eKnitter KH-910 Antenna Specification

eknitter KH-910 uses Espressif ESP32-S3-DevKit-1 as controller. ESP32-S3-WROOM-1 has following Antenna Specification:

esp32-s3-wroom-1_
wroom-1u_datasheet

## 6 Antenna Specifications

6.1. 1 PCB Antenna

Model: ESP ANT B
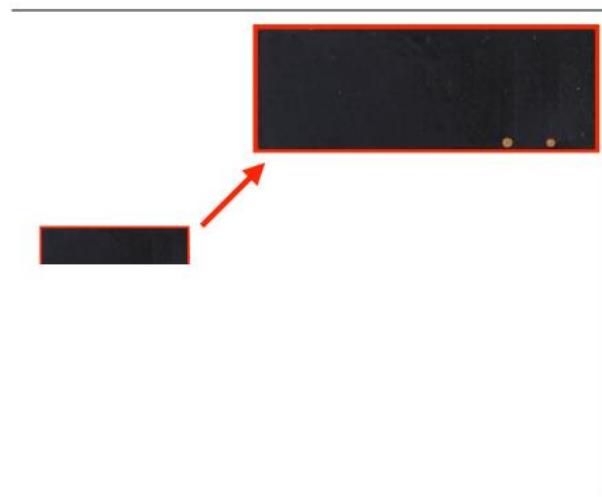
Assembly: PTH

Gain:

Model	Test Item	Test State	Frequency (MHz)	Efficiency (%)	Gain (dB)	Note
ESP-ANT B	Gain	Free Space	2412	73.79	2.39	Vertical 30°
			2417	77.04	2.97	
			2422	79.83	2.80	
			2427	81.19	2.89	
			2432	80.54	3.04	
			2437	76.86	2.86	
			2442	76.17	2.99	
			2447	73.99	2.96	
			2452	72.00	2.80	
			2457	70.71	2.72	
			2462	71.31	2.94	
			2467	71.32	3.12	
			2472	72.03	3.28	
			2477	72.71	3.24	
			2482	75.42	3.40	

Dimensions:

L1	3.94	
L2	2.70	
L3	5.00	
L4	2.64	
L5	2.00	
L6	4.90	
W1	0.90	
W2	0.50	
D1	0.50	
D2	0.30	
D3	0.30	
D4	0.50	
D5	1.40	
D6	1.70	

Pattern Plots:

Cut1

Max: 2
Min: -20
Scale: 2/div

Horizontal X-Y

Cut2

Max: 2
Min: -20
Scale: 2/div

Horizontal X-Z

Cut3

Max: 2
Min: -20
Scale: 2/div

Horizontal Y-Z

Cut1

Max: 2
Min: -20
Scale: 2/div

Vertical X-Y

Cut2

Max: 2
Min: -20
Scale: 2/div

Vertical X-Z

Cut3

Max: 2
Min: -20
Scale: 2/div

Vertical Y-Z
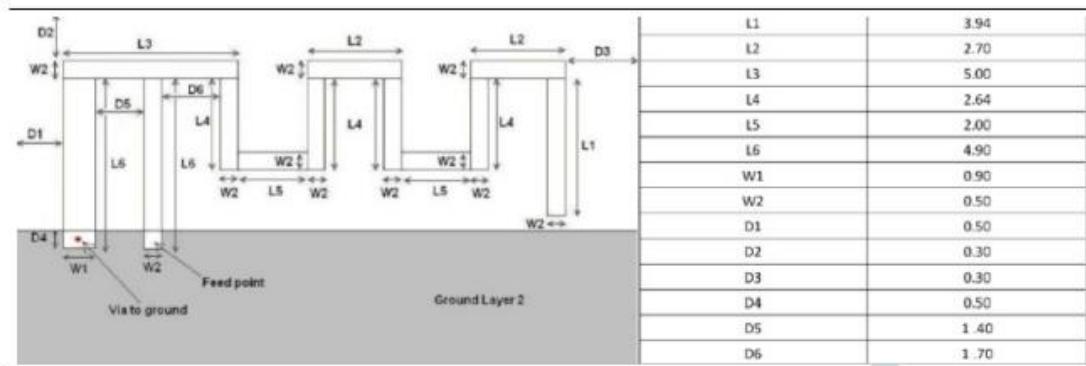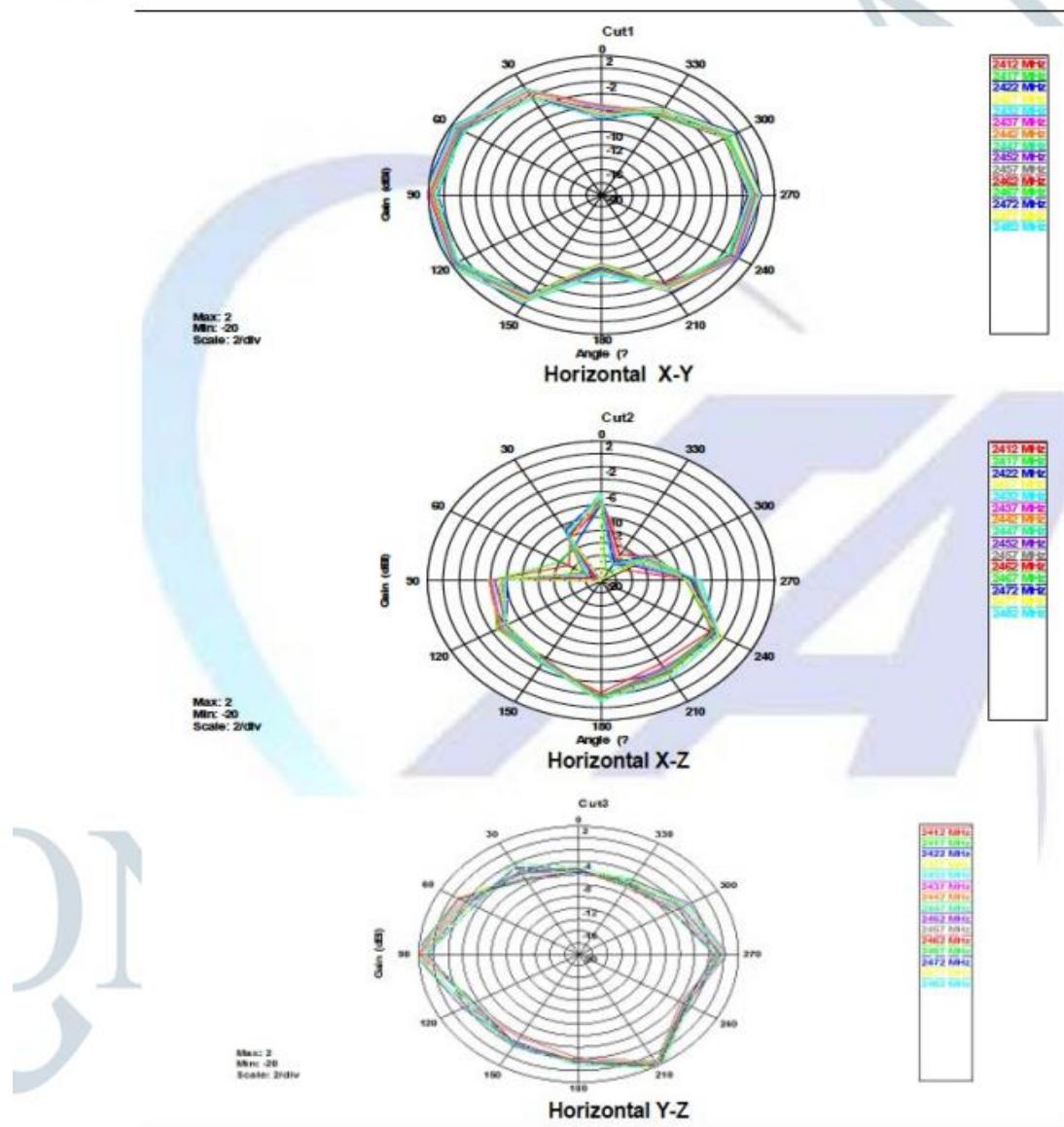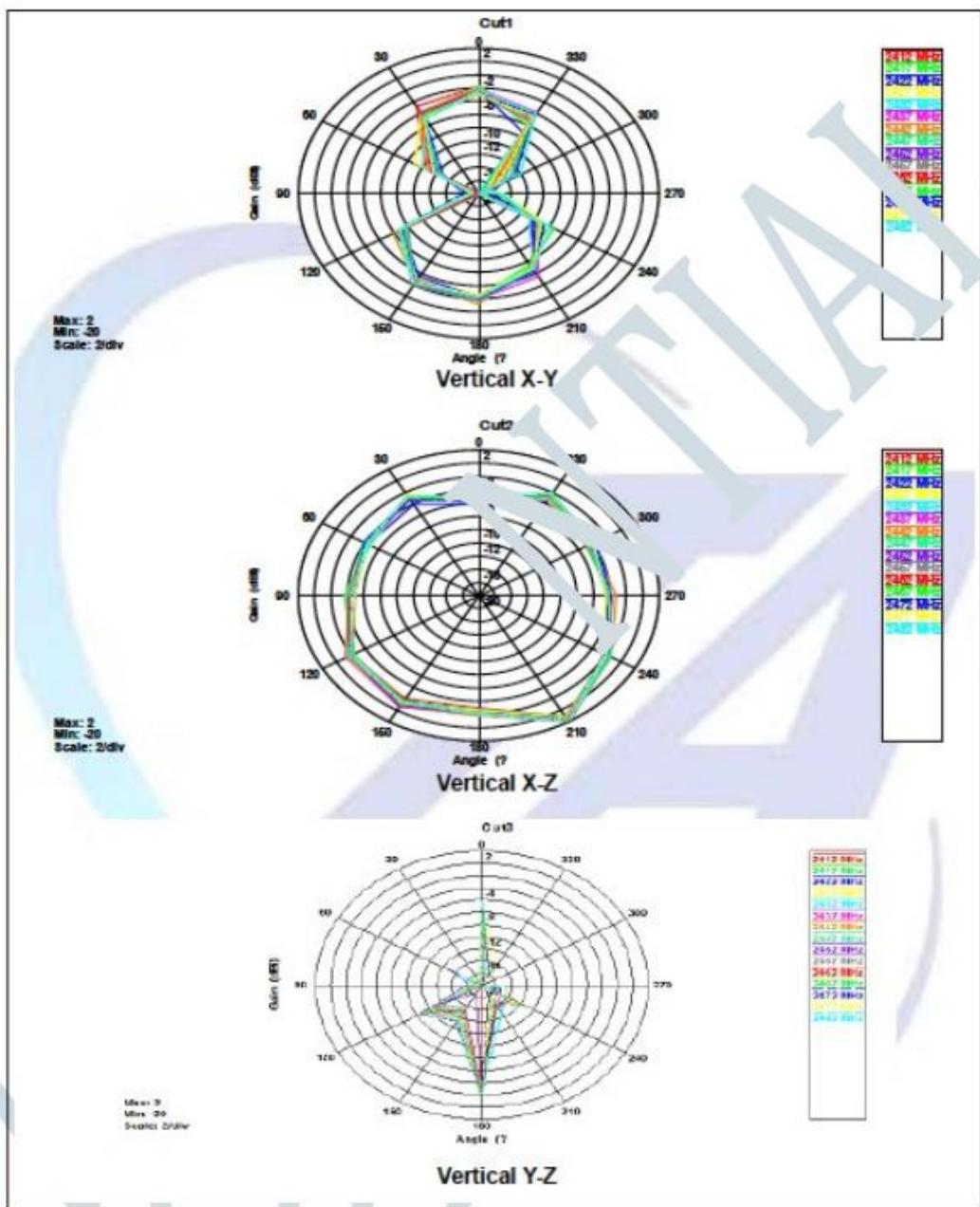
7 RF Characteristics

This section contains tables with RF characteristics of the Espressif product.

The RF data is measured at the antenna port, where RF cable is connected, including the front-end loss. The external antennas used for the tests on the modules with external antenna connectors have an impedance of 50 Ω.Devices should operate in the center frequency range allocated by regional regulatory authorities. The target center frequency range and the target transmit power are configurable by software. See ESP RF Test Tool and Test Guide for instructions.

Unless otherwise stated, the RF tests are conducted with a 3.3 V (±5%) supply at 25 ℃ ambient temperature.

7.1 Wi-Fi Radio

Table 15: Wi-Fi RF Characteristics

Name	Description
Center frequency range of operating channel	2412 ~ 2484 MHz
Wi-Fi wireless standard	IEEE 802.11b/g/n

7.1.1 Wi-Fi RF Transmitter (TX) Characteristics

Table 16: TX Power with Spectral Mask and EVM Meeting 802.11 Standards

Rate	Min (dBm)	Typ (dBm)	Max (dBm)
802.11b, 1 Mbps	—	20.5	—
802.11b, 11 Mbps	—	20.5	—
802.11g, 6 Mbps	—	20.0	—
802.11g, 54 Mbps	—	18.0	—
802.11n, HT20, MCS 0	—	19.0	—
802.11n, HT20, MCS 7	—	17.5	—
802.11n, HT40, MCS 0	—	18.5	—
802.11n, HT40, MCS 7	—	17.0	—

Table 17: TX EVM Test[1]

Rate	Min (dB)	Typ (dB)	Limit (dB)
802.11b, 1 Mbps, @20.5 dBm	—	−24.5	−10
802.11b, 11 Mbps, @20.5 dBm	—	−24.5	−10
802.11g, 6 Mbps, @20 dBm	—	−23.0	−5
802.11g, 54 Mbps, @18 dBm	—	−29.5	−25
802.11n, HT20, MCS 0, @19 dBm	—	−24.0	−5

Table 17 – cont'd from previous page

Rate	Min (dB)	Typ (dB)	Limit (dB)
802.11n, HT20, MCS 7, @17.5 dBm	—	−30.5	−27
802.11n, HT40, MCS 0, @18.5 dBm	—	−25.0	−5
802.11n, HT40, MCS 7, @17 dBm	—	−30.0	−27

[1] EVM is measured at the corresponding typical TX power provided in Table 16 *TX Power with Spectral Mask and EVM Meeting 802.11 Standards* above.

7.1.2   Wi-Fi RF Receiver (RX) Characteristics

For RX tests, the PER (packet error rate) limit is 8% for 802.11b, and 10% for 802.11g/n.

Table 18: RX Sensitivity

Rate	Min (dBm)	Typ (dBm)	Max (dBm)
802.11b, 1 Mbps	—	−98.2	—
802.11b, 2 Mbps	—	−95.6	—
802.11b, 5.5 Mbps	—	−92.8	—
802.11b, 11 Mbps	—	−88.5	—
802.11g, 6 Mbps	—	−93.0	—
802.11g, 9 Mbps	—	−92.0	—
802.11g, 12 Mbps	—	−90.8	—
802.11g, 18 Mbps	—	−88.5	—
802.11g, 24 Mbps	—	−85.5	—
802.11g, 36 Mbps	—	−82.2	—
802.11g, 48 Mbps	—	−78.0	—
802.11g, 54 Mbps	—	−76.2	—
802.11n, HT20, MCS 0	—	−93.0	—
802.11n, HT20, MCS 1	—	−90.6	—
802.11n, HT20, MCS 2	—	−88.4	—
802.11n, HT20, MCS 3	—	−84.8	—
802.11n, HT20, MCS 4	—	−81.6	—
802.11n, HT20, MCS 5	—	−77.4	—
802.11n, HT20, MCS 6	—	−75.6	—
802.11n, HT20, MCS 7	—	−74.2	—
802.11n, HT40, MCS 0	—	−90.0	—
802.11n, HT40, MCS 1	—	−87.5	—
802.11n, HT40, MCS 2	—	−85.0	—
802.11n, HT40, MCS 3	—	−82.0	—
802.11n, HT40, MCS 4	—	−78.5	—
802.11n, HT40, MCS 5	—	−74.4	—
802.11n, HT40, MCS 6	—	−72.5	—

Table 18 – cont'd from previous page

Rate	Min (dBm)	Typ (dBm)	Max (dBm)
802.11n, HT40, MCS 7	—	−71.2	—

Table 19: Maximum RX Level

Rate	Min (dBm)	Typ (dBm)	Max (dBm)
802.11b, 1 Mbps	—	5	—
802.11b, 11 Mbps	—	5	—
802.11g, 6 Mbps	—	5	—
802.11g, 54 Mbps	—	0	—
802.11n, HT20, MCS 0	—	5	—
802.11n, HT20, MCS 7	—	0	—
802.11n, HT40, MCS 0	—	5	—
802.11n, HT40, MCS 7	—	0	—

Table 20: RX Adjacent Channel Rejection

Rate	Min (dB)	Typ (dB)	Max (dB)
802.11b, 1 Mbps	—	35	—
802.11b, 11 Mbps	—	35	—
802.11g, 6 Mbps	—	31	—
802.11g, 54 Mbps	—	14	—
802.11n, HT20, MCS 0	—	31	—
802.11n, HT20, MCS 7	—	13	—
802.11n, HT40, MCS 0	—	19	—
802.11n, HT40, MCS 7	—	8	—