



Method for Measuring Resonant Frequency of RFID Tags

Issues when Measuring Resonant Frequency

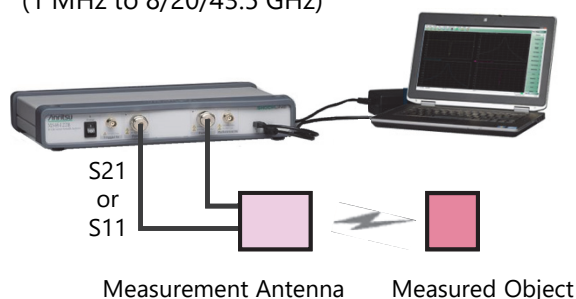
RFID tags are used as non-contact automatic identification technology in various fields. There are many RFID tag types; some are passive without batteries, while others are active with built-in batteries. There are also multiple frequency standards and communication technologies.

Issue: The weakness of RFID tags compared to barcodes is unstable connectivity due to radio propagation conditions, making it important to confirm RFID tag antenna performance.

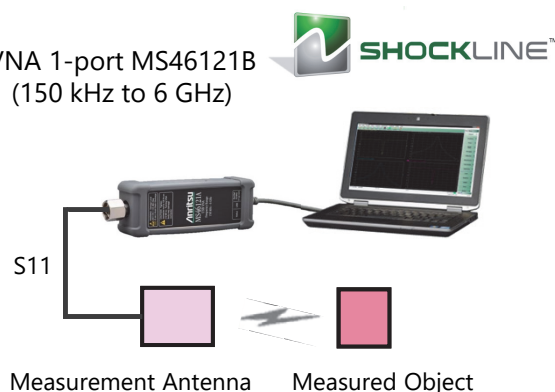
Solutions

- The small and cost-effective Shockline VNA*¹ has the performance needed to measure RFID characteristics.
- Excellent trace noise*² performance enables stable, fast measurement of resonant frequency.
- Even first-time users can make accurate measurements quickly at the PC screen.
- Supports measurement automation: Procedure creation (ETT)/Automation control (VBA) tools

VNA 2-port MS46122B
(1 MHz to 8/20/43.5 GHz)



VNA 1-port MS46121B
(150 kHz to 6 GHz)



*1: Vector Network Analyzer

*2: MS46122B trace noise standard: 0.006 dB (0.001 dB, typ.)

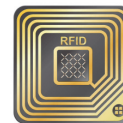
Measure RFID Tag Antenna Resonant Frequency Using VNA.

Customer: Security Equipment Manufacturer (Product: VNA MS46122B)

■ Issues before implementation:

Customer's RFID IC tag resonant frequency results measured using their own test instruments were different (about 70 kHz) from the manufacturer's data.

The customer needed to find the cause and take countermeasures.



■ Results after implementation:

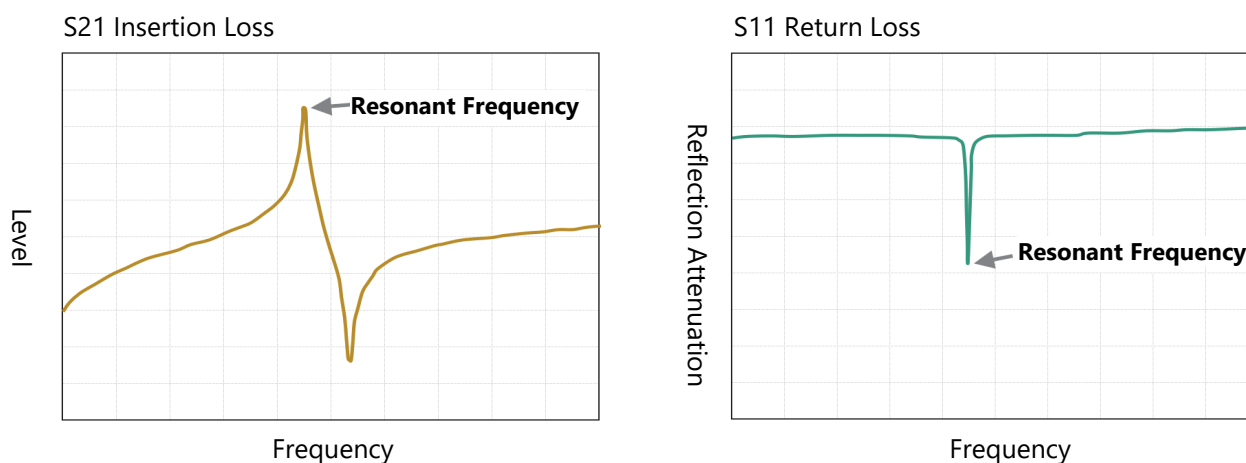
The resonant frequency measured using the Shockline VNA MS46122B S21 and S11 S-parameters almost matched the manufacturer's data.

The difference using their existing spectrum analyzer is thought to be due to level and frequency repeatability caused by tracking error*.

The customer understood that VNA measurement reduces these errors and provides stable data.

* Level error caused by difference between TG (Tracking Generator) output frequency and tuning frequency of spectrum analyzer

Resonant Frequency Measurement Results



The contents of this document may be subject to change without notice. In addition, the numerical results shown in each measurement screen example are not guaranteed values. Please refer to the catalog/data sheet for standard values.