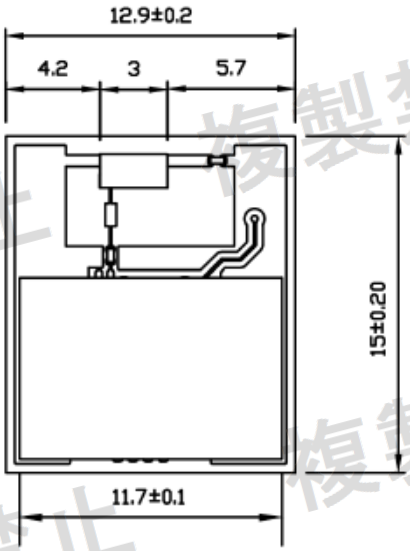
### 3.3 Antenna

BGM210P modules include a built-in antenna with the characteristics detailed in the table below. They also include a 50 Ω-matched RF pin to enable the use of an external antenna instead of the one built-in. See Section 4.15.1 Antenna Radiation and Efficiency and Section 11.1 Qualified Antennas for other relevant details. Antenna diversity is not supported.

**Table 3.1. Antenna Efficiency and Peak Gain**

| Parameter | With optimal layout | Note |
|---|---|---|
| Efficiency | -1 to -2 dB | Antenna efficiency, gain and radiation pattern are highly dependent on the application PCB layout and mechanical design. Refer to the Design Guidelines for recommendations to achieve optimal antenna performance. |
| Peak gain | 1.86 dBi | |

Operation Frequency:2402-2480MHz




Silicon Laboratories International Pte. Ltd.
18 Tai Seng #05-01 18 Tai Seng Street Singapore 539775

### 4.15.1 Antenna Radiation and Efficiency

Typical BGM210P radiation patterns and efficiency for the on-board chip antenna under optimal operating conditions are plotted in the figures that follow. Antenna gain and radiation patterns have a strong dependence on the size and shape of the application PCB the module is mounted on, as well as on the proximity of any mechanical design to the antenna.

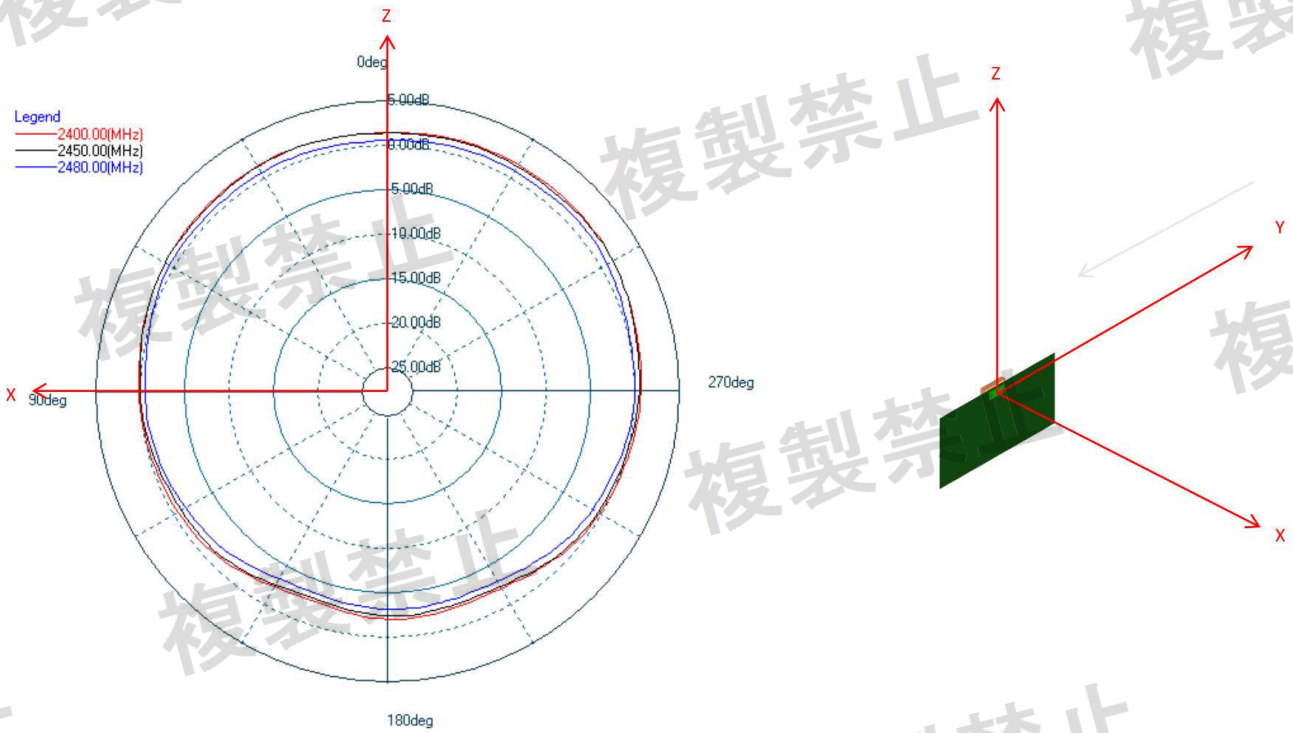



**Figure 4.1. Typical 2D Antenna Radiation Patterns - Phi 0° (Side View) Gain (dBi)**

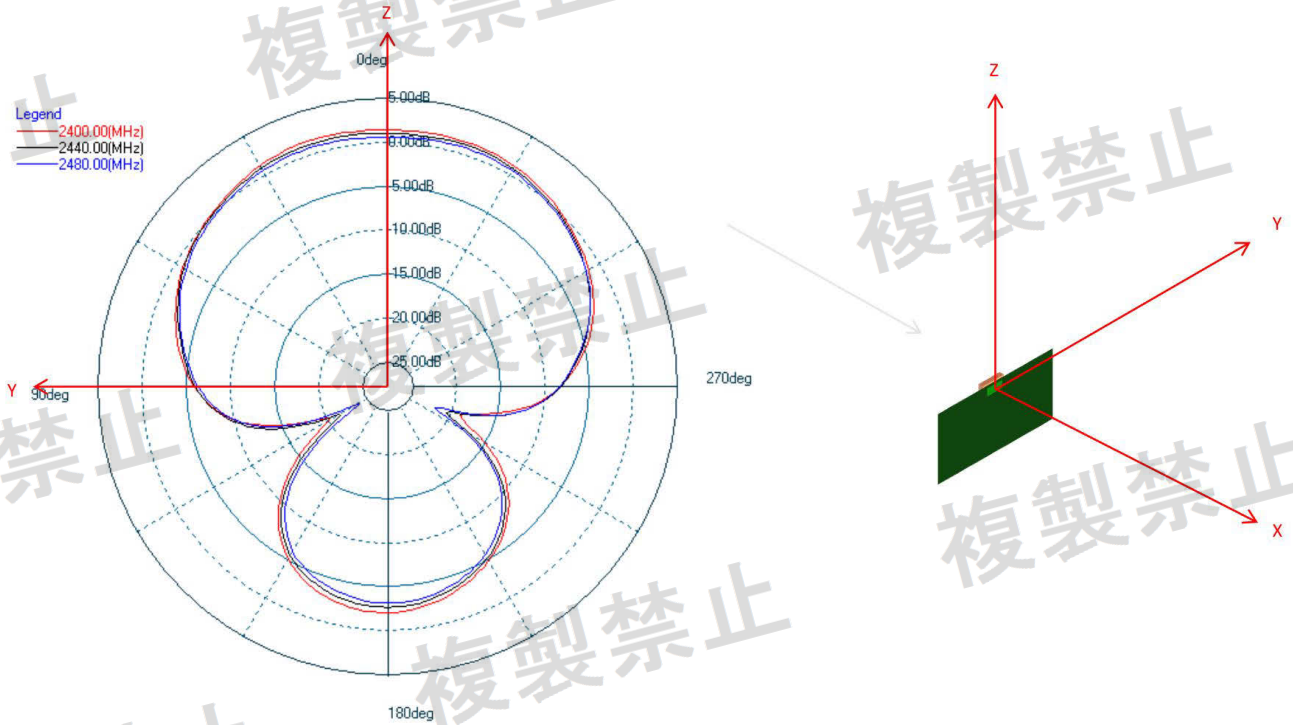



**Figure 4.2. Typical 2D Antenna Radiation Patterns - Phi 90° (Top View) Gain (dBi)**

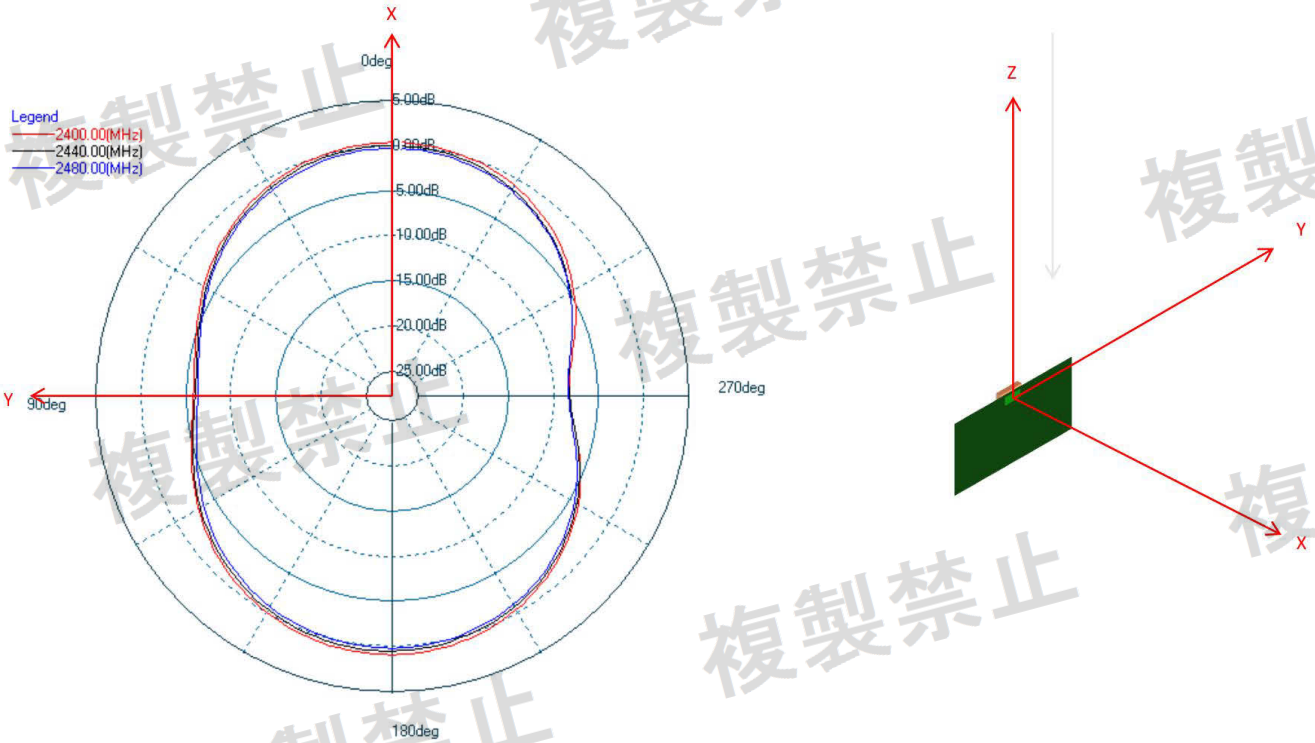



**Figure 4.3. Typical 2D Antenna Radiation Patterns - Theta 90$^{o}$ (Front View) Gain (dBi)**

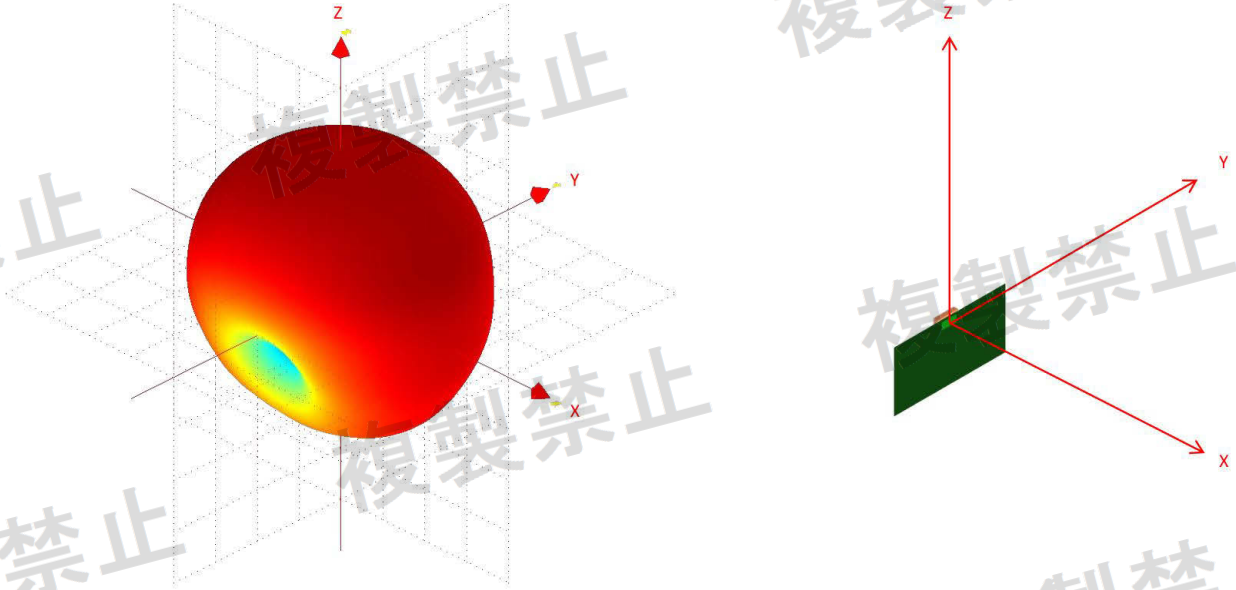



**Figure 4.4. 3D Radiation Pattern at 2440MHz**

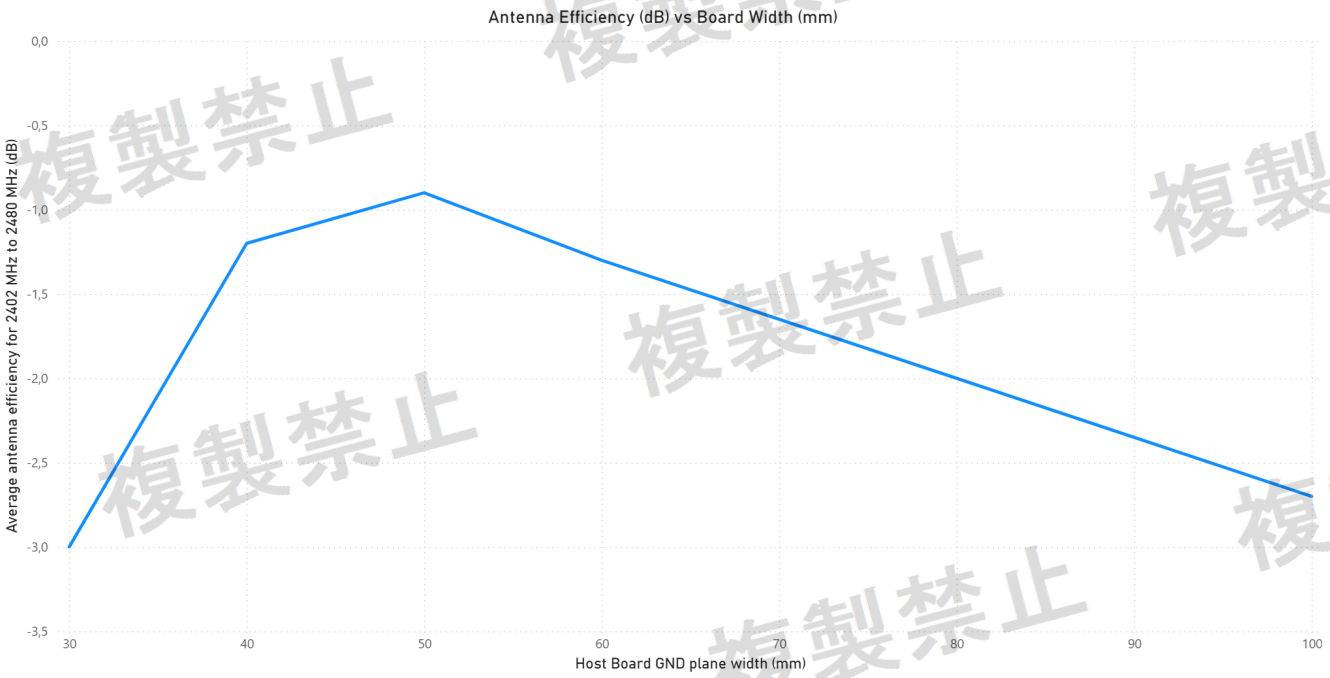



**Figure 4.5. Efficiency of the Built-in Antenna as Function of the Carrier Board Width (mm)**

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