

ReZolt® AN-005

ReZolt® Em-Fi™ Module Regulatory Certification User Guide

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1. Introduction

ReZolt provides embedded Wi-Fi (Em-Fi™) modules, including RZ707MS-G1N and RZ707MS-E1N, to enable low-power Wi-Fi communication on deeply embedded devices. The ReZolt Em-Fi modules transmit and receive radio signals in accordance with the spectrum regulations for the 2.4 Ghz unlicensed ISM band. Regional regulatory agency approval may be required to operate these modules throughout the world.

This document describes regulatory certifications applicable to ReZolt Em-Fi modules, as well as regulatory certification requirements on end-products that integrate these modules.

1.1. Intended Audience and Reading Suggestions

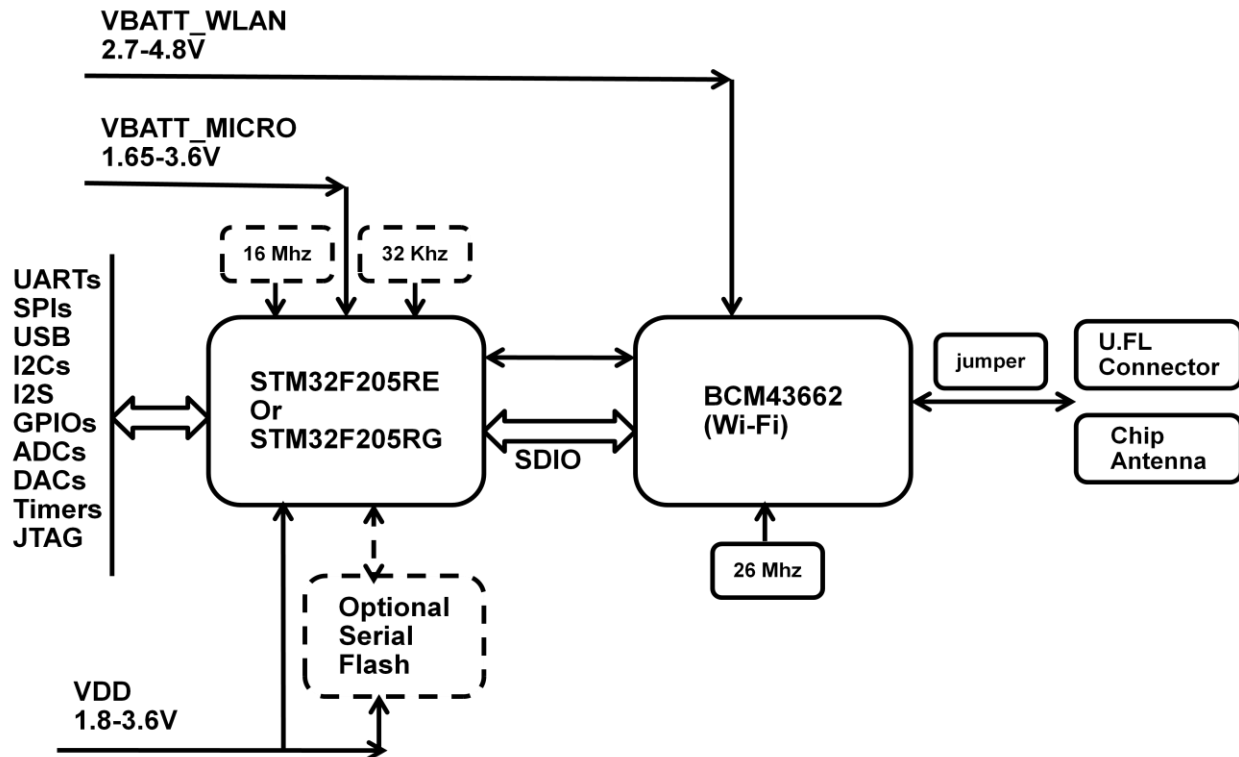
This document is intended for customers of ReZolt Em-Fi modules.

1.2. Scope of the Document

This document provides general information involved with Regulatory Certification when installing and operating ReZolt Em-Fi modules.

2. Module Description

ReZolt provides several Embedded Wi-Fi modules, including RZ707MS-G1N and RZ707MS-E1N. The chart below describes the block diagram of the two modules.



RZ707MS Module consists of two main components: an ARM Cortex-M3 based 32-bit microcontroller that runs Em-Fi Software and Broadcom BCM43662 Wi-Fi device. It also includes an optional serial Flash (1MB or 2MB), an on-board chip antenna and a u.FL connector for optional external antenna.

The difference between RZ707MS-G1N and RZ707MS-E1N is only in the microcontroller, which solely controls the digital part of the module. For RZ707MS-G1N, STM32F205RG is used, which has 1 MB flash and 128 KB SRAM. For RZ707MS-E1N, STM32F205RE is used, with 512 KB flash and 128 KB SRAM. The two microcontrollers are pin-compatible and completely identical in their functionality, except for the supported flash size.

3. Eligibility Requirements on Regulatory Certification

Most countries have a regulatory body for radio products and the wireless emissions that they create. Generally, these bodies oversee three major areas for any radio device.

- **Intentional radiation:** This is the actual radio signal that is being generated and transmitted by the device (i.e. ReZolt Em-Fi module). There are typically regulations for radio communication radiating at frequencies or power outputs. The device in question cannot radiate outside of predefined ranges and regulatory limits.
- **Unintentional radiation:** All systems radiate some energy as a result of onboard clocks oscillators and other devices. If the unintentional radiation is strong enough, it can interfere with normal operation of with other products that are close by, such as the intentional radiator within the system (i.e. ReZolt Em-Fi module). Regulatory bodies generally have specific limits that are set on unintentional radiation.
- **Safety:** Safety certifications ensure that the product has met regulatory specifications for health, safety, and environmental requirements.

To help customers integrating Em-Fi modules with shorter time-to-market, ReZolt submit its Em-Fi modules to relevant agencies and obtained regulatory approvals for specific countries, under the “Modular Approval (MA) Grant”.

In countries that accept the MA Grant, the intentional radiation portion of this grant is transferable to end-product manufacturers given adherence to specific implementation criteria noted in this document. Such countries include US, Canada, and many European countries. This means the end-product manufacturers are relieved from having to perform the radio certification part in such countries. Detailed terms and conditions of regulatory approval for these countries are described in this document.

However, any modification of the modules will void the manufacturer’s warranty. Any alteration or deviation from the documented installation and/or operation of the modules will void the MA Grant as it applies to the end-products. In such cases, the end-products may require a complete regulatory certification, depending on the governmental requirements of the regions where the products are sold.

The unintentional radiation (or digital emission) portion of the grant is *not* transferrable to end-products in any cases.

4. Users Manual Requirements

For electronic devices that integrate ReZolt Em-Fi modules, their manufacturer must include certain text in their product user's guide, in accompaniment with other regulatory information. The text may be disbursed according to language or geographic regions, if needed, but the exact text shown below must be maintained.

4.1 United States Requirements

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This typically is written as follows:

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

5. United States Regulatory Approval

The requirements for United States FCC Modular Approval (MA) were released in June 2000 in the FCC's public notice: FCC Public Notice DA 00-1407, part 15 Unlicensed Modular Transmitter Approvals.

5.1 Design Requirements

The following conditions must be strictly adhered to for MA:

1. No modification to the module including the circuitry is permitted
2. The design criteria including antenna, interconnects and transmission line
3. Testing of the final device configuration for Digital Emissions Compliance

The modules may not be altered or modified in any way by the OEM or other integrator(s). Additionally, no component(s) may be added which change the radio frequency (RF) characteristics. These include unintentional or spurious emissions, immunity, ESD characteristics, or other items commonly associated with RF devices. This includes all components; passive and active (such as RF filters and RF switches). Additionally, no RF components may be placed between the RF output of the module and the antenna.

ReZolt Em-Fi modules consist of an on-module antenna which has been qualified and approved for use under the MA certification. This antenna is designed to be compatible with the RF impedance and frequency range of the modules. Any changes or modifications on the on-module antenna voids the MA grant.

ReZolt Em-Fi modules also consist of a u.FL connector that can be used to connect an external antenna to the module. Use of an external antenna voids the MA grant.

5.2 Unintentional Radiation Testing

Any end-products integrating ReZolt Em-Fi modules must meet unintentional radiation compliance: FCC Part 15 Section 15.109 Sub-paragraph A, Class B Radiated Emission Limits.

The products must be tested in accordance with the above requirements in order to confirm radiated emissions are within specified limits.

5.3 Co-Location of Additional Transmitters

For end-products using two or more co-located RF transmitters, please refer to the following statement in the MA grant:

“This modular transmitter is approved for use in Digital Electronic Devices and may operate in conjunction with other mobile and portable transmitters in the same device; provided, the other mobile and portable transmitters have satisfied the appropriate RF exposure requirements contained in the FCC rules. The grantee must also provide Digital Electronic Device integrators, or end users if marketed directly to end users, with installation and operating instructions for satisfying RF exposure requirements. The Grantee must inform

second manufacturers/installers that in order for this module to be operated in any configuration other than that permitted in the preceding sentences, a separate FCC equipment authorization must be obtained for each device into which this module is installed.”

5.4 Product Labeling Requirements

ReZolt Em-Fi modules are properly labeled with Regulatory Certification information, including FCC ID. The FCC ID shown on the final product must be readily visible at the time of purchase. If the module is installed in a location whereby the included label is visible, then a permanent label with the statement below needs to be placed on the final product and no further labeling need apply. If the product is to be labeled using electronic labeling. The end product users manual must show the ID and provide user instructions on how to access the ID in software. If the label is not visible after being integrated into the customer products, a permanent label referring to the ReZolt module must be used on the customer products that refer to the FCC ID listed below in form of “**Contains Transmitter Module FCC ID: O2R-707MS1**” or “**Contains FCC ID: O2R-707MS1**” and including the statement shown below:

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.

Note if the product is too small (defined by <4 x 4 inches) or if approved by the FCC, this statement may be placed in the manual.

6. Industry Canada Regulatory Approval

Industry Canada regulatory approval typically conforms to the FCC in terms of emission levels and other regulatory requirements.

6.1 Design Requirements

The following conditions must be strictly adhered to for MA:

1. No modification to the module including the circuitry is permitted
2. The design criteria including antenna, interconnects and transmission line
3. Testing of the final device configuration for Digital Emissions Compliance

The modules may not be altered or modified in any way by the OEM or other integrator(s). Additionally, no component(s) may be added which change the radio frequency (RF) characteristics. These include unintentional or spurious emissions, immunity, ESD characteristics, or other items commonly associated with RF devices. This includes all components; passive and active (such as RF filters and RF switches). Additionally, no RF components may be placed between the RF output of the module and the antenna.

ReZolt Em-Fi modules consist of an on-module antenna which has been qualified and approved for use under the MA certification. This antenna is designed to be compatible with the RF impedance and frequency range of the modules. Any changes or modifications on the on-module antenna voids the MA grant.

ReZolt Em-Fi modules also consist of a u.FL connector that can be used to connect an external antenna to the module. Use of an external antenna voids the MA grant.

6.2 Unintentional Radiation Testing

Any end-products integrating ReZolt Em-Fi modules must meet unintentional radiation compliance: FCC Part 15 Section 15.109 Sub-paragraph A, Class B Radiated Emission Limits.

The products must be tested in accordance with the above requirements in order to confirm radiated emissions are within specified limits.

Note that Industry Canada generally follows the guidelines of the FCC for emission level requirements. FCC end-product compliance certification results may be used to satisfy Industry Canada requirements. Please consult the Industry Canada ICES-003 specifications to confirm interagency compliance. If comparable FCC testing has not been performed or if the specifications are not cross compliant, ICES-003 testing will be required.

6.3 Product Labeling Requirements

ReZolt Em-Fi modules are properly labeled with Regulatory Certification information, including IC ID. The IC ID shown on the final product must be readily visible at the time of purchase. If the module is installed in a location whereby the included label is visible, then no further labeling need apply. If the product is to be labeled using electronic labeling. The end product

users manual must show the ID and provide user instructions on how to access the ID in software. If the label is not visible after being integrated into the customer products, a permanent label referring to the ReZolt module must be used on the customer products that refer to the IC ID listed below in form of “This device contains IC: 10363A-707MS1” or “Contains IC: 10363A-707MS1”.

The following requirements may be placed in the product’s manual or on the product label or both at the option of the manufacturer or responsible party.

This device complies with Industry Canada licence-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 présent appareil est conforme aux CNR d'Industrie 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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

6.4 RF Exposure

If the end product design incorporates a User to Antenna separation distance closer than 20cm the Industry Canada certification may become invalid and may require separate certification for the finished product. Contact ReZolt for details. (Refer to RSS-102 for further information.)

Revision History

| Date | Version | Changes |
|-----------|---------|---|
| 5/21/2012 | 0.1 | First draft. |
| 10/3/2012 | 0.2 | Added Section RF exposure requirement for IC. |