

QRC06003 Datasheet

2.4/5 GHz Compound-loop Dual-band Antenna

Applications

- IoT devices
- AI Glasses

Features

- Omnidirectional radiation pattern
- Standard low-cost FR4 material
- Exceptionally small footprint
- High efficiency

Key Specifications

- Average total efficiency
 - 61 % (2.4 GHz)
 - 77 % (5 GHz)
- Peak gain
 - 4.1 dBi (2.4 GHz)
 - 3.7 dBi (5 GHz)

Overview

The QuantalRF QRC06003 is a high efficiency dual-band (2.4/5 GHz) PCB antenna for Wi-Fi 4, Wi-Fi 5, Wi-Fi 6 and Wi-Fi 7. The QRC06003 features an exceptionally small footprint and fits within extremely compact form factors. Nevertheless, it provides high efficiency and omnidirectional radiation pattern across the 2.4/5 GHz bands. The base design which is specified in this data sheet can be customized to specific use cases and applications to ensure that all customer demands are met.

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1 Antenna Specifications

1.1 Electrical Specifications

Table 1: General specifications

Parameter	Specification
Frequency range	2400 – 2500 MHz, 5150 – 5835 MHz
Impedance	50 Ω
Polarization	Linear
Radiation Pattern	Omnidirectional

Table 2: Detailed specifications

Parameter	2400 – 2500 MHz	5150 – 5835 MHz
Maximum VSWR	1.7	1.5
Minimum return loss (dB)	11.5	13.2
Average efficiency (%)	61	77
Maximum peak gain (dBi)	4.1	3.7

1.2 Mechanical and Environmental Specifications

Parameter	Specification
Antenna dimensions	5 mm x 25 mm
Antenna type	Integrated on PCB
Material	FR4 ($\epsilon_r = 4.4$, $\tan\delta = 0.02$)
Operating temperature	-40C to +85C
Storage temperature	-40C to +85C

2 Antenna Performance

2.1 VSWR

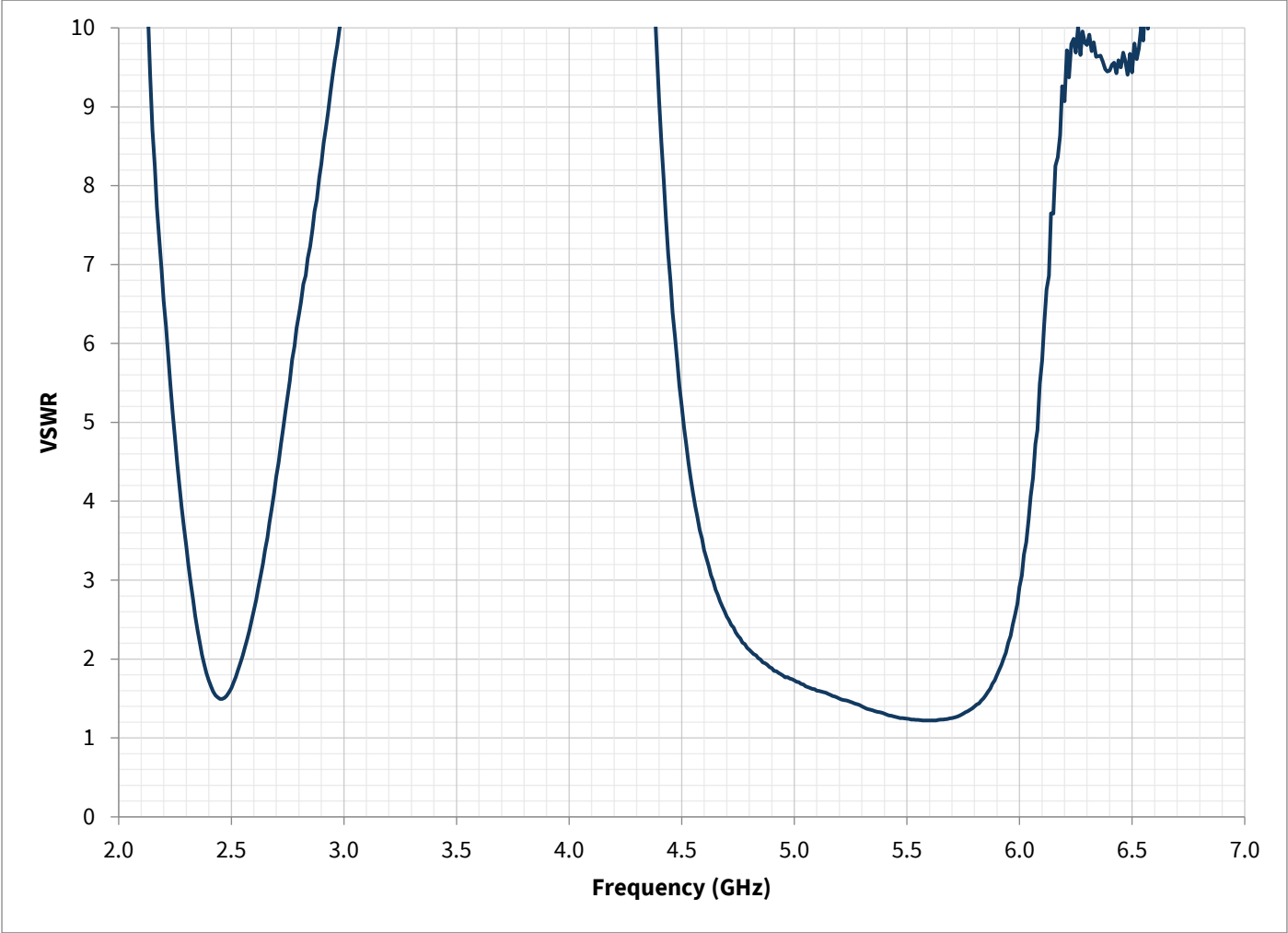


Table 3: 2.4 GHz VSWR

Frequency (MHz)	2400	2420	2440	2460	2480
VSWR	1.7	1.6	1.5	1.5	1.5

Table 4: 5 GHz VSWR

Frequency (MHz)	5150	5200	5250	5300	5350
VSWR	1.5	1.5	1.5	1.4	1.3
Frequency (MHz)	5400	5450	5500	5550	5600
VSWR	1.3	1.3	1.2	1.2	1.2
Frequency (MHz)	5650	5700	5750	5800	5835
VSWR	1.2	1.2	1.3	1.4	1.5

2.2 Return loss

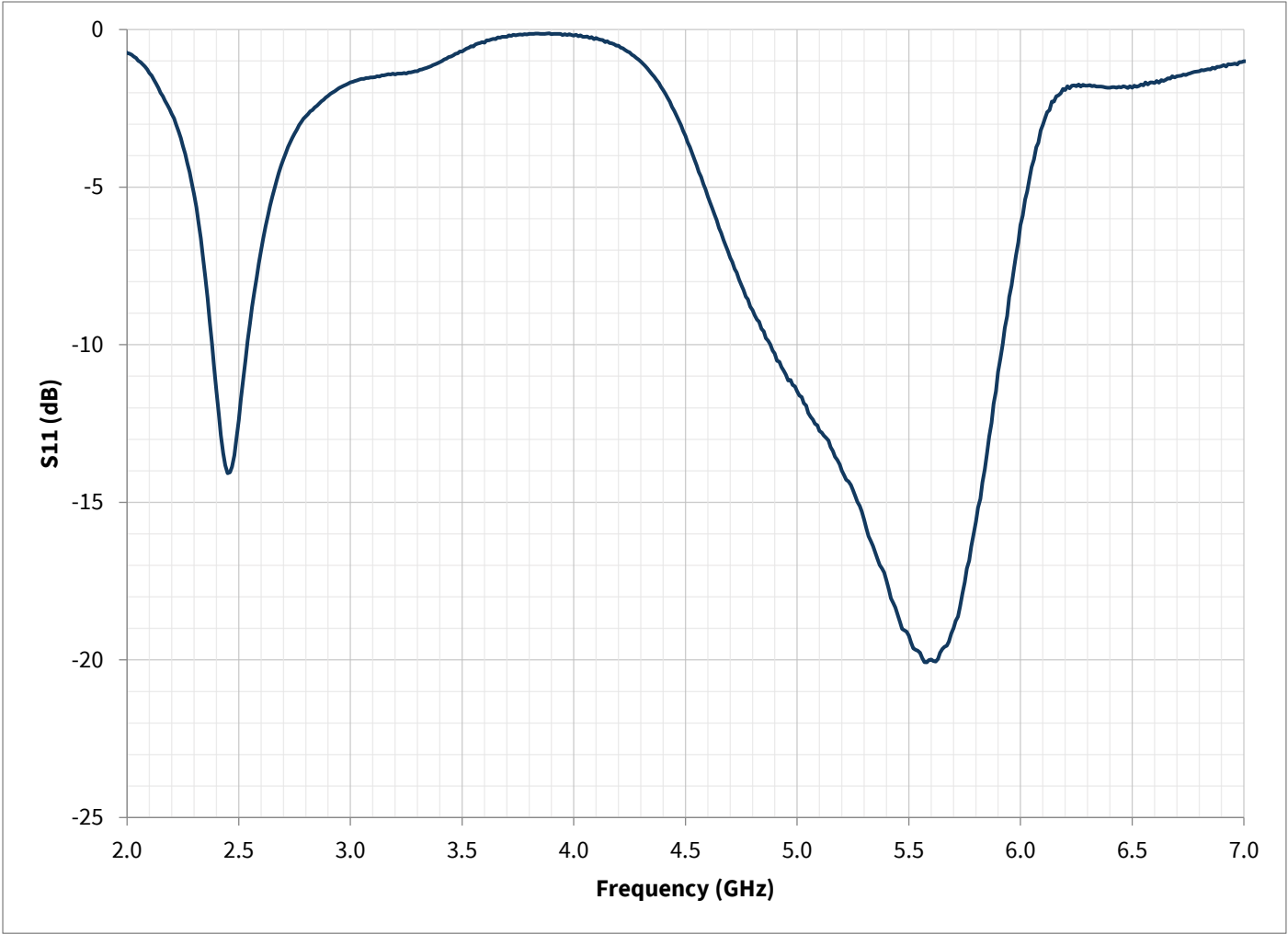


Table 5: 2.4 GHz Return loss (dB)

Frequency (MHz)	2400	2420	2440	2460	2480
Return loss (dB)	11.5	12.9	13.8	14.0	13.5

Table 6: 5 GHz Return loss (dB)

Frequency (MHz)	5150	5200	5250	5300	5350
Return loss (dB)	13.2	14.0	14.6	15.5	16.7
Frequency (MHz)	5400	5450	5500	5550	5600
Return loss (dB)	17.5	18.5	19.2	19.8	19.9
Frequency (MHz)	5650	5700	5750	5800	5835
Return loss (dB)	19.6	19.0	17.5	15.6	14.1

2.3 Efficiency

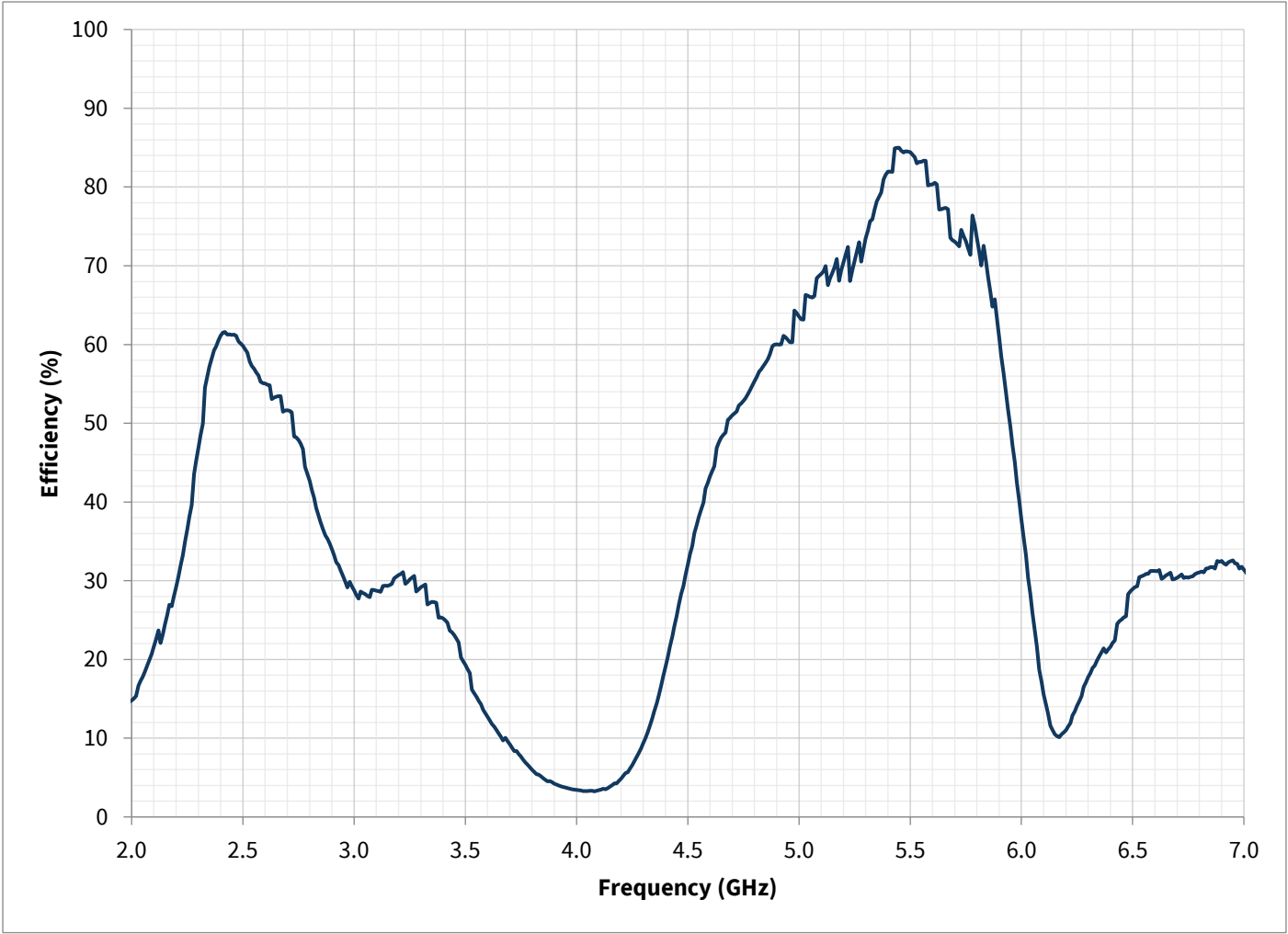


Table 7: 2.4 GHz Efficiency (%)

Frequency (MHz)	2400	2420	2440	2460	2480
Efficiency (%)	61.1	61.6	61.3	61.2	60.4

Table 8: 5 GHz Efficiency (%)

Frequency (MHz)	5150	5200	5250	5300	5350
Efficiency (%)	69.1	70.4	70.7	73.5	78.2
Frequency (MHz)	5400	5450	5500	5550	5600
Efficiency (%)	81.9	85.0	84.4	83.2	80.3
Frequency (MHz)	5650	5700	5750	5800	5835
Efficiency (%)	77.3	73.1	73.1	73.5	71.5

2.4 Peak gain

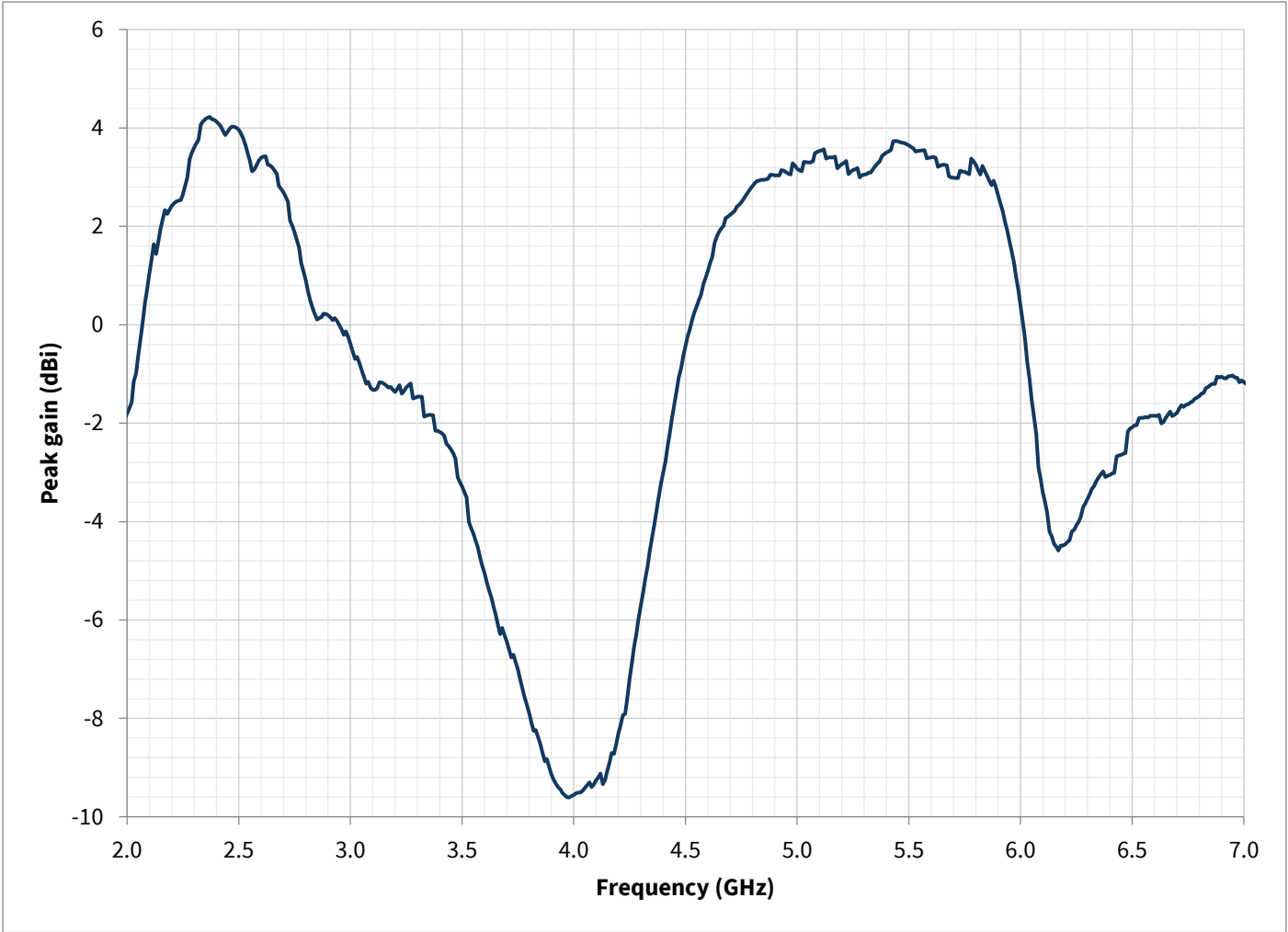


Table 9: 2.4 GHz Peak gain (dBi)

Frequency (MHz)	2400	2420	2440	2460	2480
Peak gain (dBi)	4.1	4.0	3.9	4.0	4.0

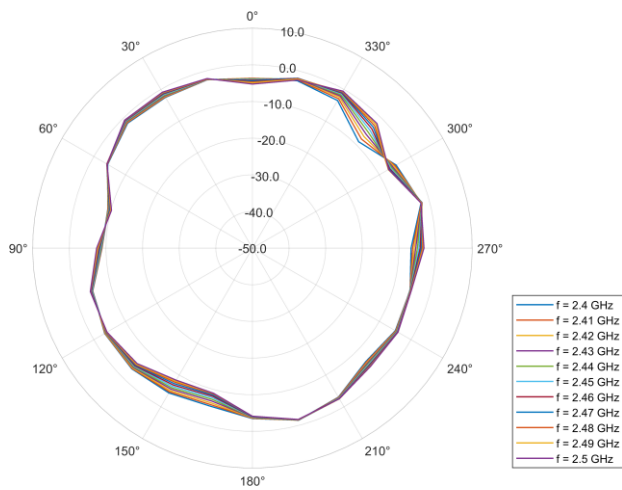
Table 10: 5 GHz Peak gain (dBi)

Frequency (MHz)	5150	5200	5250	5300	5350
Peak gain (dBi)	3.4	3.2	3.1	3.0	3.2
Frequency (MHz)	5400	5450	5500	5550	5600
Peak gain (dBi)	3.5	3.7	3.6	3.5	3.4
Frequency (MHz)	5650	5700	5750	5800	5835
Peak gain (dBi)	3.2	3.0	3.1	3.2	3.1

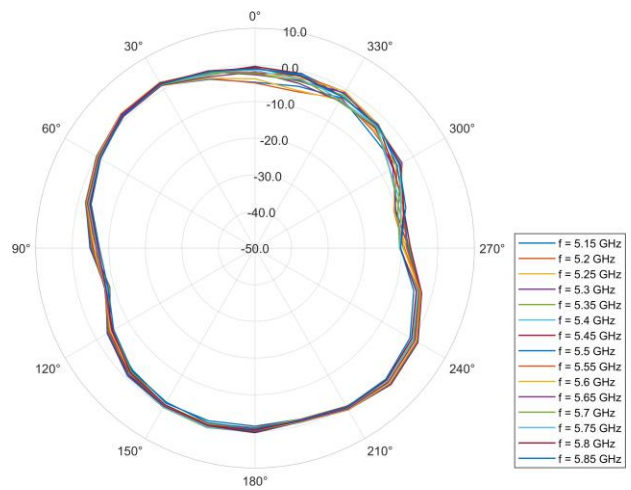
2.5 2D Radiation patterns

2.5.1 Azimuth plane

2.4 GHz azimuth plane

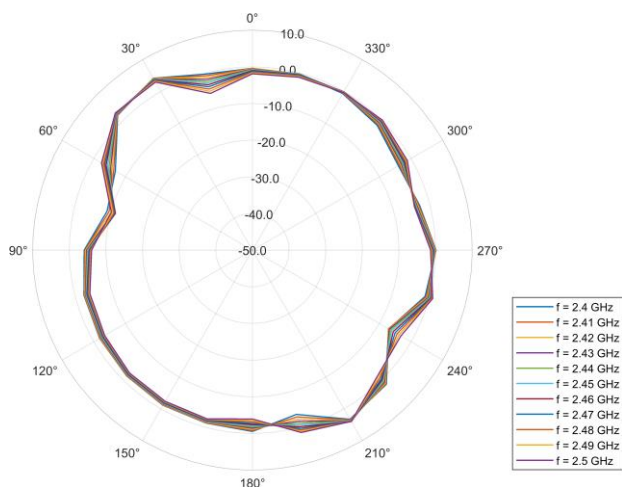


5 GHz azimuth plane

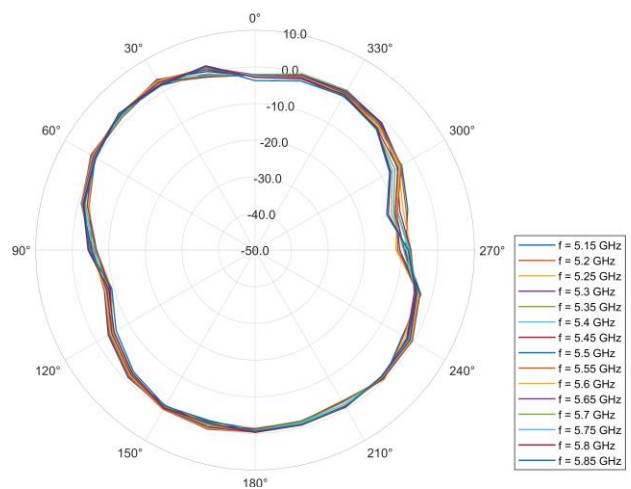


2.5.2 Elevation plane

2.4 GHz elevation plane



5 GHz elevation plane



RoHS Compliance

The part is compliant with the 2011/65/EU RoHS directive, as amended by Directive 2015/863/EU.

Contact Information

For the latest specifications, additional product information and support:

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Learn more at quantalrf.com

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