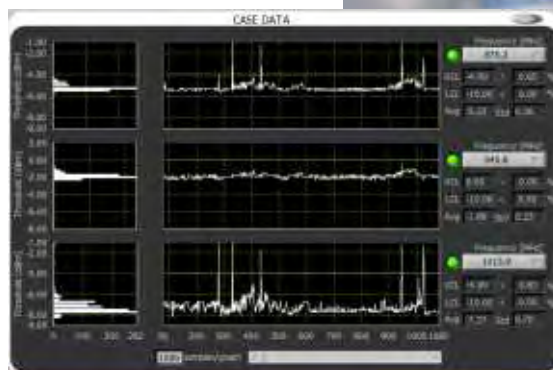


## UHF Tag Performance Testing the New Era of RFID Quality Assurance

# Integrated in Your RFID Factory

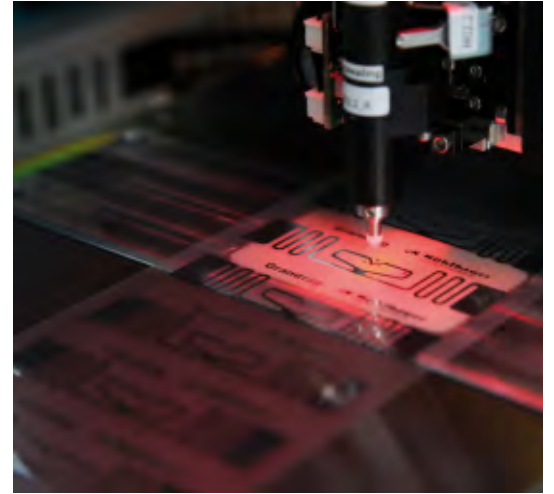


## The Industry Leaders in RFID Quality

Voyantic is the expert of RFID measurement solutions. For several years we have been solving the customer production quality issues, by replacing their UHF tag functionality check with true quality assurance by performance testing.

Mühlbauer is the world leading RFID machine manufacturer, with cutting edge technology competence. The company's RFID Factory portfolio covers all manufacturing technologies.

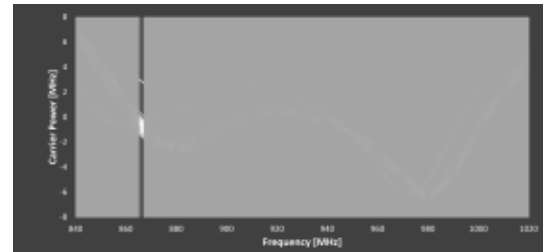
Our knowledge combined with the Mühlbauer's decades of experience in RFID related processes has yielded superior integrated performance testing solutions. The companies are proudly offering the inline quality assurance of a new era for RFID manufacturing processes, now available for all Mühlbauer RFID Factory equipment from chip assembly to finalization.



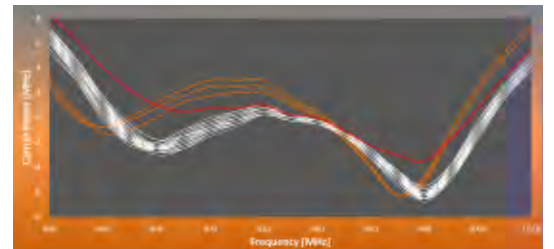
## Performance Testing - True Quality Assurance

RFID readers have been used for checking that the tag is functional, but these type of solutions don't take into consideration that the performance level of the tag varies. This results in the fact that the maximum distance where the tags can be read in the end application varies significantly.

A typical UHF tag is a component with a wide frequency band. The wide band enables the tag to function on different materials, regardless of the detuning effect. Checking the tag functionality on a production roll, in free air, and only at a reader frequency, does not give any information on the tag tuning. Verifying the performance of the tag on its full frequency band enables assuring that each tag performs similarly in the end application.



RFID reader ETSI

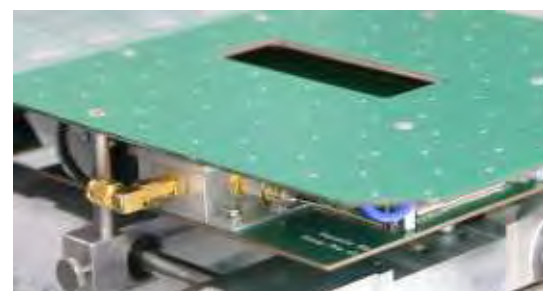


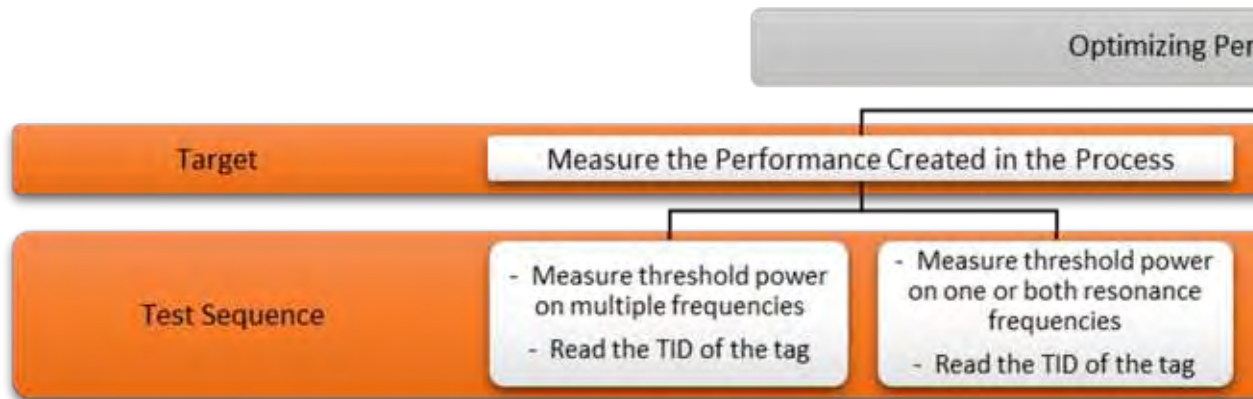
Voyantic Tagsurance 800-1100MHz

## Correct Near-Field Coupling - The Key to Reliable Performance Testing in Manufacturing Process

In manufacturing processes, the UHF tags are always tested in near-field, as there is no possibility to singulate the tags and take them one by one to an environment without interference and reflections. For reliable quality assurance, the performance of the tag in near field should correlate well with the absolute far-field measurements.

The Snoop Pro coupling element is optimized for testing dipole tags, by developing a type of electrical field coupling that gives good correlation to far field performance, tests the whole tag structure, and is tolerant to environmental interferences and reflections.



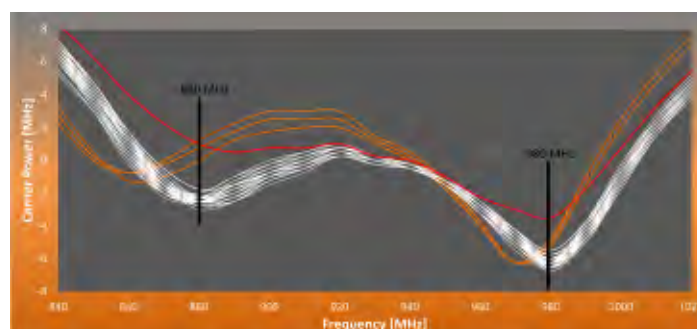
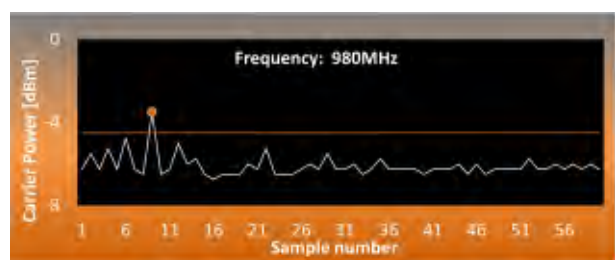
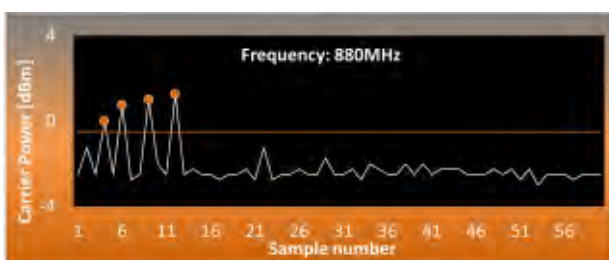


## Quality Assurance in Chip Assembly

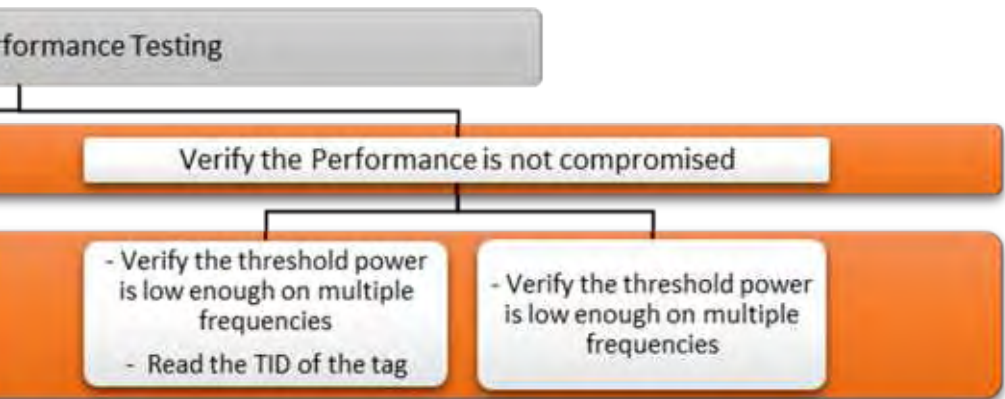
The RFID tag performance is created in inlay manufacturing when connecting the chip to the antenna. The tag performance depends on the antenna design and matching to the chip internal impedance, but the manufacturing process brings its own variable to the outcome in practice. The quality consistency is dependent on many factors like the variation in material properties, process parameters, facility conditions and the design tolerance to the variables.

## Measured Quality – Real-Time Process Monitoring

Tagsurance not only verifies whether the performance level of the tags is sufficient, but actually measures it for each tag. GUI shows the results in real-time enabling the operator to monitor the process and spot any differences immediately.

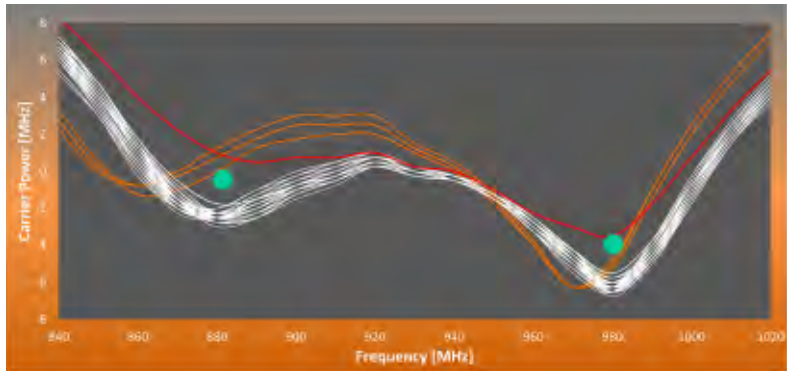


# for Different Processes



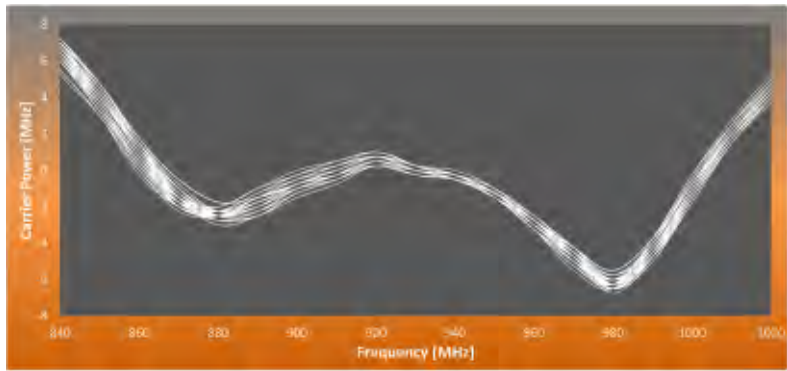
## Quality Assurance in Converting

When the inlays with stable performance are converted as labels, tickets, hang tags etc., the target of the testing is to verify that the level and variation of the RFID performance is not compromised. Tagsurance allows the test to be run exactly on the correct frequencies.



Different UPH Processes  
Same Quality Criteria

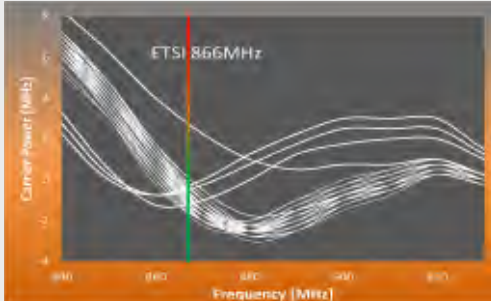
Without Slowing  
Down The Process



## Go/No-Go Testing with an RFID Reader

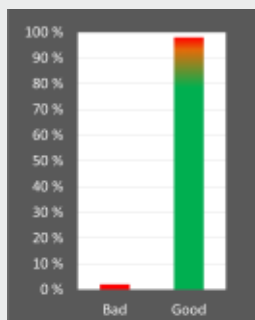
### Visibility to Quality

#### Setting acceptance criteria is less accurate



- Based only on reader frequencies
- Power output not calibrated
- > Leads to uncertainties and typically using very low acceptance criteria, enabling poor tags to pass the test

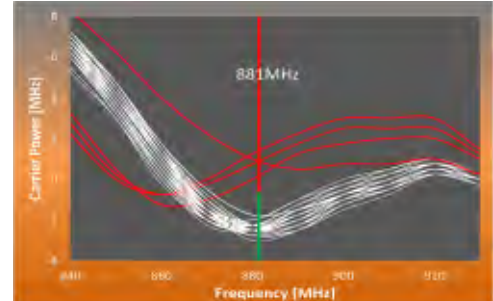
#### Monitoring the amount of functional tags



- No numerical measurement data available
- > No feedback on changes until failure point

## Performance Testing with Tagsurance Tester

#### Quality assurance accurately and reliably



- Test frequencies chosen to be optimal for each tag
- Measurement instrument with traceable calibration
- > Proven quality to customers

#### Real-time Quality Monitoring



- Quantifying the quality
- Measuring power threshold at set frequencies
- > Immediate feedback on process changes

### Process Development and Troubleshooting

- No measurement data
- No visibility to the tag performance
- No visibility to the changes in the tag quality until failure
- > Troubleshooting and development requires lab equipment

- Threshold measured already during production run
- Full visibility to tag performance with the threshold analysis in 3 seconds
- Better visibility to cause and effect of process variables
- > Speed up troubleshooting and development



Voyantic Ltd. provides RFID measurement and testing solutions. These solutions speed up development, improve production quality, and increase sales of RFID technology. Voyantic deliveries cover an installation base of over 300 systems across five continents.



Mühlbauer has grown to become the leading supplier of complete turnkey solutions for the production and personalization of RFID Smart Labels and Smart Tickets. From the very beginning, Mühlbauer machines have been setting global technology standards in terms of speed, quality and flexibility.



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