

## AS321X-T Passive RAIN RFID Sensor Evaluation Tag



### Features

- ✓ RAIN (UHF EPC Gen2) compliant
- ✓ Batteryless
- ✓ 512 bits non-volatile memory (EEPROM)
- ✓ Data available through standard READ command in USER
- ✓ Temperature sensor
- ✓ Integrated acquisition channel with amplifier and ADC
- ✓ Both resistive and capacitive external sensor data monitoring
- ✓ Integrated sensors: temperature, ALS, Strain, Continuity, Hall
- ✓ Extended temperature range -40°C to +120°C

### Applications

- ✓ Condition monitoring (pressure, temperature, humidity, vibration...)
- ✓ Supply chain management, tracking and tracing
- ✓ Cold chain monitoring
- ✓ Sensor monitoring

### Description

AS321X-T is an EPCTM Class-1 Generation-2 compliant evaluation tag for UHF RFID applications. The Tag offers advanced performance in sensor acquisition mode, due to an ultra-low power internal acquisition channel. It can be powered either by a battery or by the RF energy transmitted from a reader.

This tag embeds 512 bits of low power non-volatile memory (EEPROM) that is organized in 4 banks in accordance with EPC Gen 2 standard. AS321X-T moreover supports the EPC data structure in compliance with the EPC Global Tag Data Standards, Version 1.10, and is delivered with a Unique Identifier (UID) to ensure full traceability.

The IC embedded on this tag integrates an acquisition channel and biasing circuitry for external sensors, including an on-chip amplifier suitable for resistive bridge, voltage and capacitive sensor measurements, and a 10-bit Analog to Digital Converter (ADC). In addition to the acquisition channel, AS321X-T features internal sensors, allowing single-chip measurements. The set of available internal sensors includes an on-chip temperature sensor, an Ambient Light Sensor, a strain sensor, an electrical continuity sensor and a Hall effect sensor.

The tag supports a temperature range from -40°C to +120°C.

## Specification

### General

Parameter	Min.	Max.	Unit
Operating Temperature	-40	120	°C
Max RF power		15	dBm
RF carrier frequency	865	915	MHz
Reading Range (including sensor)		5	m
Writing range		4	m
Erase / write endurance	10,000		Cycles
Retention	10		Years
Tag Size	80mmx25mm		

### Temperature Sensor Characteristics

Parameter	Min.	Typ.	Max.	Unit
Temperature Range	-40		120	°C
Resolution		±0.5		°C
Measurement time		137		µs
Accuracy (after calibration)		1		°C

### Acquisition Channel Characteristics

NOTE: At temp=25°C

Parameter	Min.	Typ.	Max.	Unit
Temperature Range	-40		120	°C
Resolution		10		bits
Measurement time	75	150	600	µs
Accuracy (after calibration)		1		LSB
Number of samples	1	1	8	
Sampling Frequency	20	80	160	kHz
Amplifier Gain	1	20	40	V/V
Offset		<1		LSB

### Sensor and Temperature Data

Sensor and Temperature data are stored in register at user memory address 0 and 1. They are accessible thanks to a simple Read command in USER memory at address 0 (temperature) and 1 (sensor). Please refer to the AS321X IC datasheet or related application notes for further details.

### Product Support

For support questions please check [www.asygn.com](http://www.asygn.com) or contact [support@asygn.com](mailto:support@asygn.com). Tag customizations such as form factor changes, specific sensor requirements or custom developments can be requested at [contact@asygn.com](mailto:contact@asygn.com).

### Important notice

This evaluation tag is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY and is not considered by Asygn to be a finished end-product fit for general consumer use.