G066000277A
Regulatory Compliance Information

Revision 0.5

Nov 2024

This document covers the Regulatory Compliance information of the G066000277A Module. For use by Hayward Engineering and OEM's incorporating the G066000277A module into end use products.

The G066000277A Module is a modular transceiver as defined by FCC / IC and must not be modified or changed by the OEM/End User, unless specifically instructed in this document. Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the 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.

2.1 United States

The G066000277A module has received Federal Communications Commission (FCC) CFR47 Telecommunications, Part 15 Subpart C "Intentional Radiators" single-modular approval in accordance with Part 15.212 Modular Transmitter approval. Single-modular transmitter approval is defined as a complete RF transmission sub-assembly, designed to be incorporated into another device, that must demonstrate compliance with FCC rules and policies independent of any host. A transmitter with a modular grant can be installed in different end-use products (referred to as a host, host product, or host device) by the grantee or other equipment manufacturer, then the host product may not require additional testing or equipment authorization for the transmitter function provided by that specific module or limited module device.

The user must comply with all of the instructions provided by the Grantee (Hayward), which indicate installation and/or operating conditions necessary for compliance.

A host product itself is required to comply with all other applicable FCC equipment authorization regulations, requirements, and equipment functions that are not associated with the transmitter module portion. For example, compliance must be demonstrated: to regulations for other transmitter components within a host product; to requirements for unintentional radiators (Part 15 Subpart B), such as digital devices, computer peripherals, radio receivers, etc.; and to additional authorization requirements for the non-transmitter functions on the transmitter module (i.e., Verification or Declaration of Conformity) as appropriate (e.g., Bluetooth and Wi-Fi transmitter modules may also contain digital logic functions). This means the end use equipment utilizing this module will need to be tested for compliance with FCC Part 15, typically class B for residential or Class A for industrial.

This module contains a Frequency Hoping Spread Spectrum (FHSS) transceiver operating from 902-928MHz as authorized by part 15.247 of FCC Rules.
This module contains a DTS transceiver operating from 2400-2483.5MHz as authorized by part 15.247 of FCC Rules.
The transceivers above utilize Time Slice Multiplexing. Cannot transmit simultaneously.

2.2 Applicable FCC Rules

CFR47 Telecommunications, Part 15 Subpart C "Intentional Radiators" single-modular approval in accordance with Part 15.212 Modular Transmitter

The module utilizes a DTS transceiver operating from 2400-2483.5MHz as authorized by part 15.247 of FCC Rules

The module utilizes a Frequency Hoping Spread Spectrum (FHSS) transceiver operating from 902.2-927.7MHz as authorized by part 15.247 of FCC Rules.

Note: As indicated in 4.9 below. Final host product still requires Part 15 Subpart B compliance testing with this modular transmitter installed.

2.3 Operational Use Conditions

Input Voltage to be 3.3Vdc (Vmax 4.1, Vmin -0.3)
Max Current when transmitting, less than 15mA
ESDMax HBM +/-2000V
Operating Ambient -20C to 55C
Non-Operating -40C to 85C
Suitable for use indoor or outdoor where module is installed in a overall enclosure meeting NEMA 1 indoor, NEMA 3 Outdoor. Alternatively NRTL Listed equivalent enclosure.
Not for use on any aircraft.
Not tested/evaluated/certified for co-location with other radio transceivers.

The Hayward installed firmware ensures the radio operates within the as tested/approved channel, modulation, frequencies, power settings and hoping parameters required by FCC 15.247. Changes to these parameters from their factory settings is not allowed. Unauthorized changes will void the authorization to operate this equipment.

2.4 Limited module procedures
None

2.5 Trace antenna designs
The only allowed antenna's are listed in this manual. They are either manufactured by Hayward as part of the module or sold as a completed product.

2.6 RF exposure considerations
This module is approved as a mobile device, for use provided the end product installation will provide a 20cm separation distance between the Antenna and person(s)/user(s). In the end product, the antenna(s) used with this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter. User and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying the RF exposure compliance. Such as minimum separation distance from users, persons of 20cm and to not be co-located with any other transmitter, without additional RF Exposure testing. If RF exposure statements and use conditions are not provided, then host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

All transmitters regulated by FCC must comply with RF exposure requirements. KDB 447498 General RF Exposure Guidance provides guidance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to Radio Frequency (RF) fields adopted by the Federal Communications Commission (FCC).
From the FCC Grant: Output power listed is conducted. This transmitter is restricted for use with the specific antenna(s) tested in this application for Certification.
In the end product, the antenna(s) used with this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operation in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying the RF exposure compliance.

2.7 Antennas

Table 2-7 (copy below) provides the list of Approved antennas along with the manufacturer and part number details. FCC / Industry Canada requires that there cannot be any changes/alterations to the authorized antenna(s). Only the approved antenna's listed below are authorized for use. The module is set at the factory to use either the built-in antenna or the use the antenna connector and a approved antenna from the table below. The Antenna port on the module uses a RP-SMA connector.

Sino.	P/N	Vendor	Antenna Gain @ 0.9GHz	Antenna Gain @ 2.4GHz	Antenna type
1	Internal	Hayward	5dBi	5dBi	Meander Line
2	X9000984-4GDRMW	AVX/ Kyocera	3.4 dBi	4.7dBi	Dipole

When utilizing the external antenna. Connect via a suitable 50 Ohm Coax Cable using the PCB Mounted UFL Connector and routing to the external antenna which uses a RP-SMA connector. Care should be taken to route the cable away from high voltage and/or sensitive electronics. The end use application must ensure that only approved antenna's from the above table are used.

2.8 Label Compliance information

The G066000277A-1 modules has been labeled with its own FCC ID number. If the FCC ID is not visible when the module is installed inside another device, then the outside of the finished product into which the module is installed must display a label referring to the enclosed module. This exterior label can use wording as follows in 4.7.1a and 4.7.1b:

2.8.1a **Contains Transmitter Module FCC ID:** RNW-BT923
or
Contains FCC ID: RNW-BT923

2.8.1b **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.**

2.8.1c **Electronic Labeling of 4.7.1a and 4.7.2b may be acceptable to the FCC. Consult FCC KDB 784748 D02 for further guidance.**

2.9 Information on test modes and additional testing requirements

The module as shipped does not support any test modes. It is configured for normal operation when manufactured. It is envisioned that when conducting the Part 15 Subpart B compliance test, the Lab will use 900MHz filter.

2.10 Additional testing, part 15 subpart B disclaimer

This modular transceiver is approved to FCC Transmitter Rules, FCC Parts 15.247. However the final host product manufacturer is still responsible for compliance with any other FCC rules that apply to the host which are not covered by this modular certification. Which includes the Host Manufacturer responsible for Part 15 Subpart B compliance testing with this modular transmitter installed.

2.11 Note EMI Consideration's

Note that a host manufacturer is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

Hayward expects that the module as delivered and detailed above will meet the needs of our customers. However if you believe there are specific changes warranted. Forward your concerns/request to Product Compliance at Hayward Industries, 1 Hayward Industrial Drive, Clemmons, NC 27012. Or to your local Hayward Representative.

2.13 User Manual Requirements

A user's manual for the finished product should include the following statement(s):

2.13a This equipment has been tested and found to comply with the limits for a Class (Insert value from actual complete equipment test (A or 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 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

2.13b **Contains Transmitter Module FCC ID:** RNW-BT923
or
Contains FCC ID: RNW-BT923

Additional information on labeling and user information requirements for Part 15 devices can be found in KDB Publication 784748, which is available at the FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB) https://apps.fcc.gov/oetcf/kdb/index.cfm

Note: The G066000277 by itself will meet Class B requirements. However as noted in para 2.1 integrator will need to test the completed final product for compliance. The requirement for either Class A or B is dependent upon the classification of the end-used equipment.

2.1.3 Approved Antenna Types

To maintain modular approval in the United States, only the antenna types that have been tested shall be used. It is permissible to use a different antenna, provided the same antenna type and antenna gain (equal to or less than) is used. An antenna type comprises antennas having similar in-band and out-of band radiation patterns.

Antennas approved for G066000277A module with the antenna types are listed in Table 2.7.

2.1.4 Helpful Websites

Federal Communications Commission (FCC): http://www.fcc.gov
FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB): https://apps.fcc.gov/oetcf/kdb/index.cfm

3.1 Canada

The G066000277A module has been certified for use in Canada under Innovation, Science and Economic Development Canada (ISED, formerly Industry Canada) Radio Standards Procedure (RSP) RSP-100, Radio Standards Specification (RSS) RSS-Gen and RSS-247. Modular approval permits the installation of a module in a host device without the need to recertify the device.

This radio transmitter 5110A-BT923 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.

Sino.	P/N	Vendor	Antenna Gain @ 0.9GHz	Antenna Gain @ 2.4GHz	Antenna type	Impedance
1	Internal	Hayward	5dBi	5dBi	Meander Line	50 Ω
2	X9000984-4GDRMW	AVX/ Kyocera	3.4 dBi	4.7dBi	Dipole	50 Ω

3.1.1 Labeling and User Information Requirements

Label Requirements (from RSP-100 Issue 11, Section 3): The host device shall be properly labeled to identify the module within the host device.

The Innovation, Science and Economic Development Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labeled to display the Innovation, Science and Economic Development Canada certification number of the module, preceded by the words "Contains", or similar wording expressing the same meaning, as follows:

For the G066000277A module use 3.1.1a or 3.1.1b:

3.1.1a Contains transmitter module IC: 5110A-BT923

3.1.1b Contains IC ID: 5110A-BT923

3.1.2 User Manual Requirements

User Manual Notice for License-Exempt Radio Apparatus (from Section 8.4 RSS-Gen, Issue 4, November 2014): User manuals for license-exempt radio apparatus shall contain the following (3.1.2a) or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both:

3.1.2a 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.
Le pr`esent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autoris`ee aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radio`electrique subi, m`eme si le brouillage est susceptible d'en compromettre le fonctionnement.

3.1.3 Transmitter Antenna (From Section 8.3 RSS-GEN, Issue 4, November 2014): User manuals, for transmitters shall display the following notice in a conspicuous location (3.1.3a) unless configured to only use the built-in Meander Line Ant:

3.1.3a **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.**

Conform`ement `a la r`eglementation d'Industrie Canada, le pr`esent `emetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inf`erieur) approuv`e pour l'`emetteur par Industrie Canada. Dans le but de r`eduire les risques de brouillage radio`electrique

`a l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonn`ee `equivalente (p.i.r.e.) ne d`epasse pas l'intensit`e n`ecessaire `a l'`etablisse-ment d'une communication satisfaisante.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi) and required impedance for each. (Ant models certified are listed in 1.1 above)

3.1.2 RF Exposure

All transmitters regulated by ISED must comply with RF exposure requirements listed in RSS-102 - Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands).
This transmitter is restricted for use with a specific antenna tested in this application for certification, and must not be co-located or operating in conjunction with any other antenna or transmitters within a host device, except in accordance with Canada multi-transmitter product procedures.

The installation of the transmitter must ensure compliance is demonstrated according to the ISED SAR procedures. In the end product, the antenna(s) used with this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operation in conjunction with any other antenna or transmitter. User and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying the RF exposure compliance.

3.1.3 Helpful Web Sites
Industry Canada: http://www.ic.gc.ca/

4.0 Installation and Use of the G066000277

This module is a data interface between the Hayward backyard environment, End User and a piece of equipment into which it is installed. The radio module supports communications over Bluetooth LE and Hayward 902.2-927.7MHz.

4.1 The G066000277A is a complete RF Transceiver module. Ready to be placed upon your Printed Circuit Board. The module is intended to be enclosed within the End Product Enclosure. For best performance the G066000277A should not be placed behind a metal enclosure. But mounted behind a RF Transparent Enclosure such as plastic material suitable for the operating conditions.

4.2 When placing upon the End Use PCB. The G066000277A is designed to sit on the edge of the PCB with the Printed Antenna overhanging the edge of the PCB. See attached photo for where not to place the Carrier PCBA.

4.3 Local communication to / from the G066000277A module is done via RS485 and Universal Asynchronous Receiver/Transmitter. These local communications channels allow the end use equipment to pass data to/from the G066000277A radio module.

4.4 The G066000277A is programmed at the factory and there is no user access to the programming, nor access to parameters regarding the operation of the transceiver. FCC and Industry Canada Approvals require that the G066000277A only operate with the approved firmware included with the G066000277A module.

4.5 A reset input is provided. This is used to allow a new Bluetooth Connection to be made to the G066000277A. Following the assertion of the reset. The G066000277A will start a new pairing procedure.

4.6 Once installed and connected the Transceiver supports/relays standard HPN (Hayward Pool Network) commands to the End Use Device local comms port (RS-485).

4.7 If using the External Antenna port. This port is a U.FL connector. FCC/IC rules require the Antenna must be restricted to one of the approved antenna's (See table 4.1). One method is to make the antenna connection permanent. While another is to use a non-standard connector. Such as the RP-SMA used on the Kyocera Ant listed in table 4.1.

4.8 Care should be made to use only high quality Coaxial cables, of short length to make antenna connection. And care must be taken to route away from interference causing components.