

WIFI Module

Model Number: NM02

Release

0.1

2022/07/27

1. INTRODUCTION

1.1. PURPOSE

This document contains the product specification of 802.11 a/b/g/n/ ac Dual Band WiFi Module for Vivint.

2. SPECIFICATION

2.1. SYSTEM AND HARDWARE SPECIFICATION

| NM02 | | |
|----------|-----------------|--|
| H.1 | Processor | <ul style="list-style-type: none">• MTK WiFi soc |
| H.2 | System ROM | <ul style="list-style-type: none">• 8MB SPI Flash |
| H.3 | System RAM | <ul style="list-style-type: none">• 128MB DDR 2 |
| H.4 | Host Interface | <ul style="list-style-type: none">• MII• I²C• SPI• UARTx2• USB• JTAG |
| H.5 | WiFi Interface | <ul style="list-style-type: none">• IPEX connector x2 |
| H.6 | Environment | <ul style="list-style-type: none">• Operation: Temp: 0°C ~ 40°C Humidity: 20% ~ 85% non-condensing• Storage: Temp: -25°C ~ 70°C Humidity: 5% ~ 95% non-condensing |
| H.7 | Certification | <ul style="list-style-type: none">• FCC/IC class B |
| Wireless | | |
| H.9 | Frequency range | <ul style="list-style-type: none">• Frequency FCC Frequency range: 2412~2462MHz, FCC Frequency range: 5180~5240MHz, 5260~5320MHz, 5500~5720MHz, 5745~5825MHz ISED Frequency range: 2412~2462MHz, ISED Frequency range: 5180~5240MHz, 5260~5320MHz, 5500~5580MHz, 5660~5720MHz, 5745~5825MHz |
| H.12 | Sensitivity | <ul style="list-style-type: none">• 802.11b (2.4GHz) : -76dBm• 802.11g (2.4GHz) : -65dBm• 802.11n (2.4GHz) : -61dBm• 802.11a (5GHz) : -65dBm• 802.11n (5GHz) : -61dBm• 802.11ac (5GHz) -51dBm |

Antenna Specification

| No. | PCB Chain No | Brand | Model | Antenna Gain(dBi) | Frequency range | Antenna Type | Connector type | Cable Length (mm) | Cable Loss (dB) | excluding cable loss Antenna Gain(dBi) |
|-----|--------------|-------|--------------|-------------------|-----------------|--------------|----------------|-------------------|-----------------|--|
| 1 | Chain 0 | NA | TE 2108517-1 | 2.5 | 2.4~2.4835GHz | PIFA | I-pex | 60 | 0.5 | 3 |
| | | | | 2 | 5.15~5.85GHz | | | | 1 | |
| 2 | Chain 1 | NA | TE 2108517-1 | 2 | 2.4~2.4835GHz | PIFA | I-pex | 230 | 1 | 3 |
| | | | | 1.5 | 5.15~5.85GHz | | | | 1.5 | |

2.2. SOFTWARE REQUIREMENTS

| | | |
|-----|---------------|--|
| F.1 | OS | <ul style="list-style-type: none"> OpenWRT Barrier Breaker 14.07 |
| F.2 | Test Features | <ul style="list-style-type: none"> Active Rx mode: independently selectable for 2.4 GHz and 5 GHz Constant Tx: unmodulated carrier independently selectable for 2.4 GHz and 5 GHz (MTK driver will support constant Tx w/ modulated but un-modulated in test mode if possible.) Constant Tx: modulated Carrier independently selectable for 2.4 GHz and 5 GHz Select fixed Tx Channel: all TX channels for 2.4 GHz and 5 GHz operation Select fixed bit rate: independently selectable for 2.4 GHz & 5 GHz transmit only Select fixed Tx Mode: b/g/n/ac Select fixed Tx power level: independently selectable for 2.4 GHz and 5 GHz Select communication to pass through only antenna 1 or antenna 2 Enable/disable wired and/or wireless modes and connections |

3. CERTIFICATIONS / TEST REPORTS REQUIREMENT

EMC/RF Certificates and Test Reports (all certifications required to meet latest version)

3.1 Emission & Immunity for EMI/EMS

| Required | EMI/EMC Test Report | Class A | Class B | Region |
|----------|---|------------|------------|--------------|
| | FCC report FCC CFR 47 Part 15 Subpart B & ANSI C63.4 (including ITE & Home Plug) IC report ICES-003 (ITE) | | | US Canada |

3.2 Radio Frequency & Human Exposure/SAR

| | RF Test Report | Categories | Region |
|---|--|-----------------|---------------|
| √ | FCC report FCC CFR 47, Part 2, FCC CFR 47, Part 15 Subpart C for 2.4GHz FCC CFR 47, Part 15 Subpart E for 5 GHz + DFS FCC OET Bulletin 65 Supplement C. (Human Exposure) | 802.11 ac/b/g/n | US/ FCC ID |
| √ | IC report RSS-GEN RSS-102 RSS-247 | 802.11 ac/b/g/n | Canada/ IC ID |

4. ENVIRONMENTAL IMPACT REQUIREMENT

- RoHS Compliance: All Components Compliant with RoHS Directive

5. WARNING STATEMENTS

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module.

Federal Communication Commission 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 harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 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.

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

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

This device is used exclusively in Vivint products and is not sold to OEM integrators.

This transmitter is tested in a standalone mobile RF exposure condition. Any other usage conditions such as co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: 2AAAS-NM02". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Additional Testing: OEM/Host Manufacturer Responsibilities

Vivint is ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.

Manual Information To the End User

The integrator must be aware to not provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Industry Canada Statement

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'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED 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.

This device is intended only for OEM integrators under the following conditions: (For module device use)

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users.
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

- 1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs.
- 2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

NOTE IMPORTANTE

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 10941A-NM02".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 10941A-NM02".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module. Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Cautions:

(i) 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;

(ii) 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;

(iii) 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; and

(iv) the worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in Section 6.2.2(3) shall be clearly indicated.

(v) 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.

Avertissement:

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

- (i) les dispositifs fonctionnant dans la bande 5150-5250 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;
- (ii) le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5250 à 5350 MHz et de 5470 à 5725 MHz doit être conforme à la limite de la p.i.r.e.;
- (iii) le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5725 à 5850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation nonpoint, selon le cas;
- (iv) les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, et énoncée à la section 6.2.2.3), doivent être clairement indiqués.
- (v) 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 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

DETACHABLE ANTENNA USAGE

This radio transmitter (IC: 10941A-NM02 / Model: NM02) has been approved by ISED to operate with the antenna type listed below with 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.

Le présent émetteur radio (IC: 10941A-NM02 / Model: NM02) a été approuvé par ISED 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, sont strictement interdits pour l'exploitation de l'émetteur.

Approved antenna(s) list

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

| No. | PCB Chain No | Brand | Model | Antenna Gain(dBi) | Frequency range | Antenna Type | Connector type | Cable Length (mm) | Cable Loss (dB) | excluding cable loss Antenna Gain(dBi) |
|-----|--------------|-------|--------------|-------------------|-----------------|--------------|----------------|-------------------|-----------------|--|
| 1 | Chain 0 | NA | TE 2108517-1 | 2.5 | 2.4~2.4835GHz | PIFA | I-pex | 60 | 0.5 | 3 |
| | | | | 2 | 5.15~5.85GHz | | | | 1 | |
| 2 | Chain 1 | NA | TE 2108517-1 | 2 | 2.4~2.4835GHz | PIFA | I-pex | 230 | 1 | 3 |
| | | | | 1.5 | 5.15~5.85GHz | | | | 1.5 | |