

Test report 20104246300 - Rev. 1.0

based on:

FCC Part 15 Subpart C, section 15.225
(10-01-09 Edition)
FCC Part 15 Subpart B, section 15.109
(10-01-09 Edition)
IC RSS-210, Issue 7 (June 2007 edition)

SoftPLC system
Prodrive B.V.
Sigma Control 2

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This report comprises of three modules. The total number of pages is: 17

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2005. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie). The contents of this test report, if reproduced, shall be copied in full, unless special consent in writing for reproduction in part is granted by Telefication. Copyright of this test report is reserved to Telefication.

Ordering party:

Company name	:	Prodrive B.V.
Address	:	Science Park Eindhoven 5501
Zipcode	:	5692 EM
City/town	:	Son
Country	:	The Netherlands
Date of order	:	22 October 2010

2 Product

A sample of the following product was submitted for testing:

Product description : SoftPLC system
Product category : Intentional radiators
Manufacturer : Prodrive B.V.
Trade mark : Prodrive B.V.
Type designation : Sigma Control 2
FCC ID : Y21SIGCON2
Software version : 6309-0800-1344

<i>Type</i>	<i>Function</i>	<i>Hardware version</i>	<i>Serial number</i>
SC2MCS	Main Control System	MCS-E	10.42.000.271
SC210M-1	IO module	IOM1-E	10.33.000.907
SC210M-2	IO module	IOM2-C	10.43.000.357
SC210M-3	IO module	IOM3-B	10.43.000.391

3 Test schedule

Tests are carried out in accordance with the specification detailed in chapter 7 "Summary" of this report.

Tests are carried out at the following location:

- Telefication, Zevenaar

Telefication is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18.

The Registration Number is: NL0001.

The test site of Telefication B.V. is registered at Industry Canada with reference number 4173A-1

The sample of the product was received on:

- 24 November 2010

Tests are carried out between:

- 24 and 26 November 2010

4 Product documentation

For production of this report the following product documentation has been used:

Description:	Identification:	Date:
Operational description	operational_description.pdf	2010-10-19
Block diagram	sc2_block_diagram.pdf	2010-10-13
Schematics	sc2iom1_schematic.pdf	2010-10-12
Schematics	sc2iom2_schematic.pdf	2010-10-12
Schematics	sc2iom3_schematic.pdf	2010-10-12
Schematics	sc2mcs_schematic.pdf	2010-10-11
Schematics	sc2rfid_schematic.pdf	2010-10-12
Specification document	SPD6309080001R15.pdf	2010-11-03
Specification document	SPD6309080001R1511-14.pdf	2010-09-29
Specification document	SPD6309080010R20.pdf	2010-11-03
User manual	user_manual_eng.pdf	2010-10-10

The above-mentioned documentation will be filed at Telefication for a period of 10 years following the issue of this report.

5 Observations and comments

The Sigma Control 2 is a SoftPLC system that can control various types of screw compressors of Kaeser Compressors GmbH.

The system under test consists of the following units:

SC2MCS	Main Control System
SC210M-1	IO module
SC210M-2	IO module
SC210M-3	IO module

The SC2MCS unit contains a 13.56 MHz RFID reader.
A power supply was not included in the tests.

6 Modifications

None.

7 Summary

The product is intended for use in the following application area:

Short Range Device

The sample is tested according to the following specifications:

FCC Part 15 Subpart C, section 15.225 (10-01-09 Edition)

FCC Part 15 Subpart B, section 15.109 (10-01-09 Edition)

IC RSS-210, Issue 7 (June 2007 Edition)

8 Conclusions

The sample of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 7 of this report.

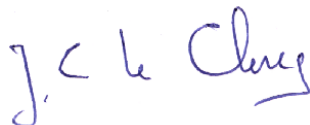
The results of the tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication accepts no responsibility for any stated properties of product items in this test report, which are not supported by the tests as specified in chapter 7 "Summary".

All tests are performed by:

name : ing. J.C. le Clercq

function : Test Engineer

signature :



Review of test methods and report by:

name : G.J. Gort

function : Senior Test Engineer

signature :



The above conclusions have been verified by the following signatory:

date : 15 December 2010

name : ing. P.A.J.M. Robben

function : Co-ordinator Test Group

signature :



Test results module

Summary

According to FCC Part 15 subparts C, section 15.225, the following tests have been performed:

Port	Reference	Phenomenon	Result
Enclosure and antenna	15.225 (a), (b), (c), (d)	Radiated emissions	P
Antenna	15.225 (e)	Frequency tolerance	P

Results:

P = pass
F = fail

NA = not applicable
NP = not performed

Emission tests

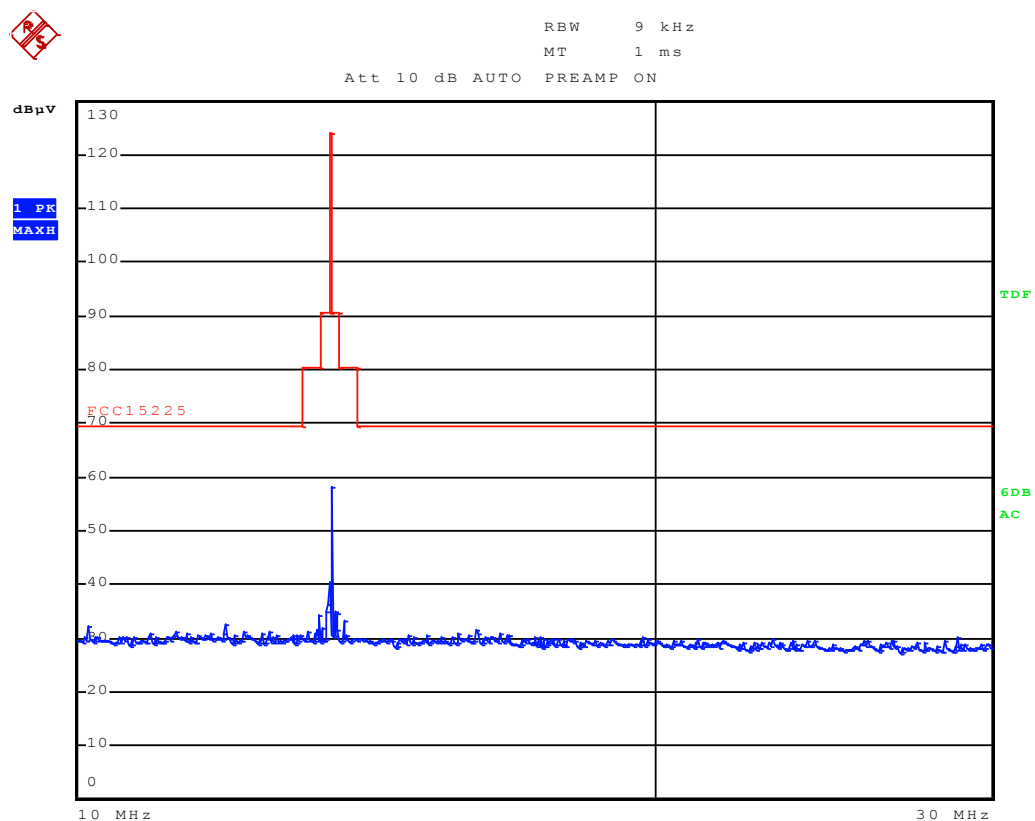
1.1 Field strength of emissions (< 30 MHz)

Compliance standard : FCC part 15, subpart C, section 15.225(a), (b), (c)\
FCC part 15, subpart C, section 15.205

Method of test : ANSI C63.4-2003, sections 5.3 & 8.2.1; FCC part 15, subpart A,
section 15.31 (f)(2), 15.33, 15.35.

Test results :

(units in dB μ V/m)



The maximum field strength at 13.56 MHz is 57 dB μ V/m (708 μ V/m).

Measurement uncertainty

+1.9 / -2.1 dB

Remark 1: when applying an inverse linear distance extrapolation factor of 40 dB for the measuring distance of 3 meter, the field strength is $82.5 - 40 = 42.5 \text{ dB}\mu\text{V/m}$.

Remark 2: in the plot the limit is modified for an inverse linear distance extrapolation factor of 40 dB (at 30 m).

Test equipment used: (Item numbers)	1, 2, 7
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Item numbers refer to the used test equipment module.

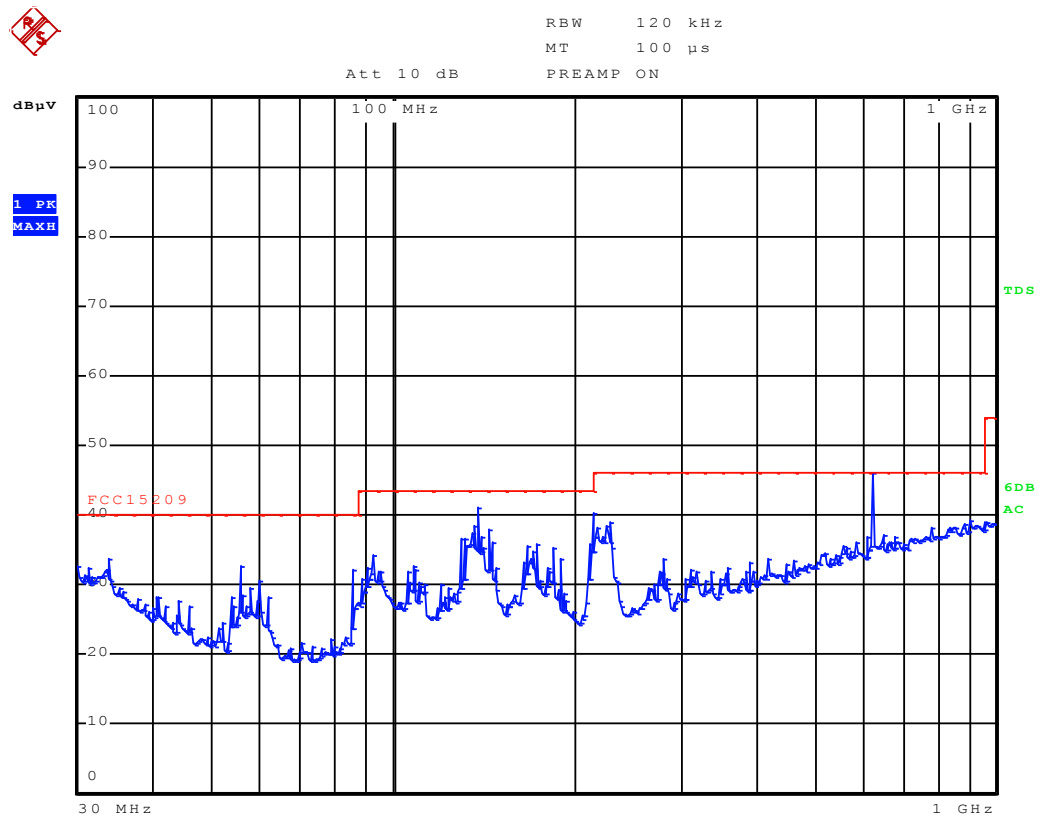
1.2 Field strength of unwanted emissions (> 30 MHz)

Compliance standard : FCC part 15, subpart C, section 15.225 (d)
 FCC part 15, subpart C, section 15.205
 FCC part 15, subpart B, section 15.109 (a)

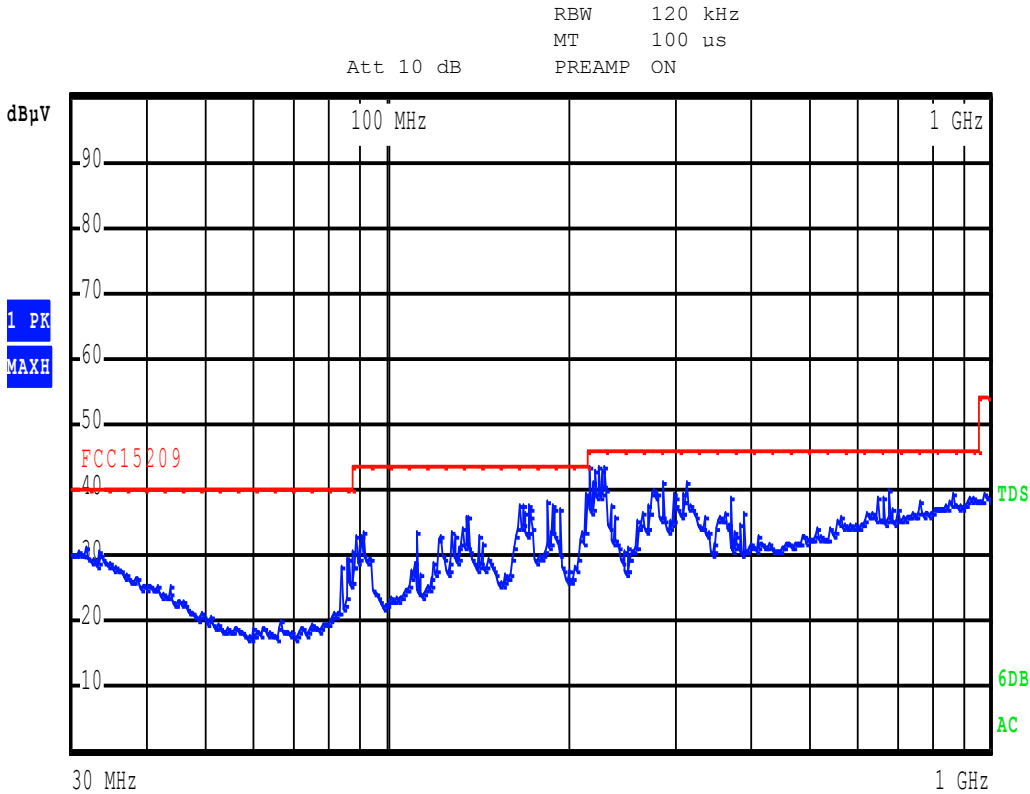
Method of test : ANSI C63.4-2003, sections 5.4.2 & 8.2.3; FCC part 15,
 subpart A, sections 15.33, 15.35.

Test results: :

Vertical polarization:



Horizontal polarization:



Frequency (MHz)	Level (QP) dB μ V	Polarisation	Limit (QP) dB μ V	Verdict
138.0	36.6	V	43.5	PASS
184.0	34.5	H	43.5	PASS
215.0	32.0	V	43.5	PASS
217.0	39.4	H	43.5	PASS
314.5	36.9	H	43.5	PASS
625.0	43.2	V	46.0	PASS

Uncertainty	
Horizontal polarization	
30 – 200 MHz	4.5 dB
200 – 1000 MHz	3.6 dB
Vertical polarization	
30 – 200 MHz	5.4 dB
200 – 1000 MHz	4.6 dB

Test equipment used: (Item numbers)	2, 7, 8
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Item numbers refer to the used test equipment module.

1.3 Frequency tolerance

Compliance standard : FCC part 15, subpart C, section 15.225 (e)

Method of test : ANSI C63.4-2003, annex H.5

Test results: :

Temperature variation:

Temp. (°C)	-20	-10	0	10	20	30	40	50
Frequency (MHz)	13.560156	13.560155	13.560154	13.560143	13.560128	13.560091	13.560077	13.560067
Deviation (%)*)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Limit (%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

*) w.r.t. operating frequency of 13.560 MHz

Voltage variation:

Voltage	Frequency (MHz)*)	Deviation (%)*)	Limit (%)
20.4 V	13.560128	0	0.01
27.6 V	13.560128	0	0.01

*) w.r.t. operating frequency of 13.560 MHz

Measurement uncertainty	+ / -1 Hz
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Test equipment used: (Item numbers)	9, 10, 11, 12
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Item numbers refer to the used test equipment module.

Used test equipment module

Ref	Description	ID	Manufacturer	Model
1	Active loop antenna	TE 00746	R & S	HFH 2-Z2
2	Test receiver	TE 00091	R & S	ESCI
3	Large triple loop antenna	TE 01066	Telefication	--
4	Logper/bow-tie antenna	TE 00700	EMCO	3143
5	Spectrum analyzer	TE 00461	HP	8563E
6	Compact anechoic chamber (ANEC)	TE 01064	Euroshield	RFD-F-100
7	Semi anechoic chamber (SAR)	TE 00861	Comtest	--
8	Bilog antenna	TE 00967	Chase	CBL6112A
9	Climate chamber	TE 00741	CTS	C-40/350
10	Digital multimeter	TE 00143	HP	34401A
11	Power supply	TE 00715	Delta	E060-06

Cross reference table

Transmitter	
IC RSS-210 Issue 7	FCC 47 CFR Part 15, subpart C (1-Oct-09 Edition)
Section 2.6, section 2.7, table 2	§ 15.209
Section 2.6, section 2.7, table 3	§ 15.209
IC RSS-210 Issue 7, Annex 2	FCC 47 CFR Part 15, subpart C (1-Oct-09 Edition)
Annex A2.6 (a)	§ 15.225 (a)
Annex A2.6 (b)	§ 15.225 (b)
Annex A2.6 (c)	§ 15.225 (c)
Annex A2.6 (d)	§ 15.225 (d)
Annex A2.6	§ 15.225 (e)

Revision history

REVISION	DATE	REMARKS	REVISED BY
1.0		<ul style="list-style-type: none">- Modification of Product description- Product documentation description added- Correction of link to tested specifications	AI