



Technical Report

Biowelder® S 1.0, RFID Antenna Datasheet

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Antenna Datasheet	Markus Wyss

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1 Introduction

This RFID read writer and its antenna including the installation in the device is designed so that as little radiation as possible penetrates to the outside world. This antenna has been integrated into the device and provided with magnetic shielding and RF shielding in such a way that only communication within the device is possible. The intended use does not provide for communication with an RFID chip outside the device.

Measurements in the laboratory and official measurements in the test laboratory have shown that the RF radiation to the outside is negligible and is close to the limit of detectability. Nevertheless, authorisation as a radio device must be obtained in certain countries. This document describes the RFID antenna and its properties.

Due to its very low radio radiation, this RFID read writer is treated as a so-called "Extremely Low Power Radio Station" according to Japanese regulations and therefore does not need to be certified as a radio device in this country. Unfortunately, this type of regulation does not exist in other countries. The radiated power limit of an "Extremely Low Power Radio Station" is undercut by a factor of 17 (See chapter 5).

2 Specifications

RFID Read Writer				
Band	Frequency (MHz)	Average gain (dBm)	Impedance	Max antenna power output
RFID / NFC	13.56	-25	46 Ω	50mW

Chart 1: Near field communication, antenna specifications

3 Antenna Characteristics

3.1 Gain pattern

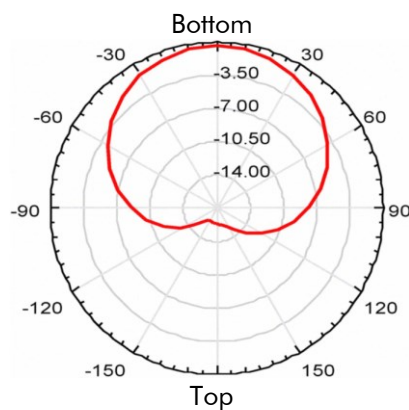


Figure 1: RFID Read Writer gain pattern

3.2 Smith diagram

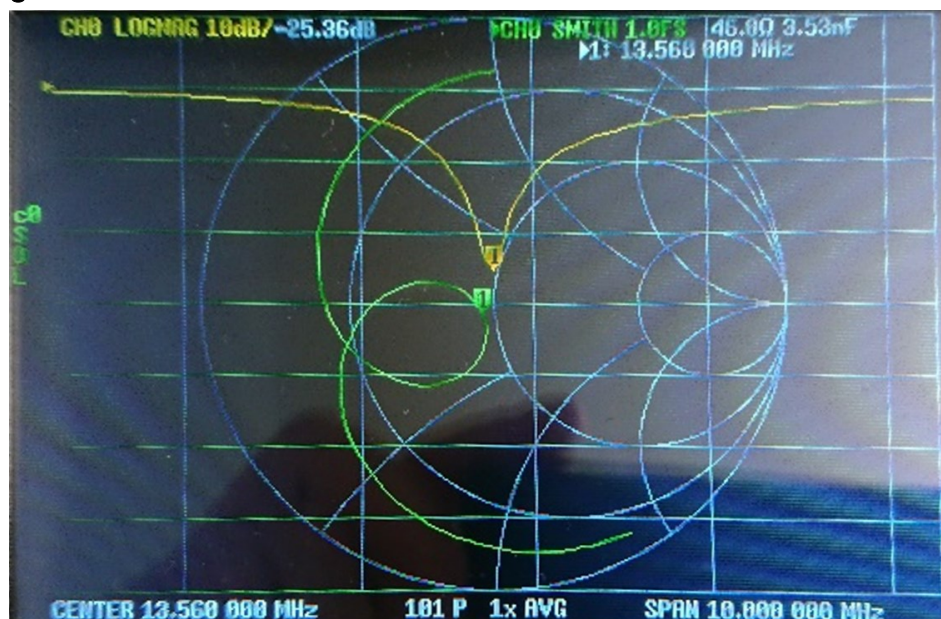


Figure 2: RFID Read Writer smith diagram measured

4 Mechanical dimensions

4.1 Basic structure

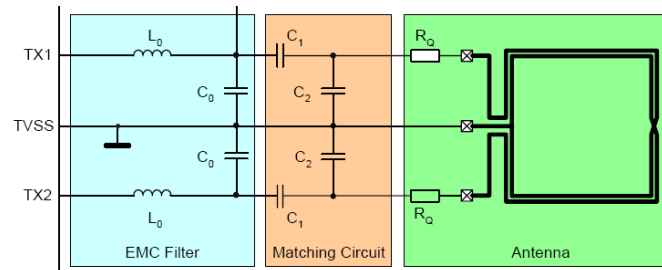


Figure 3: RFID Read Writer basic structure

4.2 Mechanical dimensions RFID Read Writer

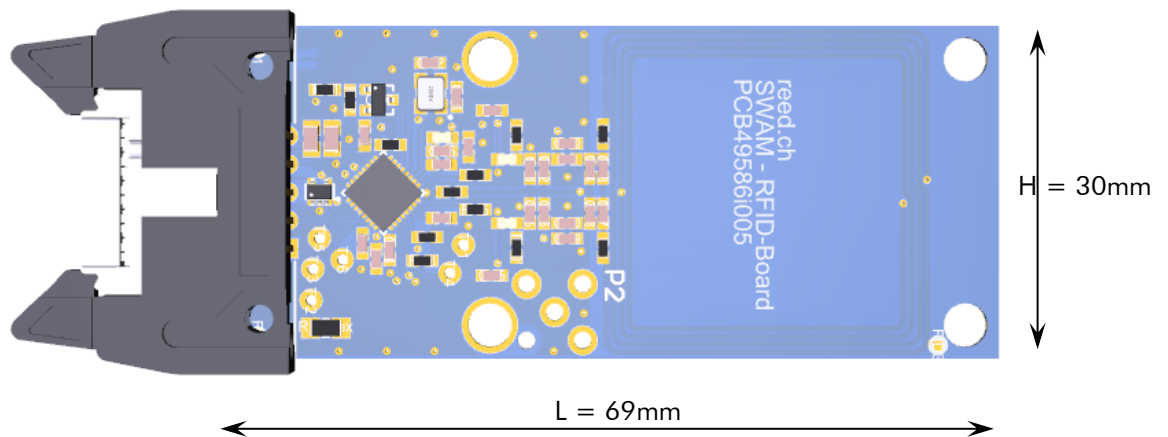


Figure 4: RFID Read Writer mechanical dimensions PCB

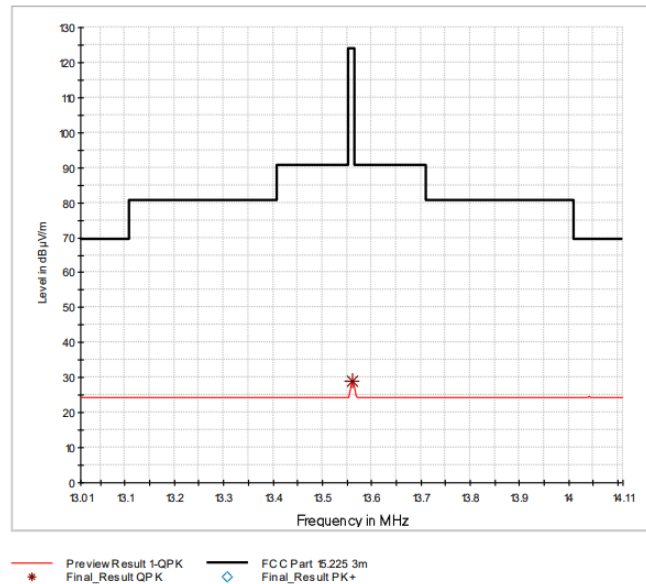
4.3 Antenna surface



Figure 5: RFID Read Writer mechanical dimensions antenna

5 Measurement of emitted RF power

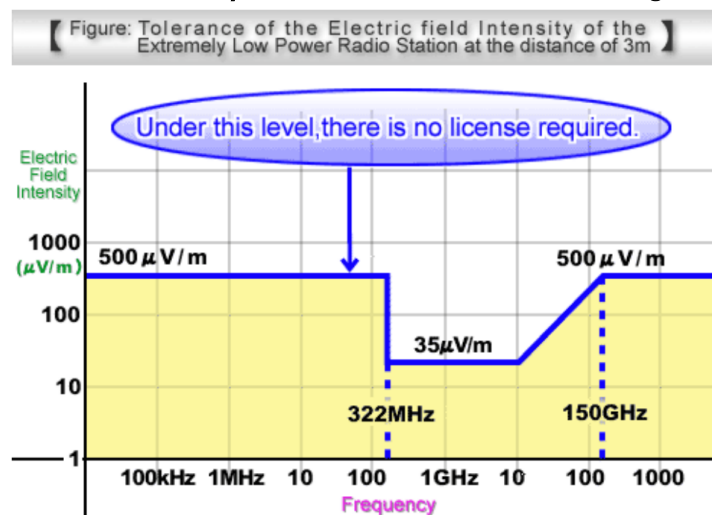
5.1 Measured radiated RF power



Maximum Field Strength @ 3 m (E)	$E - (24 - 20 \log_{10}(f/\text{MHz}))$	Limit	Margin
29.09 dBµV/m	27.74 dBµV/m	53.98 dBµV/m	24.89 dB

Figure 6: RFID Reader Writer, measured radiated RF power

5.2 Comparison: Japanese “Extremely Low Power Radio Station” regulation



At a frequency of 13.56MHz a power of $<500\mu\text{V/m}$ or **53.98 dBµV/m** is specified. The measured power is **27.7 dBµV/m** which is approximately a **factor of 17 lower**.

6 Directories

6.1 Figure directories

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