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The Power of Linking Together

Abracon PTM Extended ACA Series - Ceramic Chip Antennas

Antennas
Crystals
Oscillators
Filters
Precision Timing
Inductors

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ACA Series
Ceramic Chip Antennas ACA-105 to 108

Purpose

To introduce the extended ACA Series, Ceramic Chip Antennas.

Objective

Present the advantage, performance and applications of Abracon ACA Series.

Content

19 pages

Learning Time

30 minutes

Welcome to Abracon's extended ACA Series; Ceramic Chip Antenna Training Module. This training session will provide an overview of the key features and benefits; as well as, discuss the applications of this product series.

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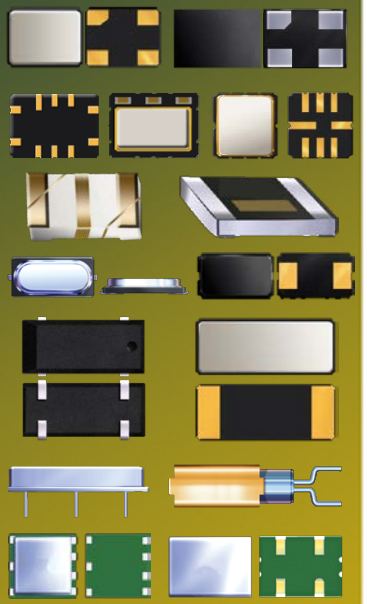

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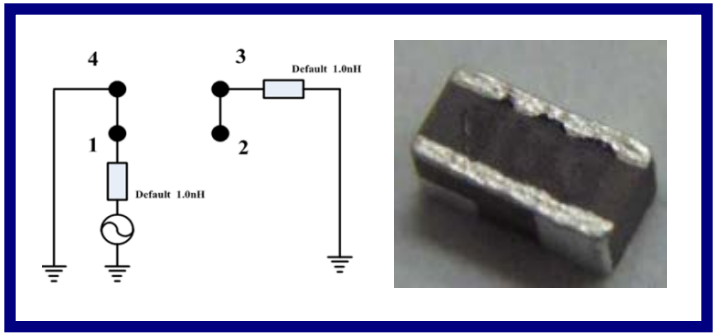
Product - ACA Series
Ceramic Chip Antennas

Abracon ACA Series-Part Numbering



ACA	—	105	—	T
Part Series		Part Codes		Packaging Code
		105 to 108		T: Tape & Reel Blank for Bulk

The ACA Series offers a range of Chip Antennas identified by part codes starting 105 to 108

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Abracon Extended ACA Series - Part Numbering & Descriptions

Part No	Description / Band	Frequency Band (MHz)	Size
ACA-105-T	Chip Antenna - Multiband ISM Antenna	470 ~ 510MHz 779 ~ 787 MHz 858 ~ 878MHz 902 ~ 928MHz	16 x 3 x 1.4 mm
ACA-106-T	Chip Antenna - BEIDOU / GPS / GNSS Bands	1555 ~ 1565MHz 1570 ~ 1580MHz 1565 ~ 1605MHz 1560 ~ 1610MHz	3 x 1.5 x 1.2 mm
ACA-107-T	Chip Antenna - UWB	3200 ~ 7200MHz	5 x 2 x 1.2 mm
ACA-108-T	Chip Antenna – Quad Band	1570 ~ 1580 & 2400 ~ 2485MHz 1920 ~ 2155MHz 2300 ~ 2655MHz 2496 ~ 2690MHz	4 x 2 x 1.2 mm

The ACA Series covers Chip Antennas covering ISM, GPS, UWB, Cellular Bands

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Wider Bandwidth Capability

Abracon introduces an extension to the ACA Series offering wider bandwidths and Ultra Wide Band (UWB) capability Chip Antennas.

Advantages:

- Allows designers to consider their wireless architecture using a common antenna footprint, that can be matched to the required band with specific lumped elements.

- Example: The ACA-105-T is capable of being matched to the Chinese 470 ~ 510MHz band, but can also be match to 902 ~ 928 ISM Band 2 for low power radio applications with only the substitution of two matching lumped elements.

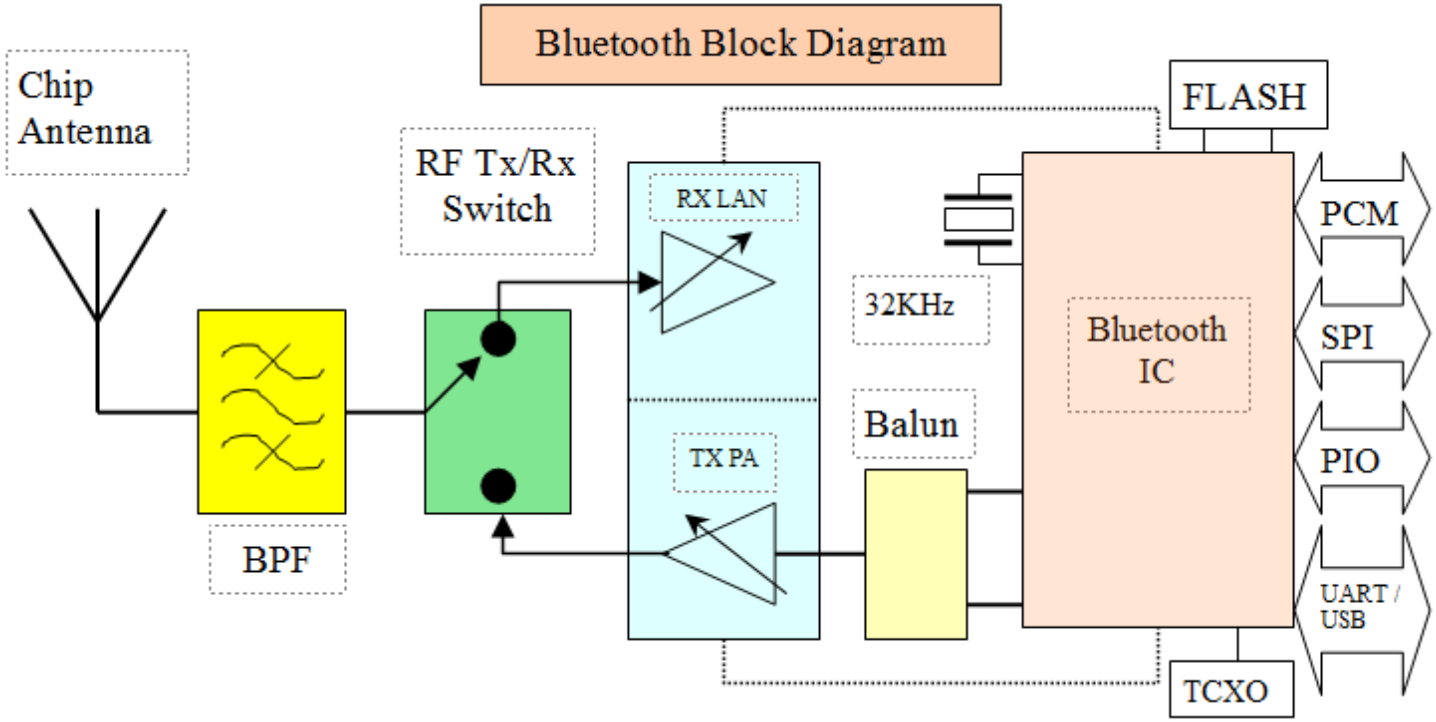
- The ACA-106-T is a broadly matched GPS chip antenna, making it suitable for wider ranges of GNSS signals.

- The ACA-107-T offers ultra wide band matching capability, making this antenna suitable for UWB applications between 3200MHZ to 7200MHz.

- The ACA-108-T has a Quad Band capability through lumped element matching allowing it to function in multiple roles in the wireless design, covering GPS Bluetooth, WCDMA, US PCS, AWS, WiBro, Bluetooth, DMB and Wi-MAX. This allows economies of scale and common layout within a multi-band radio system.

This selection of ACA chip antennas offers users the capability to use a common antenna over a broad range of applications due to their wide matched bandwidths.

Example of Block Diagram Bluetooth TCVR



Block diagram shows application of **Chip Antenna** in the 2.45GHz Bluetooth TCVR. See also use of BPF, Balun, TCXO and 32.768KHz Xtal in Bluetooth module.

In this Bluetooth example, the 2.45GHz antenna provides the transmission and reception of signals. In many handheld solution the choice of antenna will be a ceramic chip type, here the ACA108-T chip antenna could provide a solution. Abracon also provides other BOM elements for Bluetooth boards or modules; typically SAW BPF, as well as 32.768KHz Crystals and TCXO used to clock the radio IC are needed.

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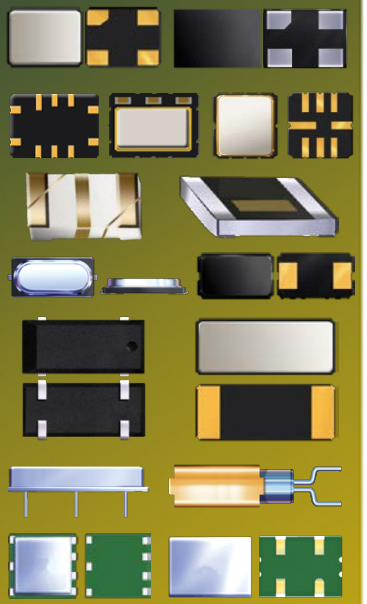

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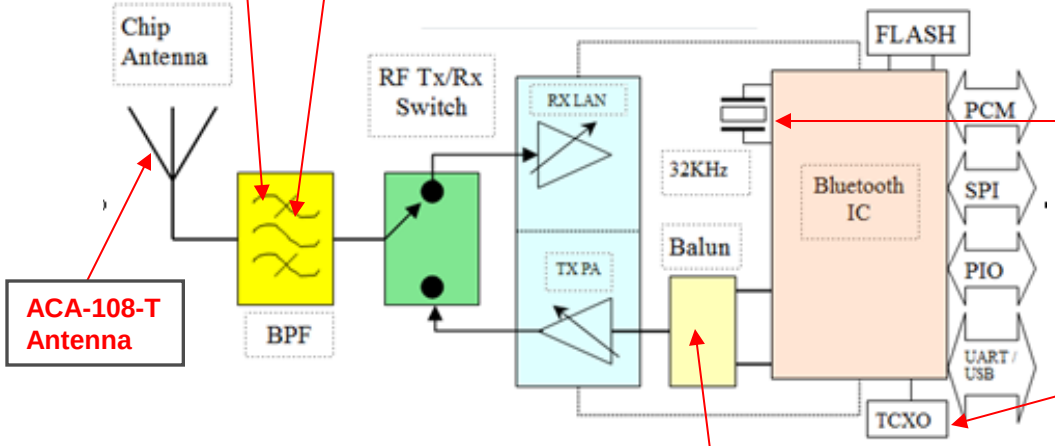
ABRACON's SAW & Balun Filters for use with ACA Series

GPS SAW Filters				
Associated Chip Antennas: ACA-104-T & ACA-106-T				
Part Number	Frequency	Bandwidth	Insertion Loss	Size
AFS14A04-1575.42-T3	1575.42MHz	4MHz	1.5dB	1.4 x 1.1 x 0.7mm
AFS20A02-1575.42-T3	1575.42MHz	2MHz	1.15dB	2.0 x 1.6 x 0.9mm
AFS20A42-1575.42-T3	1575.42MHz	42MHz	1.2dB	2.0 x 1.6 x 0.9mm
AFS20A53-1575.42-T3	1575.42MHz	53MHz	2.1dB	2.0 x 1.6 x 0.9mm
AFS1575.42W80-TS5	1575.42MHz	2.4MHz	2.2dB	2.5 x 2.0 x 1.5mm
AFS1575.42S4	1575.42MHz	2.4MHz	2.4dB	3.0 x 3.0 x 1.5mm

WiFi / Bluetooth / Zigbee SAW Filters				
Associated Chip Antennas: ACA-101-T & ACA-102-T, ACA-103-T & ACA-108-T				
Part Number	Frequency	Bandwidth	Insertion Loss	Size
AFS14A72-2436.00-T3	2436MHz	72MHz	3.2dB	1.4 x 1.1 x 0.7mm
AFS2442.0S4	2442MHz	78MHz	6dB	3.0 x 3.0 x 1.4mm



WiFi / Bluetooth / Zigbee Balun Filters				
Associated Chip Antennas: ACA-101-T & ACA-102-T, ACA-103-T & ACA-108-T				
Part Number	Conjugnate Match	Bandwidth	Insertion Loss	Size
ADBLF21-2450.00-A-T	CSR BT BC3/BC4 IC	100MHz	3.5dB	2.0 x 2.25 x 1.0mm
AMBF22-2450-01	100Ω (50Ω+50Ω)	100MHz	3.0dB	2.5 x 2.00 x 1.2mm
AMBF22-2450-06	36 + j73Ω	100MHz	3.0dB	2.0 x 2.25 x 1.0mm

The tables show associated SAW and Baluns for GPS, WiFi, Bluetooth, and ZigBee applications.

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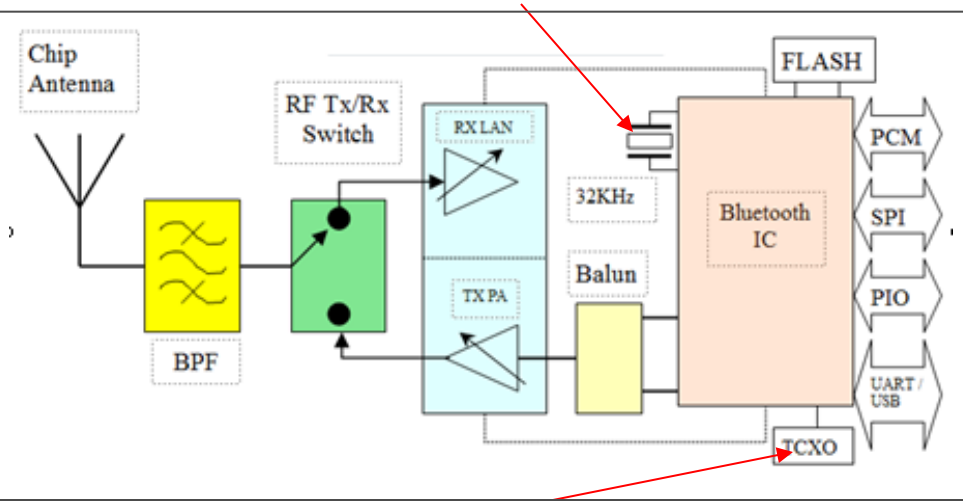
ABRACON's Crystal, XO and TCXO options

The clock frequency of Bluetooth or GPS Chipset will vary with supplier. Bluetooth Low Energy (BLE) applications may use low power 32.768KHz crystals and RTC.

ABS06-107-32.768kHz-T & ABS07-120-32.768KHz-T provide ultra low power options. Abracon RTC AB08XX and AB18XX provide ultra low power options.



TCXO or XO are used as reference clocks. Their frequency varies with the chipset used, common frequencies include 14.40, 15.36, 16.0, 16.2, 16.8, 19.2, 19.44, 19.68, 19.8, 38.4 & 40.0MHz.

ABM8X series, ABM9-16.000MHz-10-D-1-U-T, ASTX-12 or ASTX-13 Series of TCXO provide options.

The diagram shows Crystal, XO, and TCXO options for Bluetooth and GPS chipset options.

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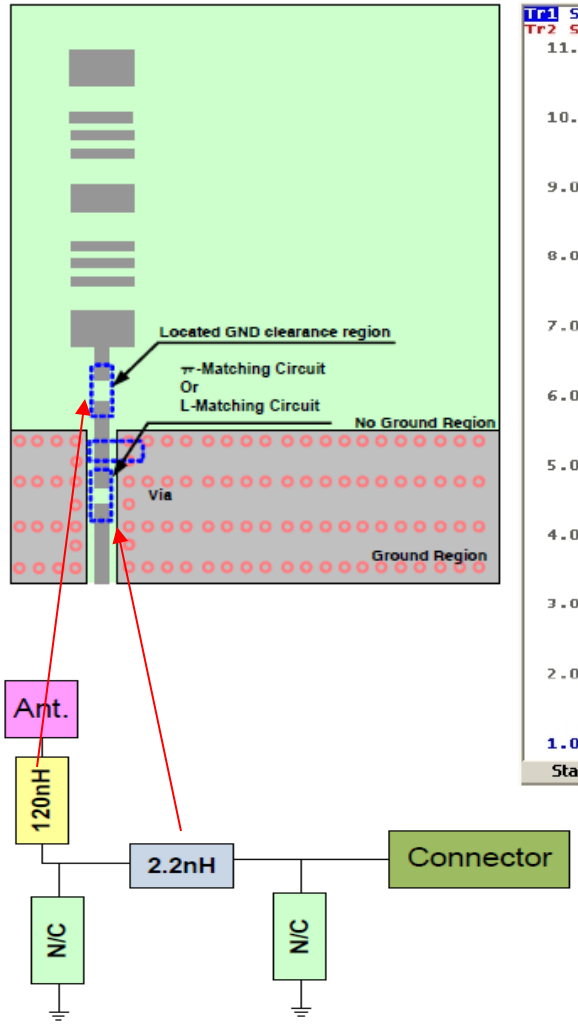
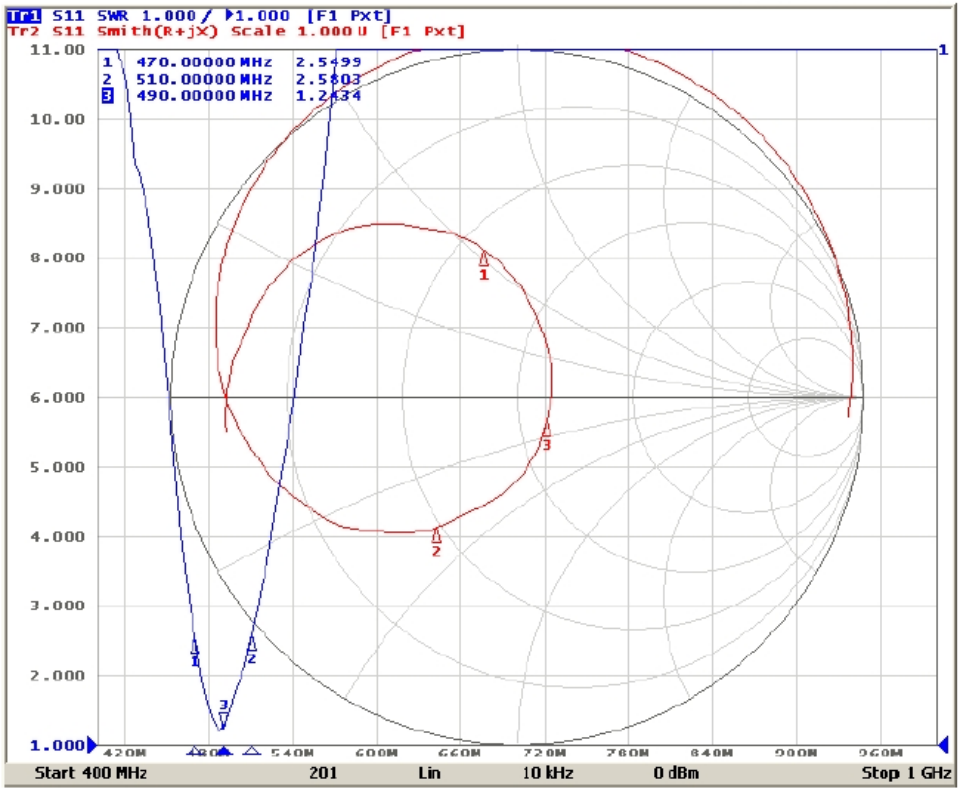
Typical Antenna PCB Matching for the **ACA-105-T**





Typical matching for the ACA-105-T at 490MHz for ISM Band

The diagram shows a typical pcb layout for the ACA-105-T chip antenna when matched to 490MHz, with matching components. Note position of Pi network elements in No-Ground and Ground plane areas

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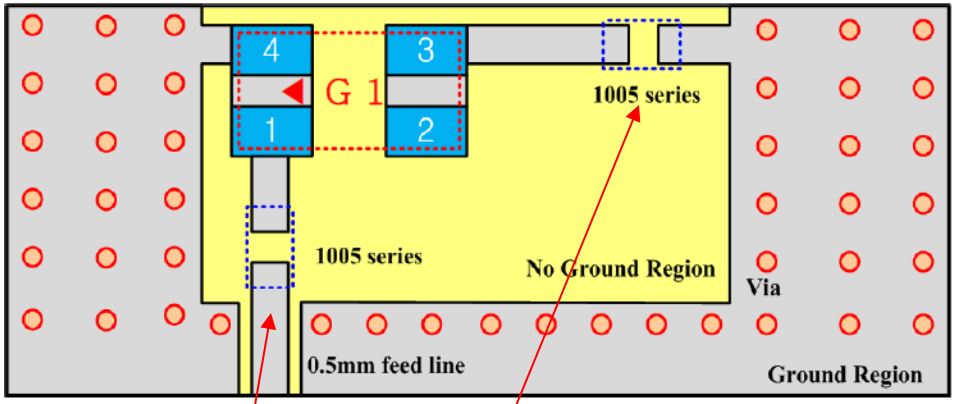
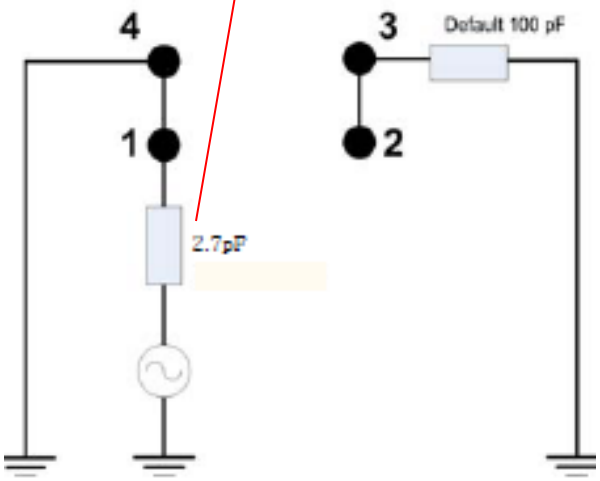
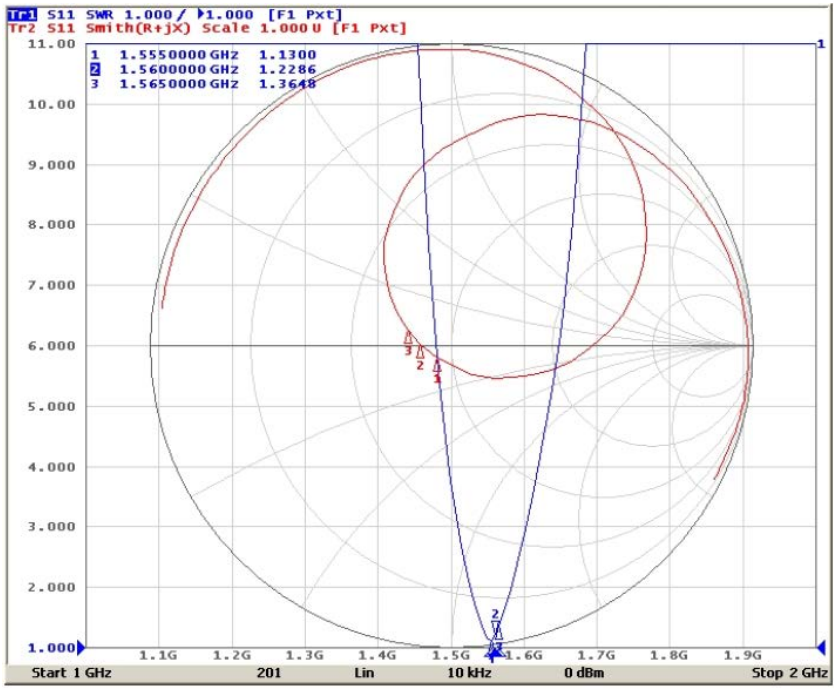
Typical Antenna PCB Matching for the **ACA-106-T**





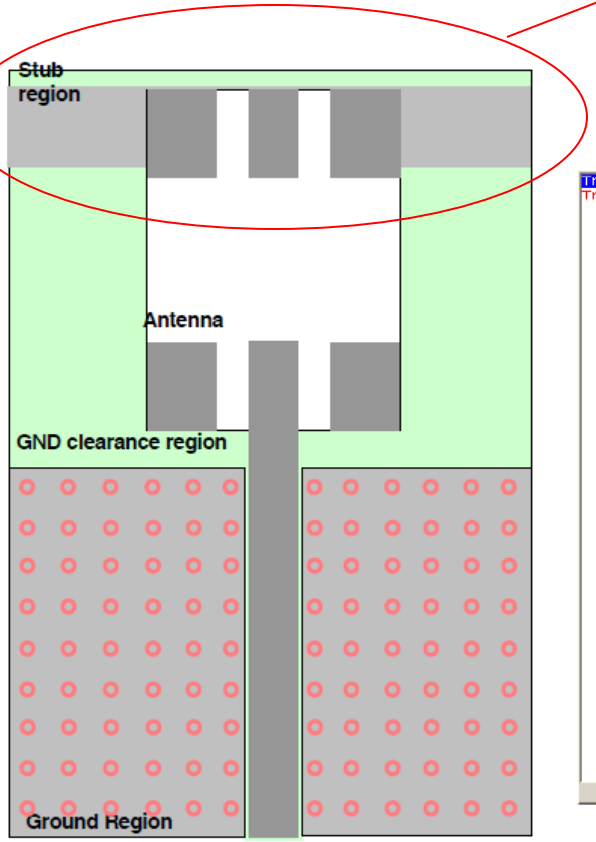


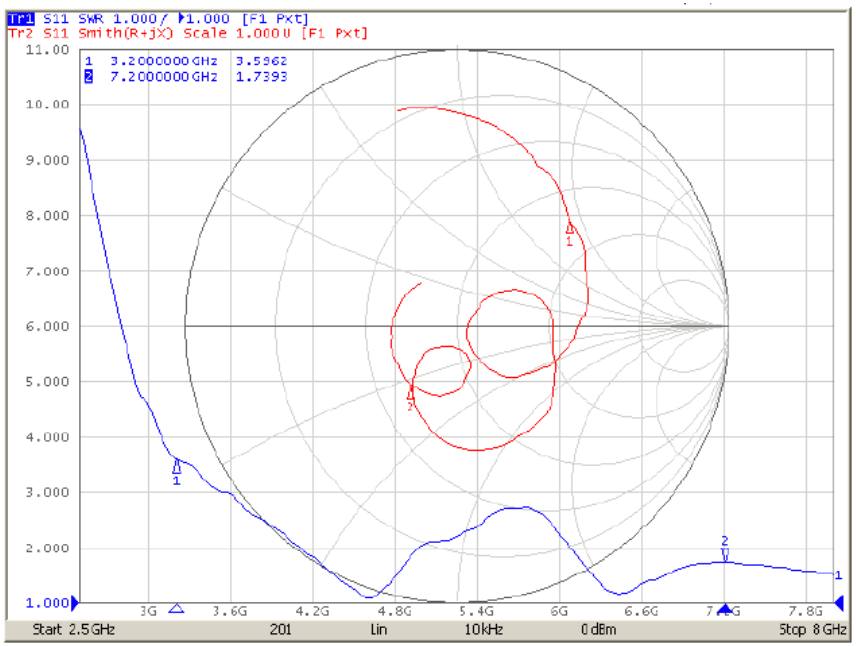
Typical matching for the ACA-106-T at 1560MHz for Beidou Band

The diagram shows a typical pcb layout for a ACA-106-T chip antenna, with matching components. Typically these will need a no-ground region / keep out area, as this is critical for antenna performance.

Typical Antenna PCB Matching for the **ACA-107-T**

Matching of the ACA-107-T is achieved using the stub region. This extended metalized stub area 2.2mm wide extends across beyond the end of the antenna and provides matching.

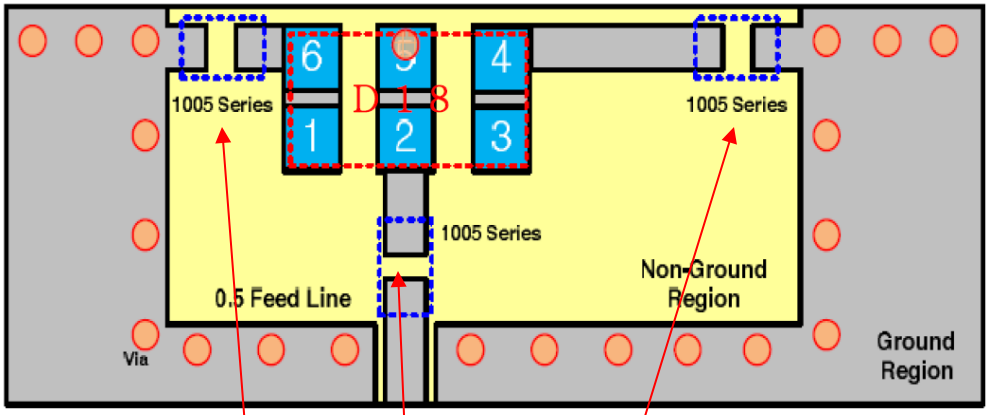




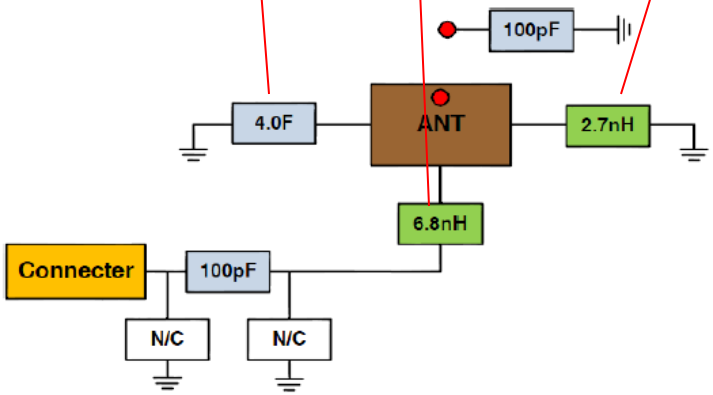
Typical matching for the ACA-107-T showing broadband match over 3200 to 7200MHz for UWB Band

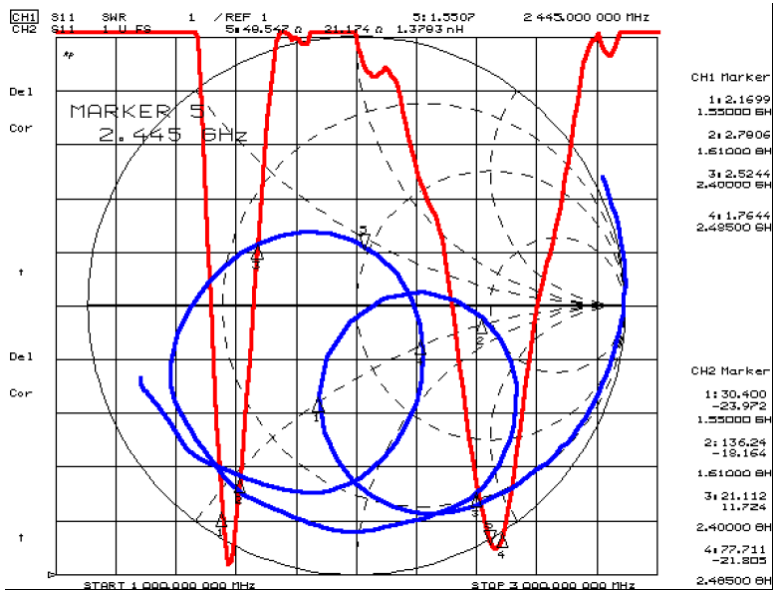
The ACA-107-T is a ultra wide band matched chip antenna. The broadband match is achieved using the extended metalized region inside the No-Ground area.

Typical Antenna PCB Matching for the **ACA-108-T**



Typical matching for the ACA-108-T showing broadband match over 1550~1610MHz and 2400 ~ 2485MHz for GPS and WiFi Bands





The ACA-108-T is a broadband matched chip antenna that covers 1550MHz ~ 2690MHz, in the example shown above the antenna is matched to the GPS and WiFI bands using the lumped elements.

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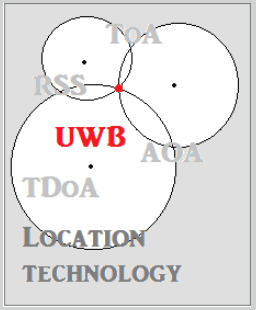
What RF Applications need Chip Antenna



UWB Location Services Tracking Security	Bluetooth WiFi WiBro SDMB Cellular GPS	Land Mobile IEEE 802.15.4c SRD Band 2 ISM	BEIDOU GPS GNSS
ACA-107-T	ACA-108-T	ACA-105-T	ACA-106-T & ACA-108-T

The extended range of ACA Series Chip Antennas offer broadband matching capability making them suitable for this wide range of applications.

Antenna Applications – **ACA-105-T**

The ACA-105-T is a multiband capable Chip Antenna, that can be matched to the required band.

- **ACA-105-T (470 ~ 510MHz)**
  - Chinese Automatic Meter Reading (AMR)
  - Smart Metering & Smart Grid
  - LMRS 450−470 MHz additionally 470−490 MHz, and 490−512 MHz in urban areas
  - Ultra Low Power Applications.

- **ACA-105-T (779 ~ 787 MHz)**
  - IEEE 802.15.4c Wireless PAN use within China.
  - Short range devices

- **ACA-105-T (858 ~ 878MHz)**
  - IEEE 802.15.4 (868 - 868.6MHz) Europe
  - SDR European Standards by ETSI (863 ~ 870MHz).

- **ACA-105-T (902 ~ 928MHz)**
  - IEEE 802.15.4 (902 ~ 928MHz) Band 2 ISM US & Americas
  - FCC Part 15.247: 902-928 MHz

The ACA-105-T is a multiband chip antenna offering a solution covering many ISM and low power applications.

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Antenna Applications – **ACA-106-T**

The ACA-106-T is a multiband capable Chip Antenna, that can be matched to the required GNSS band.

- **ACA-106-T (1555 ~ 1565 MHz)**
  - Chinese BEIDOU band
  - 1.561098 GHz BEIDOU Band (B1)

- **ACA-106-T (1570 ~ 1580 MHz)**
  - GPS band
  - 1.57542 GHz GPS (L1 signal)

- **ACA-106-T (1565 ~ 1605 MHz)**
  - GPS and GNSS bands
  - 1.559 ~ 1.592 GHz GALILEO (E2-L1-E11)
  - 1.602 GHz GLONASS

- **ACA-106-T (1560 ~ 1610 MHz)**
  - BEIDOU, GPS and GNSS bands
  - 1.561098 GHz BEIDOU Band (B1)
  - 1.57542 GHz GPS (L1 signal)
  - 1.602 GHz GLONASS

The ACA-106-T is a broadband Chip antenna that can be matched to BEIDOU (Chinese Navigational Satellite system) or GPS or a wider selection of GNSS services between 1560 ~ 1610MHz.

Antenna Applications – **ACA-107-T**

The ACA-107-T is an ultra wideband Chip Antenna, that can be matched over bands supporting UWB technology

- **ACA-107-T (3200 ~ 7200MHz)**
  - UWB as defined by the ITU-R and FCC
  - Location Services
  - Real Time tracking
  - Medical Equipment
  - WBAN

The ACA-107-T is an ultra wideband chip antenna offering a solution covering 3200MHz to 7200MHz.

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Antenna Applications – **ACA-108-T**

The ACA-108-T is a multiband capable Chip Antenna, that can be matched to the required band

- **ACA-108-T (1570 ~ 1580MHz & 2400 ~ 2485MHz)**
  - GPS: 1570 ~ 1580MHz & Bluetooth / WiFi: 2400 ~ 2485MHz
  - Navigational system capable of BT or WiFi connection
  - Tracking or Location systems
  - Single antenna, dual band application

- **ACA-108-T (1920 ~ 2155MHz)**
  - WCDMA : 1920 ~ 2170US
  - PCS Rx: 1930 ~ 1990AWS
  - Rx: 2110 ~ 2155

- **ACA-108-T (2300 ~ 2655MHz)**
  - WiBro: 2300 ~ 2390
  - Bluetooth: 2400 ~ 2485
  - DMB: 2605 ~ 2655

- **ACA-108-T (2496 ~ 2690MHz)**
  - IEEE 802;16m WiMax: 2496 ~ 2690MHz
  - Broadband connections
  - Backhaul

The ACA-108-T is a multiband chip antenna offering a solutions across 4 bands between 1570MHz to 2690MHz which are matched using lumped elements for the individual band selection.

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Major Competitors and Cross Reference

ABRACON	YAGEO (PHYCOMP)	TAIYO YUDEN	JOHANSON TECHNOLOGY Inc
ACA-105-T	ANT1204F007R0870A		0490AT62A0040
	ANT7020LL05R0870A		0783AT43A0008
			0868AT43A0020
			0915AT43A002
ACA-106-T	ANT8010LL05R1516A		1575AT47A0040
	ANT5320LL14R1516A		1575AT44A0010
			1600AT45A0040
			1575AT54A0010
ACA-107-T		AH086M555003-T	
ACA-108-T		AH104F2650S1-T	2450AT42D0100
	ANT1003LL16R1524A	AH316M245001-T	
	ANT5320LL07R1524A		

The table offers a cross reference of Abracon cost effective solutions compared to other competitors chip antennas. These are not generally drop-in alternatives, but cover similar bands

Thank You for your Kind Attention

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