# Agilemesh RF Module Implementation Guide

**Purpose:** This guide is intended as an internal Agilemesh guidance document to ensure that the radio module identified is installed in Agilemesh equipment in an appropriate manner so as to comply with the conditions of the original FCC grant and IC certificate.

**Applicability:** RF module FCC ID.: TTHDNMA92AM, IC:10127A-DNMA92AM

**Antennas:** The module was certified with the following antennas. These antennas or antennas of the same design but lower gain may be used in the final installation.

| Band (GHz) | Gain dBi | Manufacturer's P/N | Manufacturer |
|---|---|---|---|
| 2.4 | 7.4 | SF-245SPR | NCG |
| 4.9 | 5.3 | SF-D49NSR | NCG |
| 5.X | 5.5 | SF-D53NSR | NCG |

**Antenna connection:** The final assembly must have non-standard antenna connection such as a reverse gender connector.

**Final assembly labeling:** The final assembly must contain a label notifying the user that the device contains a certified rf module that is identified by the following product approval numbers:

FCC ID.: TTHDNMA92AM
IC: 10127A-DNMA92AM

An example of such a label is shown below.

**Human exposure to Radio Frequency (RF) energy:** The module referenced in this document was evaluated to determine compliance with ANSI C.95 (USA) and Safety Code 6 (Canada). This module can only be used in final assemblies that are used in a mobile environment where the radiating element is located a minimum of 20 cm. from the user or nearby persons. This module must not be used in a final product that is used in an environment where the radiated element may be expected to be closer than 20 cm. from the user or nearby persons.

**Unintentional emission requirements:** The final product must be tested for unintentional emissions in accordance with the following regulations.
USA – CFR 47, Part 15, Subpart B
Canada – ICES-003, Issue 4

**Modification:** The rf module referenced in this document must not be modified in an manner.

**RF Power and channel assignment:** The rf module is programmed to operate only in the following channels and with the specified rf power output.

| AgileMesh Channel | Band/Modulation | Center Freq. (GHz) | TX Power (dBm) |
|---|---|---|---|
| 0 | 2.4 GHz OFDM | 2.4120 | 16 |
| 1 | 2.4 GHz OFDM | 2.4170 | 20 |
| 2 | 2.4 GHz OFDM | 2.4220 | 20 |
| 3 | 2.4 GHz OFDM | 2.4270 | 20 |
| 4 | 2.4 GHz OFDM | 2.4320 | 20 |
| 5 | 2.4 GHz OFDM | 2.4370 | 20 |
| 6 | 2.4 GHz OFDM | 2.4420 | 20 |
| 7 | 2.4 GHz OFDM | 2.4470 | 20 |
| 8 | 2.4 GHz OFDM | 2.4520 | 20 |
| 9 | 2.4 GHz OFDM | 2.4570 | 20 |
| 10 | 2.4 GHz OFDM | 2.4620 | 16 |
| | | | |
| 22 | 5.X GHz OFDM | 5.1800 | 19 |
| 23 | 5.X GHz OFDM | 5.2000 | 20 |
| 24 | 5.X GHz OFDM | 5.2200 | 20 |
| 25 | 5.X GHz OFDM | 5.2400 | 20 |
| | | | |
| 30 | 5.X GHz OFDM | 5.7450 | 21 |
| 31 | 5.X GHz OFDM | 5.7650 | 21 |
| 32 | 5.X GHz OFDM | 5.7850 | 21 |
| 33 | 5.X GHz OFDM | 5.8050 | 21 |
| 34 | 5.X GHz OFDM | 5.8250 | 21 |
| | | | |
| 50 | 4.9 GHz OFDM | 4.9600 | 21 |
| 51 | 4.9 GHz OFDM | 4.9800 | 21 |

**Final Product User Guide Statements:** The user guide for the final product must have the following statements to inform the user of proper operation and implementation of the product.

FCC specific statements:

- 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.
- 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.
- RF Exposure warning: This device must be operated with a minimum separation distance of 20 cm between the radiating elements and the user or nearby persons.

Industry Canada specific statements (**in both English and French**):

- 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

- This device has been designed to operate with the antennas listed below, and having a maximum gain of 7.4dBi. Antennas not included in this list or having a gain greater than 7.4dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

| Band (GHz) | Gain dBi | Manufacturer's P/N | Manufacturer |
|---|---|---|---|
| 2.4 | 7.4 | SF-245SPR | NCG |
| 5.X | 5.5 | SF-D53NSR | NCG |

- 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 permitted for successful communication.
- This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- RF Exposure warning: This device must be operated with a minimum separation distance of 20 cm between the radiating elements and the user or nearby persons.

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- Le fonctionnement de cet appareil dans la bande 5150-5250 MHz est réservé à une utilisation en intérieur pour réduire le risque d'interférences nuisibles aux systèmes mobiles par satellite utilisant les mêmes canaux.
- Cet appareil a été conçu pour fonctionner avec les antennes énumérées ci-dessous, et ayant un gain maximal de 7.4dBi. Les antennes non inclues dans cette liste ou ayant un gain supérieur à 7.4dBi sont strictement interdites pour une utilisation avec cet appareil. L'impédance d'antenne requise est de 50 ohms.

| Canal (GHz) | Gain dBi | Numéro de série du fabricant | Fabricant |
|---|---|---|---|
| 2.4 | 7.4 | SF-245SPR | NCG |
| 5.X | 5.5 | SF-D53NSR | NCG |

- Pour réduire le risque d'interférence avec d' autres utilisateurs, le type d'antenne ainsi que son gain doivent être choisis afin que

la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

- Cet appareil est conforme la norme d'Industrie Canada exempts de licence RSS (s). Son fonctionnement est sous réserve des deux conditions suivantes: (1) cet appareil ne doit causer aucune interférence, et (2) cet appareil doit pouvoir accepter toute interférence reçue, y compris une interférence pouvant causer une opération indésirable

- Avertissement d'exposition aux fréquences radio (RF) : Cet appareil doit être utilisé avec une distance de séparation minimale de 20cm entre les éléments rayonnants et l'utilisateur ou personnes proches.