Electromagnetic Compatibility

Test of:	PSS 7000 PC Link Module
Model Number:	P.N. 3356894
Applicant:	Draeger Safety UK Ltd
Test Type:	Compliance
Test Specification:	FCC CFR47, parts 2.1049, 2.1055, 15.207, 15.209
SGS Serial Number:	EMC120407/9/ST/08
Date of Receipt:	16th July 2008
Date of Test(s):	28th July 2008 to 10th November 2008
Date of Issue:	11th November 2008
Issue Number:	3

Authorised Signatory

S. Thompson
Test Engineer

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1. Client Information

Company Name:	Draeger Safety UK Limited
Address:	Ullswater Close Kitty Brewster Industrial Estate Blyth Northumberland NE24 4RG
Contact Person:	Marcus Berney-Smith
Telephone:	01670 561306
Facsimile:	01670 541741

2. Details Of Test Laboratory

Company Name:	SGS UK Ltd.
UKAS Accreditation Number:	1116
Address:	South Industrial Estate, Bowburn, Co. Durham, DH6 5AD.
Contact Persons:	Mr Stephen Thompson
Telephone:	+44 191 377 2000
Facsimile:	+44 191 377 2020

3. Equipment Under Test (EUT)

3.1   Identification Of EUT

Model Number:	P.N. 3356894
Unique Identifier:	BRZC0024
Description of EUT:	PSS 7000 PC Link Module
Highest Internal Clock Frequencies:	10 kHz – Intentional Radiator 48 MHz – Unintentional Radiator
Supply Voltage:	Supplied via USB
Ports present:	USB
Accessories Supplied:	Laptop Compaq Armada PP2 040 ID Card

4. Test Specification, Methods and Procedures

4.1   Test Specification(s)

Specification(s)	Title
FCC CFR 47 : October 2007 Parts 2.1049, 2.1055, 15.207, 15.209	Code Of Federal Regulations part 15 Telecommunication – Radio frequency devices

4.2   Purpose Of Test

To perform the relevant tests and assess the product for compliance with the above specification (s).

4.3   Methods and Procedures

The standards listed on the previous page refer to the following tests: -

CFR 47 Clause	Test
15.209	Radiated Emissions
15.207	Conducted Emissions
2.1049	Occupied Bandwidth
2.1055	Frequency Stability

All tests were conducted using the procedures in ANSI C63.4 2003 as required by 47 CFR Part 15 Subpart A paragraph 15.31 (a)(3).

5. Deviations or Exclusions from the Test Specifications

There were no deviations from the test specifications.

6. Operation of the EUT During Testing / Configuration and Peripherals

6.1 Operation of EUT during testing.

The EUT was constantly reading from a RFID card.

6.2 Configuration and Peripherals

The EUT was connected via the USB port to the laptop during the testing.

An RFID card was used during the test.

7. Test Results

7.1 General Comments

The test methods used are referred to in the individual test results sections of this test report.

7.2 Modifications Made to the EUT

No modifications were made to the EUT during the testing.

7.3 Summary of Test Results

CFR 47 Clause	Test	Result
15.209	Radiated Emissions	Complied
15.207	Conducted Emissions	Complied
2.1049	Occupied Bandwidth	Complied
2.1055	Frequency Stability	Complied

Result

In the configuration tested, the EUT complies with the requirements of Clauses of CFR 47 :

Full details of all tests can be found in the test results section of this report.

7.4   Radiated Emissions Test Results 15.209

CFR Clause	15.209
Frequency Range	9 kHz – 1 GHz

Operating Mode

The compliance test was performed whilst the EUT was connected to the laptop, the EUT was continuously reading the RFID tag.

Test Results

Note: The graphical plots show the radiated emissions pre-test when the equipment is in an anechoic screened room at 3m distance.

The tables indicate the compliance measurement when the measurements are performed on the open area test site at 3m.

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Peak Emissions – Horizontal Polarisation 30-1000MHz
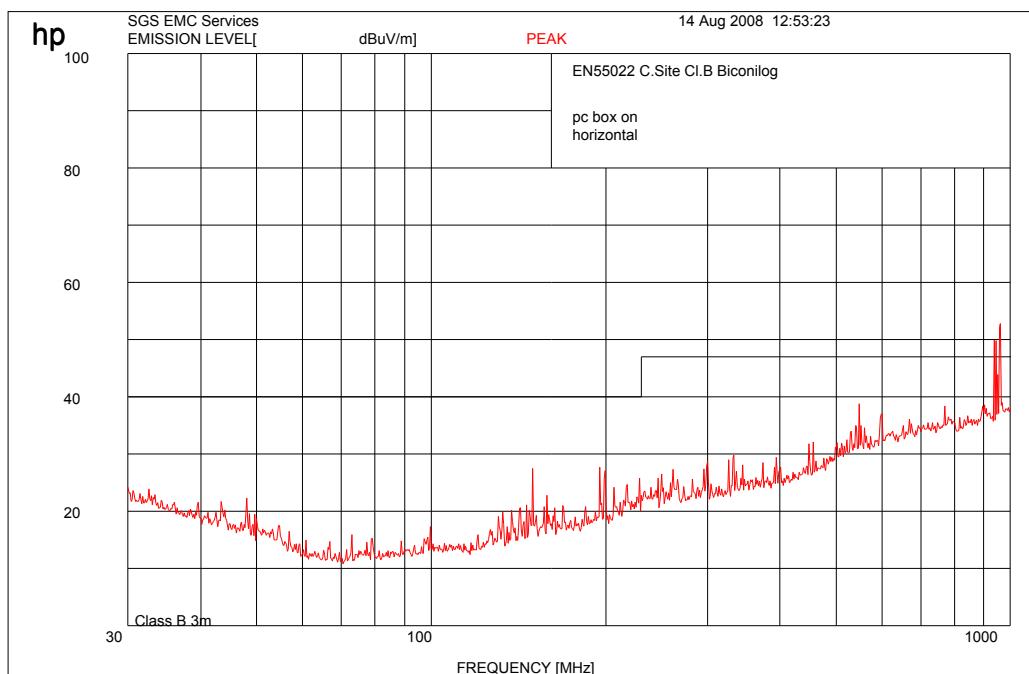
Peak Emissions – Vertical Polarisation 30-1000MHz
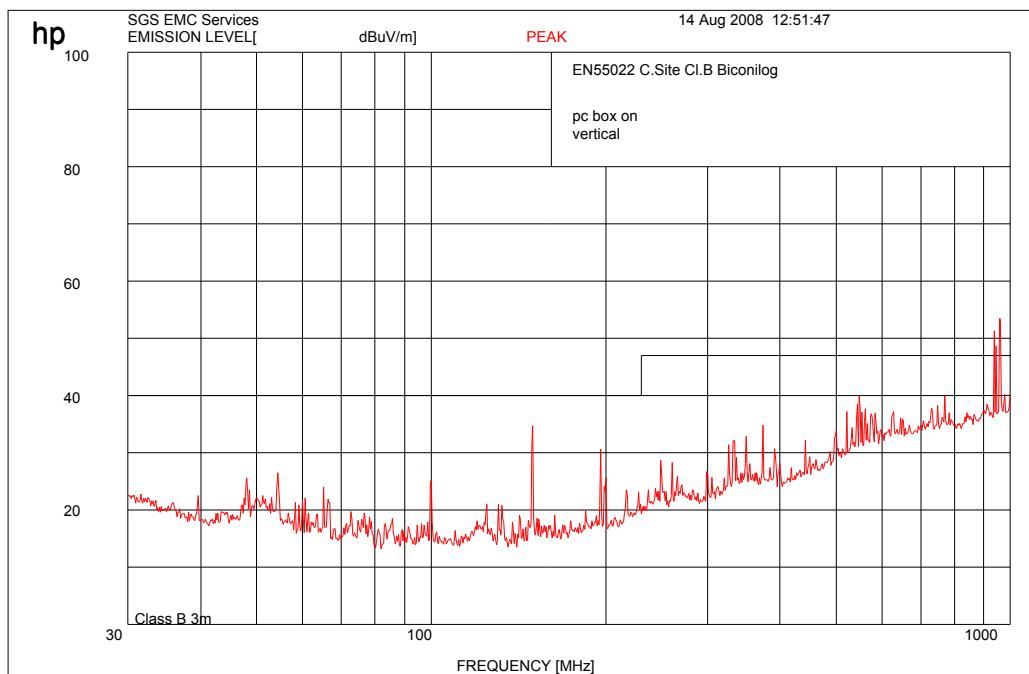
The emissions above were attributed to the support PC.

Worse Case Quasi Peak Measurements (30-1000MHz)

Measurements made at 3m

Frequency (MHz)	Quasi-peak measurement (dBuV)	Cable loss (dB)	Antenna Factor (dB)	Pre-amplifier gain (dB)	Corrected measurement (dBuV/m)	Limit dBuV/m	Antenna Polarity
35.000	38.7	1.50	12.0	30.5	21.7	40.0	Vertical
57.000	31.2	1.99	8.4	29.9	11.7	40.0	Vertical
216.600	24.7	4.33	14.6	29.8	13.9	46.0	Horizontal
414.212	25.8	6.67	16.7	30.3	18.9	46.0	Horizontal
599.950	31.0	10.17	18.3	30.2	29.3	46.0	Vertical
878.808	31.0	13.00	22.1	30.2	35.9	46.0	Horizontal

Worst case peak measurements 9kHz-30MHz

Measurements made at 3m

Frequency (kHz)	Peak measurement (dBuV)	Cable loss (dB)	Antenna Factor (dB)	Correction factor*	Corrected measurement (dBuV/m)	Limit (uV/m)	Limit (dBuV/m)	Measurement Distance (meters)
67.9	43.5	0.2	10.8	80	-25.5	2400/f(kHz)	30.96	300
120.52	47.12	0.2	10.2	80	-22.48	2400/f(kHz)	25.98	300
126.12	58.9	0.2	10.2	80	-10.7	2400/f(kHz)	25.58	300
133.68	49.87	0.2	10.2	80	-19.73	2400/f(kHz)	25.08	300
193.14	50.3	0.2	10.1	80	-19.4	2400/f(kHz)	21.88	300
274.00	36.32	0.2	10.1	80	-33.38	2400/f(kHz)	18.85	300
394.98	50.14	0.2	10	80	-19.66	2400/f(kHz)	15.67	300
626.14	21.3	0.2	10	40	-8.5	24000/f(kHz)	31.67	30
876.80	21.57	0.2	9.9	40	-8.33	24000/f(kHz)	28.74	30
18310	10.48	3.1	8.3	40	-18.12	30	29.54	30
25620	10.59	3.1	7.4	40	-18.91	30	29.54	30
25930	10.32	3.1	6.8	40	-19.78	30	29.54	30

No preamplifier used in frequency range 9kHz – 30MHz

* This correction factor is based on 40dB/decade (part 15.31).
** The limits of 15.209 have been used for the fundamental as no alternative requirements exist in 15.217 through 15.257.

Radiated Emissions Test Configuration 30-1000MHz

Radiated Emissions Test Configuration 9kHz – 30MHz

Radiated Emissions Environmental Conditions

Power Supply	115V, 60 Hz*
Temperature	12-21°C
Relative Humidity	41-43%
Barometric Pressure	1002-1004mb

*   Laptop power.

Radiated Emissions Measurement Uncertainties

Frequency	$\pm$ 200kHz
Amplitude	$\pm$ 4.6dB

The uncertainties stated are calculated in accordance with the requirements of UKAS with a confidence level of 95%.

Radiated Emissions Test Equipment Used

Equipment Type	Model Number	Calibration Date	Calibration Cycle
Software	Open Site HP85879A	N/A	N/A
Antenna	EMCO 3109	31st July 2008	3 years
Antenna	EMCO 3146	2nd March 2006	3 years
Antenna	EMCO 6152	30th June 2008	3 years
Software	Closed Site HP85869PC	N/A	N/A
Receiver	HP Receiver System (85733)	4th September 2008	2 years

7.5   Conducted Emissions Test Results 15.207

CFR 47 Clause:	15.207
Frequency Range	0.15 – 30MHz

Operating Mode

The compliance test was performed whilst the EUT was communicating with the card. As the equipment has no AC power mains, the laptop mains was measured.

Test Results

Communicating with card

Live Terminal Worst Case Emissions

Chase EMS 6.00

Notes

Analyse L1 115V READING CARD
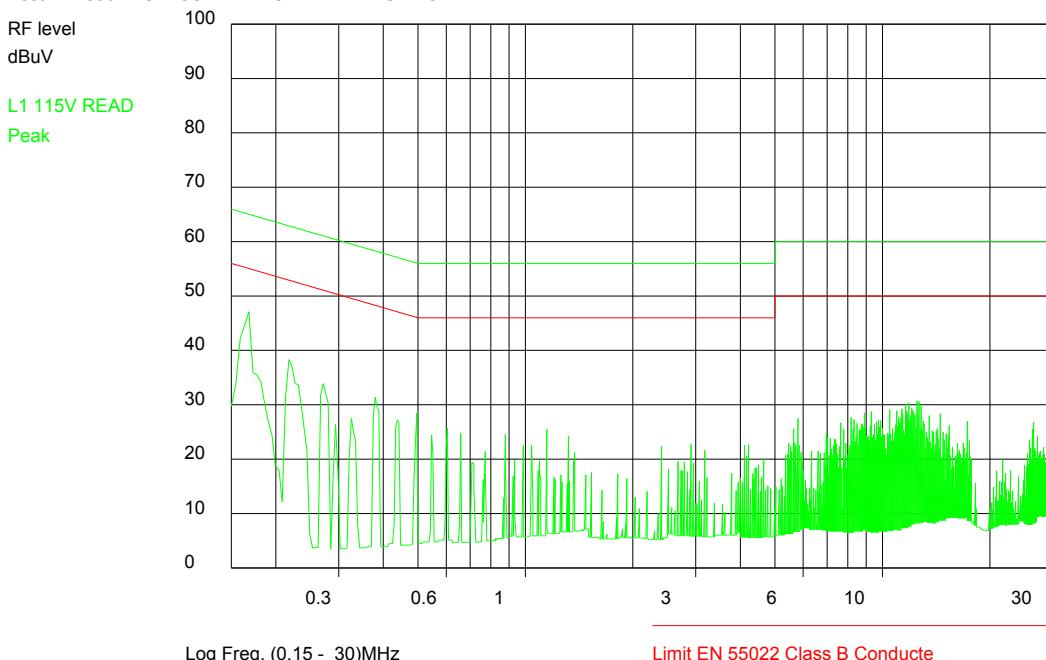
Test: EN 55022 CLASS B MAINS TERMINALS PKS

RF level
dBuV

L1 115V READ
Peak

Log Freq. (0.15 - 30)MHz

Limit EN 55022 Class B Conducte

Frequency (MHz)	Average Measurement (dBµV)	Average Limit (dBµV)	Quasi Peak Measurement (dBµV)	Quasi Peak Limit (dBµV)
0.168	27.8	65.06	38.1	57.78
0.217	35.8	62.93	39.3	55.01
0.379	26.0	58.30	32.3	48.99
0.496	13.6	56.06	19.2	46.09
0.658	11.4	46.00	18.3	56.00
0.874	23.3	46.00	25.4	56.00
1.149	17.0	46.00	22.0	56.00
7.642	19.7	50.00	21.6	60.00
8.133	16.2	50.00	23.3	60.00
11.913	6.3	50.00	6.3	60.00
13.605	6.3	50.00	6.3	60.00
26.421	15.2	50.00	21.3	60.00

## Neutral Terminal Worst Case Emissions

Chase EMS 6.00

Notes

Analyse L2 115V READING CARD
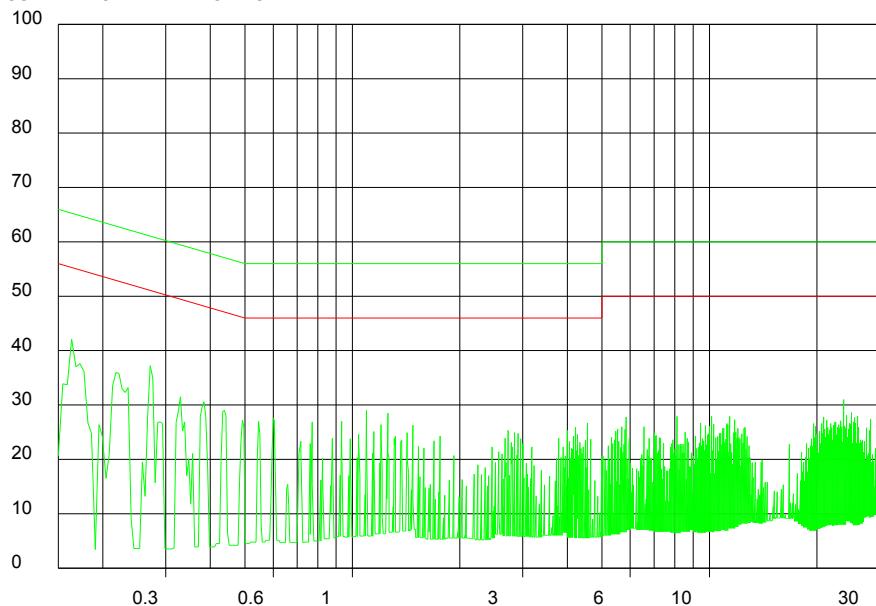
Test: EN 55022 CLASS B MAINS TERMINALS PKS

RF level dBuV

L2 115V READ Peak

Log Freq. (0.15 - 30)MHz

Limit EN 55022 Class B Conducte

Frequency (MHz)	Average Measurement (dBµV)	Average Limit (dBµV)	Quasi Peak Measurement (dBµV)	Quasi Peak Limit (dBµV)
0.163	34.4	65.31	41.6	58.10
0.217	35.9	62.93	38.6	55.01
0.271	29.3	61.09	28.4	52.61
0.330	26.9	59.45	30.0	50.49
0.438	28.0	59.45	32.2	47.43
0.600	29.1	46.00	31.1	56.00
1.095	18.8	46.00	23.3	56.00
1.257	23.3	46.00	25.9	56.00
4.200	23.9	46.00	28.9	56.00
11.346	20.1	50.00	28.5	60.00
11.733	6.3	50.00	19.2	60.00
22.978	15.6	50.00	23.6	60.00

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Conducted Emissions Test Configuration

Conducted Emissions Environmental Conditions

Power Supply	115V 60Hz
Temperature	17.5°C
Relative Humidity	58%
Barometric Pressure	1004mb

Conducted Emissions Measurement Uncertainties

Frequency	± 200kHz
Amplitude	± 3.0dB

The uncertainties stated are calculated in accordance with the requirements of UKAS with a confidence level of 95%.

Test Equipment Used

Equipment Type	Model Number	Last Calibration Date	Calibration Interval
LISN (50Ω)	Thurlby Thandar TTi 1600	22/10/07	1 year
Chase Receiver	LHR7000	05/03/08	1 year
Software	Version 6.00b	N/A	N/A

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## 7.6 Occupied Bandwidth 2.1049

Operating mode

The compliance test was performed whilst the EUT was connected to the laptop, the EUT was continuously reading the RFID tag.

Test Results

Bandwidth	Lower Frequencies	Upper Frequencies
26 dB	114.1 KHz	146.5 KHz
46 dB	73.4 KHz	258.7 KHz

Occupied Bandwidth Environmental Condition

Power Supply	110V, 60 Hz
Temperature	21°C
Relative Humidity	43%
Barometric Pressure	1004 mb
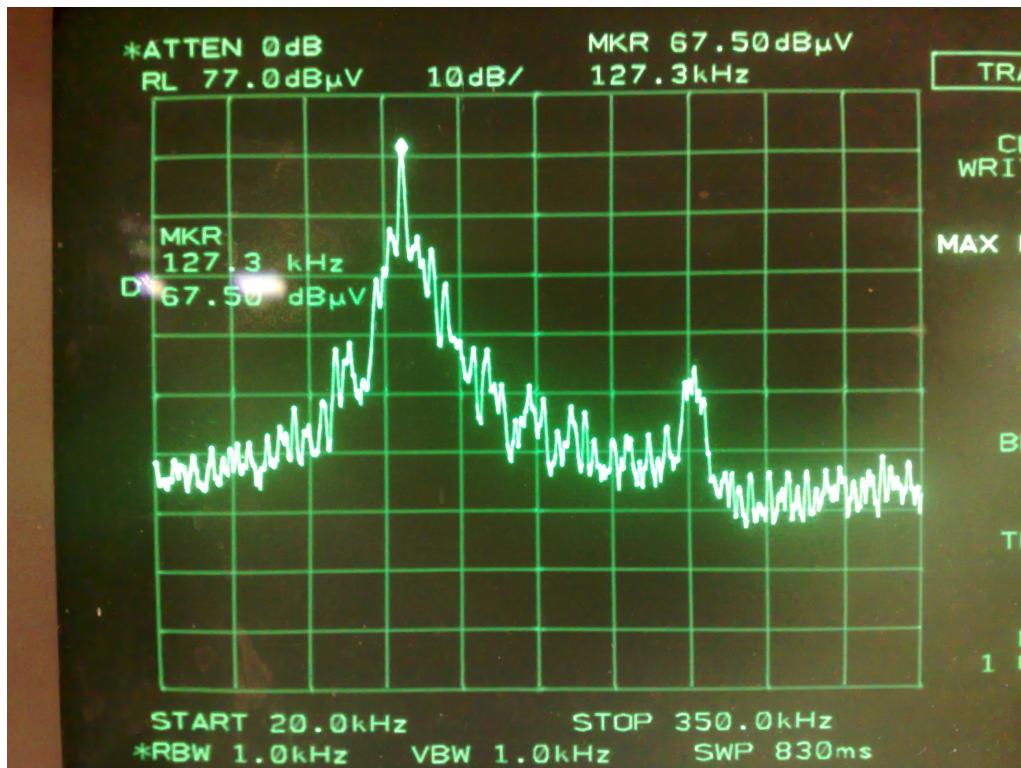
Test Equipment Used

Equipment Type	Model Number
Spectrum Analyser	HP 8563E
Environmental Chamber	

7.7   Frequency Stability 2.1055

Operating mode

The compliance test was performed whilst the EUT was connected to the laptop, the EUT was continuously reading the RFID tag.

-30°C	20°C	50°C
Frequency (kHz)	Frequency (kHz)	Frequency (kHz)
126.3	126.4	126.9

Occupied Bandwidth Environmental Condition

Power Supply	115V, 60 Hz
Temperature	21°C
Relative Humidity	43%
Barometric Pressure	1004 mb

Test Equipment Used

Equipment Type	Model Number
Spectrum Analyser	HP 8563E
Environmental Chamber	