

Electromagnetic Compatibility

Test of: User Interface Module

Model Number: Bodyguard 7000 user Interface Module

Applicant: Draeger Safety UK Ltd

Test Type: Compliance

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

SGS Serial Number: EMC120407/8/ST/08

Date of Receipt: 16th July 2008

Date of Test(s): 6th August 2008 to 22nd August 2008

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Authorised Signatory

S. Thompson
Test Engineer

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1. Client Information

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2. Details Of Test Laboratory

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UKAS Accreditation Number: 1116

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3. Equipment Under Test (EUT)

3.1 Identification Of EUT

Model Number:	Bodyguard 7000 User Interface Module
Unique Identifier:	BRZE-0986 05/08
Description of EUT:	User Interface Module
Highest Internal Clock Frequencies:	4MHz
Supply Voltage:	7.5V AA Battery Pack
Ports present:	None
Accessories Supplied:	Bodyguard 7000 Electronic Monitoring Unit and pressure transmitting module BRZE0987 05/08

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
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 reading from a RFID card.

6.2 Configuration and Peripherals

An RFID card was used during the test.

A Bodyguard 7000 Electronic monitoring unit and pressure transmitting module were 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
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

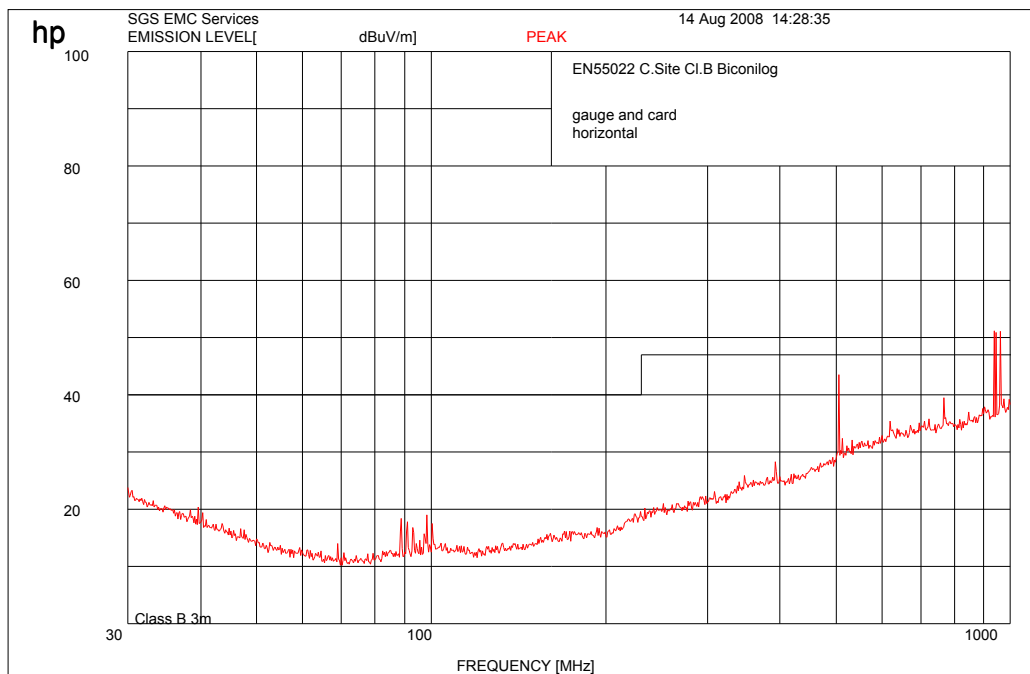
The compliance test was performed whilst the EUT was communicating with card.

Test Results

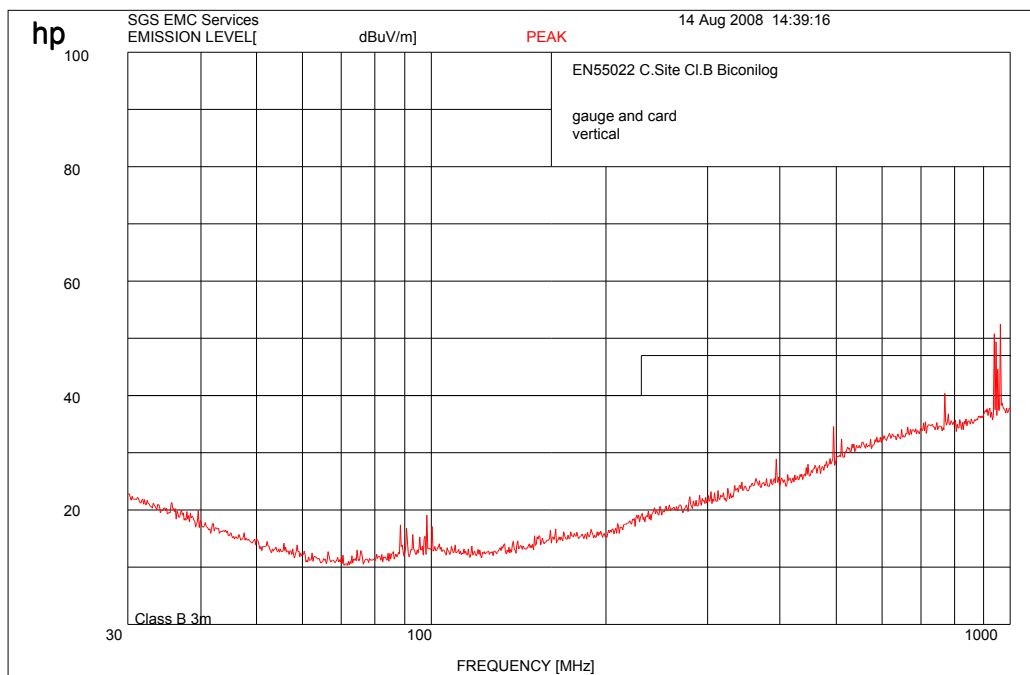
Note: The graphical plots show the radiated emissions pre-test when the equipment is in an anechoic screened room at 3m distance.

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
39.000	32.0	1.50	12.0	30.2	15.3	40	Vertical
59.000	29.8	1.99	8.4	29.9	10.3	40	Vertical
274.841	22.3	5.67	16.0	30.0	14.0	46	Vertical
350.097	21.8	6.67	15.5	30.0	14.0	46	Vertical
478.970	24.3	8.17	18.3	30.0	20.8	46	Horizontal
625.889	27.0	10.17	18.6	30.2	25.6	46	Horizontal
749.849	36.0	10.32	19.8	30.0	36.1	46	Vertical
841.766	35.0	11.33	21.2	30.0	37.6	46	Horizontal
964.768	28.4	13.67	22.5	29.7	34.9	54	Vertical

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)
99.04	48.03	0.2	10.3	80	-21.47	2400/f(kHz)	27.68	300
114.92	41.2	0.2	10.2	80	-28.40	2400/f(kHz)	26.39	300
124.60	48.3	0.2	10.2	80	-28.30	2400/f(kHz)	25.69	300
128.36	49.1	0.2	10.2	80	-20.50	2400/f(kHz)	25.43**	300
132.68	49.8	0.2	10.2	80	-19.80	2400/f(kHz)	25.14	300
138.20	53.2	0.2	10.2	80	-16.40	2400/f(kHz)	24.79	300
381.50	48.6	0.2	10.0	80	-21.20	2400/f(kHz)	15.97	300
619.20	46.2	0.2	10.0	40	16.4	24000/F(kHz)	31.76	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	21°C
Relative Humidity	43%
Barometric Pressure	1004mb

Radiated Emissions Measurement Uncertainties

Frequency	± 200kHz
Amplitude	± 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	31 st July 2008	3 years
Antenna	EMCO 3146	2 nd March 2006	3 years
Antenna	EMCO 6152	30 th June 2008	3 years
Software	Closed Site HP85869PC	N/A	N/A
Receiver	HP Receiver System (85733)	4 th September 2008	2 years

7.5 Occupied Bandwidth 2.1049

Operating mode

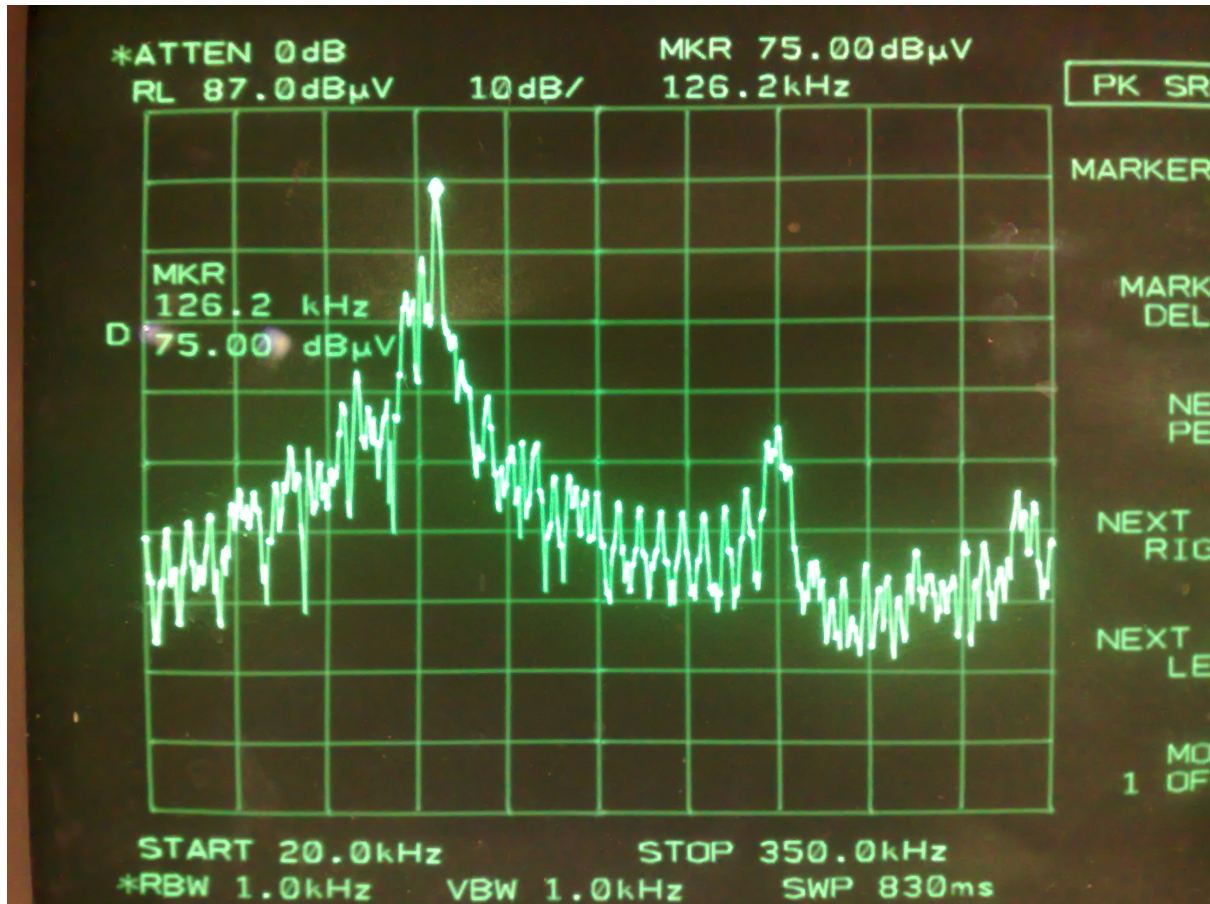
The compliance test was performed whilst the EUT was reading the RFID tag.

Test Results

Bandwidth	Lower Frequencies	Upper Frequencies
26 dB	95.9 KHz	135.5 KHz
46 dB	44.0 KHz	344.0 KHz

Occupied Bandwidth Environmental Condition

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



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 reading an RFID tag.

-30°C	20°C	50°C
Frequency (kHz)	Frequency (kHz)	Frequency (kHz)
125.27	125.33	125.3

Occupied Bandwidth Environmental Condition

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

Test Equipment Used

Equipment Type	Model Number
Spectrum Analyser	HP 8563E
Environmental Chamber	