Fixed/mobile
A08-HASM-560*	Articulated half-wave	RPSMA	2.1 dBi	Fixed/mobile

Ceramic chip antenna

All antenna part numbers followed by an asterisk (*) are not available from Digi. Consult with an antenna manufacturer for an equivalent option.

This antenna type is mounted on the surface mount carrier.

Follow all directions for use of this product.

Part number	Type	Gain	Connector	Required antenna cable loss	Application
29001957*	Ceramic chip antenna (Micro form factor only)	0 dBi	N/A	0	Fixed/mobile

India (WPC)

TBD