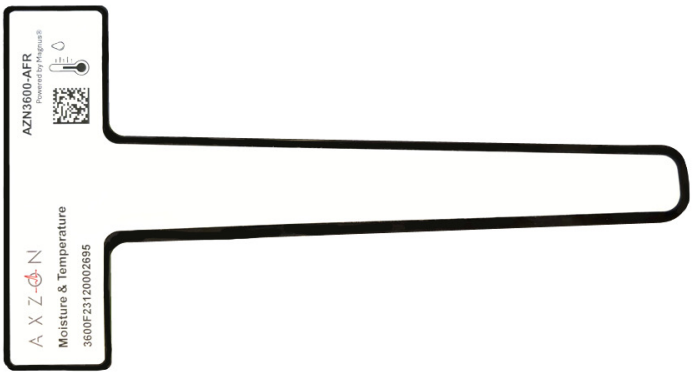
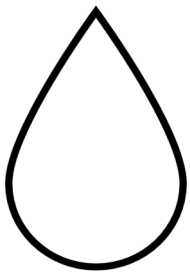
Wireless Moisture Sensor

Built For TID/EPC Tagged Objects





AZN3600

Battery-Free Moisture and Temp Sensor

The AZN3600 is a battery-free sensor, powered by Magnus® IC, designed to monitor moisture content as well as sensing the temperature information of the surrounding environment. The tag is a T-shaped apparatus which enables sensing deep in areas where RF transmission is highly affected (a.k.a. RF unfriendly area). The bottom of the tag which hosts Magnus® IC, gets buried into any RF unfriendly areas, to sense moisture and temperature of the environment the tail is buried into, while the top of the tag is designed to protrude from the entity being measured to allow an unobstructed RF transmission path of the data through the air.

APPLICATIONS

Agricultural applications
Measuring moisture content

KEY FEATURES

User-Accessible Memory:
96-bit Unique Tag ID
128-bit EPC
192-bit Use Memory
Dimensions:
a: 0.25mm, 0.50mm, 0.75mm, 1.00mm, 1.25mm
w: 1.25mm, 1.50mm, 1.75mm, 2.00mm, 2.25mm
Worldwide UHF:
860 MHz to 960 MHz
On-Chip Received Signal Strength Indicator (OCRSSI)
Battery-Free Wireless Operation
Meets ISO/IEC 18000-63
Meets EPCglobal™ Gen2 (v. 2.)
Powered by Magnus®-S3
Moisture level
Temperature

Moisture Measurement Capabilities

The AZN3600 alerts users on the relative dryness or moisture level of the measured entity, accurately determining the moisture level of the environment being measured. The measurement method is enabled by Magnus® IC, which converts the moisture level into a relative Sensor Code. In general, as an example, a dry condition is detected when the Sensor Code has a value of 260, while a Sensor Code of 160 indicates a 25% moisture level content. In short, the AZN3600 determines moisture level or content of the environment in an RF unfriendly environment by Sensor Code reading, as the environment's moisture content rises, the Sensor Codes value will decrease and vice versa.

Vast Applications

While the AZN3600 has a vast array of applications, it is designed and tested for agricultural use, intended to detect moisture level in soil near crops and plants. The moisture level/content of soil plays an important role in the quality, health, and the growth of the plants. If the soil is too dry, a plant's roots will not be able to absorb necessary nutrition needed to grow, significantly affecting the health and the growth of the plant. On the other hand, excess moisture in soil stunts the plant's growth due to a lack of oxygen supply, hence adversely affecting the quality of the

plant which leads to a decrease in seed production and leaf area, causing smaller, less fruitful plants. With the information that the AZN3600 sensor provides, users can make educated decisions regarding how to optimize soil's moisture level/content by precisely managing the water level applied to their plants, thus maximizing their growth.

Compliance

The AZN3600 is available in FCC and EU/ETSI frequency ranges. The AZN3600 requires a RAIN/UHF compliant reader. The summary of the performance parameters is shown in Table 1.

AZN3600 Performance Data

Moisture Sensor Powered by Magnus® S3

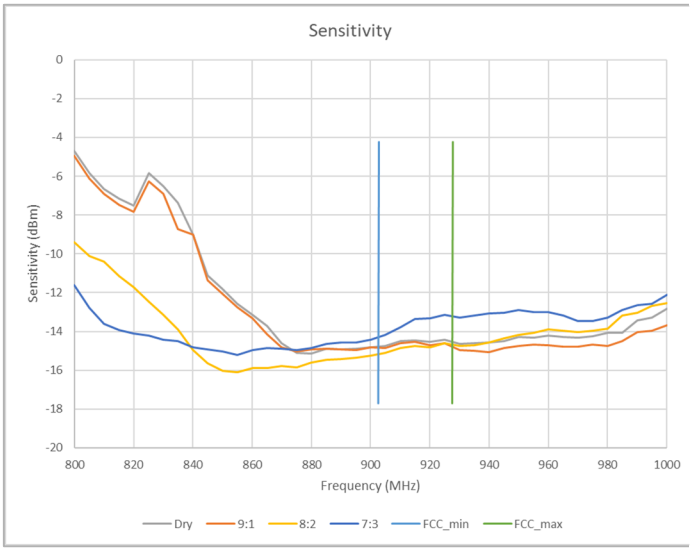
Table 1 Summary of Performance Parameters

PARAMETER	VALUE
Data Retention	10 years
Write and Erase Endurance	10,000 cycles
Compatible Standards	EPC class 1 gen 2 v2.0.1 ISO/IEC 18000-63
Integrated Circuit	Powered by Magnus® S3
TID Memory	96 bits
EPC Memory	160 bits supporting up to 128-bit EPC
Read Range	8 m – 9 m
User Memory	192 bits
Ordering Information	AZN3600-AFR (FCC 902 MHz to 928 MHz) AZN3600-AER (ETSI 865.6 MHz to 867.6 MHz)

Table 2 shows the Sensitivity of the tag as well as the sensor codes vs. Frequency for different moisture level; Dry, 9 cups dirt mixed with 1 cup of water (9:1), 8 cups of dirt mixed with 2 cups of water (8:2) and finally 7 cups of dirt mixed with 3 cups of water (7:3).

Table 3 shows the Average Sensor Codes, Sensitivity (dBm) and Read Range (m) in the FCC band for the Dry (0%) and 8:2 (25%) cases.

Table 2 AZN3600 Sensitivity and Sensor Codes vs. Frequency



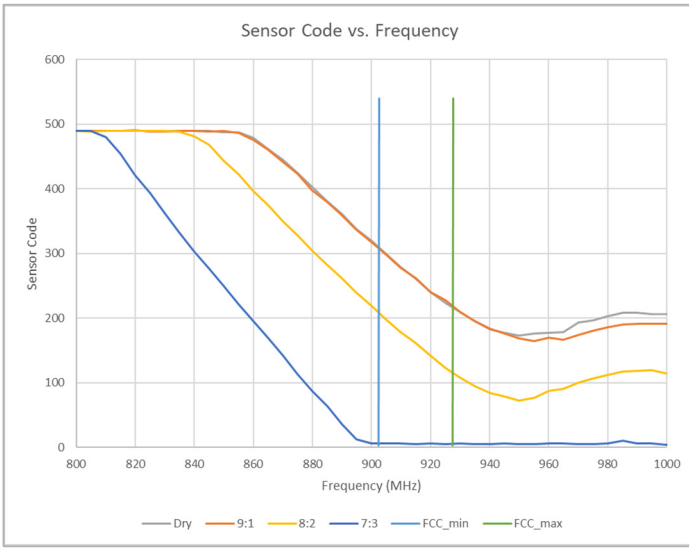


Table 3 AZN3600 FCC performance metrics

Sensor Codes	
Moisture	AZN3600
0%	262
25%	161

Sensitivity (dBm)	
Moisture	AZN3600
0%	-14.6
25%	-14.9

Read Range (m)	
Moisture	AZN3600
0%	8.9
25%	9.2