

## Electromagnetic Compatibility

**Test of:** Bodyguard 7000 Electronic Monitoring Unit Pressure Transmitting Module

**Model Number:** Unique Identifier: BRZD-0006 04/08

**Applicant:** Draeger Safety UK Ltd

**Test Type:** Compliance

**Test Specification:** FCC CFR47, parts 2.1049, 2.1055, 15.209

**SGS Serial Number:** EMC120407/7/ST/08

**Date of Receipt:** 16<sup>th</sup> July 2008

**Date of Test(s):** 6<sup>th</sup> August 2008 to 22<sup>nd</sup> August 2008

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**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

<b>Model Number:</b>	Not Supplied
<b>Unique Identifier:</b>	BRZD-0006 04/08
<b>Description of EUT:</b>	Bodyguard 7000 Electronic Monitoring Unit Pressure Transmitting Module
<b>Highest Internal Clock Frequencies:</b>	10 kHz – Lowest 48 MHz – Highest
<b>Supply Voltage:</b>	7.5V AA Battery Pack
<b>Accessories Supplied:</b>	Bodyguard 7000 user Interface Module S/N: BRZD-0450 04/08 Head Up display

## 4. Test Specification, Methods and Procedures

### 4.1 Test Specification(s)

Specification(s)	Title
FCC CFR 47 : October 2007 Parts 2.1049, 2.1055, 15.209	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

## **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 transmitting to the Head up display.

### **6.2 Configuration and Peripherals**

A Bodyguard 7000 Electronic monitoring was connected to the unit, a head up display was also used to receive the signal from the EUT.

## **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 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

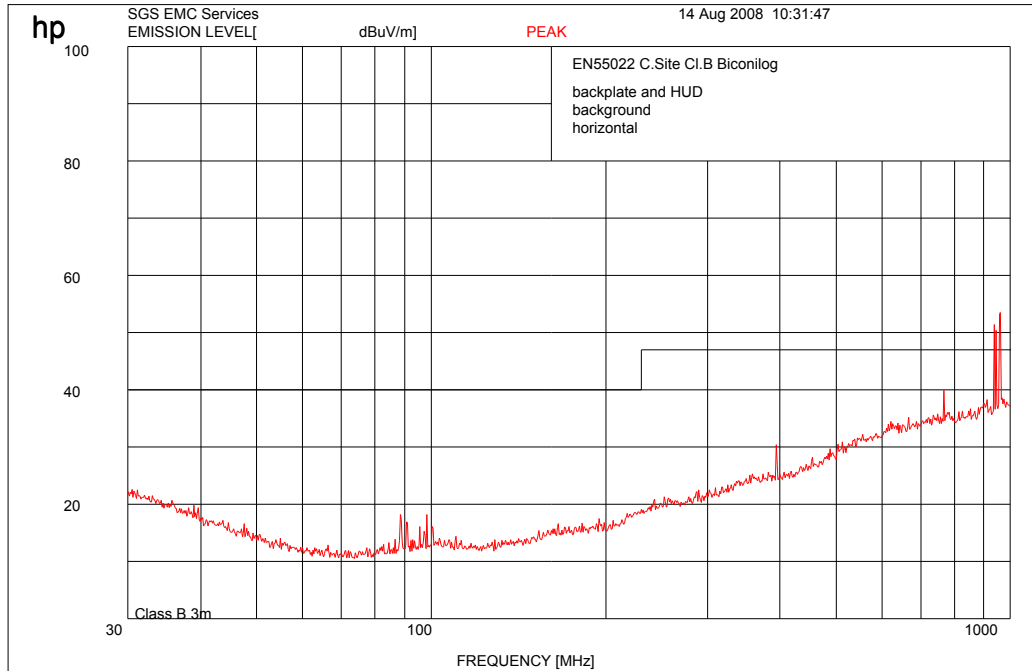
The EUT was constantly transmitting to the Head up display.

##### Test Results

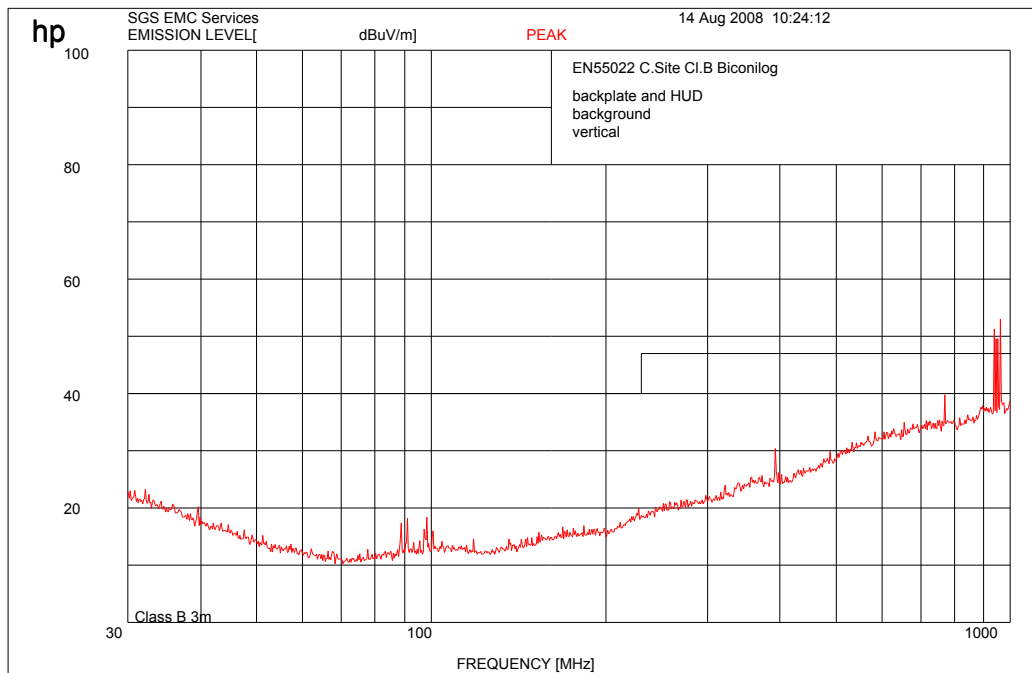
**Note:** The graphical plots show the radiated emissions pre-test when the equipment is in an anechoic screened room at 3m distance.

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

### Peak Emissions – Horizontal Polarisation 30-1000MHz



### Peak Emissions – Vertical Polarisation 30-1000MHz



The emissions in the plots above were all ambient emissions..

## 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
49.000	30.7	1.99	10.4	29.9	13.2	40.0	Vertical
78.000	27.5	2.82	7.0	29.7	7.7	40.0	Vertical
162.077	20.8	4.33	12.6	29.8	8.0	43.5	Horizontal
245.873	28.7	4.33	15.1	29.8	18.4	46.0	Horizontal
379.917	22.9	6.67	15.5	30.3	14.8	46.0	Vertical
639.917	26.5	10.17	18.9	30.2	25.4	46.0	Vertical
736.110	33.5	10.33	19.8	30.0	33.7	46.0	Horizontal
858.776	28.0	11.33	21.8	30.2	31.0	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)
35.24	71.30	0.2	12.0	80	3.50	2400/f(kHz)	36.66**	300
37.95	72.41	0.2	12.0	80	4.61	2400/f(kHz)	36.01**	300
77.35	46.53	0.2	10.7	80	-22.57	2400/f(kHz)	29.83	300
282.9	53.63	0.2	10.1	80	-16.07	2400/f(kHz)	18.57	300
1000	22.34	0.2	9.9	40	-7.56	24000/F(kHz)	27.60	30
5000	16.50	1.2	9.8	40	-12.5	30	29.54	30
15000	12.90	2.3	8.9	40	-15.9	30	29.54	30
28000	12.92	3.1	5.6	40	-18.38	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	7.5V
Temperature	19
Relative Humidity	43%
Barometric Pressure	1002mb

### Radiated Emissions Measurement Uncertainties

Frequency	$\pm 200\text{kHz}$
Amplitude	$\pm 4.6\text{dB}$

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	31 <sup>st</sup> July 2008	3 years
Antenna	EMCO 3146	2 <sup>nd</sup> March 2006	3 years
Antenna	EMCO 6152	30 <sup>th</sup> June 2008	3 years
Software	Closed Site HP85869PC	N/A	N/A
Receiver	HP Receiver System (85733)	4 <sup>th</sup> September 2008	2 years

## 7.5 Occupied Bandwidth 2.1049

### Operating mode

The EUT was constantly transmitting to the Head up display.

### Test Results

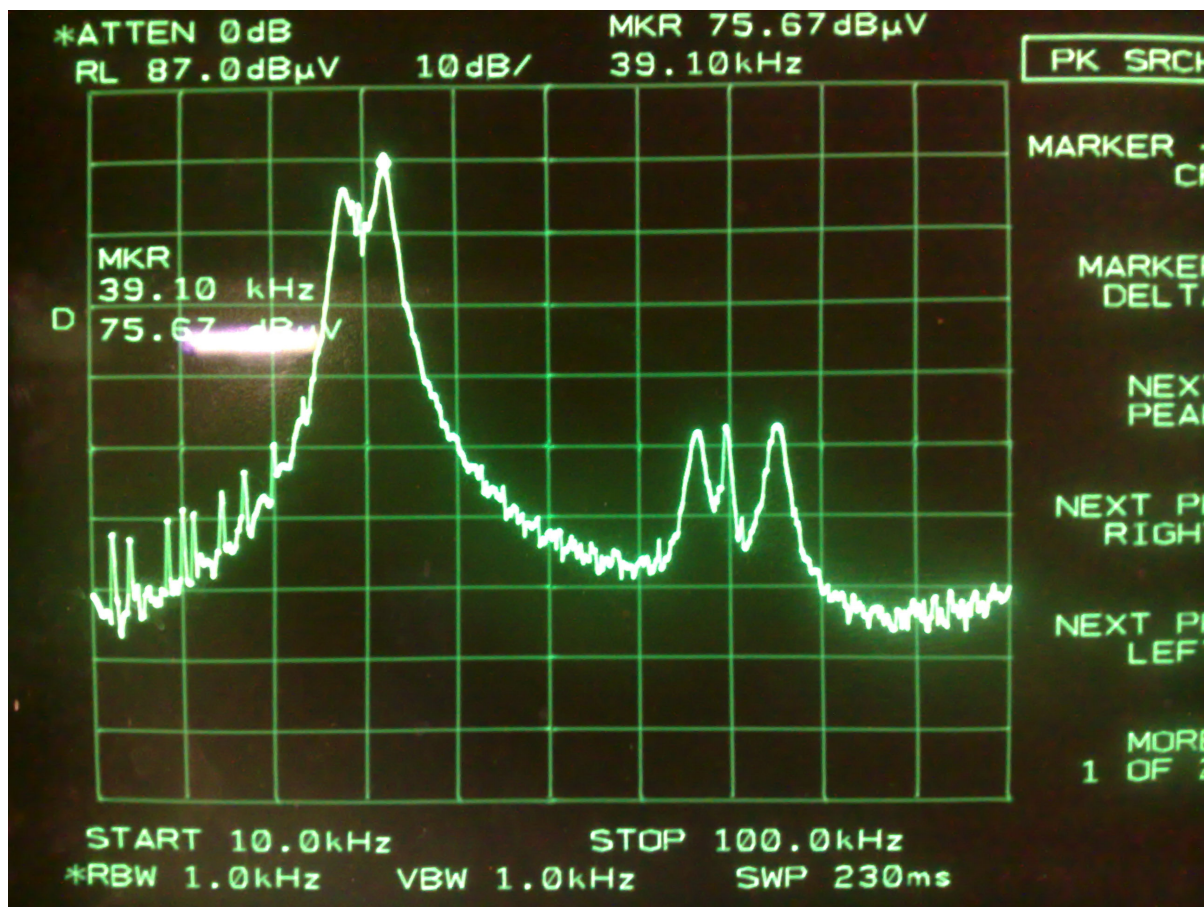
Bandwidth	Lower Frequencies	Upper Frequencies
26 dB	32.05 KHz	42.40 KHz
46 dB	20.35 KHz	79.15 KHz

### Occupied Bandwidth Environmental Condition

Power Supply	7.5V
Temperature	21°C
Relative Humidity	43%
Barometric Pressure	1004 mb



### Carrier



### Test Equipment Used

Equipment Type	Model Number
Spectrum Analyser	HP 8563E
Environmental Chamber	



## 7.6 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)
38.58	38.65	38.65

## Occupied Bandwidth Environmental Condition

<b>Power Supply</b>	<b>7.5V</b>
Temperature	21°C
Relative Humidity	43%
Barometric Pressure	1004 mb

## Test Equipment Used

<b>Equipment Type</b>	<b>Model Number</b>
Spectrum Analyser	HP 8563E
Environmental Chamber	