


**REPORT: FCC / IC Radio Frequency (RF) test report**

**PRODUCT:**

|                        |  |
|------------------------|--|
| Test item description: | Radio remote control   |
| Trade Mark:            | Scanreco   |
| Model/Type reference:  | G4 PWM / 3101  |
| Serial number:         | 152107   |
| Customer:              | SCANRECO Industrietechnik AB<br>BOX 47144 / Årsta Skolgränd 22<br>S-100 74 Stockholm<br>Sweden |
| Contact person:        | Katrin Ekvall  |
| Manufacturer:          | SCANRECO Industrietechnik AB<br>BOX 47144 / Årsta Skolgränd 22<br>S-100 74 Stockholm<br>Sweden |

**DATE:** 11.12.2009

**TESTED BY:**   
Matti Virkki ; Test engineer

**APPROVED BY:**   
Tuomo Hahl ; Test engineer

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## 1 LABORATORY INFORMATION

|   |   |
|---|---|
| <b>Test Laboratory</b>                                    | Intertek ETL Semko OY<br>EMC Laboratory<br>Koneenkatu 12 / K17<br>05830 Hyvinkää<br>FINLAND<br><br>Tel: +358 10 424 6200<br>Fax: +358 10 424 6201<br>e-mail: firstname.surname@intertek.com |
| <b>FCC registration number:</b><br><b>IC file number:</b> | 910391 (January 27, 2003)<br>IC 2042C-1 (May 14, 2003)  |

## 2 SUMMARY OF TEST RESULTS

The tests listed in this report have been done to demonstrate compliance to the FCC rules section §15.107, §15.109, §15.247 and IC standard RSS-GEN / RSS-210.

### Transmitter measurements

| Section in CFR 47 | Section in RSS-210 | Test                                 | Result |
|-------------------|--------------------|--------------------------------------|--------|
| 15.247, a 1       | A8.1 (2)           | Carrier frequency separation         | -      |
| 15.247, a 1 iii   | A8.1 (4)           | Number of hopping frequencies        | -      |
| 15.247, a 1 iii   | A8.1 (4)           | Time of occupancy                    | -      |
| 15.247, a         | A8.1 (1)           | 20dB bandwidth                       | -      |
| 15.247, b 1       | A8.4 (2)           | Peak output power                    | -      |
| 15.247, d         | A8.5               | Band-edge compliance of RF emissions | -      |
| 15.247, d         | A8.5               | Spurious RF conducted emissions      | -      |
| 15.247, d         | A8.5               | Spurious radiated emissions          | -      |

### Receiver measurements

| Section in CFR 47 | Section in RSS-GEN | Section in ICES-003 | Test                                  | Result |
|-------------------|--------------------|---------------------|---------------------------------------|--------|
| §15.107           | 7.2.2              | 5.3                 | Conducted emissions to AC-power lines | -      |
| §15.109           | 7.2.3              | 5.5                 | Radiated emissions                    | PASS   |

PASS Pass  
 FAIL Fail  
 X Measured, but there is no applicable performance criteria  
 - Not done

### 3 EUT INFORMATION

The EUT and accessories used in the tests are listed below. Later in this report only EUT numbers are used as reference.

|                    | <b>Device</b>        | <b>Type</b>            | <b>S/N</b>        | <b>EUT number</b> |
|--------------------|----------------------|------------------------|-------------------|-------------------|
| <b>EUT</b>         | Radio remote control | Scanreco G4 PWM / 3101 | 151695 Rev.090917 | 1                 |
| <b>Accessories</b> | -                    | -                      | -                 | -                 |

#### 3.1 EUT description

EUT is receiver unit operating in the 900MHz ISM frequency band. The system supports only simplex communication.

EUT is powered by 24VDC.

EUT oscillator is in spread spectrum operation mode.

The EUT was not modified during the tests.

#### 4 EUT TEST SETUPS

For each test the EUT was exercised to find out the worst case of operation modes and device configuration.

The test setup photographs are in the document referenced in section 8.

#### 5 APPLICABLE STANDARDS

The tests were performed in guidance of:

CFR 47 Part:

§15.109  
ANSI C63.4 (2003)

IC standard:

RSS-GEN, Issue 1  
RSS-210, Issue 7  
CISPR 22, 2002

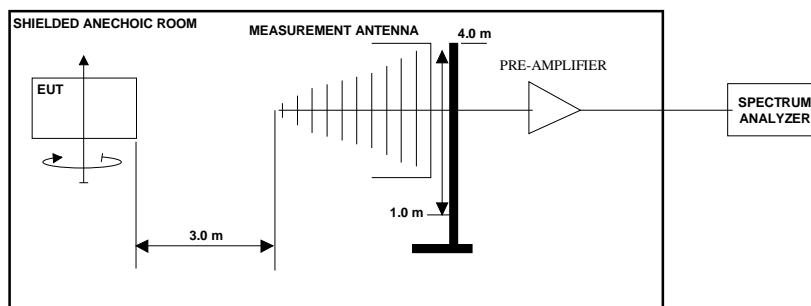
Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method" for each test case.

## 6 RECEIVER RADIATED EMISSION

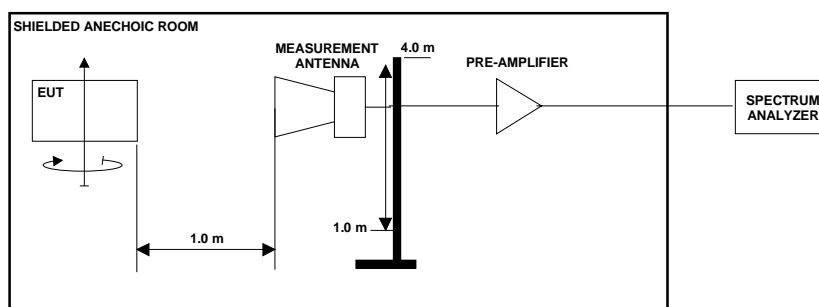
|                                     |                  |        |         |
|-------------------------------------|------------------|--------|---------|
| <b>EUT</b>                          | 1                |        |         |
| <b>Accessories</b>                  | -                |        |         |
| <b>Temp, Humidity, Air Pressure</b> | 22 °C            | 28 %RH | 993 hPa |
| <b>Date of measurement</b>          | December 9, 2009 |        |         |
| <b>FCC rule part</b>                | §15.109          |        |         |
| <b>RSS-GEN section</b>              | 7.2.3            |        |         |
| <b>ICES-003 section</b>             | 5.5              |        |         |
| <b>Measured by</b>                  | Matti Virkki     |        |         |

### 6.1 Test setup

The test was done using an automated test system, where a computer controlled the measurement equipments.



Picture 1: Test setup for radiated spurious emissions measurement  
30 MHz - 1 GHz frequencies



Picture 2: Test setup for radiated spurious emissions measurement  
1 GHz – 5 GHz frequencies

## 6.2 Test method

1. The emissions were searched and maximized by moving the turntable, changing the measuring antenna polarization and height and manipulating the EUT.
2. Levels of suspicious signals and levels of EUT transmitter harmonics were recorded.
3. The recorded levels were corrected in the automated test system with the measurement antenna factor, cable attenuations and filter attenuation.
4. The corrected values, giving the EUT radiated spurious emission levels as dB $\mu$ V/m at 3 m distance, are reported.

## 6.3 EUT operation mode

|                           |               |
|---------------------------|---------------|
| <b>EUT operation mode</b> | Receiver mode |
| <b>EUT frequency</b>      | Na            |
| <b>EUT TX power level</b> | Na            |

## 6.4 Limit

Table 1: Radiated spurious emission limits at measurement distance 3m

| <b>Frequency band (MHz)</b> | <b>3m Limit (<math>\mu</math>V/m)</b> | <b>3m Limit (dB<math>\mu</math>V/m)</b> | <b>Detector</b> |
|-----------------------------|---------------------------------------|---|-----------------|
| 30 – 88                     | 100                                   | 40                                      | QP              |
| 88 - 216                    | 150                                   | 43,5                                    | QP              |
| 216 - 960                   | 200                                   | 46                                      | QP              |
| 960 - 1000                  | 500                                   | 54,0                                    | QP              |
| 1000 - 12400                | 500                                   | 54,0                                    | AVG             |
| 1000 - 12400                | 5000                                  | 74,0                                    | PEAK            |

As default, all emissions were compared against the general limits. If any emission exceeded that limit, it was further checked, if it was outside the restricted band thus complying with the -20dBc requirement.

## 6.5 Results

The measured interference values using Quasi peak and average detectors are shown in the pictures below.

All signals closer than 6 dB to the limit below 1 GHz have been measured using quasi peak or average detector and reported in the table 2, 3 and 4.

Table 2: Radiated emissions using Quasi peak detector

| Freq MHz | Correction Factor | Result dB $\mu$ V/m | Margin dB | Limit | Ant Pol. | Ant height | TT angle |
|----------|-------------------|---------------------|-----------|-------|----------|------------|----------|
| 93,96    | 9,17              | 39,2                | -4,3      | 43,5  | V        | 1.4        | 108      |
| 97,98    | 9,73              | 39,7                | -3,8      | 43,5  | V        | 1          | 96       |
| 186,96   | 9,92              | 33,0                | -10,5     | 43,5  | H        | 1.1        | 107      |
| 187,98   | 9,99              | 28,5                | -15,0     | 43,5  | H        | 1          | 86       |
| 195,96   | 10,48             | 35,6                | -7,9      | 43,5  | H        | 1.6        | 113      |
| 476,94   | 17,99             | 43,1                | -2,9      | 46    | V        | 1.1        | 354      |
| 492,96   | 18,27             | 44,3                | -1,7      | 46    | V        | 1.1        | 195      |

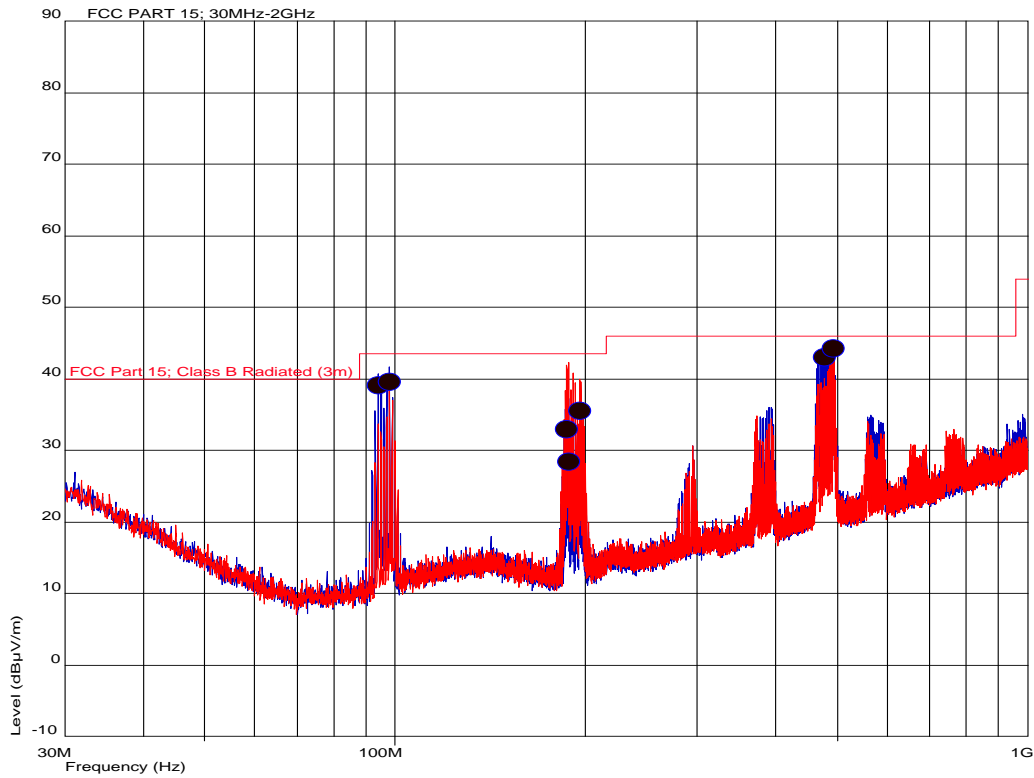
Table 3: Radiated emissions using Peak detector

| Freq MHz | Result dB $\mu$ V/m | Margin dB | Limit | Ant Pol. | Ant height | TT angle |
|----------|---------------------|-----------|-------|----------|------------|----------|
| N/A      |                     |           |       |          |            |          |

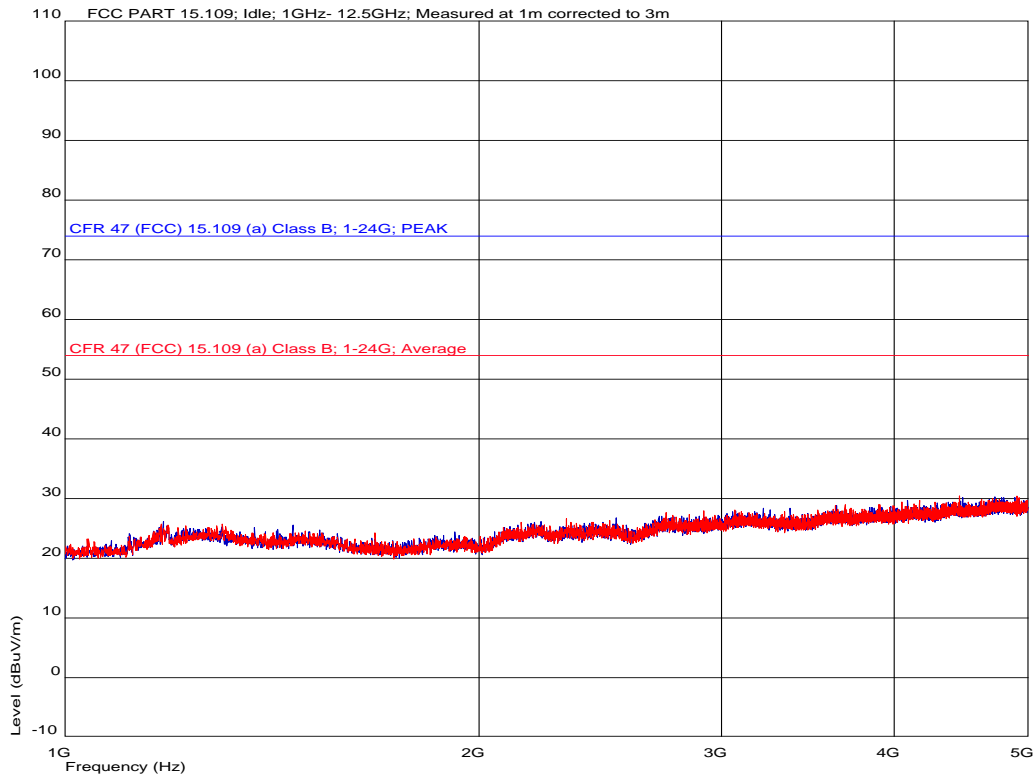
Table 4: Radiated emissions using Average detector

| Freq MHz | Measured Value dB $\mu$ V | Correction Factor dB | Result dB $\mu$ V/m | Marginal dB | EUT Position | Ant Pol. | Ant height | TT angle |
|----------|---------------------------|----------------------|---------------------|-------------|--------------|----------|------------|----------|
| N/A      |                           |                      |                     |             |              |          |            |          |





Picture 3: radiated emission results, 30 – 1000 MHz,  
Red= horizontal polarization, blue = vertical polarization



Picture 4: radiated emission results, 1 – 5 GHz,  
Red= horizontal polarization, blue = vertical polarization

## 7 TEST EQUIPMENT

All testing and measurement equipment has been calibrated once a year, except the antennas which are calibrated every two years.

### 7.1 Radiated measurements

| Equipment                            | Manufacturer | Model      |
|--------------------------------------|--------------|------------|
| Spectrum Analyzer                    | Agilent      | E7405A     |
| Antenna                              | Chase        | CBL 6141   |
| Antenna                              | Schwarzbeck  | BBHA 9120D |
| Pre-amplifier                        | JCA          | 118-400    |
| Turn table / antenna mast controller | EMCO         | 2090       |
| Antenna mast                         | EMCO         | 2075-2     |

## 8 TEST SETUP PHOTOGRAPHS

Test setup photograph can be found in a separate document

200063A-RF-PHOTOS.doc