Products Specifications

AC10506-01A
AC10506-01B
AC10506-01C

Single Band Embedded Omni-directional 5G Wi-Fi Antenna for Wi-Fi Tri-Bands Router

25 September 2023

Rev. 0.4

Revision History

Date	Rev.	Summary of Changes
16 June 2023	0.1	First version of Product Specification
15 August 2023	0.2	Updated Antenna Visuals, Added assembly instructions
20 September 2023	0.3	Antenna specifications updated for certification
25 September 2023	0.4	Modify individual peak gain to aggregated peak gain

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1 Single Band Wi-Fi antennas

1.1 Scope and purpose

This document describes the AC10506-01A, AC10506-01B, AC10506-01C antenna and its specifications. It is intended for antenna design engineers and OEM/ODMs who wish to integrate these products. The antenna has been optimized for configuration in a Wi-Fi Tri-Bands router and has been designed for excellent coverage in indoor environments.

1.2 AC10506-01 features

- Quasi-omnidirectional single band 5GHz Wi-Fi.
- Implemented on rigid PCB with 1.37mm coaxial cable.
- Suitable for integration on non-conductive surfaces.
- Attached with double sided adhesive 3M 9495LE tape to the plastic housing of the end-product.

1.3 Antenna specifications

Table 1: AC10506-01A, AC10506-01B, AC10506-01C RF specifications

Parameter	AC10506-01A	AC10506-01B	AC10506-01C
Frequency band support	5150 – 5850MHz	5150 – 5850MHz	5150 – 5850MHz
Radiation pattern	Quasi-omnidirectional	Quasi-omnidirectional	Quasi-omnidirectional
VSWR (Return Loss)	< 2:1	< 2:1	< 2:1
Input impedance	50Ω	50Ω	50Ω
Typical Efficiency	>76%	>70%	>75%
*Peak Realized Aggregated Gain Max(Dg(θ, ϕ)), θ,=0~360, ϕ=0~360	5.0dBi (@ θ=85°, ϕ=135°)		

Notes:

- The characterization is performed with the antennas mounted inside the end-product.
- The end-product is tested in free-space.
- Peak Aggregated Realized Gain:

  $$\text{Max}(\text{Dg}(\theta,\phi)) = 10\log\left[\left(10^{\left(\frac{\text{Ant1Gain}(\theta,\phi)}{20}\right)} + 10^{\left(\frac{\text{Ant2Gain}(\theta,\phi)}{20}\right)} + \cdots 10^{\left(\frac{\text{AntNGain}(\theta,\phi)}{20}\right)}\right)^2 / N_{ant}\right],$$

  θ=0~360, ϕ=0~360. Maximum aggregated antenna gain for all gain values of θ, ϕ

Table 2: AC10506-01A, AC10506-01B, AC10506-01C physical specifications

Parameter	AC10506-01A	AC10506-01B	AC10506-01C
Size (length **x** width)	16.76 x 9.95 mm^2	16.76 x 9.95 mm^2	16.76 x 9.95 mm^2
Cable length[1]	107mm	115mm	35mm
Cable diameter	1.37mm	1.37mm	1.37mm
Cable color	Black	White	Gray
Connection	CM	CM	CM
Connector Orientation[3]	Right	Up	Down

Notes:

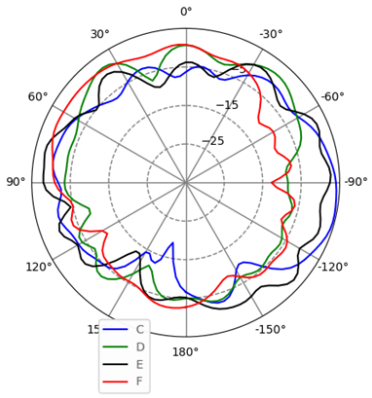
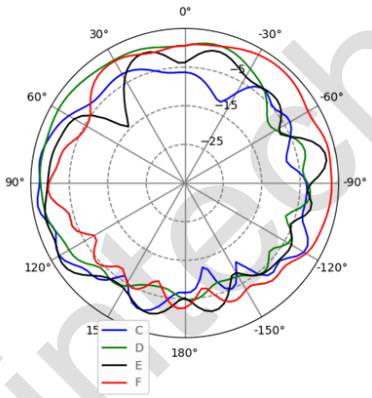
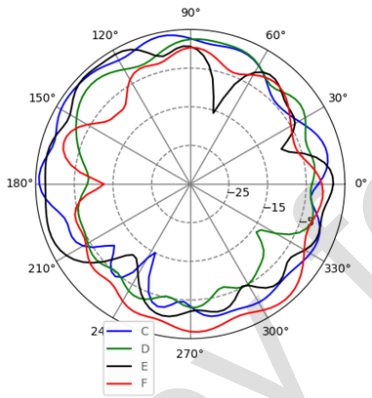
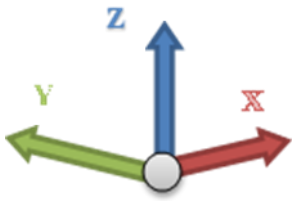
1- The reported cable length includes the connector.
2- For all dimensions, the ISO 2768-mK standard is followed. For the outer dimensions this means a tolerance of ±0.1 mm is applicable
3- Connector orientation is seen from the top side of the Antenna

Table 3: AC10506-01A, AC10506-01B, AC10506-01C environmental specifications

Parameter	AC10506-01A, AC10506-01B, AC10506-01C
Operational temperature	-20˚C to +85˚C
RoHS	Yes

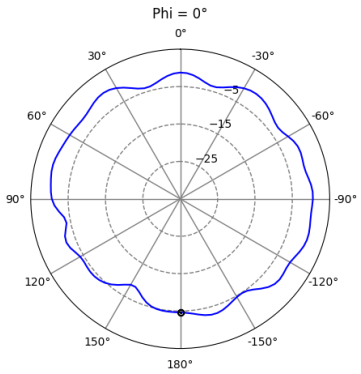
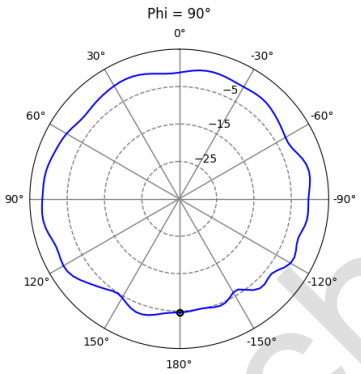
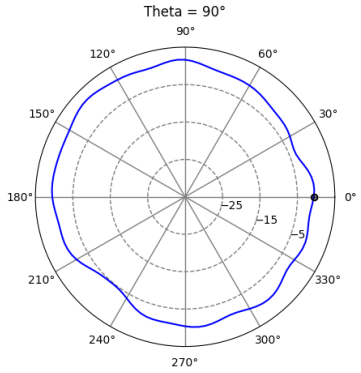
1.4 Radiation pattern

The table below shows the typical measured radiation pattern of the AC10506-01A, AC10506-01B, AC10506-01C antennas, when operating in the end-device, along the XZ, YZ and XY planes.

XZ Plane	YZ Plane
	
XY Plane	
	

The AC10506-01A, AC10506-01B, AC10506-01C antennas can be used in a 4x44 MIMO configuration. The corresponding aggregated radiation pattern is depicted in table 5.

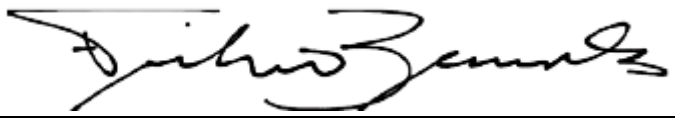
Table 5: AC10506-01A, AC10506-01B, AC10506-01C Aggregated Wi-Fi System Radiation Pattern at 5.50GHz

XZ Plane	YZ Plane
	
XY Plane	
	

1.5 Test Equipment

The radiation properties of the antenna are measured in a MVG system with 0.65-18GHz probes mounted on a circular arc. The system specifications are summarized in the table below.

Table 13: Test equipment specifications

Name	Manufacturer	Type/Model	Serial num.	Cal. Date	Cal. Due Date
Chamber	MVG	StarLab	1102163-001	9/28/2022	9/28/2023
VNA	Agilent Technologies	E5071C	MY46417538	22/092020	9/22/2023
TX Amplification Unit	SATIMO	N/A	1101252-0002	NCR	NCR
RX Amplification Unit	SATIMO	N/A	1101238-0002	NCR	NCR
Transfer Switching Unit	SATIMO	N/A	1101248-0002	NCR	NCR
Power Unit Control	SATIMO	N/A	1101225-0050	NCR	NCR
Reference Horn Antenna	MVG	SH600-51	N/A	NCR	NCR
Satimo Passive Measurements	MVG	V1.11.1	N/A	N/A	N/A
Antenna Test Engineer		**Tester's Signature**			
Fabio Barcelos					

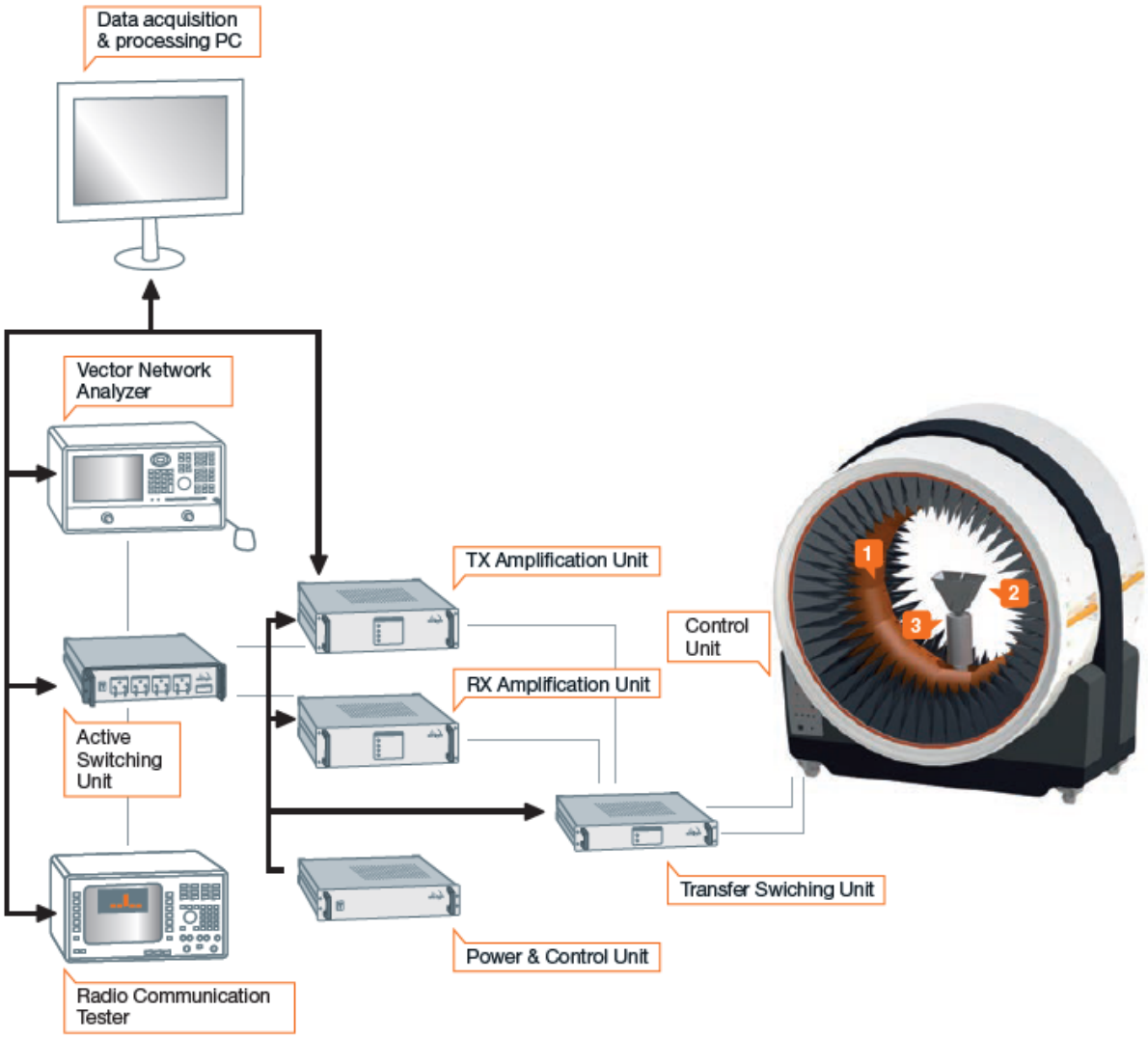


Figure 3: bloc diagram of the MVG antenna measurement system

2 Product Handling & Ordering Information

2.1 Assembly Recommendation

1-Surface Preparation: Make sure that the surfaces of the antenna carrier is clean, dry, and free from any oil, dirt, or dust. The typical surface cleaning solvent is isopropyl alcohol.

2- Environmental condition: Ideal application temperature range is 21°C to 38°C (70°F to 100°F). Initial application at temperatures below 10°C (50°F) is not recommended.

3- Applied pressure: During application, it is necessary to provide a pressure of at least 1 Bar (15 Psi) to achieve a strong bond. This pressure can be achieved by applying heavy pressure with the thumb along the length of the antenna or by using a J-Roller or other pressure system

4- Curing time: Allow the bond to develop without stress. After application, the bond strength will increase as the adhesive bonds with the surface. At room temperature, approximately 50% of the ultimate strength will be achieved after 20 minutes, 90% after 24 hours and 100% after 72 hours.

2.2 Product Marking

Every antenna contains the part number, PCB number, revision number and production date code for easy tracking.

Table 6: AC10506-01A, AC10506-01B, AC10506-01C Marking Specifications

Text on Antenna	Explanation
AC10506 -01A or AC10506 -01B or AC10506 -01C	AC Type Number
175-00049	PCB Number
0.04	Revision Number
	Production Date and Supplier Code
Y = J	2021
Y = K	2022
Y = L	2023

2.3 Packaging

The AC10506-01A, AC10506-01B, AC10506-01C will be delivered in a carton box containing a total of 2500 pcs. The carton box will consist of 5 inner carton boxes. Each inner box will be filled with 10 plastic polyethylene (PE) bags of 50 pcs.

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