

Report on the FCC and IC Testing of the  
Siemens AG  
SIMATIC RTLS PCB OEM AC  
In accordance with FCC 47 CFR Part 1.1310 and  
Part 2.1091 and RSS-102



Product Service

Choose certainty.  
Add value.

Prepared for: Siemens AG  
Gleiwitzer Str. 555  
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Germany

FCC ID: NXWOEMAC  
IC: 267X-OEMAC

COMMERCIAL-IN-CONFIDENCE

Date: 2020-03-13  
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| RESPONSIBLE FOR      | NAME            | DATE       | SIGNATURE          |
|----------------------|-----------------|------------|--------------------|
| Project Management   | Alex Fink       | 2020-03-13 | <br>SIGN-ID 338698 |
| Authorised Signatory | Matthias Stumpe | 2020-03-13 | <br>SIGN-ID 338842 |

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 and Part 2.1091 and RSS-102, Issue 5, (4), Table 4. The sample tested was found to comply with the requirements defined in the applied rules.

| RESPONSIBLE FOR | NAME      | DATE       | SIGNATURE          |
|-----------------|-----------|------------|--------------------|
| Testing         | Alex Fink | 2020-03-13 | <br>SIGN-ID 338698 |

Laboratory Accreditation  
DAkkS Reg. No. D-PL-11321-11-02  
DAkkS Reg. No. D-PL-11321-11-03

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 and Part 2.1091 and RSS-102, Issue 5, (4), Table 4.

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# 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.

| Issue | Description of Change   | Date of Issue |
|-------|---|---------------|
| 1     | First Issue   | 2019-10-30    |
| 2     | Page 2: MLFB added.<br>Page 4: Equipment characteristics added.                         | 2019-11-11    |
| 3     | Report updated for RSS-102  | 2019-11-14    |
| 4     | Section 1.4: Frequency range corrected.   | 2020-02-14    |
| 5     | Page 5: Minimum Distance of the Antenna to the human body corrected from 20 cm to 20 mm | 2020-03-13    |

**Table 1**

## 1.2 Introduction

|                               |  |
|-------------------------------|--|
| Applicant                     | Siemens AG   |
| Manufacturer                  | Siemens AG   |
| Model Number(s)               | SIMATIC RTLS PCB OEM AC  |
| MLFB                          | 6GT2700-8DF00-0AX1<br>6GT2700-8DF10-0AX1<br>6GT2700-8DF20-0AX1<br>6GT2700-8DF30-0AX1 |
| Serial Number(s)              | A55882   |
| Hardware Version(s)           | 0606   |
| Software Version(s)           | 2.1.0  |
| Number of Samples Tested      | 1  |
| Test Specification/Issue/Date | FCC 47 CFR Part 1.1310 and Part 2.1091<br>RSS-102, Issue 5, (4), Table 4             |
| Test Plan/Issue/Date          | NA   |
| Order Number                  | B18-09018  |
| Date                          | 2018-09-05   |
| Date of Receipt of EUT        | 2018-09-20   |
| Start of Test                 | 2019-05-02   |
| Finish of Test                | 2019-05-02   |
| Name of Engineer(s)           | Alex Fink  |
| Related Document(s)           | KDB 447498 D01 General RF Exposure Guidance v06<br>ANSI C63.10 (2013)                |



Product Service

### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 1.1310 and Part 2.1091 is shown below.

| Section   | Specification Clause | Test Description       | Result | Comments/Base Standard |
|---|----------------------|------------------------|--------|------------------------|
| Configuration and Mode: Continuously transmitting |                      |                        |        |                        |
| 2.1   | 1.1310<br>RSS-102    | RF Exposure Evaluation | Pass   | KDB 447498 D01 v06     |









**Table 2**



### 1.4 Application Form

| <b>Eigenschaften des Prüflings:</b>              |  |  |   |
|--|--|--|---|
| <b>Equipment characteristics:</b>                |  |  |   |
| Type of equipment:                               | Communication and Real Time Location System in 2.4 GHz ISM Band and UWB  |  |   |
| Type designation:                                | SIMATIC RTLS PCB OEM AC  |  |   |
| MLFB   | 6GT2700-8DF00-0AX1<br>6GT2700-8DF10-0AX1<br>6GT2700-8DF20-0AX1<br>6GT2700-8DF30-0AX1   |  |   |
| Parts of the system:                             | Tag  |  |   |
| Intended use                                     | Communication and Real Time Location System  |  |   |
| Hardware Version:                                | 0606   |  |   |
| Software Version:                                | 2.1.0  |  |   |
| Intended area of use                             | <input type="checkbox"/> residential environment (home)  | <input type="checkbox"/> vehicle (automotive)  |   |
|  | <input checked="" type="checkbox"/> industrial environment   |  |   |
| Power supply:                                    | <input type="checkbox"/> AC<br>Nominal:<br>Minimum:<br>Maximum:<br>Nominal frequency: Hz   | <input checked="" type="checkbox"/> DC<br>Nominal: 3.3 V<br>Minimum: 3.1 V<br>Maximum: 3.4 V | <input type="checkbox"/> Batterie<br>Nominal:<br>Max. |
| Dimensions (in cm)                               | 2.5 x 2.5 x 1.8 cm   |  |   |
| General requirements according to RED:           | <input checked="" type="checkbox"/> Funk / Radio   | <input checked="" type="checkbox"/> Sicherheit / Safety                                      | <input checked="" type="checkbox"/> EMV / EMC         |
|  |  |  | <input checked="" type="checkbox"/> EMF               |
| Application:                                     | Short Range Devices  |  |   |
| Kind of equipment:                               | Transceiver  |  |   |
| Frequency band:                                  | Phase: 2400 – 2483.5 MHz; UWB: 3100 – 4800 MHz (EU, USA), UWB: 6000 - 7000 MHz (EU, USA), UWB: 6240 – 6739.2 MHz (Canada and China)  |  |   |
| Number of RF-channels:                           | Phase: 14 (2410 MHz – 2480 MHz)<br>UWB: 2 (Channel 2, without DAA, Center 3993.6 MHz)<br>(Channel 5, without DAA, Center 6489.6 MHz) |  |   |
| Channel spacing                                  | Phase: 5 MHz<br>UWB: 499.2 MHz   |  |   |
| Rated Carrier Power:                             | Phase: 4 dBm<br>UWB: -14.31 dBm  |  |   |
| Type(s) of Modulation (e.g. BPSK, FSK, ASK, ...) | Phase: OQPSK in ISM 2.4 GHz<br>UWB: BPSK with BPM  |  |   |



|   |   |
|---|---|
| Type of radio transmission / Use of frequency spectrum (e.g. DSSS, OFDM,..) | Phase: 4QAM<br>UWB: BPM-BPSK  |
| Number / Type of Antenna(s)   | 2 PCB antennas (both internal)  |
| Antenna Gain  | 2 dBi   |
| Minimum Distance of the Antenna to the human body                           | > 20 mm   |
| Nominal Temperature & Temperature Range:                                    | 20°C / 0 °C to +50 °C   |
| Marking plate   | <p>FCC:</p> <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p><b>SIEMENS</b><br/>         SIMATIC RTLS PCB OEM AC<br/>         1P 6GT2700-8DF10-0AX1<br/>         S VP JM123456<br/>         3S ADDR: 17:85:40:00:28:01</p> <p>FCC ID: NXWOEMAC<br/>         IC: 267X-OEMAC</p> <p>   </p> <p>Siemens AG<br/>         DE-76181 Karlsruhe<br/>         Made in Germany</p> </div> <p>ISED:</p> <div style="border: 1px solid black; padding: 10px;"> <p><b>SIEMENS</b><br/>         SIMATIC RTLS PCB OEM AC<br/>         1P 6GT2700-8DF30-0AX1<br/>         S VP JM123456<br/>         3S ADDR: 17:85:40:00:28:01</p> <p>FCC ID: NXWOEMAC<br/>         IC: 267X-OEMAC</p> <p>   </p> <p>Siemens AG<br/>         DE-76181 Karlsruhe<br/>         Made in Germany</p> </div> |



### 1.5 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: A55882))      | Not Applicable         | Not Applicable           |

**Table 3**

### 1.6 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 |                     |
| 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 and RSS-102, Issue 5, (4) Table 4

#### 2.1.2 Equipment Under Test and Modification State

SIMATIC RTLS PCB OEM AC, S/N: A55882 - Modification State 0

#### 2.1.3 Test Method

The test was performed in accordance with KDB 447498 D01 v06  
 Evaluation distance is 2 cm.

#### 2.1.4 Test Results

In accordance with KDB 447498 D01 v06:

$$S = \frac{EIRP}{4\pi R^2}$$

S= power density  
 R= distance to the center of radiation of the antenna

| Operation Mode | Operating frequency | Measured maximum EIRP [dBm] | Measured maximum EIRP [mW] | Duty cycle [%] | MPE-Value [mW/cm <sup>2</sup> ] | MPE-Limit [mW/cm <sup>2</sup> ] | Margin to Limit [mW/cm <sup>2</sup> ] |
|----------------|---------------------|-----------------------------|----------------------------|----------------|---------------------------------|---------------------------------|---------------------------------------|
| ZigBee 2.4 GHz | 2410 MHz            | + 13.7                      | 23.442                     | 100            | 0.466370                        | 1.0000                          | 0.5336                                |
|                | 2445 MHz            | + 13.5                      | 22.387                     |                | 0.445379                        | 1.0000                          | 0.5546                                |
|                | 2480 MHz            | + 13.0                      | 19.953                     |                | 0.396945                        | 1.0000                          | 0.6031                                |
| UWB 4 GHz      | 4.00 GHz            | - 5.89 [dBm/50MHz]          | 0.258                      | 100            | 0.005125                        | 1.0000                          | 0.9949                                |
| UWB 6.4 GHz    | 6.49 GHz            | - 6.98 [dBm/50MHz]          | 0.200                      | 100            | 0.003988                        | 1.0000                          | 0.9960                                |

Maximum calculated MPE value for co-location assessment (ZigBee 2410 MHz and UWB 4 GHz):

$$0.466370 + 0.003988 = \underline{0.471495} \quad [\text{mW}/\text{cm}^2]$$

The measurements results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile devices and RSS-102, Issue 5, (4) Table 4.





### 3 Measurement Uncertainty

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   | kp | 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  $p = 95.45\%$