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Application Note

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

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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.

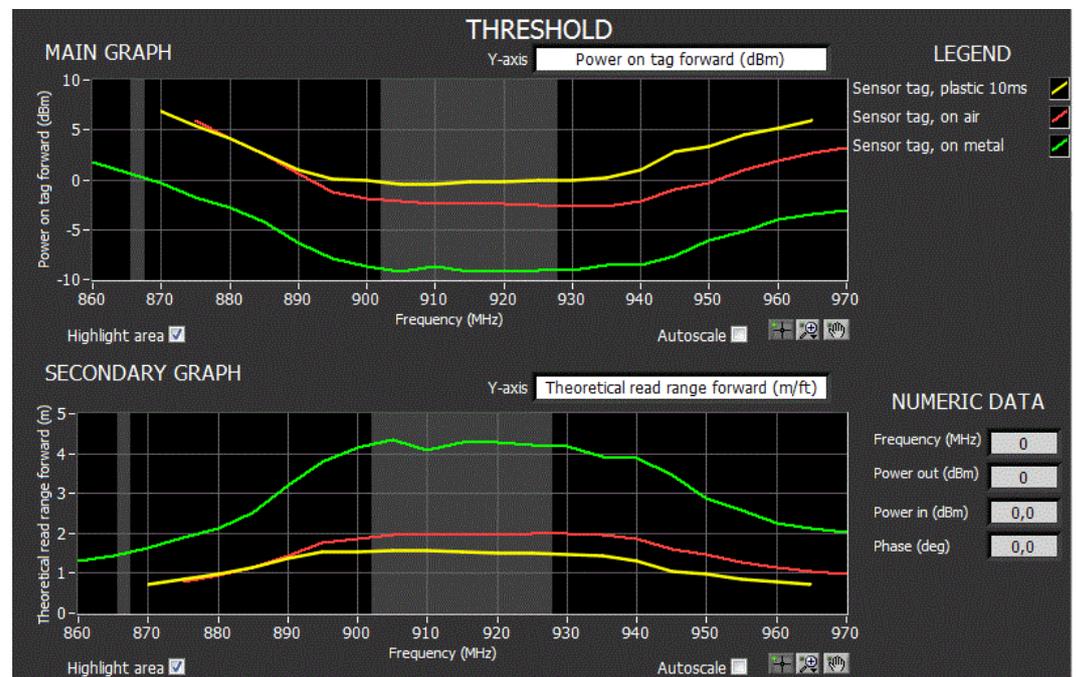


Figure 1. Tuning sensitivity graph of a RFMicron sensor tag attached on different background materials

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.

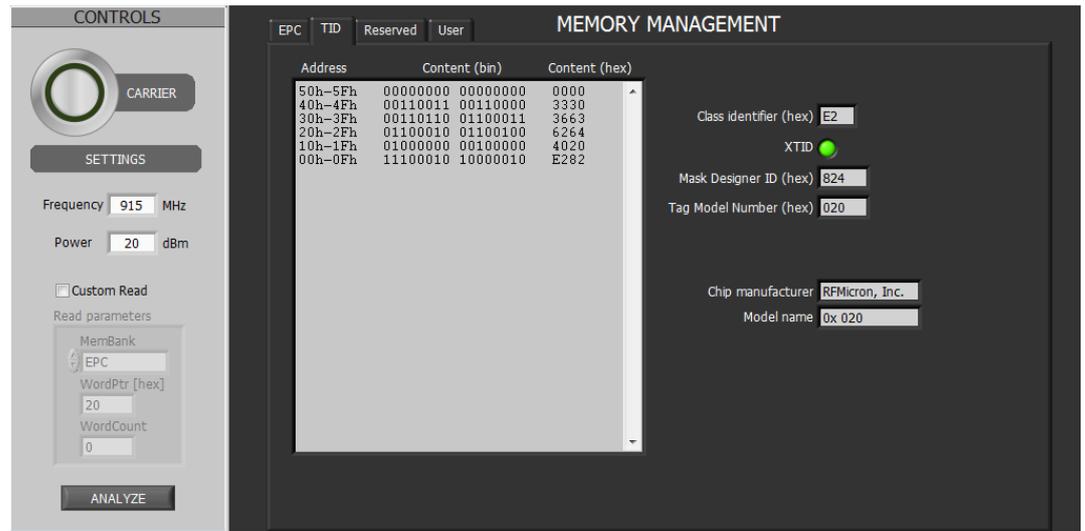


Figure 4. Analyzing the memory contents of sensor tags

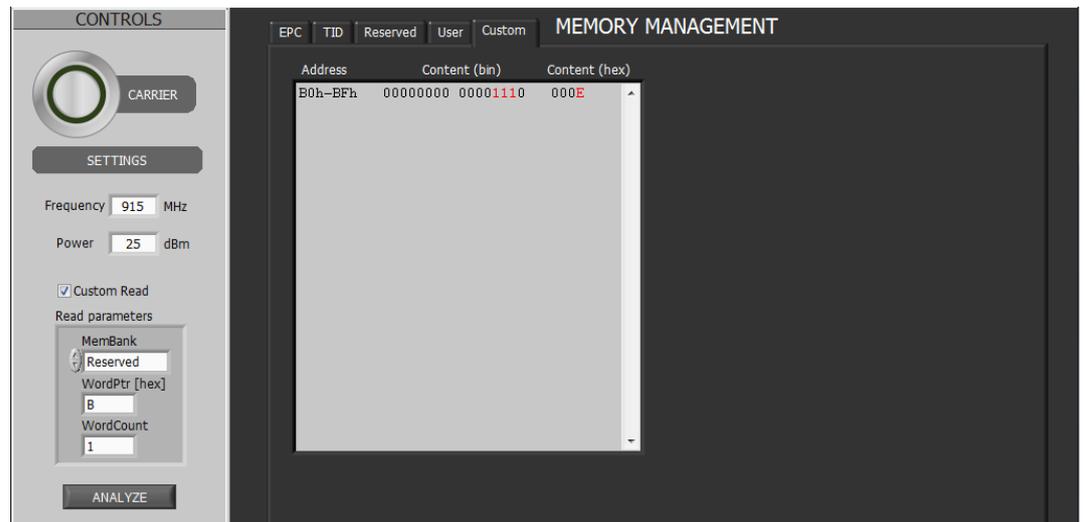


Figure 5. Analyzing changes in a hidden memory area

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.

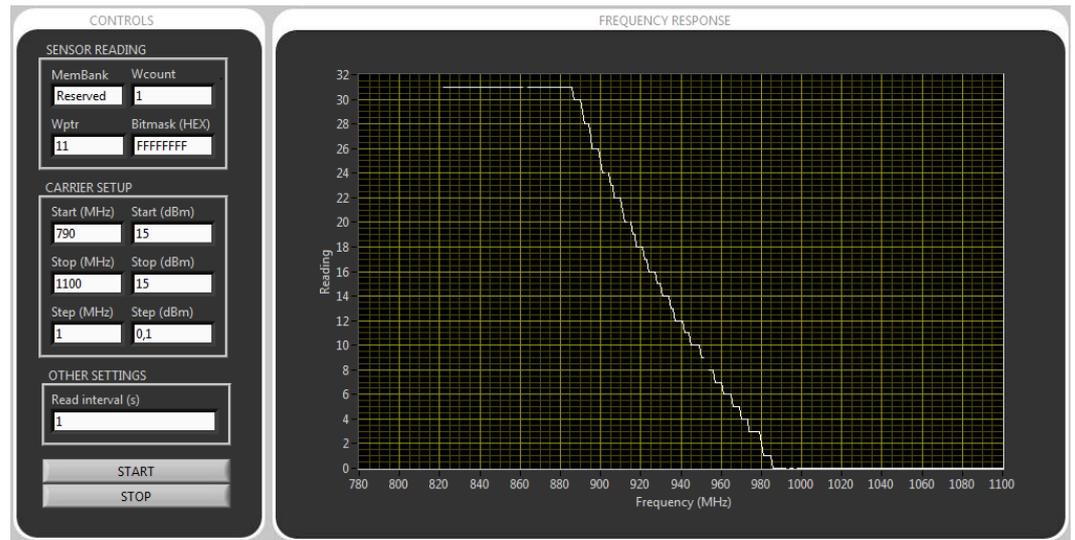


Figure 6. Sensor Code™ plotted at a fixed output power while varying the transmit frequency

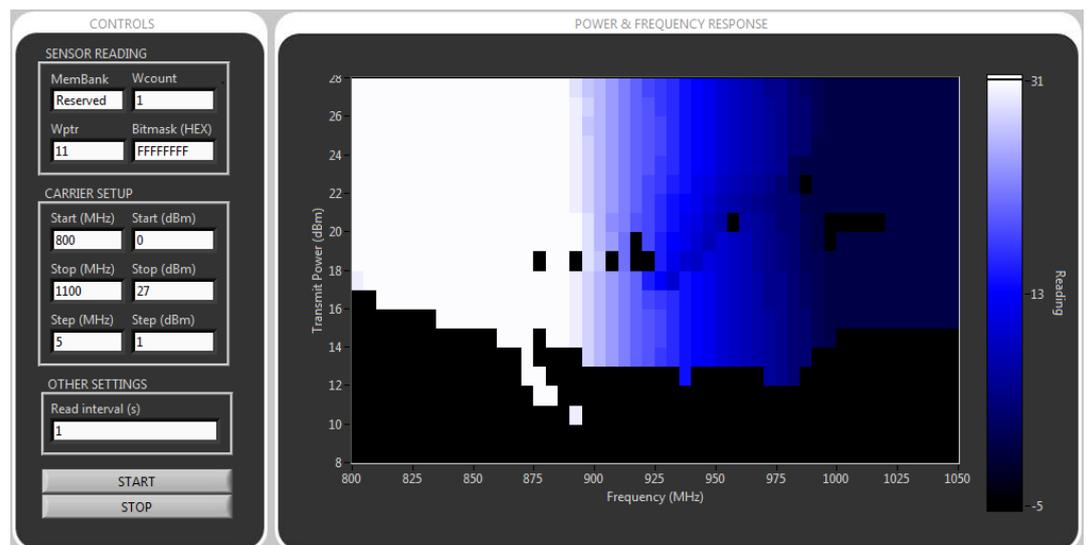


Figure 7. Sensor Code™ plotted as a function of frequency and power

The sensing 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.