Voyantic

Application Note

Utilizing Voyantic Tagformance to Speed Up Development of UHF RAIN RFID Sensor Tags

Rev 2.0

5/2015

Copyright © Voyantic Ltd. All rights reserved.

1 Introduction

Active tags have included sensor capabilities for a long time. However, due to cost pressure and the need for simplicity, sensor implementations are now emerging for passive UHF tags. Small RAIN RFID tags offer a tempting platform for diverse sensing applications.

Recently, dedicated sensor ICs have been introduced to the market. As always, when a new IC enters the market, one of the first tasks is to design a suitable antenna. The antenna should match the IC impedance, be compatible with the intended manufacturing technology, and meet the end application requirements in terms of its frequency tuning and sensitivity. In this application note, we show how to do that, using the Magnus™ IC from RFMicron, Inc as an example.

2 Solution

The industry de-facto tool for this engineering challenge is the Voyantic Tagformance Threshold measurement. An additional benefit is that the same threshold test can be done while reading a certain memory location. This measurement enables anyone to optimize the bandwidth and the sensitivity of a tag.

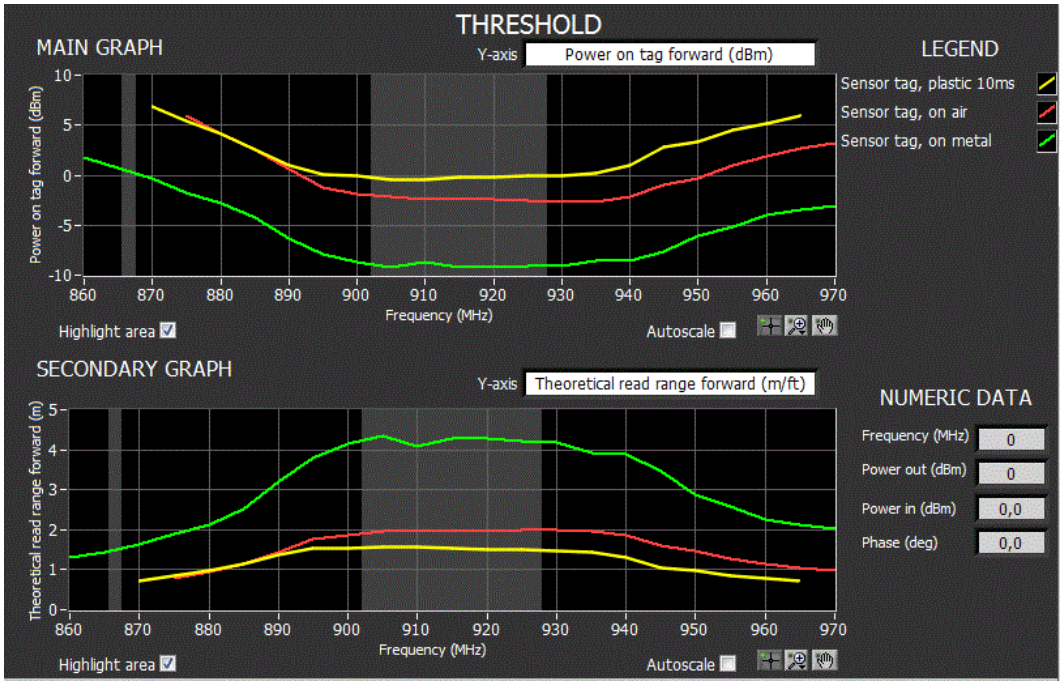

Figure 1. Tuning sensitivity graph of a RFMicron sensor tag attached on different background materials

To speed up the initial tests for any new sensor tag IC, the Tagformance system also offers the Protocol Testing Suite. This tool can be conveniently used to create and send custom commands and to monitor and decode the tags responses.

Copyright © Voyantic Ltd. All rights reserved.

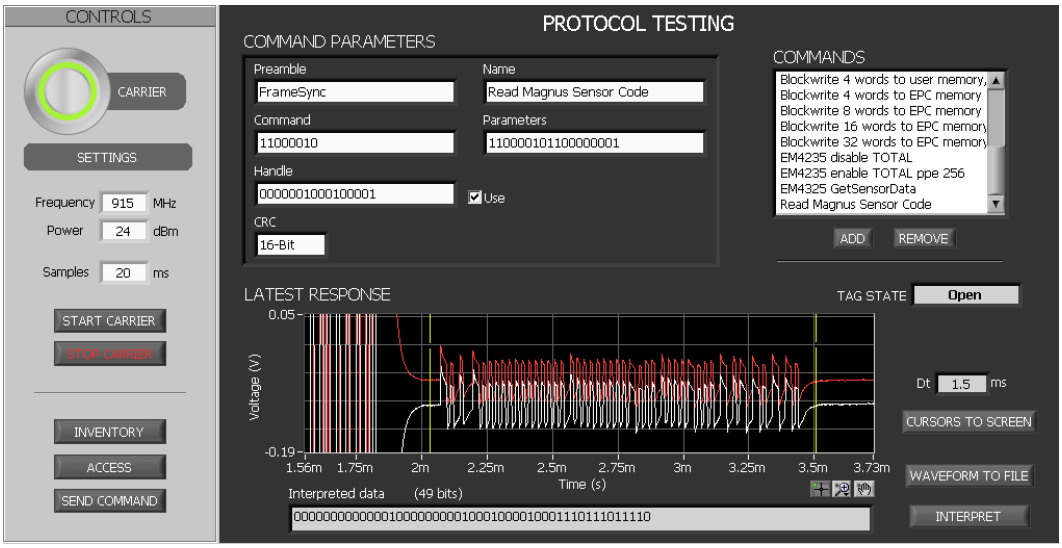

Figure 2. Using the Protocol Testing Suite to read the Sensor Code™ from a Magnus™

The Tagformance Response test functionality also allows logging any memory value as a function of time. The frequency and power level can be freely defined by the user, as well as the logging interval. This conveniently provides the user the ability to study the behavior of the tag as a function of time. This approach is often used to determine the accuracy and calibration specifications for the tag.

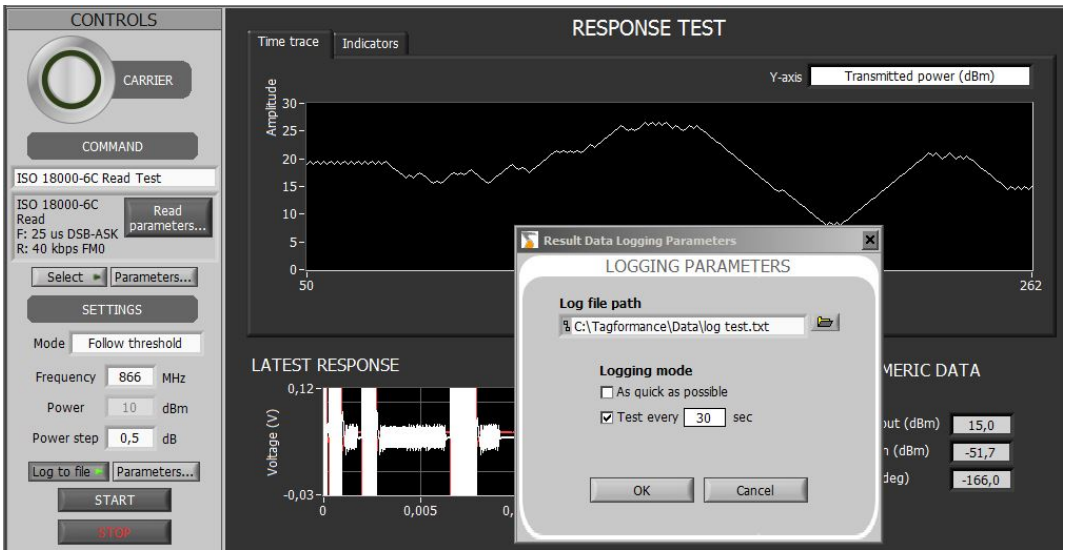

Figure 3. Logging certain memory locations as a function of time

The Tagformance software version 8 includes a new Memory Management functionality that shows the contents of the different memory locations of the tag IC. The functionality also allows reading hidden memory areas that cannot be found by reading the full memory banks. In addition, Memory Management highlights changes in the memory areas.

Copyright © Voyantic Ltd. All rights reserved.

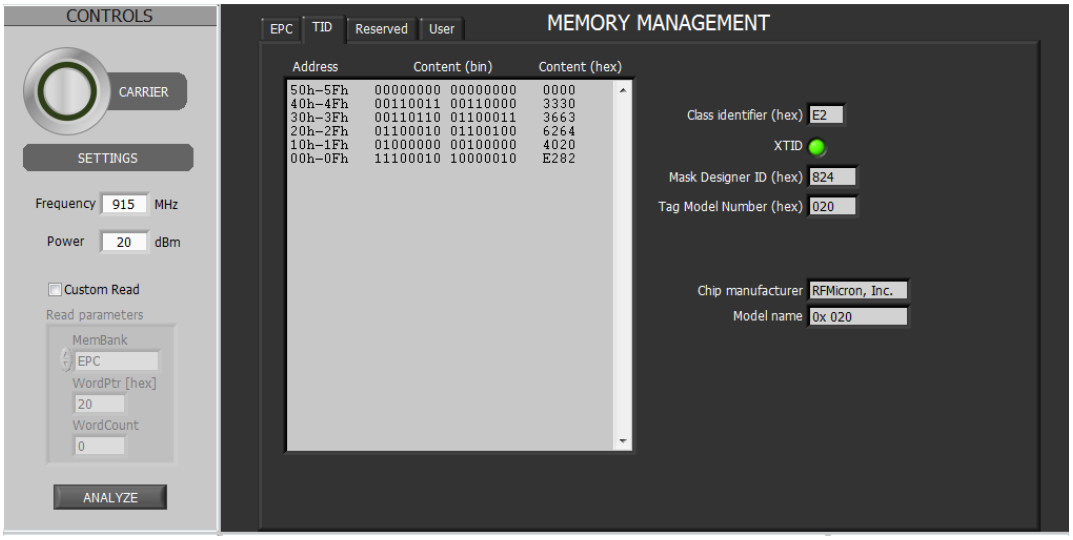

Figure 4. Analyzing the memory contents of sensor tags

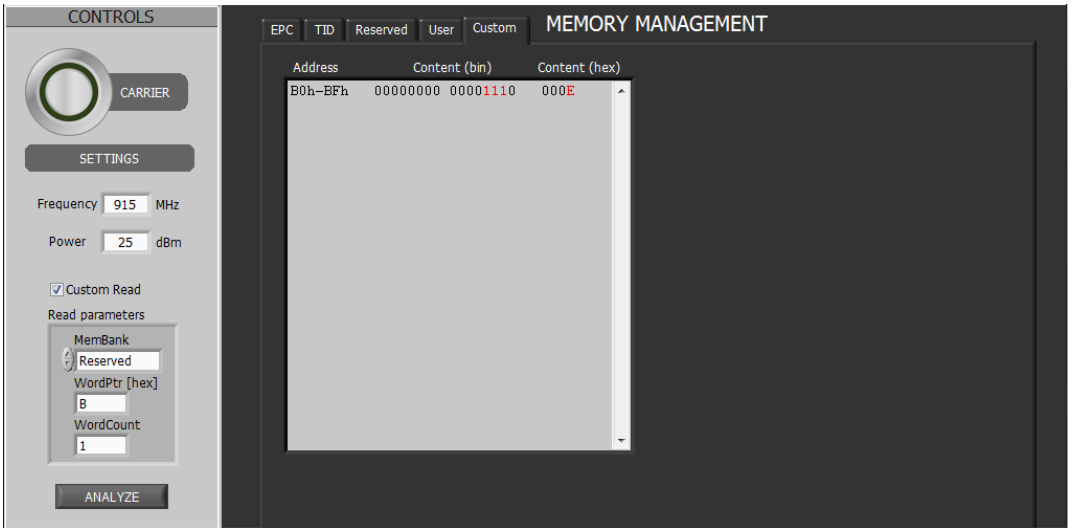

Figure 5. Analyzing changes in a hidden memory area

A dedicated test script is also available that can read any memory location while running a frequency or a power sweep, enabling the detailed characterization of sensor tag properties. For example, the Sensor Code™ or the on-chip RSSI value on the Magnus™ IC can be analyzed this way.

Copyright © Voyantic Ltd. All rights reserved.

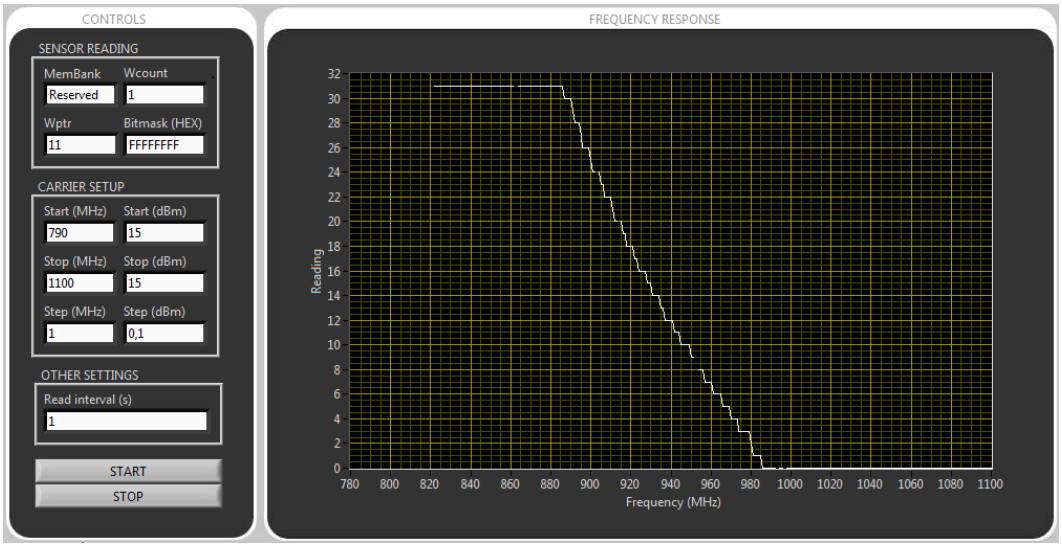

Figure 6. Sensor Code™ plotted at a fixed output power while varying the transmit frequency

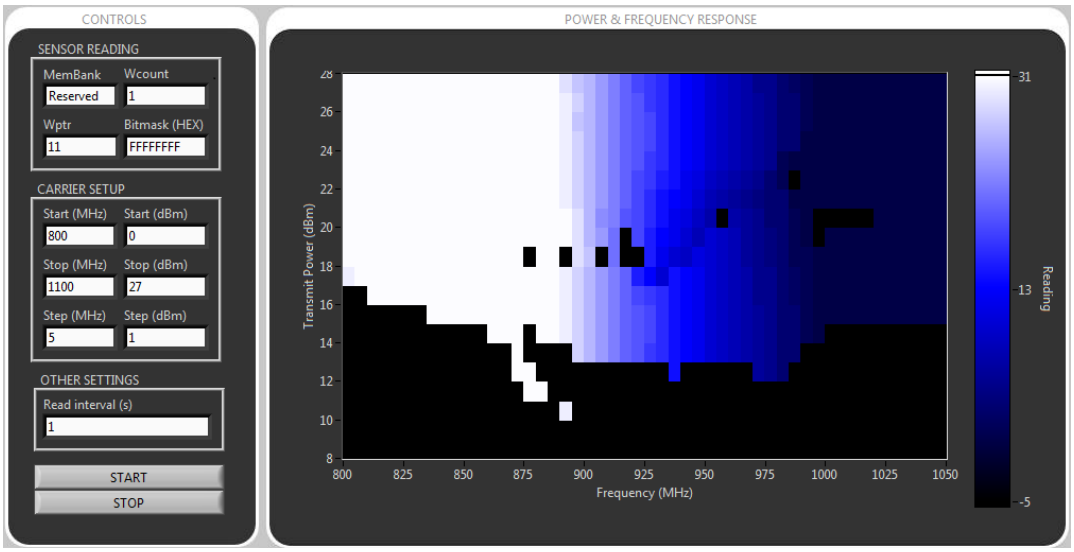

Figure 7. Sensor Code™ plotted at as a function of frequency and power

The sensoring technology is taking steps forward at a rapid pace. If you have a test requirement outside the test coverage described above, please do not hesitate to contact Voyantic's experts at *support@voyantic.com*. You can also follow our progress in Twitter and at the Voyantic blog.

Voyantic Ltd.
Kutojantie 11 | 02630 Espoo | Finland
Tel. +358 20 788 8190 | info@voyantic.com | www.voyantic.com
Twitter @voyantic | LinkedIn www.linkedin.com/company/voyantic-ltd-

Copyright © Voyantic Ltd. All rights reserved.