



Voyantic

Application Note

Chip Performance Measurements with Voyantic
Tagformance: Write Time Test

2013

1 Introduction

Chip performance has (at least) three aspects: the read sensitivity, the write sensitivity and the write time. The last means how long it takes to complete the write operation. In this application note you will learn how to test this with Tagformance.

2 Getting Started

To follow this Application Note you should already have the following:

- Tagformance System set up for tag measurements
- software license for Protocol Testing Suite (in case you do not, please contact sales@voyantic.com for free evaluation license)
- the tag containing the chip you want to test
- EPC Global Class 1 Gen 2 protocol handy and basic understanding about it.

3 Testing the Write Time

- 1) Place the DUT in suitable position. E.g. 30 cm away from the measurement antenna and in correct polarization. The Measurement Setup in Tagformance does not need to be set as we do not use calculated units such as **power on tag forward** (sensitivity) or **read range** with Protocol Testing Suite.
- 2) Set the carrier frequency and power so that the tag will have about 10 dB excess power. To find out how much you need you can first run Threshold sweep using write command. Then pick a frequency you want to test on. Then look at the y-axis value **Transmitted power** on that frequency and add e.g. 3 dB to make sure your write should always be successful.
- 3) Start carrier.
- 4) Run inventory.
- 5) Select RegRN command.
- 6) Click send command.

7) Create write time test command:

- Preamble: Frame Sync
- Name: e.g. write RN16 as EPC 1st word
- Command: 11000011 (write)
- Parameters: **01** 00000010 **0000000000000000**

where:

01 = EPC bank

00000010= word pointer, first word of EPC code

0000000000000000 = data XOR RN16 from tag as response to RegRN in previous step ; with 16 zeros the data to be written will be the received RN16

- Handle: use handle

- CRC: 16-bit

Click ADD to add this command in the COMMANDS list

The screenshot displays the Voyantic Tagformance software interface. On the left, the 'CONTROLS' panel includes a 'CARRIER' button, 'SETTINGS' (Frequency: 866 MHz, Power: 15 dBm, Samples: 10000 us), and 'INVENTORY' buttons. Three callout boxes point to these sections: '2) Set F and P' points to the settings, '3) Start Carrier' points to the 'START CARRIER' button, and '4) Run Inventory' points to the 'INVENTORY' button. The main 'PROTOCOL TESTING' window shows 'COMMAND PARAMETERS' (Preamble: 1100, Name: Query, Parameters: 0000000000000000) and a 'COMMANDS' list with 'Query' selected. Below this is the 'LATEST RESPONSE' waveform plot showing Voltage (V) vs Time (s). The 'TAG STATE' is 'Open'. At the bottom, there is a 'MEASUREMENTS' table and 'EXT. CONTROLS' for rotation and angle.

5) Select RegRN for Command

6) Click Send Command

8) Using cursors measure the Write time

7) Create Write test command and send it

Cursor control button; press here and then drag cursors as in picture

delta t (time between cursors) this here is your result!

The software interface includes the following sections:

- CONTROLS:** CARRIER, SETTINGS (Frequency: 866 MHz, Power: 20 dBm, Samples: 10000 us), START CARRIER, STOP CARRIER, INVENTORY, ACCESS, SEND COMMAND.
- COMMAND PARAMETERS:** Preamble (FrameSync), Name (RegRN), Command (11000001), Handle (110011110011000), CRC (16-Bit).
- COMMANDS:** List of commands including RegRN, Access, Read APWD, Write APWD, Read TID, Read User Memory, Write RN16 as EPC 1st word.
- LATEST RESPONSE:** Waveform plot showing Voltage (V) vs Time (s). Interpreted data: 10000010111001110001001011000011.
- TAG STATE:** Open button.
- MEASUREMENTS:** Table with columns: Show, Measurement, Date / Time, Comments.
- EXT. CONTROLS:** Rotation, Angle, Set to 0, Go to 0, Multiplexer Channels (1, 2, 3, 4).

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-