Integrating third party antennas in Raspberry Pi's key markets

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Document version history

Release	Date	Description
1	10 Feb 2026	Initial release

Scope of document

This document applies to the following Raspberry Pi products:

Compute Modules

CM1	CM3	CM4	CM5
		✓	✓

Introduction

When designing and producing Raspberry Pi devices, we consider as many potential use cases as possible — particularly when it comes to criteria like wireless (WLAN and Bluetooth) performance and antenna usage. While our single-board computers (such as Raspberry Pi 5) include only an on-board PCB antenna, our Raspberry Pi Compute Module range offers two pre-approved options: an on-board PCB antenna and the external whip antenna from the official Raspberry Pi Antenna Kit.

Figure 1.
Official Antenna kit

However, we recognise that some industrial and commercial customers may need to employ alternative, third-party antennas for their applications. Example scenarios include the following:

- Embedding a Compute Module within a metal enclosure, where the PCB antenna would perform insufficiently due to the Faraday cage effect
- Extending the communication distance of a device, which requires increased antenna gain
- Integrating an antenna with a different form factor, such as a flexible PCB antenna

In these cases, the Compute Module and new antenna combination may be required to undergo additional testing and certification before the product can be sold. While procedures vary depending on the market and the device's features, Raspberry Pi is well placed to support our customers in meeting these additional requirements — either by updating our existing certifications or by obtaining new certifications on their behalf.

Compliance requirements

For new antennas, compliance requirements depend on whether the antenna gain is less than, equal to, or higher than the approved gain value. Alternative antenna options are therefore split into two categories:

- Antenna gain is **equal** to or **less than** the approved antenna gain
- Antenna gain is **higher than** the approved antenna gain

Below is a summary of the specific certifications and testing procedures required in a number of our key markets.

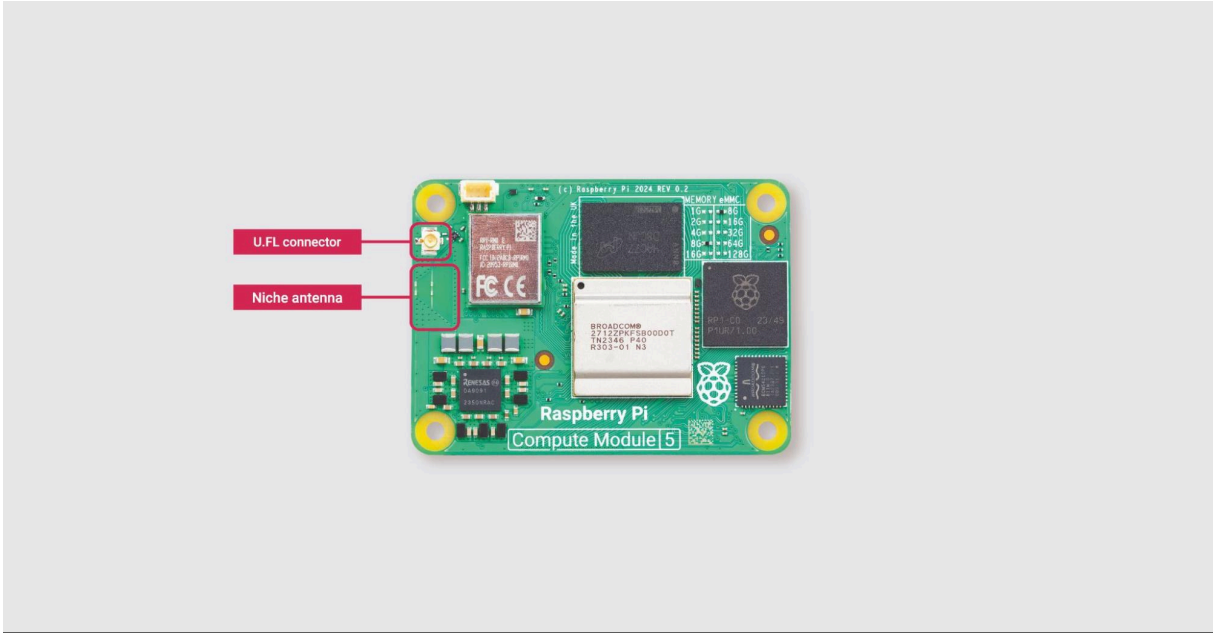
Market	Antenna with equal or lower gain	Antenna with higher gain
EU/UK	RED - 2014/53/EU Module Integration: The integrator is able to adopt an antenna with a gain less than or equal to the gain of the antenna used for the original certification. No further spectrum usage testing (RED Article 3.2) is needed. The integrator is strongly advised to conduct spurious emissions tests (RED Article 3.2) and other EMC tests (RED Article 3.1b) on the final integration; a process of self-declaration is acceptable.	RED - 2014/53/EU Module Integration: Depending on the gain value of the antenna used, integrators must repeat some or all of the spectrum usage tests (RED Article 3.2). The integrator is strongly advised to conduct spurious emissions tests (RED Article 3.2) and other EMC tests (RED Article 3.1b) on the final integration; a process of self-declaration is acceptable.
USA/Canada	The integrator is able to adopt an antenna with a gain less than or equal to the gain of the antenna used for the original certification. USA: Under the process of a Class 1 Permissive Change (C1PC), as described in the FCC Knowledge Database (KDB), Publication 178919 D01 II:A.2. Canada: The ISED has a near-identical process.	USA: Under the process of a Class 2 Permissive Change (C2PC), as described in the FCC Knowledge Database (KDB), Publication 178919 D01 II:A.3. Canada: The ISED has a near-identical process.
China	Additional external antennas are not regulated by the SRRC. No modification to existing certifications is required.	Additional external antennas are not regulated by the SRRC. No modification to existing certifications is required. Manufacturers must ensure that the radiated output power does not exceed the regulatory limits.
Japan	Updating existing certifications with the MIC's certification is required. All antenna options must be listed.	Updating existing certifications with the MIC's certification is required. All antenna options must be listed. Additional testing is **not** required.
South Korea	Updating existing certifications with the RRA's KC certification is required. All antenna options must be listed.	Updating existing certifications with the RRA's KC certification is required. All antenna options must be listed. Additional testing **is** required.
Taiwan	Updating existing certifications with the NCC's certification is required. All antenna options must be listed.	Updating existing certifications with the NCC's certification is required. All antenna options must be listed. Additional testing **is** required.
Vietnam	No modification to existing certifications is required.	No modification to existing certifications is required. Manufacturers must ensure that the radiated output power does not exceed the regulatory limits.

Market	Antenna with equal or lower gain	Antenna with higher gain
Mexico	No modification to existing certifications is required.	No modification to existing certifications is required. Manufacturers must ensure that the radiated output power does not exceed the regulatory limits.
Brazil	No modification to existing certifications is required.	Updating existing certifications with ANATEL's certification is required. This may involve additional testing.
India	Updating existing certifications with the WPC ETA certification is required. All antenna options must be listed.	Updating existing certifications with the WPC ETA certification is required. All antenna options must be listed.

Using pre-approved Raspberry Pi antennas

To avoid potential compliance issues or additional costs altogether, manufacturers, integrators, and end users can employ Raspberry Pi's existing antenna architecture, which is already fully compliant in all of our key markets.

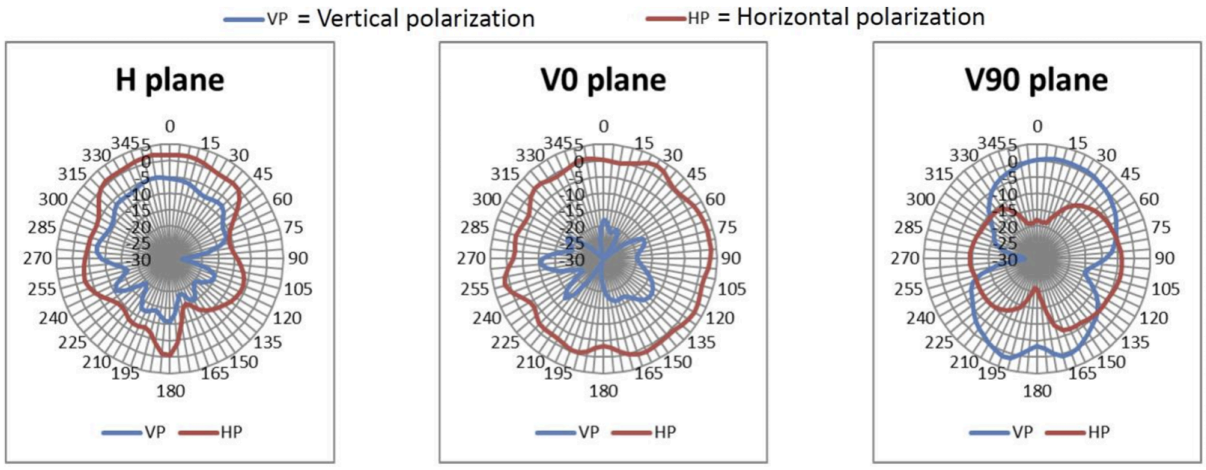
Figure 2.
Raspberry Pi Compute Module 5 Antenna location



Niche antenna

Newer Raspberry Pi single-board computers and microcontrollers include an integrated PCB Niche antenna, providing on-board Wi-Fi and Bluetooth connectivity as standard. Raspberry Pi Compute Module 4 and Raspberry Pi Compute Module 5 also feature one of these PCB Niche antennas, along with a built-in U.FL connector for attaching an external antenna.

Figure 3.
Antenna gain plot for the onboard niche antenna (Source: https://pip.raspberrypi.com/categories/602-antenna-patterns)

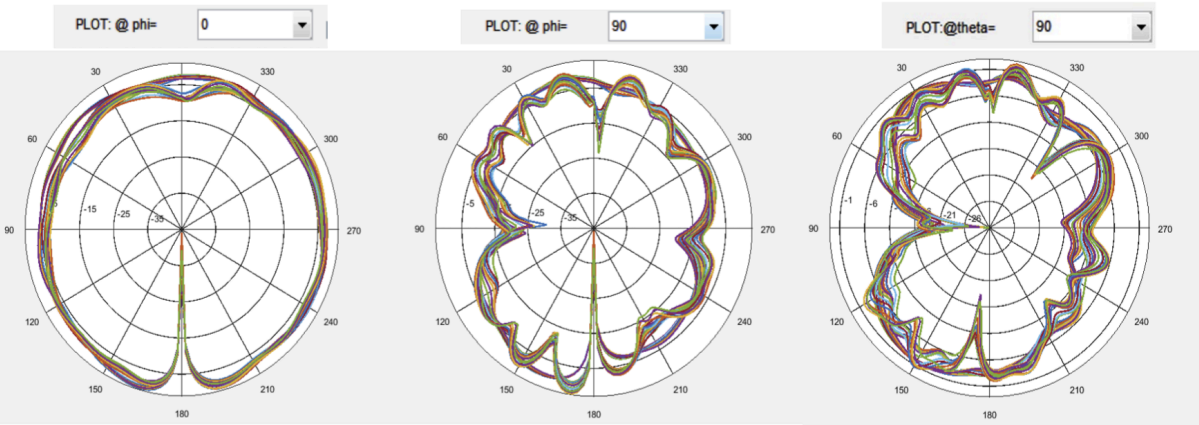


External whip antenna

The U.FL connector on Raspberry Pi Compute Module 4 and Raspberry Pi Compute Module 5 can be fitted with the omnidirectional external whip antenna included in our pre-approved Raspberry Pi Antenna Kit, or with another compatible third-party antenna.

Figure 4.

Antenna gain plot for the external whip antenna in the Raspberry Pi antenna kit. (Source: https://pip.raspberrypi.com/categories/602-antenna-patterns)



Next steps: How Raspberry Pi can help

Should you need further assistance with integrating an alternative antenna — either during the product design process or after launch — our in-house Global Market Access (GMA) team is fully equipped to handle any additional tests, documentation submissions, or approvals on your behalf. Contact gma@raspberrypi.com with your product requirements, including the proposed antenna options and a list of your target markets (including any not listed above).

The GMA team will review your antenna specifications and advise whether compliance with the relevant market regulations is possible. Once confirmed, the team will update the existing approvals or obtain new ones to include the new antenna, carrying out any additional testing as required.

Disclaimer

This document is intended to be used as initial guidance only. Customers should always refer to the official regulations and publications issued by the relevant authorities.

Contact Details for more information

Please contact applications@raspberrypi.com if you have any queries about this whitepaper.

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