

Broadband RF Coupler/Antenna Isolator for Smart Utilities

Product Datasheet **AC20424-01**

November, 2023

Rev. 1.0

Revision History

Date	Rev.	Summary of Changes
06 November 2023	1.0	First version of preliminary product datasheet

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1 Description and Specifications

1.1 Scope and Purpose

The AC20424-01 is a broadband and ultra-low-loss RF (radio frequency) coupler. This antenna isolator is designed with a generic form factor suitable for use within the enclosure of most electric utility meters and AMI communications modules. The 10kV electrical isolation enables safe routing of the RF signal from the NIC or wireless modem to a remote external antenna via a bulk-head connection in the meter base or body of the communications module

The AC20424-01 has been designed to provide high voltage isolation for external antennas used to extend wireless range in a wide variety of applications:

- Off network SMART Utility Meters
- Residential & Commercial SMART Meters
- LED Street Lighting
- Substation monitoring

1.2 Features

- Ultra-low insertion loss <0.3dB @450MHz
- Broadband operation 400MHz - 2.45GHz
- 10kV High Voltage electrical isolation
- Standard MMCX jack input/output
- UL 94V-0 coating

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RFST LLC US Patent 9118095B2
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1.3 RF Coupler Specifications

Table 1: AC20424-01 RF specifications

Parameters	AC20424-01
Frequency Range (MHz)	400MHz - 2.45GHz
VSWR Max	<1.8:1 (<1.5:1 typical)
Typical Insertion Loss* (dB)	0.3dB @ 450MHz 0.7dB @ 915MHz 1.7dB @ 1710MHz 2dB @ 1990MHz 1.7dB @ 2170MHz 2.2dB @ 2450MHz
Reference Impedance (Ω)	50 Ohms
Max RF Power (W)	2 watts (+33dBm)
Electrical Isolation (kV)	10kV (no damage)

Notes:

- The VNA calibration plane reference is at MMCX male/plug test interfaces

Table 2: Physical specifications

Parameter	AC20424-01
Dimensions W x L x H (mm)	45mm x 45mm x 0.8mm
Coating	UL 94V-0 rated
RF Input/Output	Qty 2 MMCX Jack (female) SMD connectors

Notes:

- For all dimensions, the ISO 2768-mK standard is followed. For the outer dimensions this means a tolerance of ± 0.3 mm is applicable

Table 3: AC20424-01 environmental specifications

Parameter	AC20424-01
Operating Temperature	-40°C to +85°C
Storage Temperature	-10°C to +40°C
RoHS and REACH compliant	Yes

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The visual representation and the dimensions of the AC20424-01 antenna are shown in Figure 1.

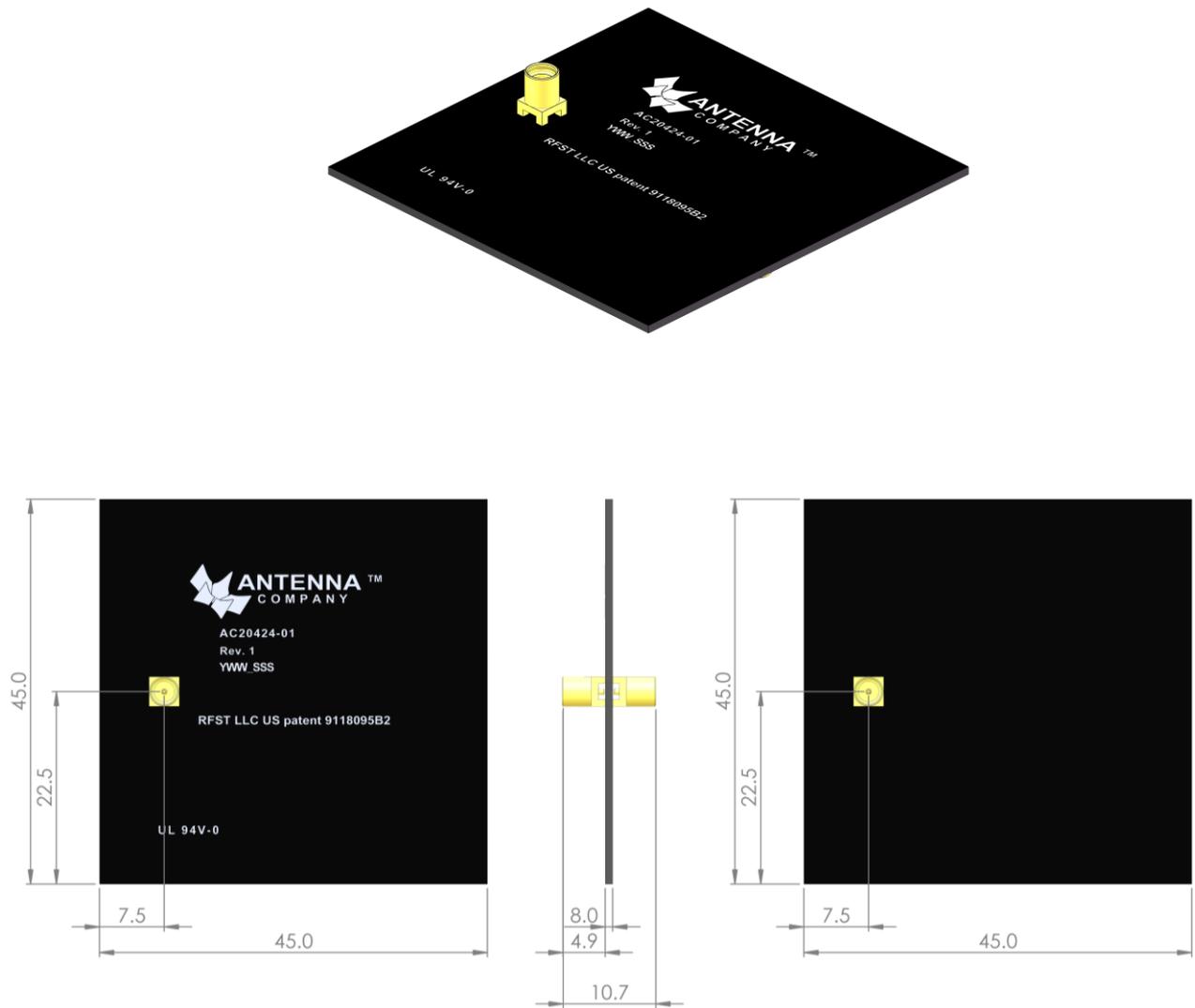


Figure 1: AC20424-01 visual representation and dimensions (in mm).

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1.4 VSWR and Insertion Losses

The measured VSWR and insertion losses as functions of frequency are depicted in Figures 2 and 3, respectively.

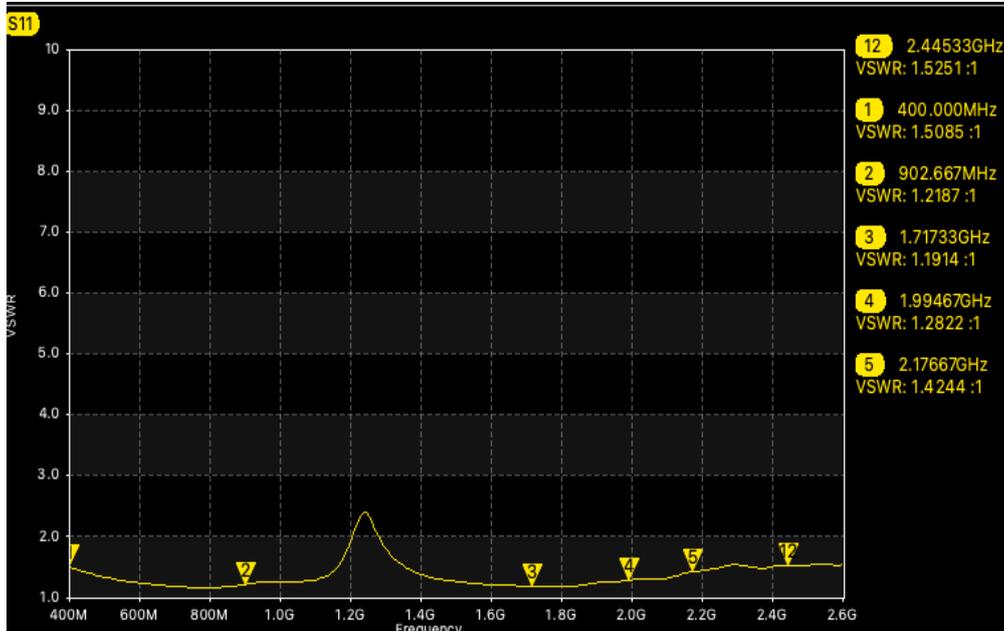


Figure 2: VSWR of the AC20424-01

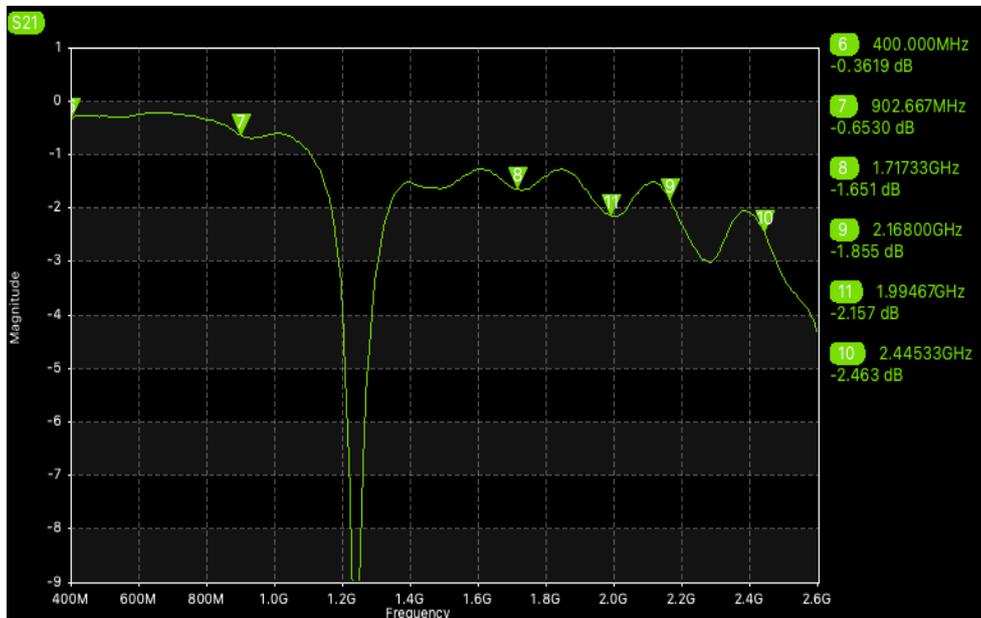


Figure 3: insertion losses of the AC20424-01

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2 Product Handling & Integration

2.1 Assembly Recommendation

Customer is advised that installation requires strict observance of relevant creepage and clearance standards such that the input and output patch coaxial cable assemblies are routed inside of their device in such a manner so as not to allow them to make contact or cross paths which if permitted can severely degrade the quoted 10kV electrical safety isolation of this product.

RF input and output patch cables can be optionally supplied and configured to customer specifications.

2.2 Mounting Instructions

The figure below shows how the AC20424-01 RF coupler is connected to a typical antenna.

As the device is reciprocal, the antenna can be connected to either port, making the other port the electrically isolated port.

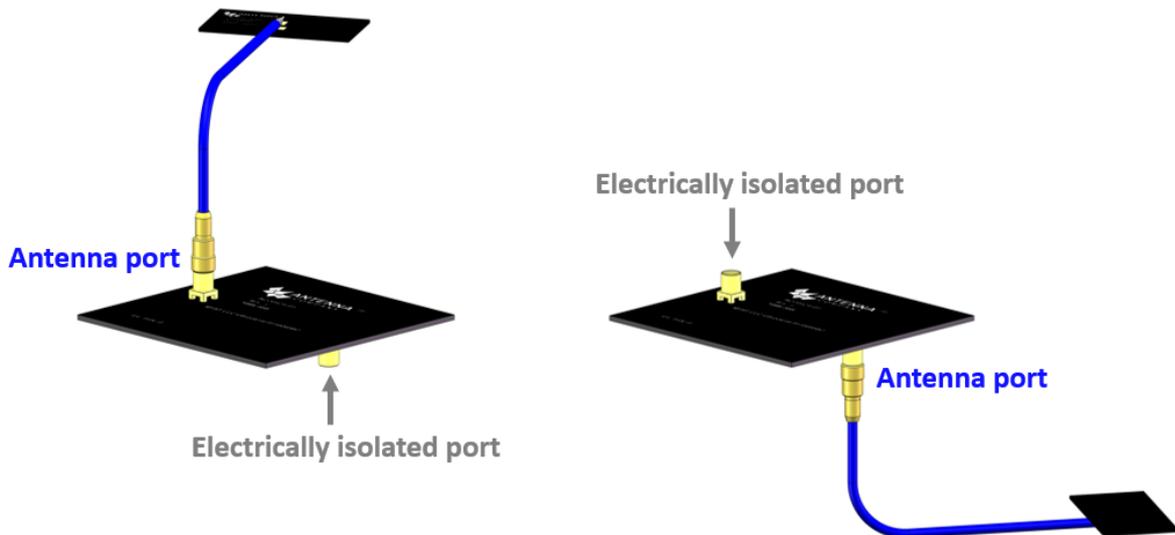


Figure 4: The AC20424-01 connected to a typical antenna

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3 Product Marking & Ordering Information

3.1 Packaging

The AC20424-01 RF coupler will be delivered in carton box subdivided in 30 compartments as illustrated in below picture. Each compartment contains one RF coupler packed in a PE bag. The packaging dimensions are L x W x H = 170 x 165 x 60mm and the gross weight is 0.26kg.

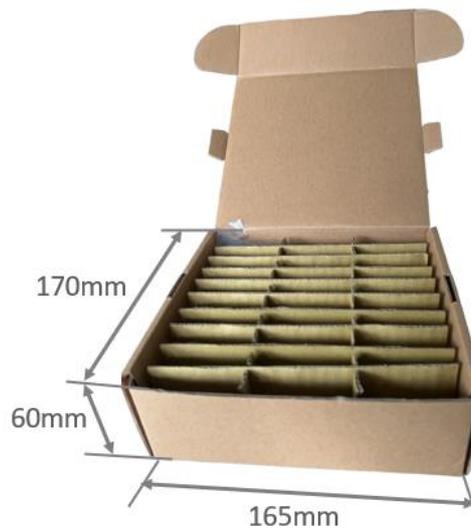


Figure 5: Packaging details of AC20424-01

3.2 Product Marking

Every element contains the part number, PCB number, revision number and production date code for easy tracking, as explained in below table.

Table 4: AC20424-01 Marking Specifications

Text on Antenna	Explanation
AC20424-01	AC Type Number
REV. 1	Revision Number

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YWW_SSS	Production Date and Supplier Code
Y = L	2023
Y = M	2024
Y = N	2025
WW	Manufacturing Week
SSS	Supplier Code

3.3 Ordering Information

Orders should be placed at orders@antennacompany.com.

For purchase orders please state: part number, description, quantity, and price

Table 5: AC20424-01, ordering information

Part number	Description	Order multiple [pcs]
AC20424-01	Broadband 400MHz – 2.45GHz RF Coupler/Antenna Isolator	30

For sample quantities, please contact sales@antennacompany.com.

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