ESP32-A1

The ESP32-A1 is compact, low profile, linear polarised antenna designed on Roger substrate with two planar antennas on a single board operating at 2.4GHz for applications including Wi-Fi, Bluetooth and Zigbee. The high quality and robust design antenna serve as a solution to solve the range issue when the radio using a whip or stubby antenna is placed against a material that reduces the gain and efficiency of the antenna or material that acts as ground plane, for example radio placed against concrete walls or ceiling, radio mounted on metal surfaces, human or animal body, or when radio placed flat on the ground.

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Specification

Table 1: ESP32-A1 Antenna Parameters.

Parameter	Details	Unit
Application	Wi-Fi, Bluetooth and Zigbee	
Operating Frequency	2.4 to 2.5	GHz
Feed Impedance	50	Ω
Wi-Fi Antenna		
S11 @ 2.4GHz	-4.4	dB
S11 @ 2.5GHz	-7.7	dB
Peak Gain	2.3	dBi
Efficiency	55	%
Bluetooth Antenna		
S11 @ 2.4GHz	-7.1	dB
S11 @ 2.5GHz	-5.8	dB
Peak Gain	0.7	dBi
Efficiency	44	%
Power Handling	1	W
Interface	SMA PLUG FEMALE	
Weight	23	g
Dimension	72 (L) x 40 (W) x 1.6 (T)	mm
Temperature	-30° to +70°	C
Humidity Range	5 to 95	%

Measurements

Wi-Fi Antenna

VSWR and S_{11}

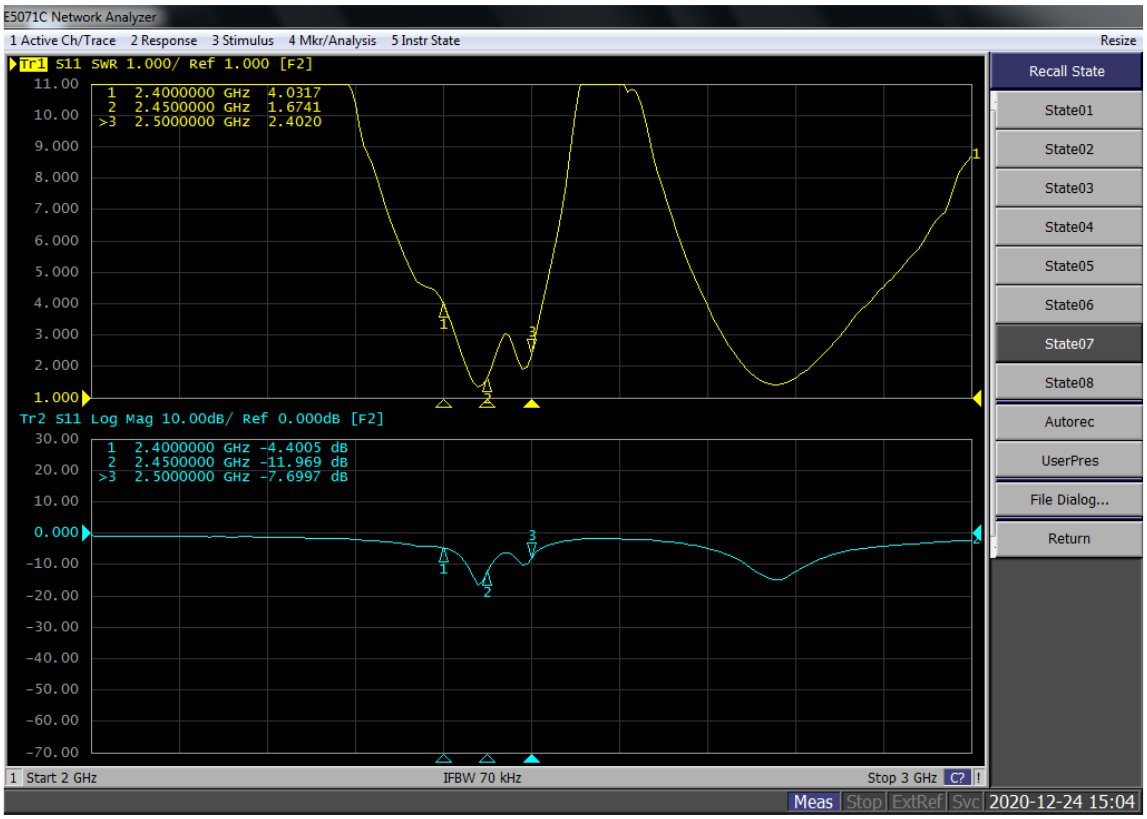

Figure 1: ESP32-A1 Wi-Fi antenna impedance measurement. Top plot for VSWR and bottom plot for S_{11}.

Radiation Pattern

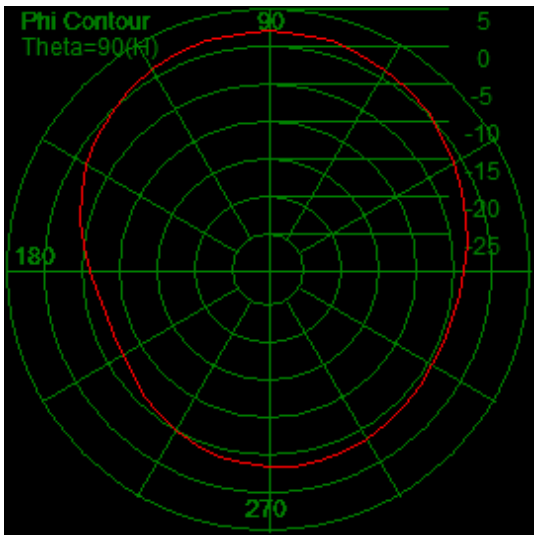

Figure 2: ESP32-A1 Wi-Fi 2D radiation pattern at 2.45GHz.

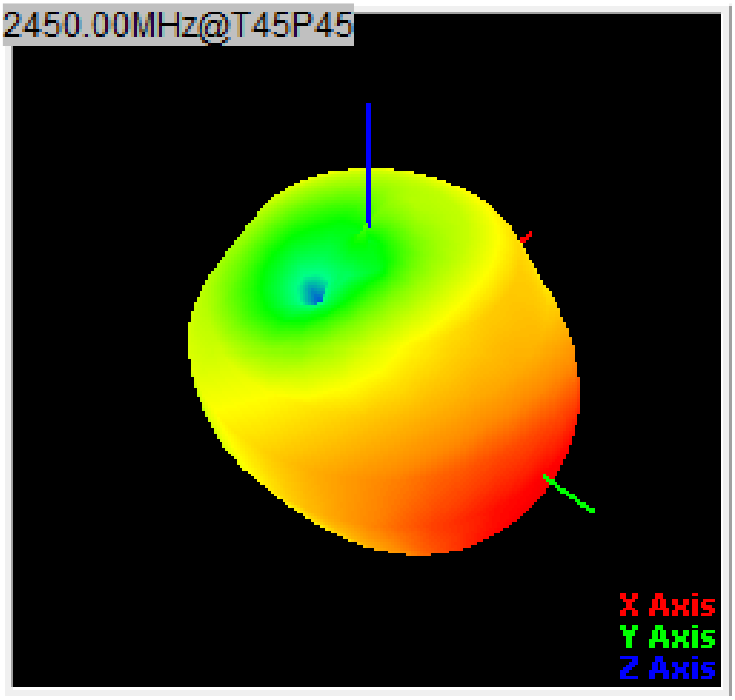

Figure 3: ESP32-A1 Wi-Fi 3D radiation pattern at 2.45GHz.

Bluetooth Antenna

VSWR and S_{11}

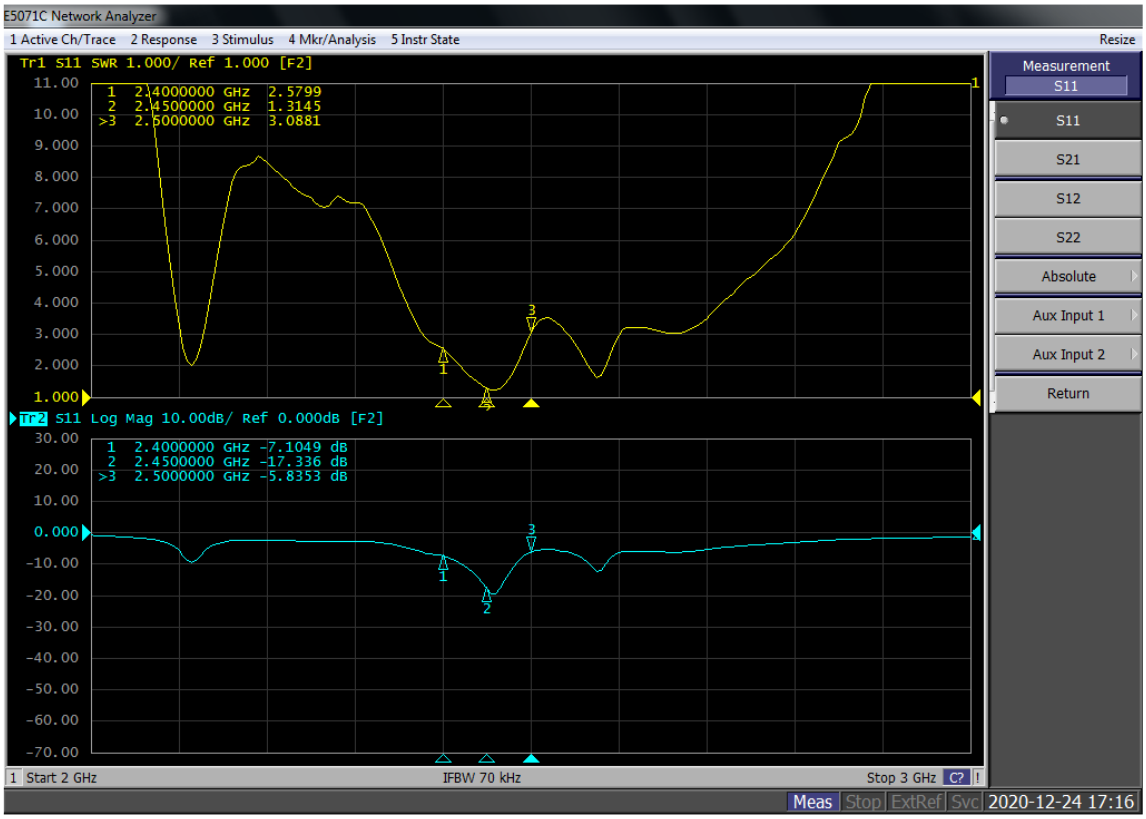

Figure 4: ESP32-A1 Bluetooth antenna impedance measurement. Top plot for VSWR and bottom plot for S_{11}.

Radiation Pattern

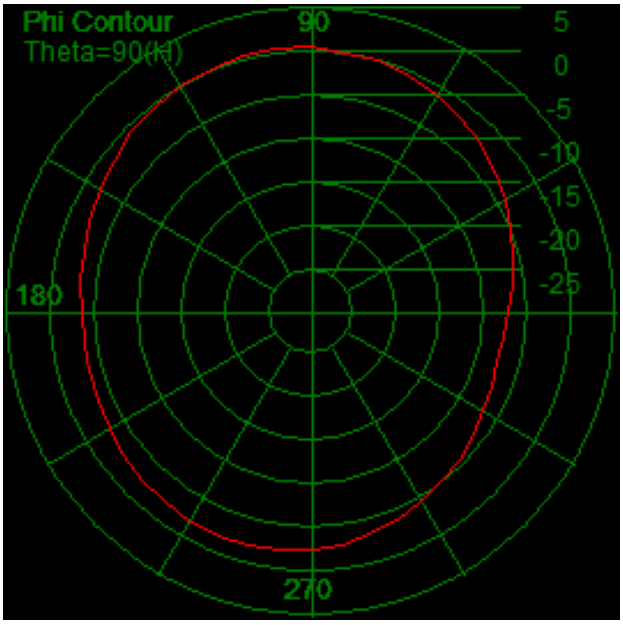

Figure 5: ESP32-A1 Bluetooth 2D radiation pattern at 2.45GHz.

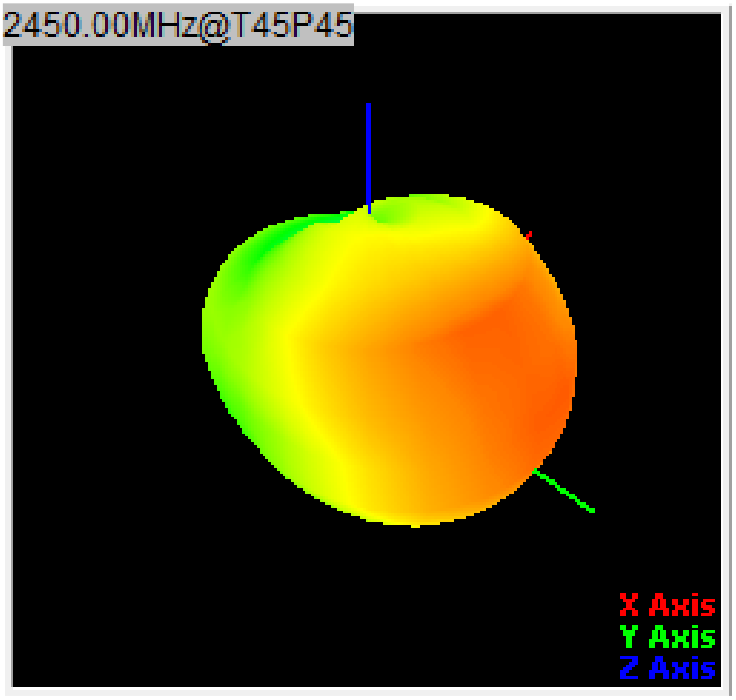

Figure 6: ESP32-A1 Bluetooth 3D radiation pattern at 2.45GHz.

Dimension

All measurements in mm. Colour White. PCB Thickness 1.6mm.

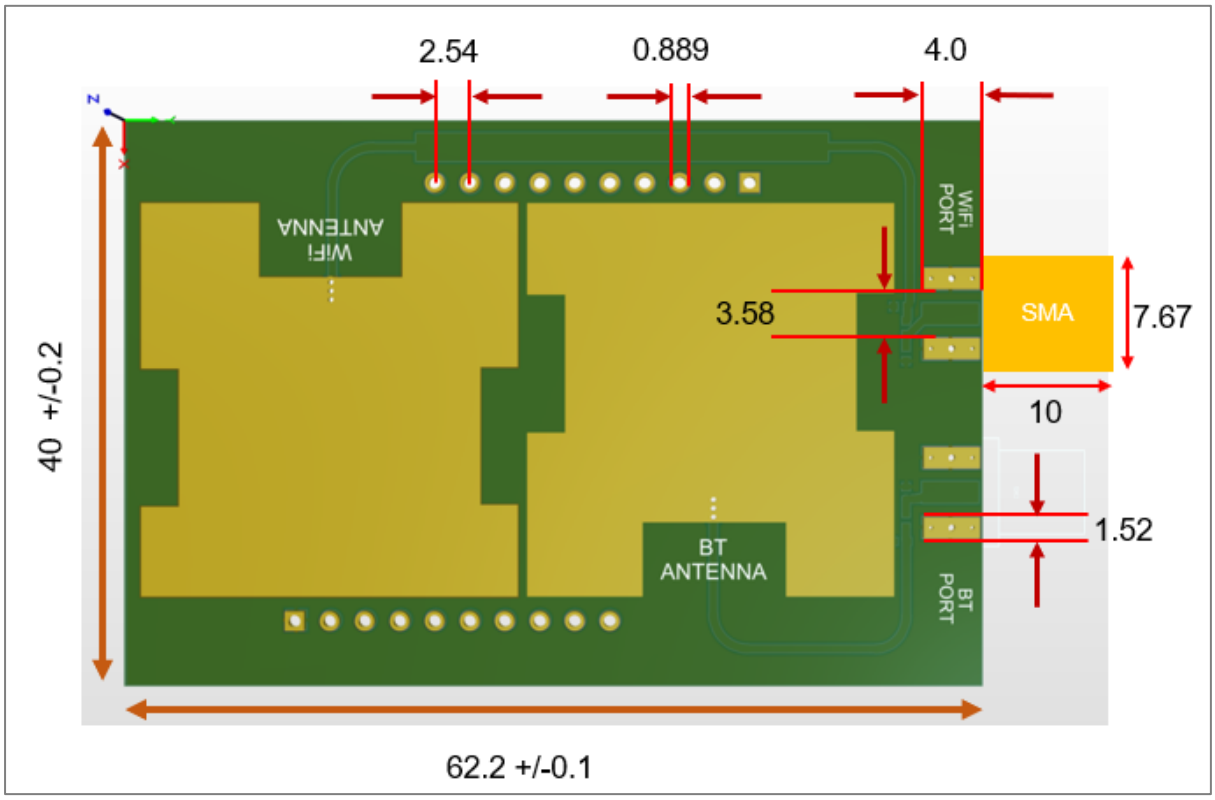

Figure 7: ESP32-A1 dimension.

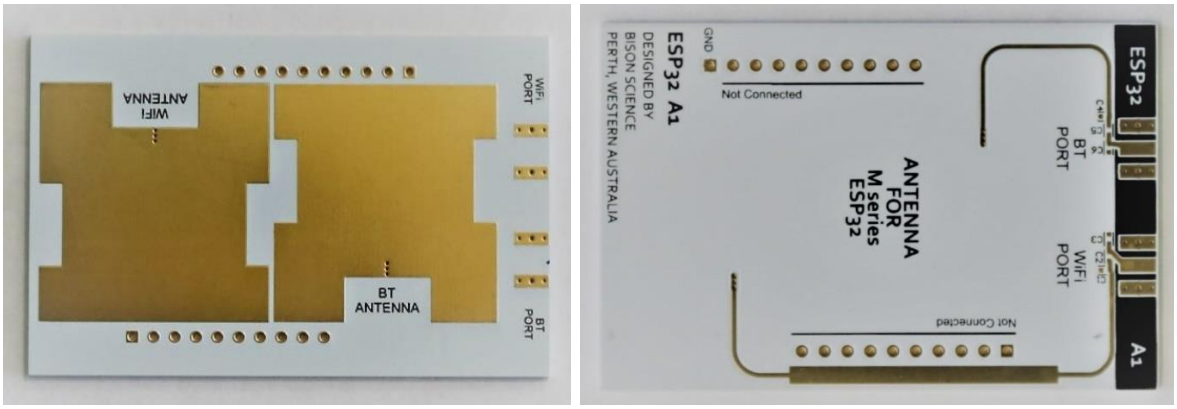

Figure 8: ESP32-A1 Antenna Front with patches and back.

Note: All materials are RoHS 2.0 compliant.