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GSI ELECTRONICS RPIRM0 Raspberry Pi RM0 Module Owner's Manual

Contents

GSI ELECTRONICS RPIRM0 Raspberry Pi RM0 Module

Installation Guide for Raspberry Pi RM0 Module Integration

Purpose

The purpose of this document is to provide information on how to use a Raspberry Pi RM0 as a radio module when integrating into a host product.
Incorrect integration or use may infringe compliance rules meaning recertification may be required.

Module Description

The Raspberry Pi RM0 module has an IEEE 802.11b/g/n/ac 1×1 WLAN, Bluetooth 5 and Bluetooth LE module based on the 43455 chip. The module is designed to be mounted to a PCB into an host product. The module must be placed in a suitable location to ensure radio performance is not compromised. The module must be use with pre-approved antenna only.

Integration into Products

Module & Antenna Placement
A separation distance greater than 20cm will always be maintained between the antenna and any other radio transmitter if installed in the same product.
Any external power supply of 5V should be supplied to the module and shall comply with relevant regulations and standards applicable in the country of intended use.
At no point should any part of the board be altered as this will invalidate any existing compliance work. Always consult professional compliance experts about integrating this module into a product to ensure that all certifications are retained.

Antenna Information

The module is approved to work with an antenna on the host board; a Dual band (2.4GHz and 5GHz) PCB niche antenna design licensed from Proant with Peak Gain: 2.4GHz 3.5dBi, 5GHz 2.3dBi or an external whip antenna (peak gain of 2dBi). It is important that the antenna is placed in a suitable place inside the host product to ensure optimal operation. Do not place close to metal casing.
The RM0 has a number of certified antenna options, you must strictly adhere to the pre-approved antenna designs, any deviation will invalidate the modules certifications. The options are;

- Niche antenna on board with a direct connection from Module to antenna layout. You must follow the design guidelines for the antenna.

- Niche Antenna on board connected to the passive RF switch (Skyworks Part number SKY13351-378LF), switch directly connected to the Module. You must follow the design guidelines for the antenna.
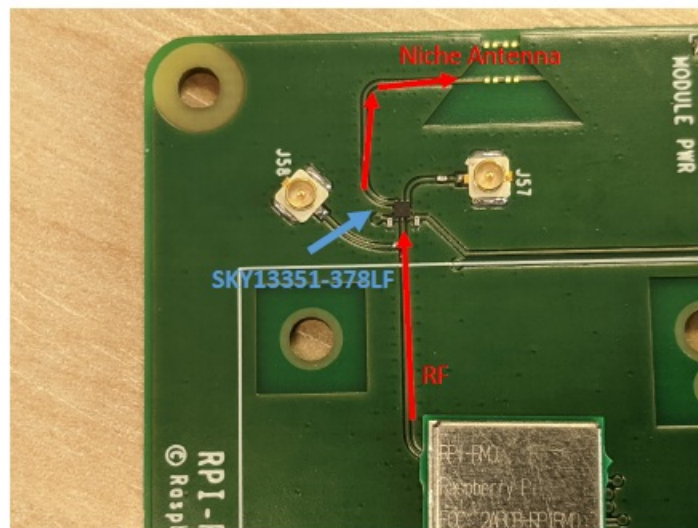
- Antenna (Manufacturer; Raspberry Pi Part number YH2400-5800-SMA-108) connected to UFL connector (Taoglas RECE.20279.001E.01) connected to RF switch (Skyworks Part number SKY13351-378LF) directly connected to the RM0 module. Photo shown below
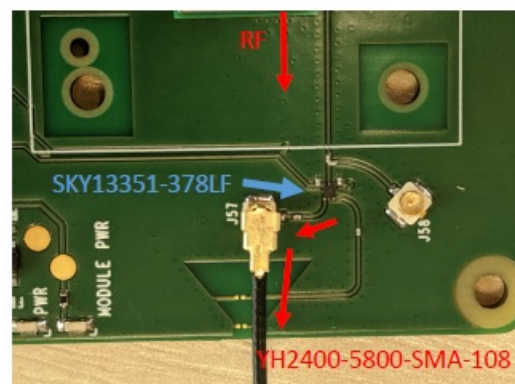

- You cannot deviate from any part of the specified antenna list.

The routing to the UFL connector or Switch must be 50ohms impedance, with suitable Ground stitching vias along the route of the trace. The trace length should be kept to a minimum, locating the module and antenna close together. Avoid routing the RF output trace over any other signals or power planes, referencing only Ground to the RF signal.

Niche antenna guidelines are below, to use the design you must license the design from Proant AB. All dimensions

are to be followed, the cutout is present on all layers of the PCB.
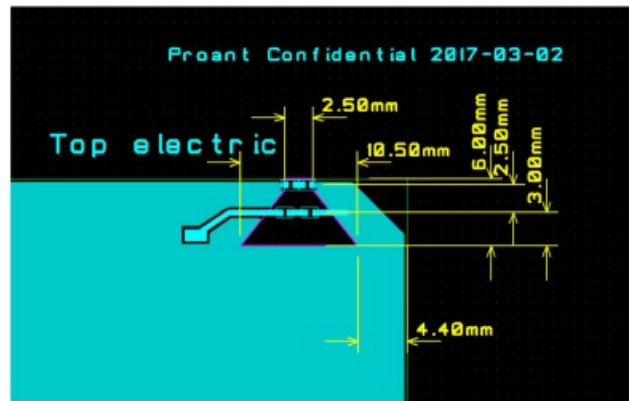
The antenna must be placed at the edge of the PCB, with appropriate grounding around the shape. The Antenna consists of the RF feed line (routed as 50ohms impedance) and cutout in the Ground copper. To verify that the design is functioning correctly you must take a plot of it's performance and calculate peak gain to ensure the implementation is not over the specified limits stated in this document. During production the antenna performance must be verified by measuring radiated output power at a fixed frequency.
To test final integration you will be required to get the latest test files from **compliance@raspberrypi.com**

Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer (integrator) must notify the module grantee (Raspberry Pi) that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.
The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the 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. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity). The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

End Product Labelling

A label is to be fitted to the exterior of all products containing the Raspberry Pi RM0 module. The label must contain the words "Contains FCC ID: 2AFLZRPIRM0" (for FCC) and "Contains IC: 11880A-RPIRM0" (for ISED).

FCC

Raspberry Pi RM0 FCC ID: 2AFLZRPIRM0
This device complies with Part 15 of FCC Rules, Operation is Subject to following two conditions:

1. This device may not cause harmful interference, and

2. This device must accept any interference received including interference that cause undesired operation.

Caution: Any changes or modifications to the equipment not expressly approved by the party responsible for compliance could void user s authority to operate the equipment.
This equipment has been tested and found to comply within 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:

- Re-orient or relocate the receiving antenna

- Increase the separation between the equipment and receiver

- Connect the equipment into an outlet on a different circuit from that to which the receiver is connected

- Consult the dealer or an experienced radio/TV technician for help.

For products available on the USA/Canada market, only channels 1 to 11 are available for 2.4GHz WLAN
This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter except in accordance with FCC's multi-transmitter procedures.
This device operates in the 5.15~5.25GHz frequency range and is restricted to in indoor use only.

IMPORTANT NOTE
FCC Radiation Exposure Statement; Co-location of this module with other transmitter that operate simultaneously are required to be evaluated using the FCC multi- transmitter procedures.
This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The host device will contain an antenna and must be installed to so that a separation distance of at least 20cm from all persons.

For products available on the USA/Canada market, only channels 1 to 11 are available for 2.4GHz WLAN
Selection of other channels is not possible.
This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures.

INTEGRATION INFORMATION FOR THE OEM

It is the responsibility of the OEM / Host product manufacturer to ensure continued compliance to FCC and ISED Canada certification requirements once the module is integrated in to the Host product. Please refer to FCC KDB 996369 D04 for additional information.
The module is subject to the following FCC rule parts: 15.207, 15.209, 15.247, 15.403 and 15.407

Important Notice to OEMs:
The FCC Part 15 text must go on the Host product unless the product is too small to support a label with the text on it. It is not acceptable just to place the text in the user guide.

E-Labelling

It is possible for the Host product to use e-labelling providing the Host product supports the requirements of FCC KDB 784748 D02 e labelling and ISED Canada RSS-Gen, section 4.4.
E-labelling would be applicable for the FCC ID, ISED Canada certification number and the FCC Part 15 text.

Changes in Usage Conditions of this Module
This device has been approved as a Mobile device in accordance with FCC and ISED Canada requirement. This means that there must be a minimum separation distance of 20cm between the Module's antenna and any persons
A change in use that involves a separation distance ≤20cm (Portable usage) between the Module's antenna and any persons is a change in the RF exposure of the module and, hence, is subject to a FCC Class 2 Permissive Change and a ISED Canada Class 4 Permissive Change policy in accordance with FCC KDB 996396 D01 and ISED Canada RSP-100.

- As noted above, This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures.

- If the device is co-located with multiple antennas, the module could be subject to a FCC Class 2 Permissive Change and a ISED Canada Class 4 Permissive Change policy in accordance with FCC KDB 996396 D01 and

ISED Canada RSP-100.

- In accordance with FCC KDB 996369 D03, section 2.9, test mode configuration information is available from the Module manufacturer for the Host (OEM) product manufacturer.
- Use of any other antennas other than those specified in section 4 of this installation guide are subject to the permissive change requirements of the FCC and ISED Canada.

Documents / Resources

(document thumbnail)	**GSI ELECTRONICS RPIRM0 Raspberry Pi RM0 Module** [pdf] Owner's Manual 2AFLZRPIRM0, RPIRM0 Raspberry Pi RM0 Module, RPIRM0, Raspberry Pi RM0 Module, Pi RM0 Module, Module

References

- **User Manual**