AMNPTTX01 and AMN42012

Operational and Installation Manual

An AMIMON Ltd. Document

Version 1.0

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This installation guide is intended for host manufacturer integrating the AMNPTTX01 and AMN42012 modules inside their end products.

The AMNPTTX01 and AMN42012 modules **can't** be bought off-the-shelf.

Please refer to the regulatory guide regarding regulatory information that needs to be on the labeling and user manual.

Revision History

Version	Date	Description
1.0	Jul 3, 2022	Initial Release

AMIMON

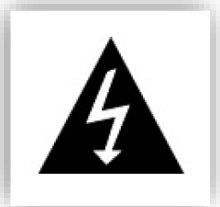
Safety Instructions

- When operating this equipment, read and follow all the instructions in this manual
- Do not open unit
- Do not block air ventilation
- Use only accessories/batteries/ power supplies provided, specified or recommended by AMIMON.
- When devices are switched on keep away at least 20 cm from your body.
- People with pacemakers should ALWAYS keep the device at the listed distance from their pacemaker when turned ON. Should you have any reason to suspect that interference is taking place, you should turn your device OFF.
- Do not expose to moisture, excessive heat or fire
- Keep away from water and other liquids
- Do not power the device when it is wet or damp
- Use the mains plug to disconnect the apparatus.
- Clean with a dry cloth only
- Unplug this apparatus during lightning storms or when unused for long periods of time
- To reduce the risk of fire or electric shock, refer servicing to qualified service personnel
- Please avoid electrostatic discharge from the antenna ports for proper operation
- WARNING – do not touch. Please beware of hot surfaces of the devices and wait until it cools off

- Please avoid electrostatic discharge from the antenna ports for proper operation
- Keep these instructions in a safe and accessible place for future use.
- Declared maximum operating temperature: +50°C

Explanation of graphical symbols:

High Voltage Sign: warns the user of the presence of uninsulated "dangerous voltage" within the product enclosure, which may be of sufficient magnitude to constitute a risk.



General Warning Sign: warns the user of the presence of important operating and maintenance (servicing) instructions in the product manual.

Introduction

The **AMNPTTX01** and **AMN42012** are wireless video system comprising of a video transmitter and video receiver modules, that operate at the 5 – 6.425GHz unlicensed band.

They are based on AMIMON's Professional chipset that consist of the AMN2130 and AMN2230 baseband receiver and the MAXIM 2850 and 2851 ICs, providing the ultimate solution for 4K Video transmission. The perfect video, audio quality, the high robustness and the invisible latency of the wireless system are unmatched by any other wireless technology and presents a true alternative to cable. The system transmits video and audio streams wirelessly and thus simplifies and eliminates system issues, such as: lip-sync, large buffers and other burdens like retransmissions or error propagation.

System Technical Specifications:

AMNPTTX01	
Frequency Range:	**Non-DFS Frequencies**: 5.150 ~ 5.250 GHz and 5.725~5.825 GHz for US **DFS Frequencies**: 5.250-5.330 GHz and 5.470 ~ 5.725 GHz for US 5.250-5.350 GHz and 5.470 ~ 5.6GHz and 5.650 ~ 5.710 GHz for Canada
Antenna:	Total connectors: 2 2 transmitting ports of which 2 ports also act as receiving ports using diversity through a single receive chain on-board UFL or RP-SMA Connectors: connected to 2dBi omni directional antenna
Environment:	Operational: -10 ÷ 50°C, 10 ÷ 90% humidity Storage: -20 ÷ 55° C, 10% ÷ 90% humidity
Voltage:	$5V_{DC}$ ±10%
Size:	Petit: L: 56mm x W: 38mm x H: 7.7mm Jay: L: 60mm x W: 38mm x H: 7.3mm Tulip: L: 60mm x W: 38mm x H: 7.3mm
FCC ID **IC**	VQSAMNPTTX01 7680A-AMNPTTX01

Table 1: **AMNPTTX01** - *Technical Specifications*

AMN42012	
Frequency Range:	**Non-DFS Frequencies**: 5.150 ~ 5.250 GHz and 5.725~5.825 GHz for US **DFS Frequencies**: 5.250-5.330 GHz and 5.470 ~ 5.725 GHz for US 5.250-5.350 GHz and 5.470 ~ 5.6GHz and 5.650 ~ 5.710 GHz for Canada
Antenna:	Total connectors: 5 1 transmitting chain with antenna diversity and 5 receive ports External using on-board UFL Connectors: 2dBi omni Antenna gain
Environment:	Operational: -10 ÷ 50°C , 10 ÷ 90% humidity Storage: -20 ÷ 55° C, 10 ÷ 90% humidity
Voltage:	$5V_{DC}$ ±10%
Size:	L: 70.0mm x W: 55.0mm x H: 7.5mm
User Control:	3 LEDs indicating Power, Video lock and Network lock 3 buttons for pairing, reset, boot;
FCC ID **IC**	VQSAMN42012 7680A-AMN42012

Table 2: AMN42012 - *Technical Specifications*

Product Description

- AMNPTTX01

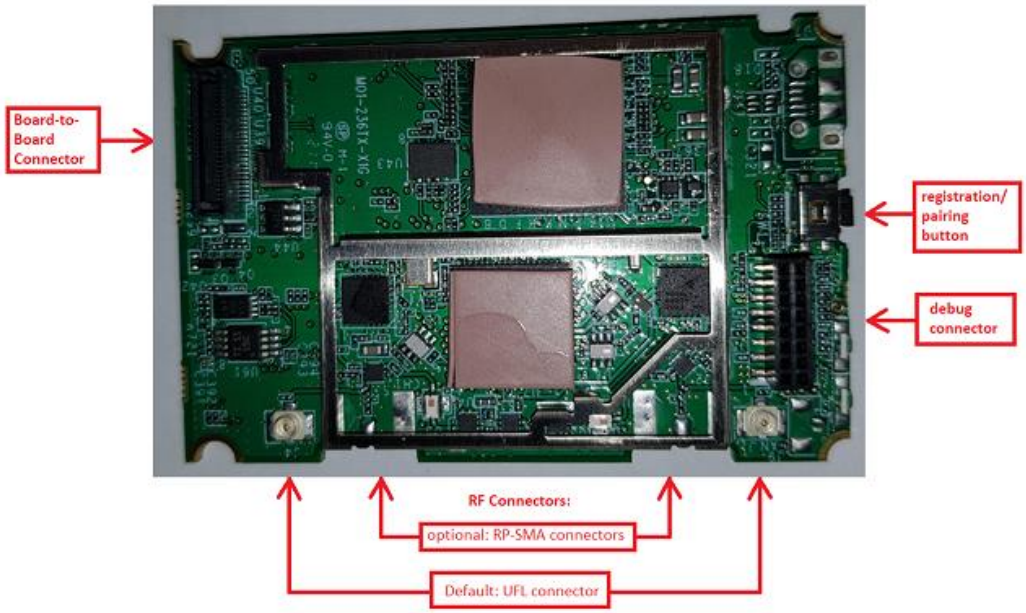


Figure 1 –AMNPTTX01 top view

- AMN42012

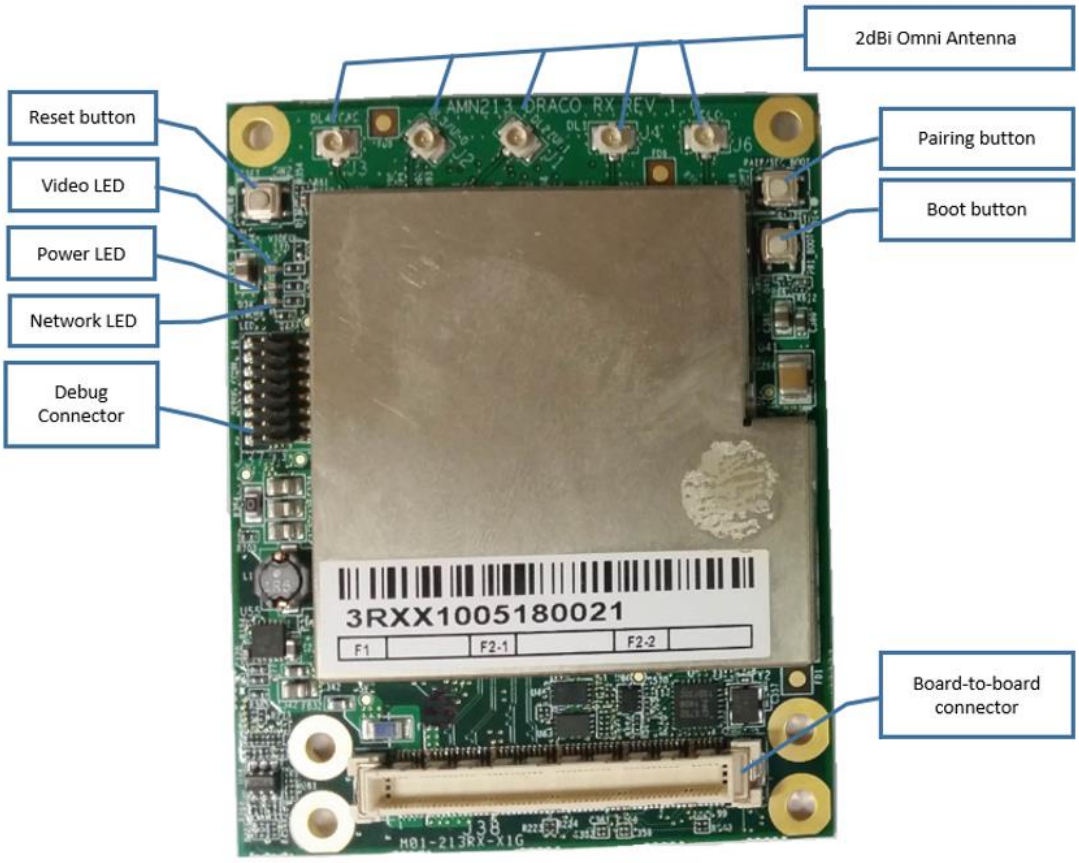


Figure 2 – AMN42012 top view

- LED behaviors

Network LED

Flashing Rate	Indication
Fast blinking (errors)	Stuck in bootloader / MAC not alive / No XML / default calibration
Off	Not registered to TX / power down / disconnected/ Waiting for user response at registration
Normal blinking	Searching for TX
Fast blinking	During registration / out of range
On	In link

Table 3 - Network LED

Video LED

Flashing Rate	Indication
Fast blinking (errors)	Stuck in bootloader / MAC not alive / No XML / default calibration
Off	Not registered to TX / power down / disconnected/ Waiting for user response at registration
Normal blinking	Searching for TX
Fast blinking	During registration / out of range
On	In link

Table 4 - Video LED

Power LED

Flashing Rate	Indication
Off	No power, power level is below acceptable levels
On	Power is supplied and ON/OFF switch is on (when exist).

Table 5 - Power LED

- Board-to-Board Connector

The Interface connector provides various interfaces to communicate between the module and the MCU to configure video related parameters and settings, or receive the network status and communication related parameters.

The following interface options are available:

- External Power Supply voltage ($5V_{DC}$ ±10%)
- Signal Ground
- Video signal
- I2S audio interface
- I2C bus
- Indication output (Power, Network, Video Indications)
- Board attached ID pins
- UART
- USB
- SPI

Host manufacturers are advised to contact Amimon to request the complete pin allocation and functional description of the interface board.

Installation

The modules are designed to be integrated with any compatible Video Interface Board (VIB), to provide a complete wireless Video Solution.

At common application, the VIB shall provide standard video interface that can be connected to standard video monitor. This video interface may be HDMI, HD-SDI or any other standard or custom video interface.

It is advised to verify compatibility of the VIB to the interface connector type, pin functionality, and signal compatibility of the modules, before initiating the installation.

At installation, make sure that the modules are firmly attached and secured to the VIB by proper mechanical means.

Installation of the modules must provide the adequate heat dissipation means to provide the modules ambient temperature within the product operating conditions as specified.

See 'Product Description' for port location described in this section.

Connect AMIMON modules to the compatible Video Interface Board (VIB).

Connect the antennas to the modules. Only use antennas provided by AMIMON

Connect the receiver VIB to a video monitor through the supported video interface of the VIB.

Connect the transmitter VIB to a video source (for example, camera) through the supported video interface of the VIB.

1. Power ON the VIB according to its operating manual.
2. Set the Antenna orientation of the receiver module to perform optimal performance:

One option is to separate the antennas to match the picture. Receiving antennas should be oriented in the same plane as the transmitting antenna.

3. If the devices are not paired to each other, press the "pairing" button on each module.

Note: For maximal range

- Keep line of sight between the transmitter and the receiver.
- Avoid placing any obstacles besides the transmitter or the receiver.
- Position both transmitter and receiver in an upwards position, for enhanced antennas performance.
- Mount the modules with proper air ventilation.
- Use only approved accessories recommended by Amimon
- Avoid Co-location: Place the modules and their antennas as far away as possible from other transceiver devices, 20cm separation is a minimal distance unless otherwise specified in the Grant.
- Avoid Proximity to Metal Objects: The antennas must be at least 7 cm away from any metal object.

Regulation Installation Requirements

The AMNPTTX01 and AMN42012 modules can't be bought off-the-shelf.

This section is intended to guide host manufacturer integrating the AMNPTTX01 and AMN42012 modules inside their end products with the regulatory requirements.

Host integrators must comply with the following requirements when operating in the UNII 1, 2, 3 band:

Modifications:

- Any changes or modifications not expressly approved by AMIMON or *the party responsible for compliance* could void the user's authority to operate the equipment and invalidate the regulatory approval.
- Host manufacturer is responsible for regression tests to show compliance to the applicable standards due to the following actions:
  - any modification done to the module.
  - Integration of the module into a host device
- Host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.
- Final host product is required to show compliance to Part 15 Subpart B with the modular transmitter installed

Usage Conditions:

The OEM must define uses/conditions of at least 20 cm from user's body.

This module in its final integration requires the end-product to continue to comply with DFS requirements.

A class II permissive change may be required for operation not already described in the FCC Grant filing.

Label Requirements:

Label on the host device must be permanently attached to a non-removable exterior portion of the host device.

The OEM must add the following statements on the labels:

- FCC ID/IC Information (unless change ID is pursued):
  - For host devices containing VQSAMNPTTX01, the label should state: "contains: FCC ID: VQSAMNPTTX01
    IC: 7680A-AMNPTTX01"

  - For host devices containing VQSAMN42012, the label should state: "contains: FCC ID: VQSAMN42012
    IC: 7680A-AMN42012"

- e-label is permitted on devices qualifying for e-label per KDB 784748

Antenna Requirements:

- The following antennae were approved with the modules:

Radio FCC ID	Antenna Information				
	Model	Type	Gain	Location	impedance
VQSAMNPTTX01	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMNPTTX01	AMN_ANT_1012-0	dipole	0dBi Typical at 5-7.3GHz	Internal	50Ω
VQSAMN42012	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMN42012	AMN_ASM_1011	mushroom	2dBi Typical at 5-7.3GHz	External	50Ω

- The product is provided with an approved antenna. Use only supplied or approved antenna by AMIMON. Any changes or modifications to the Antenna may void the regulatory approvals obtained for the product.
- Host device must comply with FCC Part 15 antenna requirements
- The OEM must design the host so that the antenna will be installed as an integrated antenna for the host containing the AMNPTTX01 and the end user shall not be able to access, remove or replace the antenna.

OEM Documentation for user:

For products using SDoC, a compliance information statement shall be supplied with the product at the time of marketing or importation, containing the following information:

a) Identification of the product, e.g., name and model number;

b) A statement that the product complies with the rules; and

c) The identification, by name, address, and telephone number, or internet contact information, of the responsible party as defined in Section 2.909. The responsible party must be located within the United States.

Compliance information statement for end products assembled from separately authorized components /modules the following applies:

(1) assembled from components (e.g., enclosures, power supplies, and CPU boards) that, by themselves, are authorized under SDoC or a grant of certification or both; and (2) where the assembled product is also subject to authorization under SDoC but, in accordance with the applicable regulations, does not require additional testing. Such products shall be supplied, at the time of importation or marketing, with a compliance information statement containing the following information.

a) Identification of the end product, e.g., name and model number.

b) Identification of the authorized components/modules used in the assembly. A component authorized under SDoC shall be identified by name and model. A component authorized under a grant of certification shall be identified by name and model number (if applicable) along with the FCC Identifier number.

c) A statement that the product complies with the rules.

d) The identification, by name, address, and telephone number, or internet contact information, of the responsible party who assembled the product from modular components. The responsible party for an SDoC must be located within the United States.

e) Copies of the compliance information statements for each authorized component used in the system that is authorized under SDoC.

Manual Requirements:

The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID and IC.

Manual to the end user must contain the following statements:

RF Modules:

These devices contain the following approved radio modules:

Device	Description	IC	FCC ID
AMNPTTX01	HD Video Transmitter	7680A-AMNPTTX01	VQSAMNPTTX01
AMN42012	HD Video Receiver	7680A-AMN42012	VQSAMN42012

FCC ID

Antenna Requirements:

- FCC:

The following antennae were approved with the modules listed in the Antenna Information table.

- Industry Canada

The radio transmitters 7680A-AMNPTTX01, and 7680A-AMN42012 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain 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.
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 (e.i.r.p.) is not more than that necessary for successful communication
Les présent émetteur radios 7680A-AMNPTTX01, et 7680A-AMN42012 ont 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.
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.

Radio FCC ID	Antenna Information				
	Model	Type	Gain	Location	impedance
VQSAMNPTTX01	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMNPTTX01	AMN_ANT_1012-0	Dipole	0dBi Typical at 5-7.3GHz	Internal	50Ω
VQSAMN42012	AMN_ANT_1010	Dipole	2dBi Typical at 5-7.5GHz	External	50Ω
VQSAMN42012	AMN_ASM_1011	mushroom	2dBi Typical at 5-7.3GHz	External	50Ω

- The product is provided with an approved antenna. Use only supplied or approved antenna by AMIMON. Any changes or modifications to the Antenna may void the regulatory approvals obtained for the product.
- Host device must comply with FCC Part 15 antenna requirements

RF Exposure

- FCC Statement

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- Industry Canada Statement

IMPORTANT NOTE:
Radiation Exposure Statement: This equipment complies with IC radiation exposure limits set forth for uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.
NOTE IMPORTANTE:
Déclaration d'exposition aux radiations: Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Unintentional Radio Interference

- FCC Statement

  Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

  If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

  - Reorient or relocate the receiving antenna
  - Increase the separation between the equipment and receiver
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
  - Consult the dealer or an experienced radio/TV technician for help.

- Canada Statement
  CAN ICES-3 B / NMB-3 B

Radio Transmitters

- FCC Statement
  Radio Transmitters (Part 15) – Class B Digital Devices

  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.

- Canada Statement

This device complies with RSS-247 of the Industry Canada 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 of the device.
The radio transmitters 7680A-AMNPTTX01, and 7680A-AMN42012 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain 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.
Ce dispositif est conforme à la norme CNR-247 d'Industrie Canada applicable 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.
Les présent émetteur radios 7680A-AMN41012, et 7680A-AMN42012 ont 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.

- Industry Canada Statement for Operation at 5GHz Range

Caution:
1. The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

2. Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.
3. The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
4. The maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate

Avertissement:

1. Les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
2. De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.
3. Le gain d'antenne maximum autorisé pour les appareils fonctionnant sous les bandes de fréquences 5250-5350 MHz et 5470-5725 MHz doit être tel que l'équipement est toujours conforme à la limite PIRE;
4. Le gain d'antenne maximum autorisé pour les appareils fonctionnant sous les bandes de fréquences 5725-5850 MHz doit être tel que l'équipement est toujours conforme à la limite PIRE spécifiée pour un fonctionnement point à point et non point à point, le cas échéant.