

# Report on the FCC and IC Testing of the Siemens AG RFID UHF Reader. Model: SIMATIC RF650R FCC

In accordance with FCC 47 CFR Part 1.1310,  
Part 2.1093 and RSS-102

Prepared for: Siemens AG  
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FCC ID: NXW-RF600R2  
IC: 267X-RF600R2



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## COMMERCIAL-IN-CONFIDENCE

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
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Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

### ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 1.1310, Part 2.1093 and RSS 102 Issue 5 (March 2015) + Amendment 1 (February 2021). The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Alex Fink	2022-07-07	 SIGN-ID 670815

Laboratory Accreditation

DAkKS Reg. No. D-PL-11321-11-03

DAkKS Reg. No. D-PL-11321-11-04

Laboratory recognition

Registration No. BNetzA-CAB-16/21-15

ISED Canada test site registration

3050A-2

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 1.1310, Part 2.1093 and RSS 102 Issue 5 (March 2015) + Amendment 1 (February 2021)

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## Contents

<b>1</b>	<b>Report Summary .....</b>	<b>2</b>
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results .....	3
1.4	EUT Modification Record .....	4
1.5	Test Location .....	4
<b>2</b>	<b>Test Details .....</b>	<b>5</b>
<b>3</b>	<b>Measurement Uncertainty .....</b>	<b>7</b>



# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Revision	Description of Change	Date of Issue
0	First Revision	2022-07-07

**Table 1**

## 1.2 Introduction

Applicant	Siemens AG
Manufacturer	Siemens AG
Model Number(s)	SIMATIC RF650R FCC
Serial Number(s)	S VPM7005427
MLFB(s)	6GT2811-6AB20-1AA0
Software Version(s)	V3.3.0
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 1.1310 and Part 2.1093 RSS 102 Issue 5 (March 2015) + Amendment 1 (February 2021)
Test Plan/Issue/Date	NA
Order Number	5623478
Date	2022-04-06
Date of Receipt of EUT	2022-05-13
Start of Test	2022-06-10
Finish of Test	2022-06-10
Name of Engineer(s)	Alex Fink
Related Document(s)	KDB 447498 D01 General RF Exposure Guidance v07 ANSI C63.10 (2013)



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### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 1.1310, Part 2.1093 and RSS-102 is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Configuration and Mode: Continuously transmitting with modulation				
2.1	1.1310 2.5.1, 2.5.2, 3	RF Exposure Evaluation	Pass	KDB 447498 D01 v07

**Table 2**



#### 1.4 EUT Modification Record

The table below details modifications made to the EUT during the test programme.  
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer (S/N: S VPM7005427)	Not Applicable	Not Applicable

**Table 3**

#### 1.5 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing Test Laboratory.

Test Name	Name of Engineer(s)
Configuration and Mode: Continuously Transmitting - 24 V DC power supply	
RF Exposure Evaluation	Alex Fink

**Table 4**

Office Address:

Äußere Frühlingstraße 45  
94315 Straubing  
Germany



## 2 Test Details

### 2.1 RF Exposure Assessment

#### 2.1.1 Specification Reference

CFR 47 Pt.1.1310  
RSS-102

#### 2.1.2 Equipment Under Test and Modification State

SIMATIC RF650R FCC, S/N: S VPM7005427 - Modification State 0

#### 2.1.3 Test Method

The test was performed in accordance with KDB 447498 D01 v07  
Evaluation distance is 20 cm.

#### 2.1.4 Test Results

RF Exposure calculation is based on the measurements in test report TR-713256859-00 section 2.2 "output power".

$$S = \frac{P * G}{4 * \pi * r^2}$$

with P = Conducted Power (mW)  
G = Numeric Gain (10(dBi/10))  
r = distance (cm) = 20 cm



**2.1.5 Test Results**

In accordance with § 1.1310, Table 1 (B):

Operating frequency [MHz]	Conducted output power [dBm]	EIRP [dBm]	max. Ant.Gain (G) [dBi]	Numeric gain (G)	Power Density (S) [mW/cm <sup>2</sup> ]	Limits [mW/cm <sup>2</sup> ]
910.8	24.2	30.2	6.0	4.0	0.208	0.618

The EUT Radiated Power density complies with the Limits for General Population/Uncontrolled Exposure in § 1.1310, Table 1 (B).

In accordance with RSS-102, Issue 5, (4), Table 6:

Operating frequency [MHz]	Conducted output power [dBm]	EIRP [dBm]	max. Ant.Gain (G) [dBi]	Numeric gain (G)	Power Density (S) [mW/cm <sup>2</sup> ]	Limits controlled environment [mW/cm <sup>2</sup> ]
910.8	24.2	30.2	6.0	4.0	0.208	1.939

The EUT Radiated Power density complies with the RF Field Strength Limits for Controlled Use Devices (Controlled Environment) in RSS-102, Issue 5, (4) Table 6.



### 3 Measurement Uncertainty

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to EN 55016-4-2: 2011 + A1 + A2 + AC and CISPR16-4-2: 2011 + A1 + A2 + Cor1 (UCISPR). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

For a 95% confidence level, the measurement uncertainties for defined systems are:

Radio Testing			
Test Name	kp	Expanded Uncertainty	Note
Occupied Bandwidth	2.0	±1.14 %	2
RF-Frequency error	1.96	±1 · 10 <sup>-7</sup>	7
RF-Power, conducted carrier	2	±0.079 dB	2
RF-Power uncertainty for given BER	1.96	+0.94 dB / -1.05	7
RF power, conducted, spurious emissions	1.96	+1.4 dB / -1.6 dB	7
RF power, radiated			
25 MHz – 4 GHz	1.96	+3.6 dB / -5.2 dB	8
1 GHz – 18 GHz	1.96	+3.8 dB / -5.6 dB	8
18 GHz – 26.5 GHz	1.96	+3.4 dB / -4.5 dB	8
40 GHz – 170 GHz	1.96	+4.2 dB / -7.1 dB	8
Spectral Power Density, conducted	2.0	±0.53 dB	2
Maximum frequency deviation			
300 Hz – 6 kHz	2	±2.89 %	2
6 kHz – 25 kHz	2	±0.2 dB	2
Maximum frequency deviation for FM	2	±2.89 %	2
Adjacent channel power 25 MHz – 1 GHz	2	±2.31 %	2
Temperature	2	±0.39 K	4
(Relative) Humidity	2	±2.28 %	2
DC- and low frequency AC voltage			
DC voltage	2	±0.01 %	2
AC voltage up to 1 kHz	2	±1.2 %	2
Time	2	±0.6 %	2

Table 5





Radio Interference Emission Testing			
Test Name	k p	Expanded Uncertainty	Note
Conducted Voltage Emission			
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB	1
100 kHz to 200 MHz (50Ω/5μH AMN)	2	± 3.6 dB	1
Discontinuous Conducted Emission			
9 kHz to 150 kHz (50Ω/50μH AMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH AMN)	2	± 3.4 dB	1
Conducted Current Emission			
9 kHz to 200 MHz	2	± 3.5 dB	1
Magnetic Fieldstrength			
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB	1
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB	1
Radiated Emission			
Test distance 1 m (ALSE)			
9 kHz to 150 kHz	2	± 4.6 dB	1
150 kHz to 30 MHz	2	± 4.1 dB	1
30 MHz to 200 MHz	2	± 5.2 dB	1
200 MHz to 2 GHz	2	± 4.4 dB	1
2 GHz to 3 GHz	2	± 4.6 dB	1
Test distance 3 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 5.0 dB	1
1 GHz to 6 GHz	2	± 4.6 dB	1
Test distance 10 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 4.9 dB	1
Radio Interference Power			
30 MHz to 300 MHz	2	± 3.5 dB	1
Harmonic Current Emissions			4
Voltage Changes. Voltage Fluctuations and Flicker			4

**Table 6**



Immunity Testing			
Test Name	kp	Expanded Uncertainty	Note
Electrostatic Discharges			4
Radiated RF-Field			
Pre-calibrated field level	2	+32.2 / -24.3 %	5
Dynamic feedback field level	2.05	+21.2 / -17.5 %	3
Electrical Fast Transients (EFT) / Bursts			4
Surges			4
Conducted Disturbances. induced by RF-Fields			
via CDN	2	+15.1 / -13.1 %	6
via EM clamp	2	+42.6 / -29.9 %	6
via current clamp	2	+43.9 / -30.5 %	6
Power Frequency Magnetic Field	2	+20.7 / -17.1 %	2
Pulse Magnetic Field			4
Voltage Dips. Short Interruptions and Voltage Variations			4
Oscillatory Waves			4
Conducted Low Frequency Disturbances			
Voltage setting	2	± 0.9 %	2
Frequency setting	2	± 0.1 %	2
Electrical Transient Transmission in Road Vehicles			4

**Table 7**

Note 1:

The expanded uncertainty reported according to CISPR 16-4-2:2003-11 is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 2$ . providing a level of confidence of  $p = 95.45\%$

Note 2:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1. 2002-08) is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 2$ . providing a level of confidence of  $p = 95.45\%$

Note 3:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1. 2002-08) is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 2.05$ . providing a level of confidence of  $p = 95.45\%$

Note 4:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95%confidence.

Note 5:

The expanded uncertainty reported according to IEC 61000-4-3 is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 2$ . providing a level of confidence of  $p = 95.45\%$

Note 6:

The expanded uncertainty reported according to IEC 61000-4-6 is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 2$ . providing a level of confidence of  $p = 95.45\%$

Note 7:

The expanded uncertainty reported according ETSI TR 100 028 V1.4.1 (all parts) to is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 1.96$ . providing a level of confidence of  $p = 95.45\%$

Note 8:



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The expanded uncertainty reported according to ETSI TR 102 273 V1.2.1 (all parts) is based on a standard uncertainty multiplied by a coverage factor of  $k_p = 1.96$ , providing a level of confidence of  $p = 95.45\%$