



Renesas RRQ610x1-008 Wi-Fi module

Antenna characterization

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Revision History

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3 Acronyms, Abbreviations and Definitions

Table 1. Acronyms

Acronym	Description
WSI	Wireless System Integration



4 Introduction

This paper presents antenna measurements for the Renesas RRQ610x1-008 Wi-Fi module when positioned on a reference test board. The module has an internal PCB integrated dual band antenna supporting the 2.4GHz and 5GHz frequency bands.

5 Antenna measurements

The Wi-Fi antenna performance is characterized in terms of *Voltage Standing Wave Ratio (VSWR)*, *antenna efficiency* and *radiation patterns*.

The antenna performances have been evaluated for the Wi-Fi module when positioned at three locations; left, middle and right on a reference test board with dimensions 70 x 50 mm.

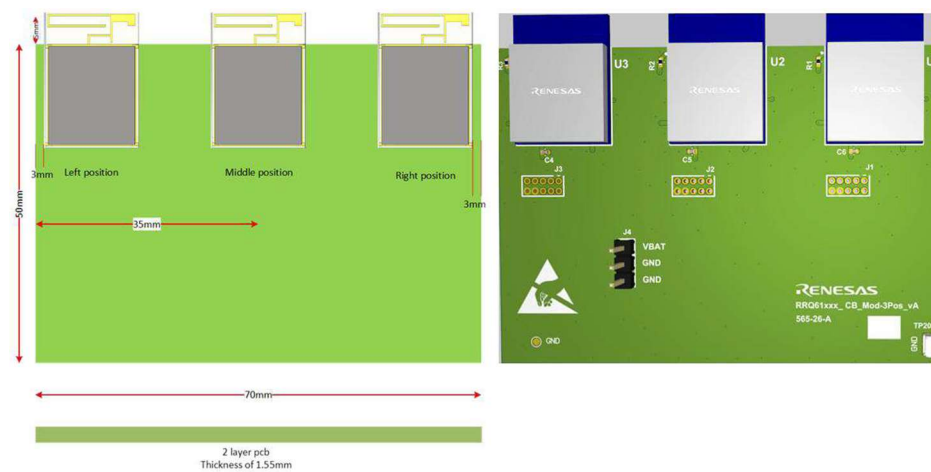


Figure 5-1 The Wi-Fi module is positioned at right, middle and left position on a reference board with dimension 70 x 50mm.

5.1 Voltage Standing Wave Ratio

Voltage Standing Wave Ratio (VSWR) is a measure of how well an antenna is impedance matched to the system impedance. A VSWR of one means a perfect match where all the available power is delivered to the antenna and an infinite VSWR means a short or an open circuit where all the energy is reflected.

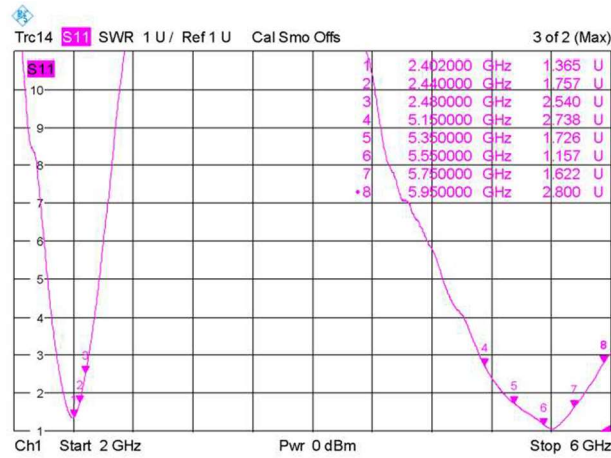


Figure 5-2 VSWR Renesas RRQ610x1-008 Wi-Fi module antenna. Module in right position.



Figure 5-3 VSWR Renesas RRQ610x1-008 Wi-Fi module antenna. Module in middle position.

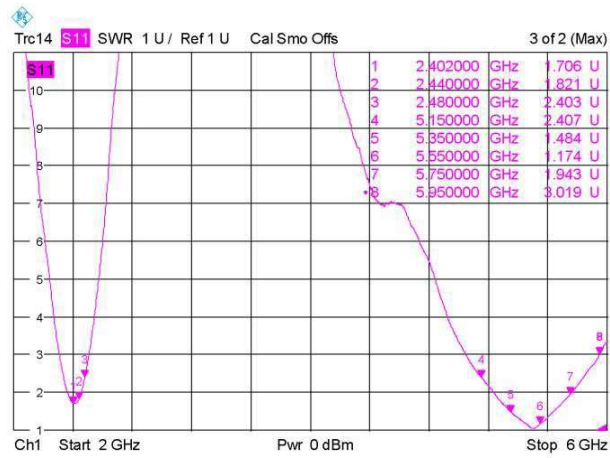


Figure 5-4 VSWR Renesas RRQ610x1-008 Wi-Fi module antenna. Module in left position.

5.2 2D Radiation patterns

The antenna radiation pattern measurements are carried out in a Satimo SG-23 6GHz Stargate Antenna Test Chamber. Radiation patterns are presented for three measurement planes: XY-, XZ- and YZ-planes.



Figure 5-5 Satimo SG-23 6 GHz Stargate Antenna Test Chamber.

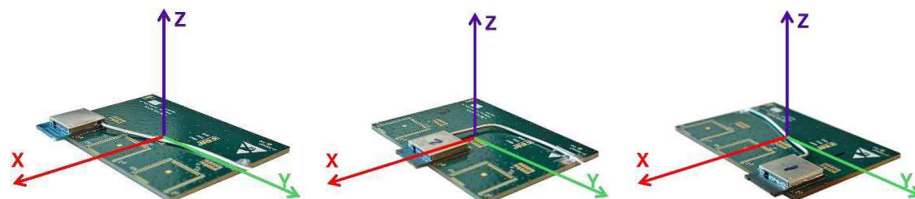


Figure 5-6 Measurement plane definitions.

5.2.1 2.4GHz

5.2.1.1 2.4GHz: Module at position Middle

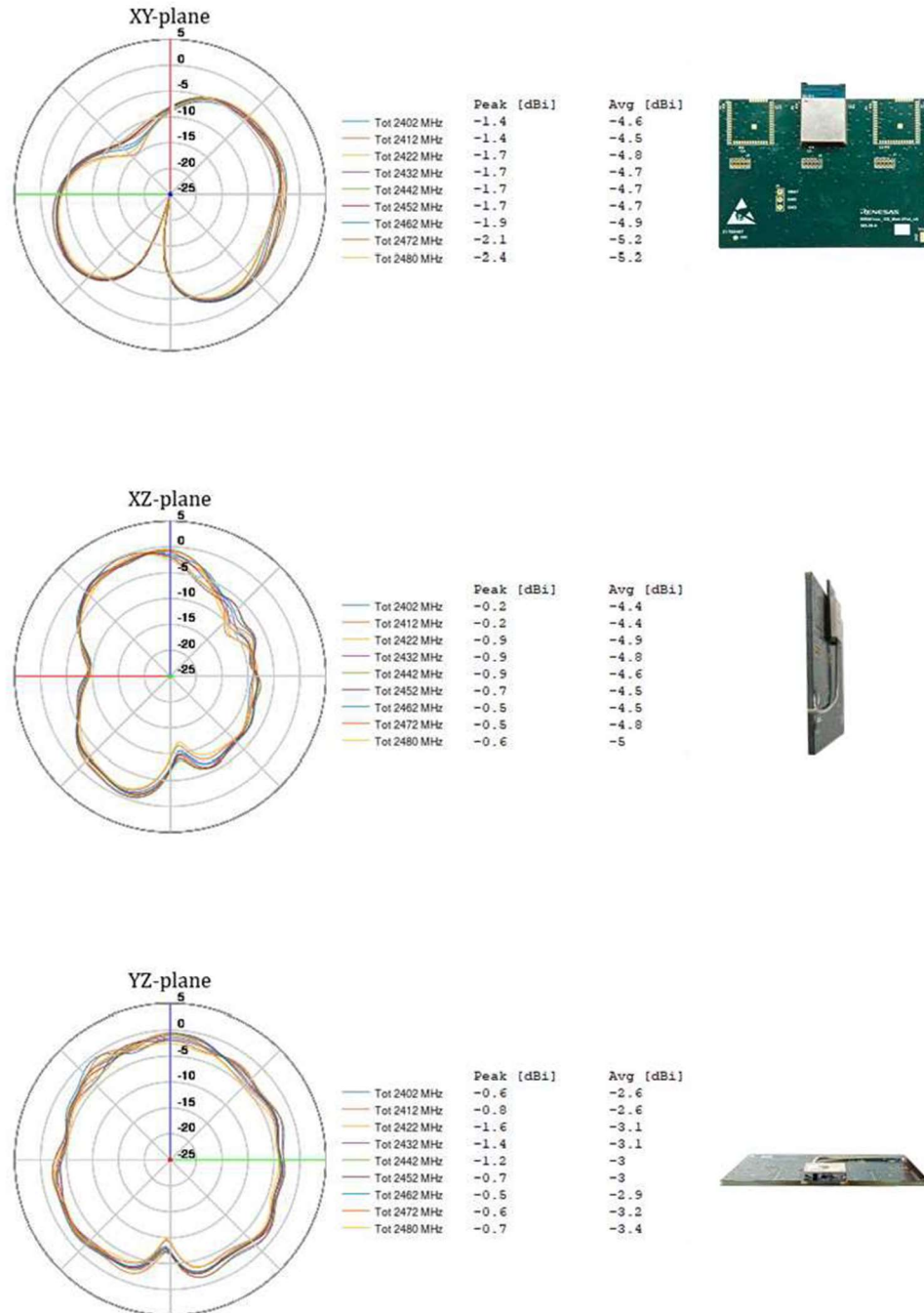


Figure 5-8 2D radiation patterns for 2.4GHz band; Renesas RRQ610x1-008 Wi-Fi module located at position Middle.

5.2.1.2 5GHz: Module at position Middle

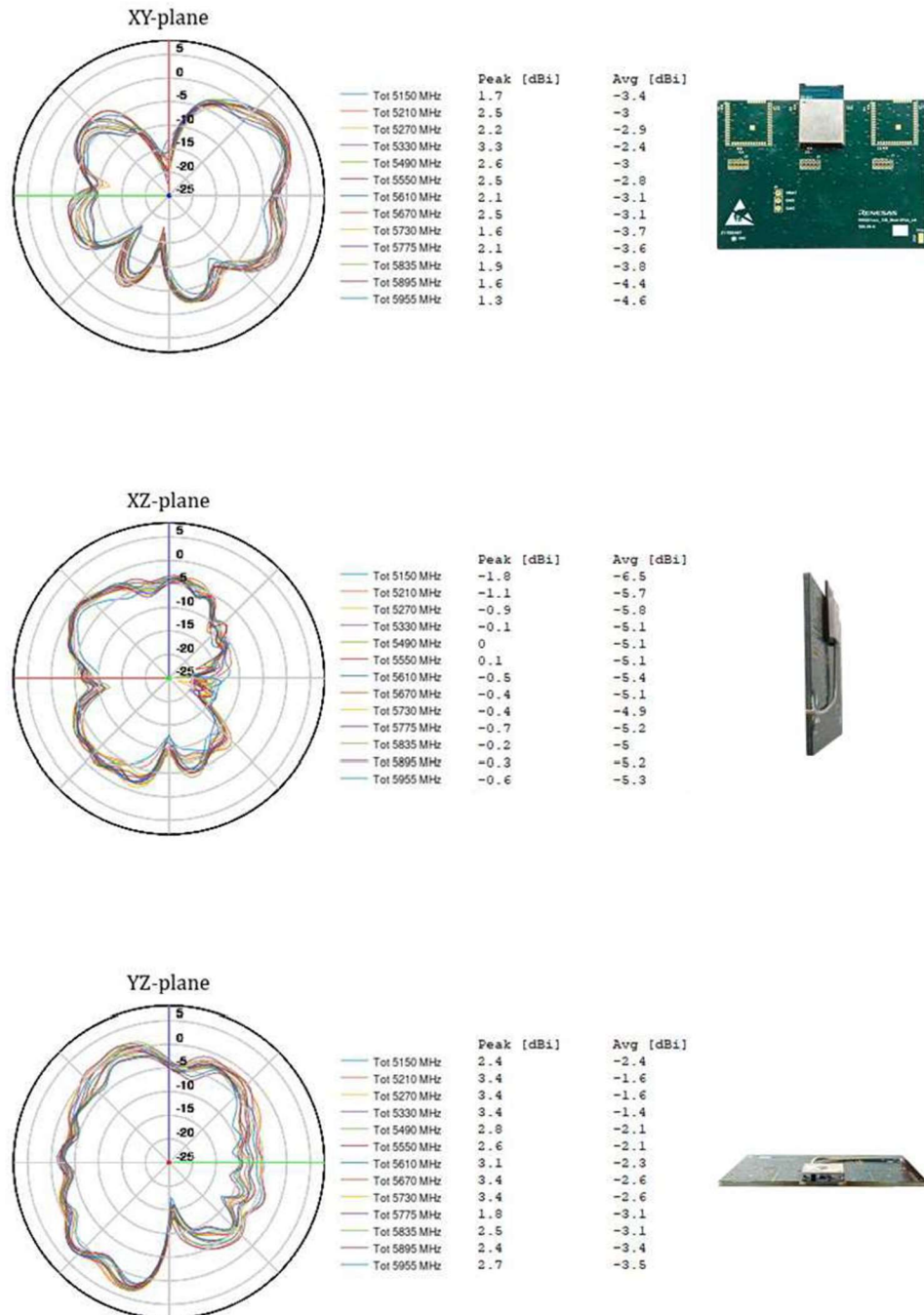


Figure 5-11 2D radiation patterns for 5GHz band; Renesas RRQ610x1-008 Wi-Fi module located at position Middle.