

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

Prepared for: Siemens AG
Gleiwitzer Str. 555
DE-90475 Nürnberg
Germany

FCC ID: NXWOEMPULSE
IC: 267X-OEMPULSE



COMMERCIAL-IN-CONFIDENCE

Date: 2020-03-26
Document Number: TR-72654-64463-08 | Issue: 02

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Alex Fink	2020-03-26	 SIGN-ID 342923
Authorised Signatory	Matthias Stumpe	2020-03-26	 SIGN-ID 343192

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	2020-03-26	 SIGN-ID 342923

Laboratory Accreditation DAKkS Reg. No. D-PL-11321-11-02
 Laboratory recognition Registration No. BNetzA-CAB-16/21-15
 ISED Canada test site registration 3050A-2
 DAKkS Reg. No. D-PL-11321-11-03

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.

DISCLAIMER AND COPYRIGHT

This non-binding report has been prepared by TÜV SÜD Product Service with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD Product Service. No part of this document may be reproduced without the prior written approval of TÜV SÜD Product Service. © 2020 TÜV SÜD Product Service.

ACCREDITATION

Our BNetzA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our BNetzA Accreditation. Results of tests not covered by our BNetzA Accreditation Schedule are marked NBA (Not BNetzA Accredited).

Trade Register Munich
HRB 85742
VAT ID No. DE129484267
Information pursuant to Section 2(1)
DL-InfoV (Germany) at
www.tuev-sued.com/im

Managing Directors:
Dr. Peter Havel (CEO)
Dr. Jens Butenandt
Patrick van Welij

Phone: +49 (0) 9421 55 22-0
Fax: +49 (0) 9421 55 22-99
www.tuev-sued.de

TÜV SÜD Product Service GmbH
Äußere Frühlingstraße 45
94315 Straubing
Germany



Contents

1	Report Summary	2
1.1	Report Modification Record.....	2
1.2	Introduction.....	2
1.3	Brief Summary of Results	3
1.4	Application Form	4
1.5	EUT Modification Record	6
1.6	Test Location	6
2	Test Details	7
3	Photographs	10
4	Measurement Uncertainty	11

Annex A: 5 pages



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	2020-03-06
2	Chapter 3 revised	2020-03-26

Table 1

1.2 Introduction

Applicant	Siemens AG
Manufacturer	Siemens AG
Model Number(s)	SIMATIC RTLS PCB OEM PULSE
MLFB	6GT2700-8AF03 6GT2700-8AF13 6GT2700-8AF23 6GT2700-8AF33
Serial Number(s)	A56709 (radiated)
Hardware Version(s)	0622
Software Version(s)	WEGA TDO4 2.1.0
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 1.1310 and Part 2.1091 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	2019-09-23
Finish of Test	2019-09-23
Name of Engineer(s)	Alex Fink
Related Document(s)	KDB 447498 D01 General RF Exposure Guidance v06 ANSI C63.10 (2013)



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 RSS-102	RF Exposure Evaluation	Pass	KDB 447498 D01 v06

Table 2



1.4 Application Form

Eigenschaften des Prüflings:			
Equipment characteristics:			
Type of equipment:	SIMATIC RTLS TRANSPONDER		
Type designation:	SIMATIC RTLS PCB OEM PULSE		
MLFB	6GT2700-8AF03 6GT2700-8AF13 6GT2700-8AF23 6GT2700-8AF33		
Parts of the system:	Transponder		
Intended use	Communication and Real Time Location System		
Hardware Version:	0622		
Software Version:	WEGA TDO4 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 Nominal: Minimum: Maximum: Nominal frequency: Hz	<input checked="" type="checkbox"/> DC Nominal: 3.3 V Minimum:3.2 V Maximum: 3.4 V	<input type="checkbox"/> Batterie Nominal: Max.
Dimensions (in cm)	4.4 x 2.4 x 0.75 cm [W x H x D]		
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:	UWB: 3100 – 4800 MHz (EU, USA), UWB: 6000 - 7000 MHz (EU, USA), UWB: 6240 – 6739.2 MHz (Canada and China)		
Number of RF-channels:	2 (Channel 2, without DAA, Center 3993.6 MHz) (Channel 5, without DAA, Center 6489.6 MHz)		
Channel spacing	UWB: 499.2 MHz		
Rated Carrier Power:	UWB: -14.31 dBm		
Type(s) of Modulation (e.g. BPSK, FSK, ASK, ...)	UWB: BPSK with BPM		
Type of radio transmission / Use of frequency spectrum (e.g. DSSS, OFDM,..)	UWB: BPM-BPSK		
Number / Type of Antenna(s)	1 external PCB antenna with UFL Connector		



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 data-bbox="655 600 1182 1169"><p>SIEMENS SIMATIC RTLS PCB OEM PULSE 1P 6GT2700-8AF13 S VP JM123456 3S ADDR: 17:85:40:00:28:01</p><p>FCC ID: NXWOEMPULSE</p><p>CE </p><p>Siemens AG DE-76181 Karlsruhe Made in Germany</p></div> <p>ISED:</p> <div data-bbox="655 1285 1182 1854"><p>SIEMENS SIMATIC RTLS PCB OEM PULSE 1P 6GT2700-8AF33 S VP JM123456 3S ADDR: 17:85:40:00:28:01</p><p>IC: 267X-OEMPULSE</p><p>CE </p><p>Siemens AG DE-76181 Karlsruhe 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: A56709)	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 PULSE, S/N: A56709 - 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



Product Service

acc. to KDB 447498 D01:

Carrier frequency:	f	=	3.89 GHz
Distance:	d	=	20 mm
Transmitter output power:	TP	=	254 μW (-5.96 dBm)
SAR Threshold			0.0250
SAR Threshold Limit:			3.0

Note: The 6485.950 MHz UWB radio is exempt from SAR based on the output power (0.184 mW) being less than 1 mW.

Limit definition:

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1 g- and 10 g-SAR test exclusion thresholds are determined by the following:

$\sqrt{f, \text{GHz}}(\text{max power of channel, mW}) / (\text{min test separation distance, mm}) \leq 3.0$ for 1 g-SAR and ≤ 7.5 for 10 g SAR.



At the present time ISED Canada SAR Exemption calculations are valid only for frequencies up to and including 6 GHz, and RSS-102 Clause 2.5.1 refers. Furthermore, ISED Canada RF Exposure calculations are valid only for distances of 20 cm or more. Therefore, the applicant cannot perform RF Exposure calculations at 2.0 cm for demonstration of compliance without ISED Canada permission.

The power density calculation at a minimum distance of 2.0 cm based on power with no accounting for duty cycle is:

Frequency (GHz)	Max EIRP Peak Level (dBm)	Max EIRP Peak Level (mW)	Min. distance (cm)	Power Density at min distance	Power Density Limit (mW/cm ²)
6.5	-7.36	0.184	2.0	3.67 μ W/cm ²	1.0

Table 5

For Max. EIRP Peak level emission test, please refer to test report TR-72654-64463-06 chapter 3.4.

2.1.5 Test Location and Test Equipment Used

This test was carried out in Semi anechoic room - cabin no. 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW44	39897	12	2021-03-31
Double ridged horn antenna	Rohde & Schwarz	HF907	40089	24	2021-02-28
EMC Measurement Software	Rohde & Schwarz	EMC32 V10.50.10	19893	N/A	N/A

Table 6



Product Service

3 Photographs

See Annex A.



4 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 ⁻⁷	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 7



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 8



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 9

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:



Product Service

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 $p = 95.45\%$