

Straubing, 28 September 2007

**T E S T - R E P O R T**

**No. 50420-070741-1 (Edition 2)**

**for**

**MP02001**

**Inductive Tag Reader**

Applicant: Dräger Medical AG & Co. KG

Test Specifications: FCC Code of Federal Regulations,  
CFR 47, Part 15,  
Sections 15.205, 15.207, 15.215 and 15.225

Industry Canada Radio Standards  
Specifications  
RSS-Gen Issue 2, Section 7.2.2 and  
RSS-210 Issue 7, Sections 2.2, 2.6, A2.6  
(Category I Equipment)

**Note:**

The test data of this report is related only to the individual item which has been tested. This report shall not be reproduced except in full extent without the written approval of the testing laboratory.

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## 1 Description of the Equipment Under Test (EUT)

| <b>General data of EUT</b>      |  |
|---------------------------------|--|
| Type designation <sup>1</sup> : | MP02001  |
| Parts <sup>2</sup> :            |  |
| Serial number(s):               | 1001364126   |
| Manufacturer:                   | FEIG ELECTRONIC GmbH                                     |
| Type of equipment:              | Inductive Tag Reader                                     |
| Version:                        | As delivered   |
| FCC ID:                         | N/A  |
| Additional parts/accessories:   | - Insp/Exsp Antenna MP02021<br>- Spirologantenna MP02011 |

| <b>Technical data of EUT</b>            |   |
|---|---|
| Application frequency range:            | <Application Frequency Range>   |
| Frequency range:                        | 13.56 MHz   |
| Operating frequency:                    | <Operating Frequency>   |
| Type of modulation:                     | ASK   |
| Pulse train:                            | N/A   |
| Pulse width:                            | N/A   |
| Number of RF-channels:                  | 1   |
| Channel spacing:                        | N/A   |
| Designation of emissions <sup>3</sup> : | 10K0A1D   |
| Type of antenna:                        | Integrated  |
| Size/length of antenna:                 | ---   |
| Connection of antenna:                  | <input type="checkbox"/> detachable <input checked="" type="checkbox"/> not detachable                      |
| Type of power supply:                   | AC supply   |
| Specifications for power supply:        | nominal voltage: 24.0 V V<br>minimum voltage: 18.0 V<br>maximum voltage: 30.0 V<br>nominal frequency: DC Hz |

<sup>1</sup> Type designation of the system if EUT consists of more than one part.

<sup>2</sup> Type designations of the parts of the system, if applicable.

<sup>3</sup> Also known as "Class of Emission".

## 2 Administrative Data

| <b>Application details</b> |  |
|----------------------------|--|
| Applicant (full address):  | Dräger Medical AG & Co. KG<br>Moislinger Allee 53-55, D-23542 Lübeck |
| Contact person:            | Markus Steeger   |
| Contract identification:   | M61NB44742017  |
| Receipt of EUT:            | 23 August 2007   |
| Date(s) of test:           | 23 August 2007   |
| Note(s):                   | ---  |

| <b>Report details</b> |                 |
|-----------------------|-----------------|
| Report number:        | 50420-070741-1  |
| Edition:              | 2               |
| Issue date:           | August 30, 2007 |

### 3 Identification of the Test Laboratory

| <b>Details of the Test Laboratory</b>   |  |
|---|--|
| Company name:                           | Senton GmbH EMI/EMC Test Center                              |
| Address:                                | Aeussere Fruehlingstrasse 45<br>D-94315 Straubing<br>Germany |
| Laboratory accreditation:               | DAR-Registration No. DAT-P-171/94-02                         |
| FCC test site registration number       | 90926  |
| Industry Canada test site registration: | IC 3050  |
| Contact person:                         | Mr. Johann Roidt   |
|   | Phone: (+49) (0)9421 5522-0                                  |
|   | Fax: (+49) (0)9421 5522-99                                   |

## 4 Summary

### Summary of test results

The tested sample complies with the requirements set forth in the  
**Code of Federal Regulations CFR 47, Part 15, Sections 15.205, 15.207, 15.215 and 15.225**  
of the Federal Communication Commission (FCC) and the  
**Radio Standards Specifications**  
**RSS-Gen Issue 2, Section 7.2.2 and**  
**RSS-210 Issue 7, Sections 2.2, 2.6, A2.6 (Category I Equipment)**  
of Industry Canada (IC).

### Personnel involved in this report

Laboratory Manager:



Mr. Johann Roidt

Responsible for testing:

Mr. Johann Roidt

Responsible for test report:

Mr. Johann Roidt

## 5 Operation Mode and Configuration of EUT

### Operation Mode(s)

Transmitter active, controlled by tes software "OBID ISOstart V6.06" supplied by the applicant

### Configuration(s) of EUT

### List of ports and cables

| Port | Description                     | Classification <sup>4</sup> | Cable type | Cable length |
|------|---------------------------------|-----------------------------|------------|--------------|
| 1    | DC supply input & signal in/out | dc power                    | Unshielded |              |

### List of devices connected to EUT

| Item | Description          | Type Designation | Serial no. or ID | Manufacturer |
|------|----------------------|------------------|------------------|--------------|
| 1    | Notebook PC          | Latitude D620    | ---              | Dell         |
| 2    | TTL to RS232 Adapter | N/A              | ---              | B & B        |

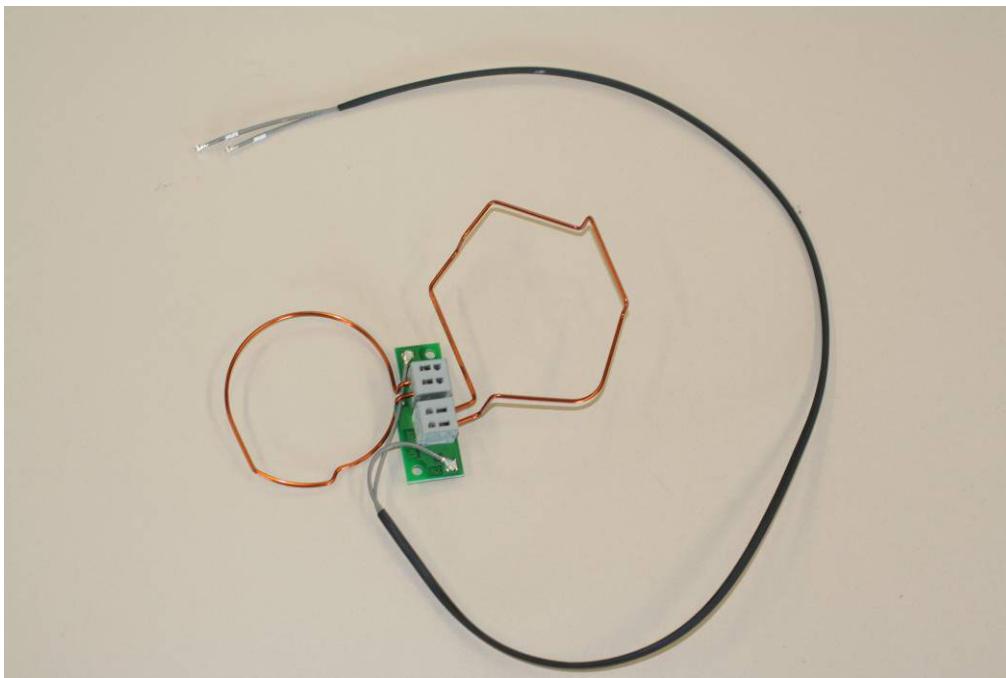
### List of support devices

| Item | Description | Type Designation | Serial no. or ID | Manufacturer |
|------|-------------|------------------|------------------|--------------|
| 1    | N/A         |                  |                  |              |
| 2    |             |                  |                  |              |
| 3    |             |                  |                  |              |
| 4    |             |                  |                  |              |

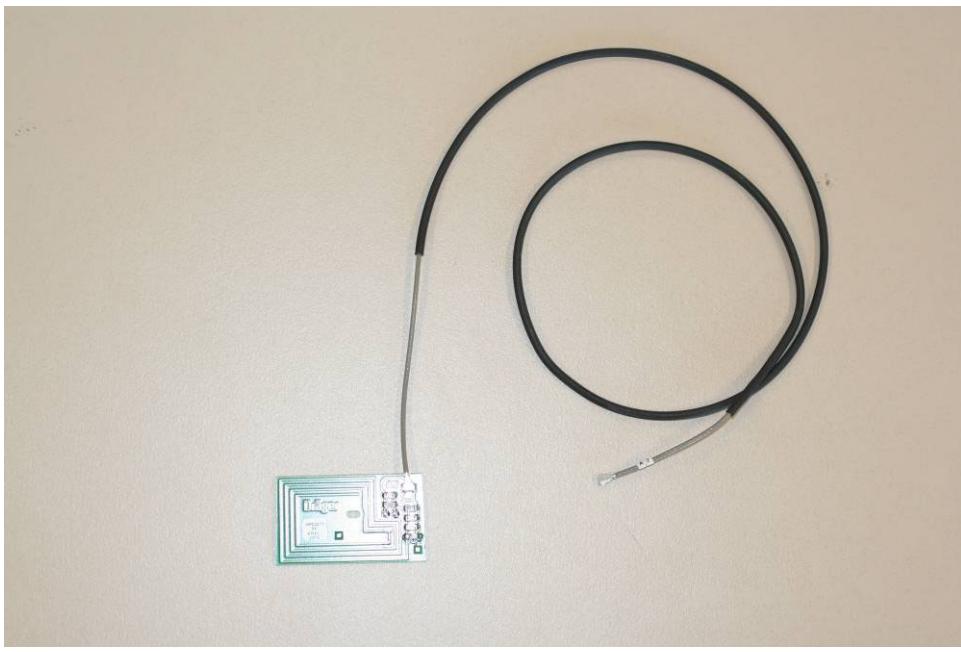
<sup>4</sup> Ports shall be classified as ac power, dc power or signal/control port

## Antenna Information

Insp/Exsp Antenna MP02021



Spirologantenna MP02011



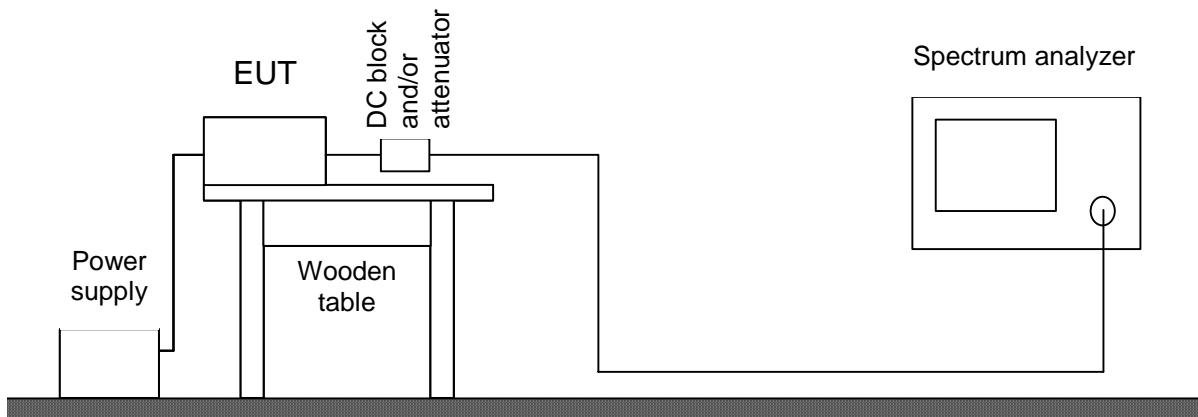
**Location of antennas:**



## 6 Measurement Procedures

### 6.1 Bandwidth Measurements

| <b>Measurement Procedure:</b>  |   |
|--|---|
| Rules and specifications:  | CFR 47 Part 2, section 2.202(a)<br>CFR 47 Part 15, section 15.215(c)<br>IC RSS-Gen Issue 2, sections 4.6.1 and 4.6.2<br>IC RSS-210 Issue 7, section A1.1.3<br>ANSI C63.4, annex H.6 |
| Guide:   | ANSI C63.4 / IC RSS-Gen Issue 2, sections 4.6.1 and 4.6.2   |
| Measurement setup:   | <input type="checkbox"/> See below<br>Conducted:<br><input checked="" type="checkbox"/> Radiated: Radiated Emission Measurement 9 kHz to 30 MHz (6.2)                               |
| <p>If antenna is detachable bandwidth measurements shall be performed at the antenna connector (conducted measurement) when the transmitter is adjusted in accordance with the tune-up procedure, if applicable. The RF output terminals are connected to a spectrum analyzer. If required, a resistive matching network equal to the impedance specified or employed for the antenna is used as well as dc block and appropriate attenuators (50 Ohms). The electrical characteristics of the radio frequency load attached to the output terminals shall be stated, if applicable.</p> <p>If radiated measurements are performed the same test setups and instruments are used as with radiated emission measurements for the appropriate frequency range.</p> <p>The analyzer settings are specified by the test description of the appropriate test record(s).</p> |   |

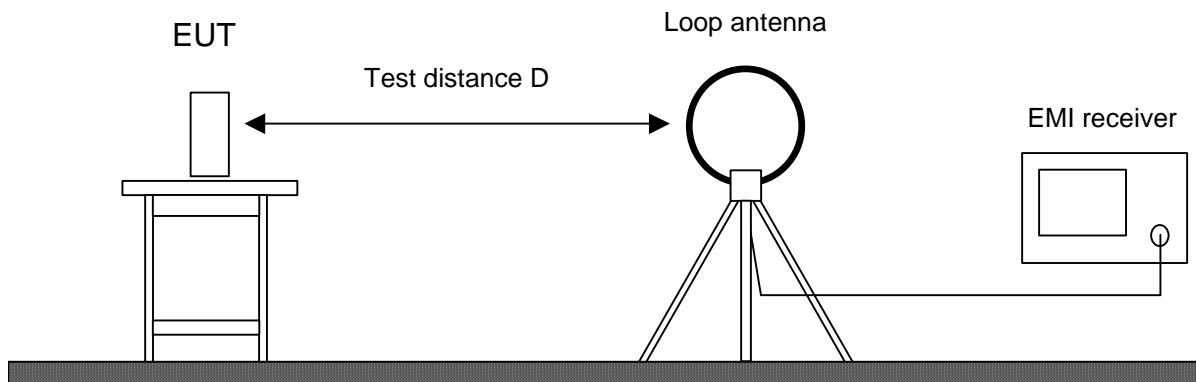


Test instruments used for conducted measurements:

| Used                                | Type              | Model   | Serial No. or ID | Manufacturer    |
|-------------------------------------|-------------------|---------|------------------|-----------------|
| <input checked="" type="checkbox"/> | Spectrum Analyzer | FSP 30  | 100063           | Rohde & Schwarz |
| <input type="checkbox"/>            | EMI test receiver | ESPI7   | 836914/0002      | Rohde & Schwarz |
| <input type="checkbox"/>            | EMI test receiver | ESMI    | 839379/013       | Rohde & Schwarz |
|                                     |                   |         | 839587/006       |                 |
| <input type="checkbox"/>            | Power meter       | NRVS    | 836856/015       | Rohde & Schwarz |
| <input type="checkbox"/>            | Peak power sensor | NRV-Z31 | 8579604.03       | Rohde & Schwarz |
| <input type="checkbox"/>            | Power sensor      | NRV-Z52 | 837901/030       | Rohde & Schwarz |
| <input type="checkbox"/>            | Power sensor      | NRV-Z4  | 863828/015       | Rohde & Schwarz |
| <input type="checkbox"/>            | DC-block          | 7006    | A2798            | Weinschel       |
| <input type="checkbox"/>            | Attenuator        | 4776-10 | 9412             | Narda           |
| <input type="checkbox"/>            | Attenuator        | 4776-20 | 9503             | Narda           |

## 6.2 Radiated Emission Measurement 9 kHz to 30 MHz

| <b>Measurement Procedure:</b>  |  |
|--|--|
| Rules and specifications:  | CFR 47 Part 15, sections 15.205, 15.215(b) and 15.225(a)-(d)<br>IC RSS-210 Issue 7, sections 2.2, 2.6 and A2.6 |
| Guide:   | ANSI C63.4   |
| Radiated emission in the frequency range 9 kHz to 30 MHz is measured using an active loop antenna. First the whole spectrum of emission caused by the equipment is recorded at a distance of 3 meters in a fully or semi anechoic room with the detector of the spectrum analyzer or EMI receiver set to peak. This configuration is also used for recording the spectrum of intentional radiators.  |  |
| Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. EUT is rotated all around to find the maximum levels of emissions. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.  |  |
| If worst case emission of the EUT cannot be recorded with EUT in standard position and loop antenna in vertical polarization the EUT (or the radiating part of the EUT) is rotated by 90 degrees instead of changing the loop antenna to horizontal polarization. This procedure is selected to minimize the influence of the environment (e.g. effects caused by the floor especially with longer distances).   |  |
| Final measurement is performed at a test distance D of 30 meters using an open field test site. In case the regulation requires testing at other distances, the result is extrapolated by either making measurements at an additional distance D of 10 meters to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). In cases of very low emissions measurements are performed at shorter distances and results are extrapolated to the required distance. The provisions of CFR 47 Part 15 sections 15.31(d) and (f)(2) apply. According to CFR 47 Part 15 section 15.209(d) final measurement is performed with detector function set to quasi-peak except for the frequency bands 9 to 90 kHz and 110 to 490 kHz where, for non-pulsed operation, average detector is employed. |  |
| If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.   |  |

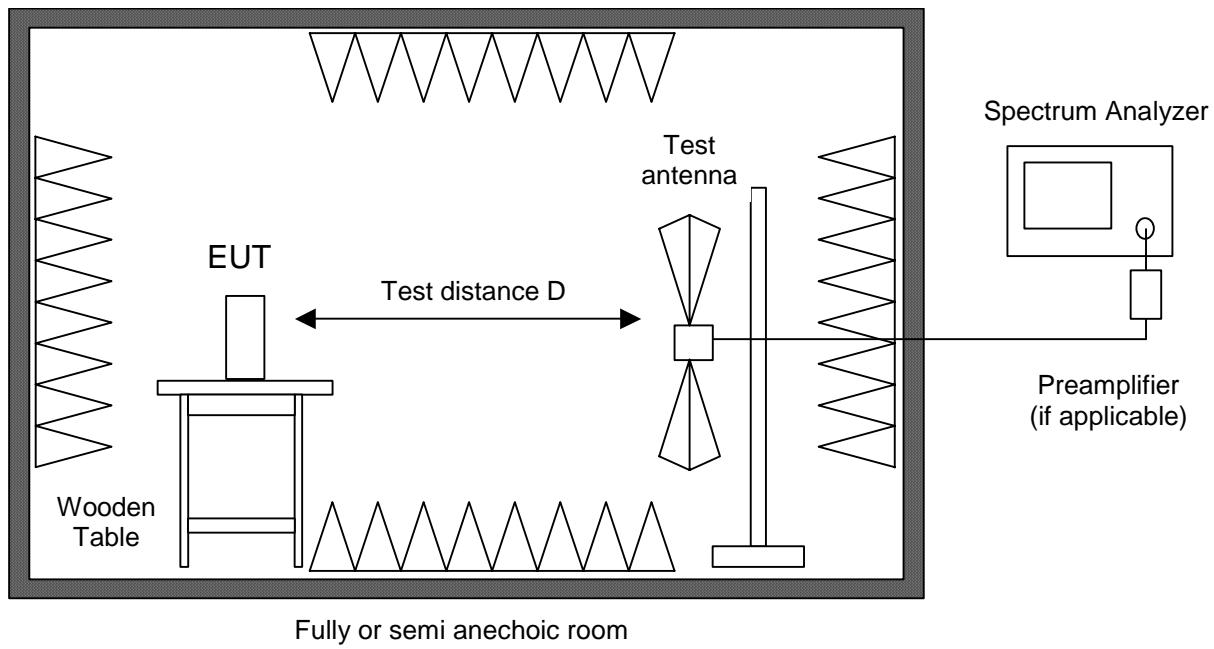


Test instruments used:

| Used                                | Type                 | Model    | Serial No. or ID         | Manufacturer       |
|-------------------------------------|----------------------|----------|--------------------------|--------------------|
| <input type="checkbox"/>            | Spectrum Analyzer    | FSP 30   | 100063                   | Rohde & Schwarz    |
| <input checked="" type="checkbox"/> | EMI test receiver    | ESMI     | 839379/013<br>839587/006 | Rohde & Schwarz    |
| <input type="checkbox"/>            | Test receiver        | ESHS 10  | 860043/016               | Rohde & Schwarz    |
| <input type="checkbox"/>            | Preamplifier         | CPA9231A | 3393                     | Schaffner          |
| <input checked="" type="checkbox"/> | Loop antenna         | HFH2-Z2  | 882964/1                 | Rohde & Schwarz    |
| <input type="checkbox"/>            | Fully anechoic room  | No. 2    | 1452                     | Albatross Projects |
| <input type="checkbox"/>            | Semi-anechoic room   | No. 3    | 1453                     | Siemens            |
| <input type="checkbox"/>            | Open field test site | EG 1     | 1450                     | Senton             |

### 6.3 Radiated Emission in Fully or Semi Anechoic Room

| <b>Measurement Procedure:</b>  |  |
|--|--|
| Rules and specifications:  | CFR 47 Part 15, sections 15.205(b) and 15.225(d)<br>IC RSS-210 Issue 7, sections 2.2(b)(c), 2.6 and A2.6 |
| Guide:   | ANSI C63.4   |
| Radiated emission in fully or semi anechoic room is measured in the frequency range from 30 MHz to the maximum frequency as specified in CFR 47 Part 15 section 15.33.   |  |
| Measurements are made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution as well as video bandwidth set to 100 kHz (below 1 GHz) or 1 MHz (above 1 GHz).  |  |
| Testing up to 1 GHz is performed with a linear polarized logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna"). For testing above 1 GHz horn antennas are used.   |  |
| All tests below 18 GHz are performed at a test distance D of 3 meters. For higher frequencies the test distance is reduced (e.g. to 1 meter) due to the sensitivity of the measuring instrument(s) and the test results are calculated according to CFR 47 Part 15 section 15.31(f)(1) using an extrapolation factor of 20 dB/decade. If required, preamplifiers are used for the whole frequency range. Special care is taken to avoid overload, using appropriate attenuators and filters, if necessary.   |  |
| If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value. |  |
| Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.  |  |
| During testing the EUT is rotated all around to find the maximum levels of emissions. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.   |  |
| For final testing below 1 GHz an open field test-site is used and the plots recorded in the fully or semi anechoic room are indicated as prescans.   |  |

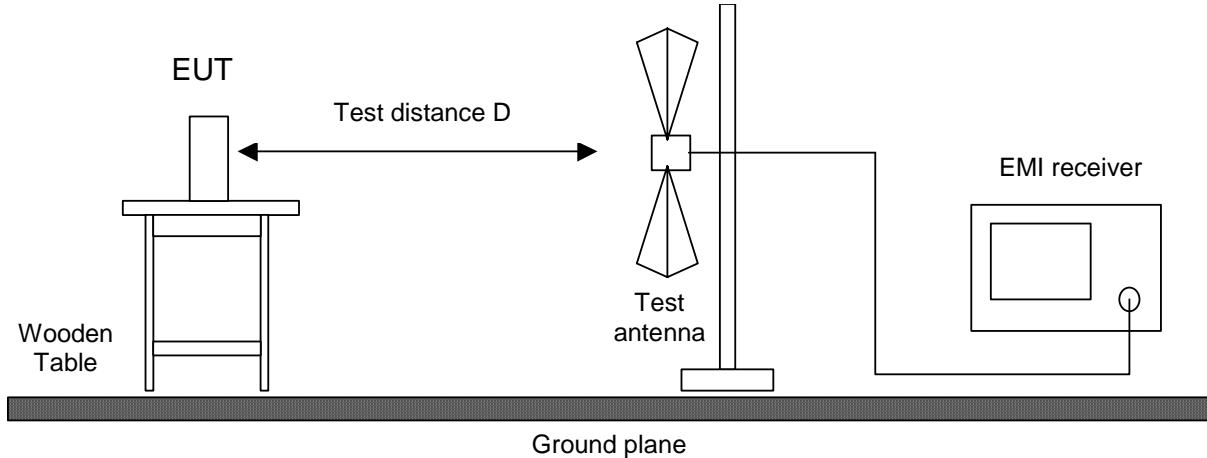


Test instruments used:

| Used                                | Type                     | Model                | Serial No. or ID         | Manufacturer       |
|-------------------------------------|--------------------------|----------------------|--------------------------|--------------------|
| <input checked="" type="checkbox"/> | Spectrum Analyzer        | FSP 30               | 100063                   | Rohde & Schwarz    |
| <input type="checkbox"/>            | Spectrum analyzer        | R 3271               | 05050023                 | Advantest          |
| <input type="checkbox"/>            | EMI test receiver        | ESMI                 | 839379/013<br>839587/006 | Rohde & Schwarz    |
| <input checked="" type="checkbox"/> | Preamplifier             | CPA9231A             | 3393                     | Schaffner          |
| <input type="checkbox"/>            | Preamplifier             | R14601               |                          | Advantest          |
| <input type="checkbox"/>            | Preamplifier 1-8 GHz     | AFS3-00100800-32-LN  | 847743                   | Miteq              |
| <input type="checkbox"/>            | Preamplifier 0.5-8 GHz   | AMF-4D-005080-25-13P | 860149                   | Miteq              |
| <input type="checkbox"/>            | Preamplifier 8-18 GHz    | ACO/180-3530         | 32641                    | CTT                |
| <input type="checkbox"/>            | External Mixer           | WM782A               | 845881/005               | Tektronix          |
| <input type="checkbox"/>            | Harmonic Mixer           | FS-Z30               | 843389/007               | Rohde & Schwarz    |
|                                     | Accessories              |                      |                          |                    |
| <input checked="" type="checkbox"/> | Trilog broadband antenna | VULB 9163            | 9163-188                 | Schwarzbeck        |
| <input type="checkbox"/>            | Horn antenna             | 3115                 | 9508-4553                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-03              | 9112-1003                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-04              | 9112-1001                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-05              | 9112-1001                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-06              | 9112-1001                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-07              | 9112-1008                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-08              | 9112-1002                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-09              | 9403-1025                | EMCO               |
| <input type="checkbox"/>            | Horn antenna             | 3160-10              | 399185                   | EMCO               |
| <input checked="" type="checkbox"/> | Fully anechoic room      | No. 2                | 1452                     | Albatross Projects |
| <input type="checkbox"/>            | Semi-anechoic room       | No. 3                | 1453                     | Siemens            |

## 6.4 Radiated Emission at Open Field Test Site

| <b>Measurement Procedure:</b>  |  |
|--|--|
| Rules and specifications:  | CFR 47 Part 15, sections 15.205(b) and 15.225(d)<br>IC RSS-210 Issue 7, sections 2.2(b)(c), 2.6 and A2.6 |
| Guide:   | ANSI C63.4   |
| Radiated emission at open field test site is measured in the frequency range 30 MHz to 1 GHz using a biconical antenna up to 300 MHz and a logarithmic periodic antenna above. The measurement bandwidth of the test receiver is set to 120 kHz with quasi-peak detector selected.   |  |
| If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value. |  |
| Hand-held or body-worn devices are tested in the position producing the highest emission relative to the limit as verified by prescans in the fully anechoic room. EUT is rotated all around and receiving antenna is raised and lowered within 1 meter to 4 meters to find the maximum levels of emission. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.   |  |
| For measuring emissions of intentional radiators and receivers a test distance D of 3 meters is selected. Testing of unintentional radiators is performed at a distance of 10 meters. If limits specified for 3 meters shall be used for measurements performed at 10 meters distance the limits are calculated according to CFR 47 Part 15 section 15.31(d) and (f)(1) using an inverse linear-distance extrapolation factor of 20 dB/decade.   |  |



Test instruments used:

| Used                                | Type                 | Model | Serial No. or ID | Manufacturer    |
|-------------------------------------|----------------------|-------|------------------|-----------------|
| <input checked="" type="checkbox"/> | EMI receiver         | ESVP  | 881120/024       | Rohde & Schwarz |
| <input checked="" type="checkbox"/> | Biconical antenna    | EG 1  | HK 116           | Rohde & Schwarz |
| <input checked="" type="checkbox"/> | Log. per. antenna    | EG 1  | HL 223           | Rohde & Schwarz |
| <input checked="" type="checkbox"/> | Open field test site | EG 1  | 1450             | Senton          |

**7      Photographs Taken During Testing**

**Test setup for radiated emission measurement 9 kHz – 30 MHz**



**Test setup for radiated emission measurement  
(fully anechoic room)**



**Test setup for radiated emission measurement  
(open field test site)**



## 8 Test Results

| <b>FCC CFR 47 Parts 2 and 15</b>       |  |                  |                |
|--|--|------------------|----------------|
| <b>Section(s)</b>                      | <b>Test</b>  | <b>Page</b>      | <b>Result</b>  |
| 2.1046(a)                              | Conducted output power                               | ---              | Not applicable |
| 2.202(a)                               | Occupied bandwidth                                   |                  | Not applicable |
| 15.215(c)                              | Bandwidth of the emission                            | 23               | Not applicable |
| 2.201, 2.202                           | Class of emission                                    | ---              | Calculated     |
| 15.35(c)                               | Pulse train measurement for pulsed operation         | ---              | Not applicable |
| 15.205(a)<br>15.205(d)(7)              | Restricted bands of operation                        | --- <sup>5</sup> | Test passed    |
| 15.207                                 | Conducted AC powerline emission<br>150 kHz to 30 MHz | ---              | Not applicable |
| 15.225(a)-(d)                          | Spectrum Mask  | 25               | Not performed  |
| 15.205(b)<br>15.215(b)<br>15.225(a)(d) | Radiated emission<br>9 kHz to 30 MHz                 | 27               | Not performed  |
| 15.205(b)<br>15.225(d)                 | Radiated emission<br>30 MHz to 1 GHz                 | 29               | Test passed    |
| 15.225(e)                              | Carrier frequency stability                          | ---              | Not performed  |

<sup>5</sup> See "Spectrum Mask" for the 13.36 to 13.41 MHz band. For all other restricted bands see "Radiated Emission".

| <b>IC RSS-Gen Issue 2</b> |   |             |   |
|---------------------------|---|-------------|---|
| <i>Section(s)</i>         | <i>Test</i>   | <i>Page</i> | <i>Result</i>                             |
| 4.8                       | Transmitter output power (conducted)                                | ---         | Not applicable                            |
| 4.6.1                     | Occupied Bandwidth  |             | Recorded                                  |
| 3.2(h), 8                 | Designation of emissions  |             | Calculated                                |
| 4.5                       | Pulsed operation  | ---         | Not applicable                            |
| 7.2.2                     | Transmitter AC power lines conducted emissions<br>150 kHz to 30 MHz | ---         | Not applicable                            |
| 5.5                       | Exposure of Humans to RF Fields                                     | 30          | Exempted from<br>SAR and RF<br>evaluation |

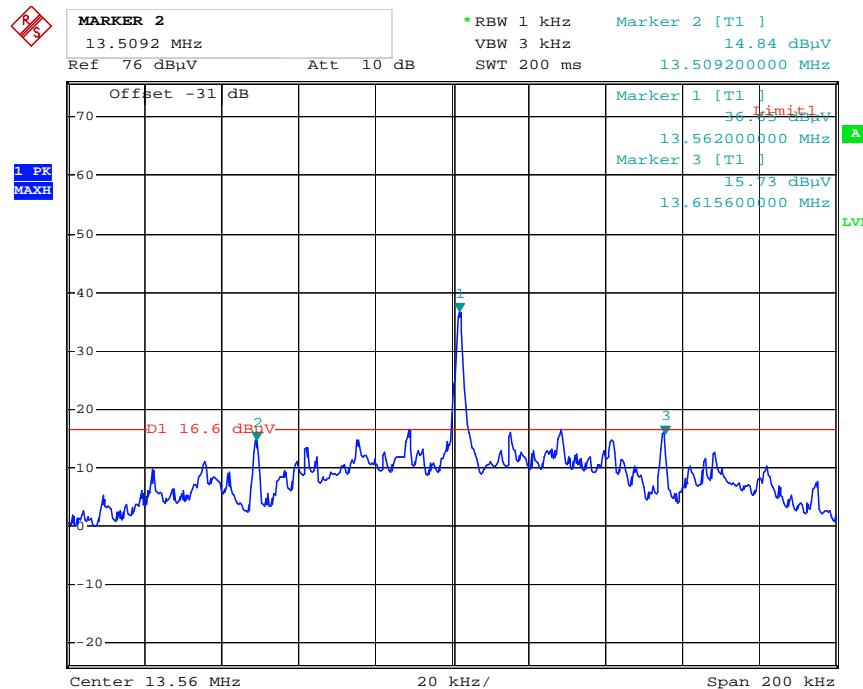
| <b>IC RSS-210 Issue 7</b> |  |                  |               |
|---------------------------|--|------------------|---------------|
| <i>Section(s)</i>         | <i>Test</i>  | <i>Page</i>      | <i>Result</i> |
| 2.2(a)                    | Restricted bands and unwanted emission frequencies | --- <sup>6</sup> | Test passed   |
| A2.6                      | Spectrum Mask                                      | 25               | Not performed |
| 2.2(b)(c), 2.6<br>A2.6    | Unwanted emissions<br>9 kHz to 30 MHz              | 27               | Test passed   |
| 2.2(b)(c), 2.6<br>A2.6    | Unwanted emissions<br>30 MHz to 1 GHz              | 29               | Test passed   |
| A2.6                      | Carrier frequency stability                        |                  | Not performed |

<sup>6</sup> See "Spectrum Mask" and "Unwanted emissions".

## 8.1 Bandwidth of the Emission

| Rules and specifications: | CFR 47 Part 15, section 15.215(c)  |                       |                              |                 |       |                    |        |                    |         |
|---------------------------|--|-----------------------|------------------------------|-----------------|-------|--------------------|--------|--------------------|---------|
| Guide:                    | ANSI C63.4   |                       |                              |                 |       |                    |        |                    |         |
| Description:              | <p>The 20 dB bandwidth of the emission is measured as the frequency range defined by the points that are 20 dB down relative to the maximum level of the modulated carrier.</p> <p>For intentional radiators operating under the alternative provisions to the general emission limits the requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.</p> <p>The resolution bandwidth of the spectrum analyzer shall be set to a value greater than 5.0% of the allowed bandwidth. If no bandwidth specifications are given, the following guidelines are used:</p> <table border="1"><thead><tr><th>Fundamental frequency</th><th>Minimum resolution bandwidth</th></tr></thead><tbody><tr><td>9 kHz to 30 MHz</td><td>1 kHz</td></tr><tr><td>30 MHz to 1000 MHz</td><td>10 kHz</td></tr><tr><td>1000 MHz to 40 GHz</td><td>100 kHz</td></tr></tbody></table> <p>The video bandwidth shall be at least three times greater than the resolution bandwidth.</p> | Fundamental frequency | Minimum resolution bandwidth | 9 kHz to 30 MHz | 1 kHz | 30 MHz to 1000 MHz | 10 kHz | 1000 MHz to 40 GHz | 100 kHz |
| Fundamental frequency     | Minimum resolution bandwidth   |                       |                              |                 |       |                    |        |                    |         |
| 9 kHz to 30 MHz           | 1 kHz  |                       |                              |                 |       |                    |        |                    |         |
| 30 MHz to 1000 MHz        | 10 kHz   |                       |                              |                 |       |                    |        |                    |         |
| 1000 MHz to 40 GHz        | 100 kHz  |                       |                              |                 |       |                    |        |                    |         |
| Measurement procedure:    | Bandwidth Measurements (6.1)   |                       |                              |                 |       |                    |        |                    |         |

|               |                                  |
|---------------|----------------------------------|
| Comment:      | ---                              |
| Date of test: | 25 September 2007                |
| Test site:    | Fully anechoic room, cabin no. 2 |



Date: 25.SEP.2007 18:29:01

|                               |   |   |
|-------------------------------|---|---|
| Permitted frequency band:     | <b>&lt;Application Frequency Range&gt;</b>    |   |
| 20 dB bandwidth:              | <b>106 kHz</b>                                |   |
| Carrier frequency stability:  | <input checked="" type="checkbox"/> specified | <input type="checkbox"/> not specified  |
| Maximum frequency tolerances: | +..... kHz<br>- ..... kHz                     |   |
| Bandwidth of the emission:    | <b>10 kHz</b>                                 | within permitted frequency band <sup>7</sup> :<br><input checked="" type="checkbox"/> yes <input type="checkbox"/> no |

|              |             |
|--------------|-------------|
| Test Result: | Test passed |
|--------------|-------------|

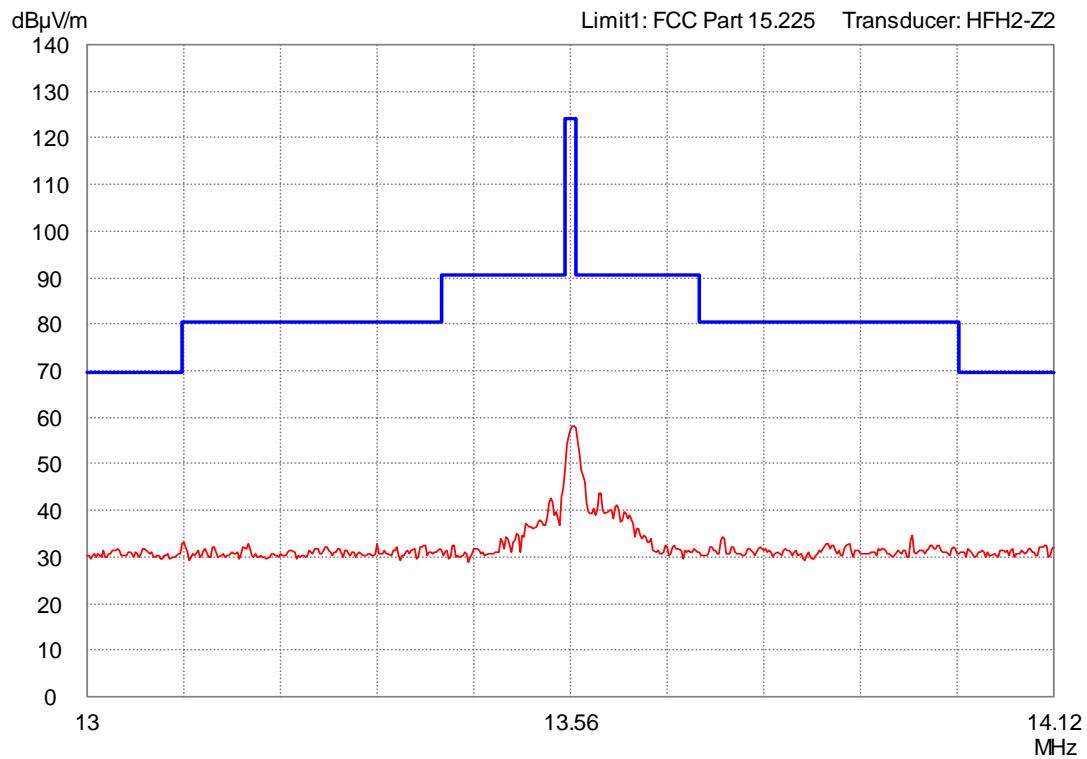
<sup>7</sup> If a frequency stability is not specified, it is recommended that the fundamental emission is kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## 8.2 Spectrum Mask

|                           |  |                             |                               |                                 |
|---------------------------|--|-----------------------------|-------------------------------|---------------------------------|
| Rules and specifications: | CFR 47 Part 15, section 15.225(a)-(d)<br>IC RSS-210 Issue 7, section A2.6  |                             |                               |                                 |
| Guide:                    | ANSI C63.4   |                             |                               |                                 |
| Description:              | Compliance with the spectrum mask is tested using a spectrum analyzer with resolution bandwidth set to a 1 kHz for the band 13.553 to 13.567 MHz and to 10 kHz outside this band. The video bandwidth shall be at least three times greater than the resolution bandwidth. |                             |                               |                                 |
| Limit:                    | Frequency of Emission (MHz)  | Field Strength ( $\mu$ V/m) | Field Strength (dB $\mu$ V/m) | Measurement Distance d (meters) |
|                           | 1.705 - 13.110   | 30                          | 29.5                          | 30                              |
|                           | 13.110 - 13.410  | 106                         | 40.5                          | 30                              |
|                           | 13.410 - 13.553  | 334                         | 50.5                          | 30                              |
|                           | 13.553 - 13.567  | 15848                       | 84.0                          | 30                              |
|                           | 13.567 - 13.710  | 334                         | 50.5                          | 30                              |
|                           | 13.710 - 14.010  | 106                         | 40.5                          | 30                              |
| Measurement procedure:    | 14.010 - 30.000  |                             |                               |                                 |
|                           | Radiated Emission Measurement 9 kHz to 30 MHz (6.2)  |                             |                               |                                 |

|                       |                                  |
|-----------------------|----------------------------------|
| Comment:              | ---                              |
| Date of test:         | 29 August 2007                   |
| Test site:            | Fully anechoic room, cabin no. 2 |
| Test distance:        | 3 meters                         |
| Extrapolation Factor: | -18.6 dB/decade                  |

|              |             |
|--------------|-------------|
| Test Result: | Test passed |
|--------------|-------------|



### 8.3 Radiated Emission Measurement 9 kHz to 30 MHz

|   |   |                             |                                      |                                 |
|---|---|-----------------------------|--------------------------------------|---------------------------------|
| Rules and specifications:   | CFR 47 Part 15, sections 15.205 and 15.225(a)-(d)<br>IC RSS-210 Issue 7, sections 2.2(b)(c), 2.6 and A2.6 |                             |                                      |                                 |
| Guide:  | ANSI C63.4  |                             |                                      |                                 |
| Limit:  | Frequency of Emission (MHz)   | Field Strength ( $\mu$ V/m) | Field Strength ( $\text{dB}\mu$ V/m) | Measurement Distance d (meters) |
|   | 0.009 - 0.490   | 2400/F(kHz)                 | 67.6 - 20 · log(F(kHz))              | 300                             |
|   | 0.490 - 1.705   | 24000/F(kHz)                | 87.6 - 20 · log(F(kHz))              | 30                              |
|   | 1.705 - 13.110  | 30                          | 29.5                                 | 30                              |
|   | 13.110 - 13.410   | 106                         | 40.5                                 | 30                              |
|   | 13.410 - 13.553   | 334                         | 50.5                                 | 30                              |
|   | 13.553 - 13.567   | 15848                       | 84.0                                 | 30                              |
|   | 13.567 - 13.710   | 334                         | 50.5                                 | 30                              |
|   | 13.710 - 14.010   | 106                         | 40.5                                 | 30                              |
|   | 14.010 - 30.000   | 30                          | 29.5                                 | 30                              |
| Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission. |   |                             |                                      |                                 |
| Measurement procedure:  | Radiated Emission Measurement 9 kHz to 30 MHz (6.2)   |                             |                                      |                                 |

|               |                      |
|---------------|----------------------|
| Comment:      | ---                  |
| Date of test: | 29 August 2007       |
| Test site:    | Open field test site |

|              |             |
|--------------|-------------|
| Test Result: | Test passed |
|--------------|-------------|

| Frequency (MHz) | Detector | Distance |    |    | Reading Value d1 ( $\text{dB}\mu$ V) | Reading Value d2 ( $\text{dB}\mu$ V) | Correction Factor (dB/m) | Extrapolation Factor |      | Pulse Train Correction (dB) | Final Value ( $\text{dB}\mu$ V/m) | Limit ( $\text{dB}\mu$ V/m) | Margin (dB) |
|-----------------|----------|----------|----|----|--------------------------------------|--------------------------------------|--------------------------|----------------------|------|-----------------------------|-----------------------------------|-----------------------------|-------------|
| 13,56000        | QP       | 3        | 10 | 30 | 48,1                                 | 38,3                                 | 20,0                     | -18,6                | -8,9 |                             | 49,4                              | 84,0                        | 34,6        |

#### Sample calculation of final values:

$$\text{Extrapolation Factor (dB/decade)} = \begin{cases} -40 \text{ (dB/decade)} & \text{if } d_1 = d_2 \\ \frac{\text{Reading Value } d_2 \text{ (dB}\mu\text{V)} - \text{Reading Value } d_1 \text{ (dB}\mu\text{V)}}{\text{Log}(d_2) - \text{Log}(d_1)} & \text{if } d_1 \neq d_2 \end{cases}$$

Extrapolation Factor (dB) =  $(\text{Log}(d) - \text{Log}(d_2)) \cdot \text{Extrapolation Factor (dB/decade)}$

Final Value (dB $\mu$ V/m) = Reading Value  $d_2$  (dB $\mu$ V) + Correction Factor (dB/m)  
+ Extrapolation Factor (dB) + Pulse Train Correction (dB)

Note: Extrapolation factor (dB) and final value (dB $\mu$ V/m) are relating to distance d.

## 8.4 Radiated Emission Measurement 30 MHz to 1 GHz

|                           |   |                             |                               |
|---------------------------|---|-----------------------------|-------------------------------|
| Rules and specifications: | CFR 47 Part 15, sections 15.205(b) and 15.225(d)<br>IC RSS-210 Issue 7, sections 2.2(b)(c), 2.6 and A2.6  |                             |                               |
| Guide:                    | ANSI C63.4  |                             |                               |
| Limit:                    | Frequency of Emission (MHz)   | Field Strength ( $\mu$ V/m) | Field Strength (dB $\mu$ V/m) |
|                           | 30 - 88   | 100                         | 40.0                          |
|                           | 88 - 216  | 150                         | 43.5                          |
|                           | 216 - 960   | 200                         | 46.0                          |
|                           | Above 960   | 500                         | 54.0                          |
|                           | Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission. |                             |                               |
| Measurement procedures:   | Radiated Emission in Fully or Semi Anechoic Room (6.3)<br>Radiated Emission at Open Field Test Site (6.4) |                             |                               |

|                |   |  |  |
|----------------|---|--|--|
| Comment:       |   |  |  |
| Date of test:  | 29 August 2007  |  |  |
| Test site:     | Frequencies $\leq$ 1 GHz: Open field test site<br>Frequencies $>$ 1 GHz: Fully anechoic room, cabin no. 2 |  |  |
| Test distance: | 3 meters  |  |  |

|              |             |
|--------------|-------------|
| Test Result: | Test passed |
|--------------|-------------|

| Frequency (MHz) | Antenna Polarization | Detector   | Receiver Reading (dB $\mu$ V) | Correction Factor (dB/m) | Pulse Train Correction (dB) | Final Value (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
|-----------------|----------------------|------------|-------------------------------|--------------------------|-----------------------------|----------------------------|----------------------|-------------|
| 752,844         | horizontal           | Quasi-Peak | 16,4                          | 22,3                     |                             | 38,7                       | 46,0                 | 7,3         |

### Sample calculation of final values:

$$\text{Final Value (dB}\mu\text{V/m)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB/m)} + \text{Pulse Train Correction (dB)}$$

## 8.5 Exposure of Humans to RF Fields

|                           |                                 |
|---------------------------|---------------------------------|
| Rules and specifications: | IC RSS-Gen Issue 2, section 5.5 |
| Guide:                    | IC RSS-102 Issue 2, section 2.5 |

| Exposure of Humans to RF Fields   |  | Applicable | Declared by applicant | Measured | Exemption |
|---|--|------------|-----------------------|----------|-----------|
| The antenna is  |  |            |                       |          |           |
| <input type="checkbox"/> detachable <p>The conducted output power (CP in watts) is measured at the antenna connector:</p> $CP = \dots \text{W}$   |  |            |                       |          |           |
| <input type="checkbox"/> the numerical antenna gain: $G = \dots$ $EIRP = G \cdot CP \Rightarrow EIRP = \dots \text{W}$  |  |            |                       |          |           |
| <input type="checkbox"/> the field strength <sup>8</sup> in V/m: $FS = \dots \text{V/m}$ $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \dots \text{W}$   |  |            |                       |          |           |
| with:<br>Distance between the antennas in m: $D = \dots \text{m}$   |  |            |                       |          |           |
| <input checked="" type="checkbox"/> not detachable <p>A field strength measurement is used to determine the effective isotropic radiated power (EIRP in watts) given by<sup>8</sup>:</p> $EIRP = \frac{(FS \cdot D)^2}{30} \Rightarrow EIRP = \dots \text{W}$ |  |            |                       |          |           |
| with:<br>Field strength in V/m: $FS = \dots \text{V/m}$<br>Distance between the two antennas in m: $D = \dots \text{m}$   |  |            |                       |          |           |
| Selection of output power   |  |            |                       |          |           |
| The output power TP is the higher of the conducted or effective isotropic radiated power (e.i.r.p.): $TP = \dots \text{W}$  |  |            |                       |          |           |

<sup>8</sup> The conversion formula is valid only for properly matched antennas. In other cases the transmitter output power may have to be measured by a terminated measurement when applying the exemption clauses. If an open area test site is used for field strength measurement, the effect due to the metal ground reflecting plane should be subtracted from the maximum field strength value in order to reference it to free space, before calculating TP.

| Exposure of Humans to RF Fields (continued)  |  | Applicable | Declared by applicant               | Measured | Exemption                           |
|--|--|------------|-------------------------------------|----------|-------------------------------------|
| Separation distance between the user and the transmitting device is  |  |            |                                     |          |                                     |
| <input checked="" type="checkbox"/> less than or equal to 20 cm <input type="checkbox"/> greater than 20 cm  |  |            | <input checked="" type="checkbox"/> |          |                                     |
| Transmitting device is   |  |            |                                     |          |                                     |
| <input type="checkbox"/> in the vicinity of the human head <input type="checkbox"/> body-worn  |  |            | <input type="checkbox"/>            |          |                                     |
| SAR evaluation   |  |            |                                     |          |                                     |
| SAR evaluation is required if the separation distance between the user and the device is less than or equal to 20 cm.  |  |            |                                     |          | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> The device operates from 3 kHz up to 1 GHz inclusively and its source-based time-averaged output power is less than, or equal to 200 mW for General Public Use and 1000 mW for Controlled Use. |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> The device operates above 1 GHz up to 2.2 GHz inclusively and its source-based time-averaged output power is less than, or equal to 100 mW for General Public Use and 500 mW for Controlled Use.          |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> The device operates above 2.2 GHz up to 3 GHz inclusively and its source-based time-averaged output power is less than, or equal to 20 mW for General Public Use and 100 mW for Controlled Use.           |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> The device operates above 3 GHz up to 6 GHz inclusively and its source-based time-averaged output power) is less than, or equal to 10 mW for General Public Use and 50 mW for Controlled Use.             |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> SAR evaluation is documented in test report no. .....   |  |            |                                     |          |                                     |
| RF exposure evaluation   |  |            |                                     |          |                                     |
| RF exposure evaluation is required if the separation distance between the user and the device is greater than 20 cm.   |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> The device operates below 1.5 GHz and its e.i.r.p. is equal to or less than 2.5 W.  |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> The device operates at or above 1.5 GHz and the e.i.r.p. of the device is equal to or less than 5 W.  |  |            |                                     |          | <input type="checkbox"/>            |
| <input type="checkbox"/> RF exposure evaluation is documented in test report no. .....   |  |            |                                     |          |                                     |

## 9 Referenced Regulations

All tests were performed with reference to the following regulations and standards:

|                                     |                          |   |   |
|-------------------------------------|--------------------------|---|---|
| <input checked="" type="checkbox"/> | CFR 47 Part 2            | Code of Federal Regulations Part 2 (Frequency allocation and radio treaty matters; General rules and regulations) of the Federal Communication Commission (FCC)   | October 1, 2006                                   |
| <input checked="" type="checkbox"/> | CFR 47 Part 15           | Code of Federal Regulations Part 15 (Radio Frequency Devices) of the Federal Communication Commission (FCC)   | May 4, 2007                                       |
| <input checked="" type="checkbox"/> | ANSI C63.4               | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz                                     | December 11, 2003 (published on January 30, 2004) |
| <input checked="" type="checkbox"/> | RSS-Gen                  | Radio Standards Specification RSS-Gen Issue 2 containing General Requirements and Information for the Certification of Radiocommunication Equipment, published by Industry Canada                       | June 2007   |
| <input checked="" type="checkbox"/> | RSS-210                  | Radio Standards Specification RSS-210 Issue 7 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, published by Industry Canada                         | June 2007   |
| <input type="checkbox"/>            | RSS-310                  | Radio Standards Specification RSS-310 Issue 1 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment, published by Industry Canada                        | September 2005                                    |
| <input checked="" type="checkbox"/> | RSS-102                  | Radio Standards Specification RSS-102 Issue 2: Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)  | November 2005                                     |
| <input type="checkbox"/>            | ICES-003                 | Interference-Causing Equipment Standard ICES-003 Issue 4 for Digital Apparatus, published by Industry Canada  | February 7, 2004                                  |
| <input checked="" type="checkbox"/> | CISPR 22                 | Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement" | 1997  |
| <input type="checkbox"/>            | CAN/CSA-CEI/IEC CISPR 22 | Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment  | 2002  |
| <input checked="" type="checkbox"/> | TRC-43                   | Notes Regarding Designation of Emission (Including Necessary Bandwidth and Classification), Class of Station and Nature of Service, published by Industry Canada  | October 9, 1982                                   |

## 10 Revision History

| <b>Revision History</b> |             |                  |  |
|-------------------------|-------------|------------------|--|
| <i>Edition</i>          | <i>Date</i> | <i>Issued by</i> | <i>Modifications</i>                                       |
| 1                       | 25.09.2007  | J. Roidt         | First Edition  |
| 2                       | 28.09.2007  | J. Roidt         | Antenna information added, supply voltage values corrected |

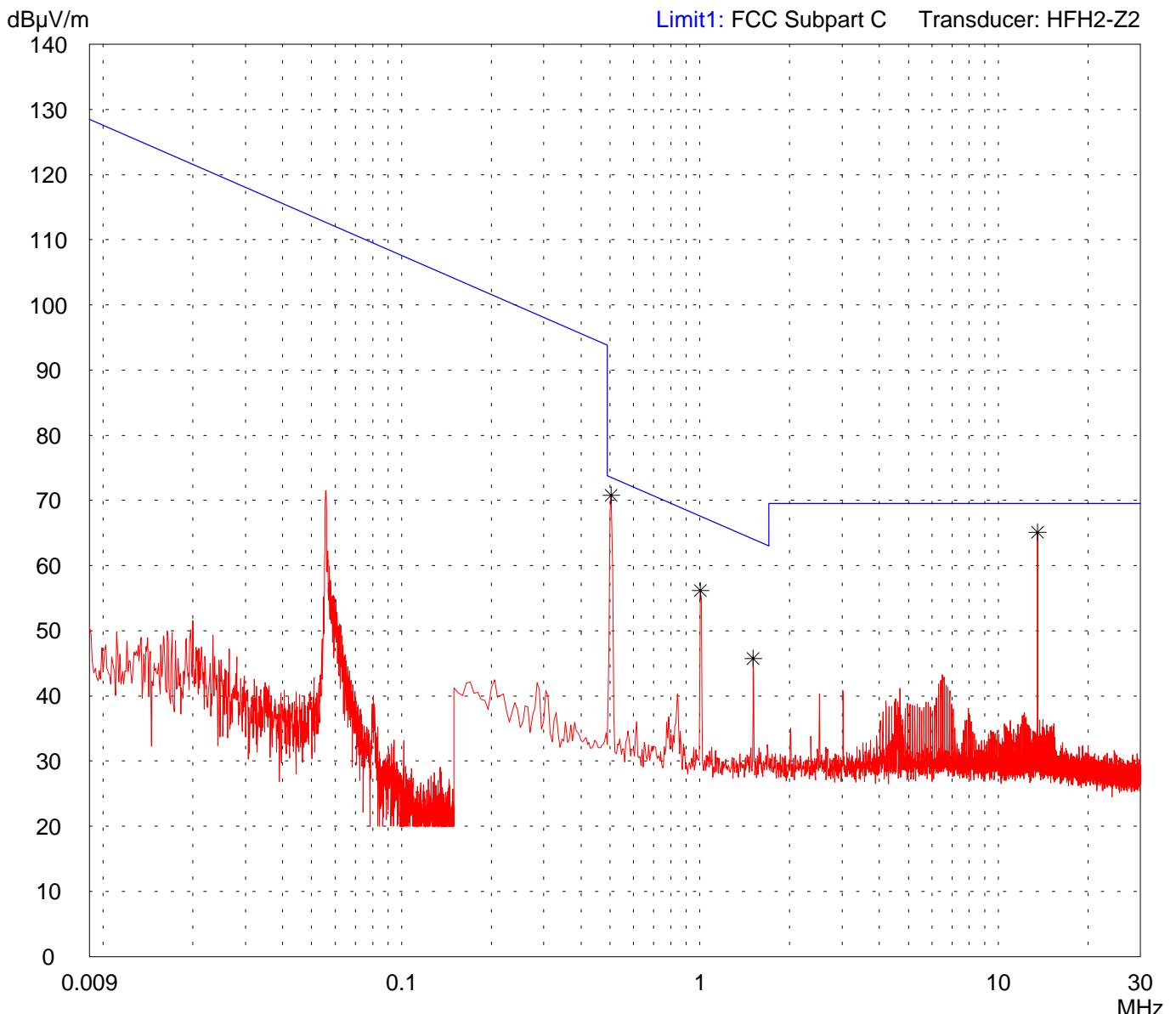
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**11 Charts taken during testing**

# Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

|                            |            |  |
|----------------------------|------------|--|
| Model:                     |            |  |
| Serial no.:                |            |  |
| Applicant:                 |            |  |
| Test site:                 |            |  |
| Shielded room, cabin no. 1 |            |  |
| Tested on:                 |            |  |
| Test distance 3 metres     |            |  |
| Date of test:              | Operator:  |  |
| 08/29/2007                 |            |  |
| Test performed:            | File name: |  |
| automatically              |            |  |

|                          |              |  |
|--------------------------|--------------|--|
| Mode:                    |              |  |
| TX active, CW mode       |              |  |
| Detector:                |              |  |
| Peak / Final Results: QP |              |  |
| Final results:           |              |  |
| 20 dB Margin             | 25 Subranges |  |



|         |  |  |
|---------|--|--|
| Result: |  |  |
| Prescan |  |  |

|               |      |    |       |
|---------------|------|----|-------|
| Project file: |      |    |       |
| 50420-070741  | Page | of | Pages |

# Radiated Emission Test 30 MHz - 1 GHz

## acc. to FCC Part 15 Subpart C (FAR)

|                                  |             |  |
|----------------------------------|-------------|--|
| Model:                           |             |  |
| M21                              |             |  |
| Serial no.:                      |             |  |
| Prototype                        |             |  |
| Applicant:                       |             |  |
| Dräger Medical AG & Co. KG       |             |  |
| Test site:                       |             |  |
| Fully anechoic room, cabin no. 2 |             |  |
| Tested on:                       |             |  |
| Test distance 3 metres           |             |  |
| Horizontal Polarization          |             |  |
| Date of test:                    | Operator:   |  |
| 08/29/2007                       | J. Roidt    |  |
| Test performed:                  | File name:  |  |
| automatically                    | default.emi |  |

Comment:  
TX active, reading transponder continuously

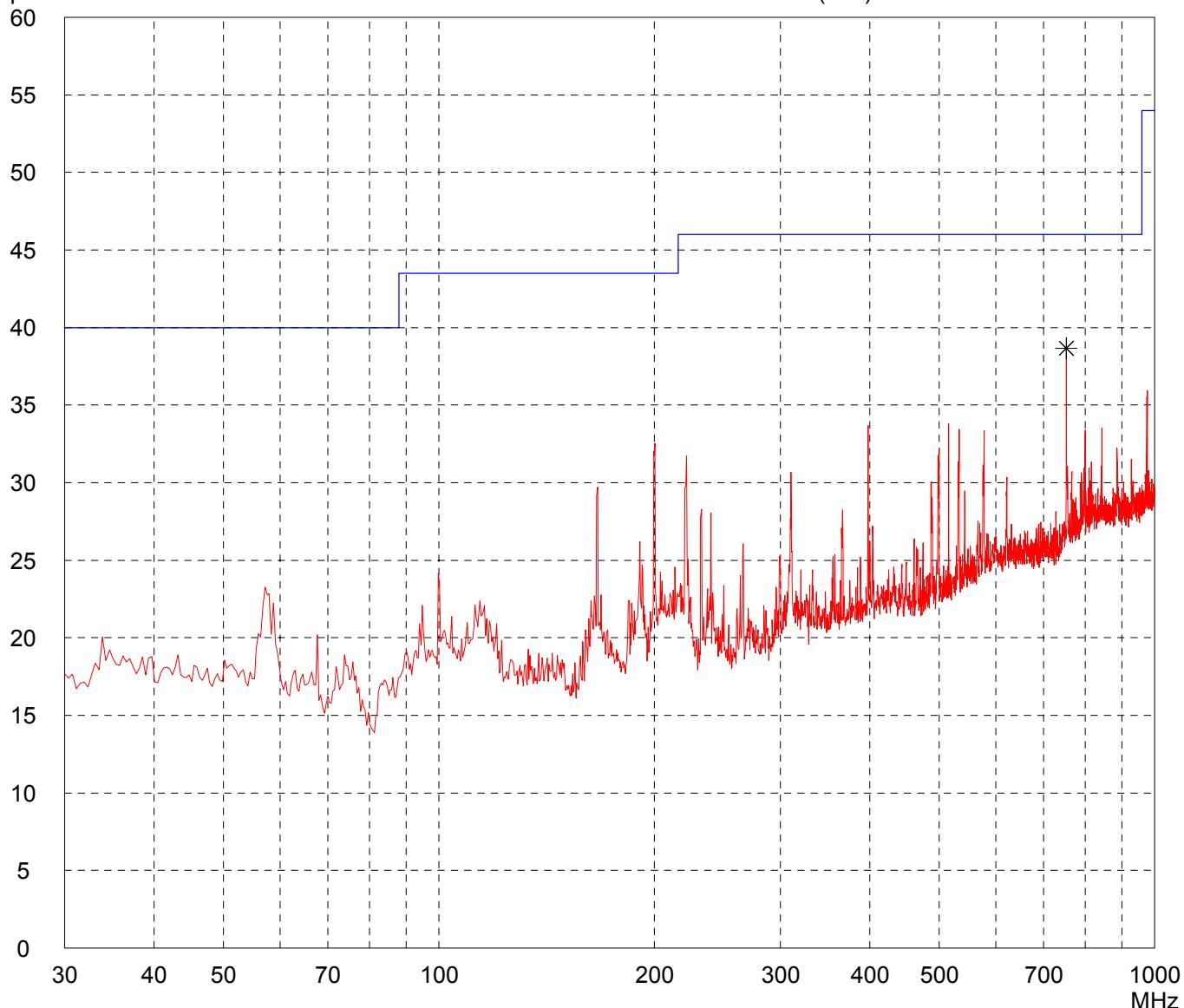
|           |  |
|-----------|--|
| Detector: |  |
| Peak      |  |

List of values:  
10 dB Margin      50 Subranges

dB $\mu$ V/m

Limit1: FCC 15.209 (3 m)

Transducer: VULB 9163



Result:  
Limit kept

Project file:  
50420-70741

Page      of      Pages

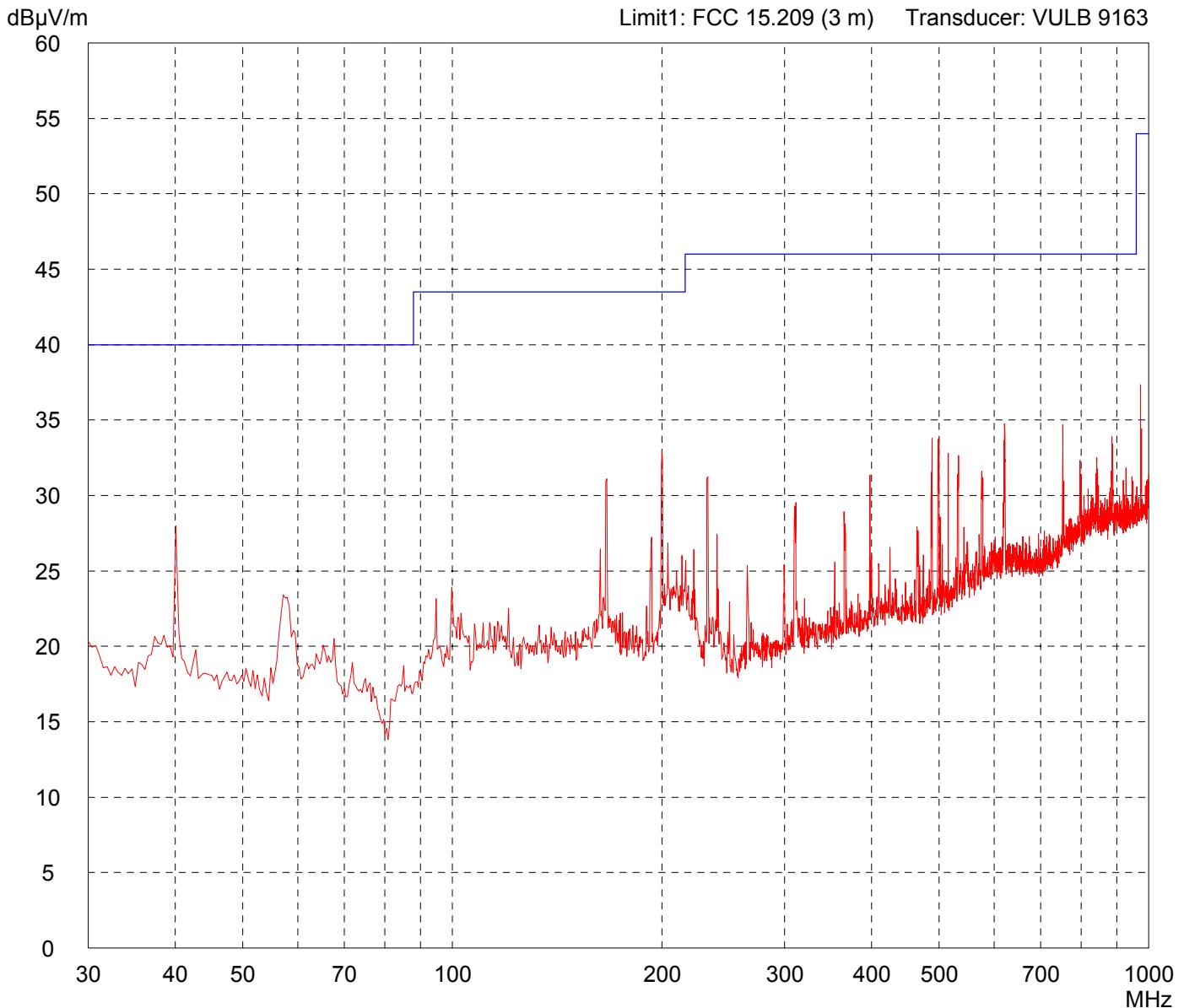
# Radiated Emission Test 30 MHz - 1 GHz

## acc. to FCC Part 15 Subpart C (FAR)

|   |   |
|---|---|
| Model:<br>M21   | Comment:                                    |
| Serial no.:<br>Prototype                                      | TX active, reading transponder continuously |
| Applicant:<br>Dräger Medical AG & Co. KG                      |   |
| Test site:<br>Fully anechoic room, cabin no. 2                |   |
| Tested on:<br>Test distance 3 metres<br>Vertical Polarization |   |
| Date of test:<br>08/29/2007                                   | Operator:<br>J. Roidt                       |
| Test performed:<br>automatically                              | File name:<br>default.emi                   |

|                   |
|-------------------|
| Detector:<br>Peak |
|-------------------|

List of values:  
10 dB Margin      50 Subranges



|                       |
|-----------------------|
| Result:<br>Limit kept |
|-----------------------|

|                              |      |    |       |
|------------------------------|------|----|-------|
| Project file:<br>50420-70741 | Page | of | Pages |
|------------------------------|------|----|-------|