

## TEST REPORT

Test report no.: 1-3880/11-01-02-B



Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-01

### Testing laboratory

**CETECOM ICT Services GmbH**

Untertuerkheimer Strasse 6 – 10

66117 Saarbruecken / Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

Internet: <http://www.cetecom.com>

e-mail: [ict@cetecom.com](mailto:ict@cetecom.com)

**Accredited Testing Laboratory:**

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Area of Testing: Radio/Satellite Communications

### Applicant

**B.E.A. S.A.**

5 Allée des Noisetiers Parc Scientifique du Sart-Tilman

4031 Angleur / BELGIUM

Fax: --

Contact: Mr. Jean-Pierre LERUTH

e-mail: Jean-Pierre.LERUTH@bea.be

Phone: +32 43 61 68 68

### Manufacturer

Same as applicant

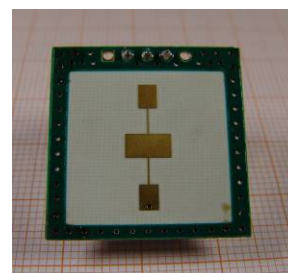
### Test standard/s

|                   |                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15    | Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission<br>Subchapter A – general, Part 15 Radio frequency devices                              |
| RSS – 210 Issue 8 | Spectrum Management and Telecommunications – Radio Standards Specification<br>Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands):<br>Category I Equipment |

For further applied test standards please refer to section 3 of this test report.

### Test Item

|                    |                         |
|--------------------|-------------------------|
| Kind of test item: | 24 GHz radar system     |
| Model name:        | BEA-T1B, mono, 3x1      |
| Frequency:         | 24.075 GHz – 24.175 GHz |
| FCC ID:            | G9B-210193              |
| IC:                | 4680A-210193            |
| Power Supply:      | 5 V DC ±5%              |
| Temperature Range: | -30 °C to +70 °C        |



Test report authorised:

*Gerald Karsten*

2012-03-12 Karsten Gerald

Test performed:

*René Oelmann*

2012-03-12 René Oelmann



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## 2 General information

### 2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### 2.2 Application details

|                                    |                   |
|------------------------------------|-------------------|
| Date of receipt of order:          | 2011-10-28        |
| Date of receipt of test item:      | 2011-11-22        |
| Start of test:                     | 2011-11-22        |
| End of test:                       | 2011-11-28        |
| Person(s) present during the test: | Mr. Soufien Menai |

## 3 Test standard/s

| Test standard     | Version    | Test standard description                                                                                                                                                           |
|-------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47 CFR Part 15    | 2010-10-01 | Title 47 of the Code of Federal Regulations; Chapter I<br>Part 15 - Radio frequency devices                                                                                         |
| RSS - 210 Issue 8 | 2010-12-01 | Spectrum Management and Telecommunications - Radio<br>Standards Specification<br>Low-power Licence-exempt Radiocommunication Devices (All<br>Frequency Bands): Category I Equipment |

## 4 Test environment

|                            |           |                                       |
|----------------------------|-----------|---------------------------------------|
| Temperature:               | $T_{nom}$ | +22 °C during room temperature tests  |
| Relative humidity content: |           | 45 %                                  |
| Air pressure:              |           | not relevant for this kind of testing |
| Power supply:              | $V_{nom}$ | 5.0 V from power supply               |
|                            | $V_{max}$ | 5.25 V                                |
|                            | $V_{min}$ | 4.75 V                                |

**5 Test item**

|                      |   |                                 |
|----------------------|---|---------------------------------|
| Kind of test item    | : | <b>24 GHz radar system</b>      |
| Type identification  | : | <b>BEA-T1B, mono, 3x1</b>       |
|                      |   |                                 |
| S/N serial number    | : | <b>C</b>                        |
| HW hardware status   | : | <b>-/-</b>                      |
| SW software status   | : | <b>-/-</b>                      |
| Frequency band [MHz] | : | <b>24.075 GHz - 24.175 GHz</b>  |
| Type of modulation   | : | <b>-/-</b>                      |
| Number of channels   | : | <b>1</b>                        |
| Antenna              | : | <b>integrated patch antenna</b> |
| Power supply         | : | <b>5.0 V from power supply</b>  |
| Temperature range    | : | <b>-30°C to + 70°C</b>          |

**6 Test laboratories sub-contracted**

None

## 7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

| TC Identifier | Description                                 | Verdict | Date       | Remark |
|---------------|---------------------------------------------|---------|------------|--------|
| RF-Testing    | 47 CFR Part 15<br>RSS 210, Issue 8, Annex 8 | Passed  | 2012-03-12 | -/-    |

| Test specification clause                               | Test case                                   | Temperature conditions | Power source voltages | Pass                                | Fail                     | NA                       | NP                       | Results (max.)                        |
|---------------------------------------------------------|---------------------------------------------|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|---------------------------------------|
| §15.245(b)<br>RSS 210 / A7.1                            | Field strength of emissions (wanted signal) | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 110.7 dBμV                            |
| §2.1049                                                 | Occupied bandwidth (99% bandwidth)          | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 666.7 kHz                             |
| §15.209(a) /<br>§15.245(b)(1)(2)(3)<br>RSS 210 / A7.1-4 | Field strength of emissions (spurious)      | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 74.0 dBμV<br>2 <sup>nd</sup> Harmonic |
| §15.207(a)<br>ICES-003                                  | Conducted emissions < 30 MHz                | Nominal                | Nominal               | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies                              |

**Note:** NA = Not Applicable; NP = Not Performed

## 8 RF measurement testing

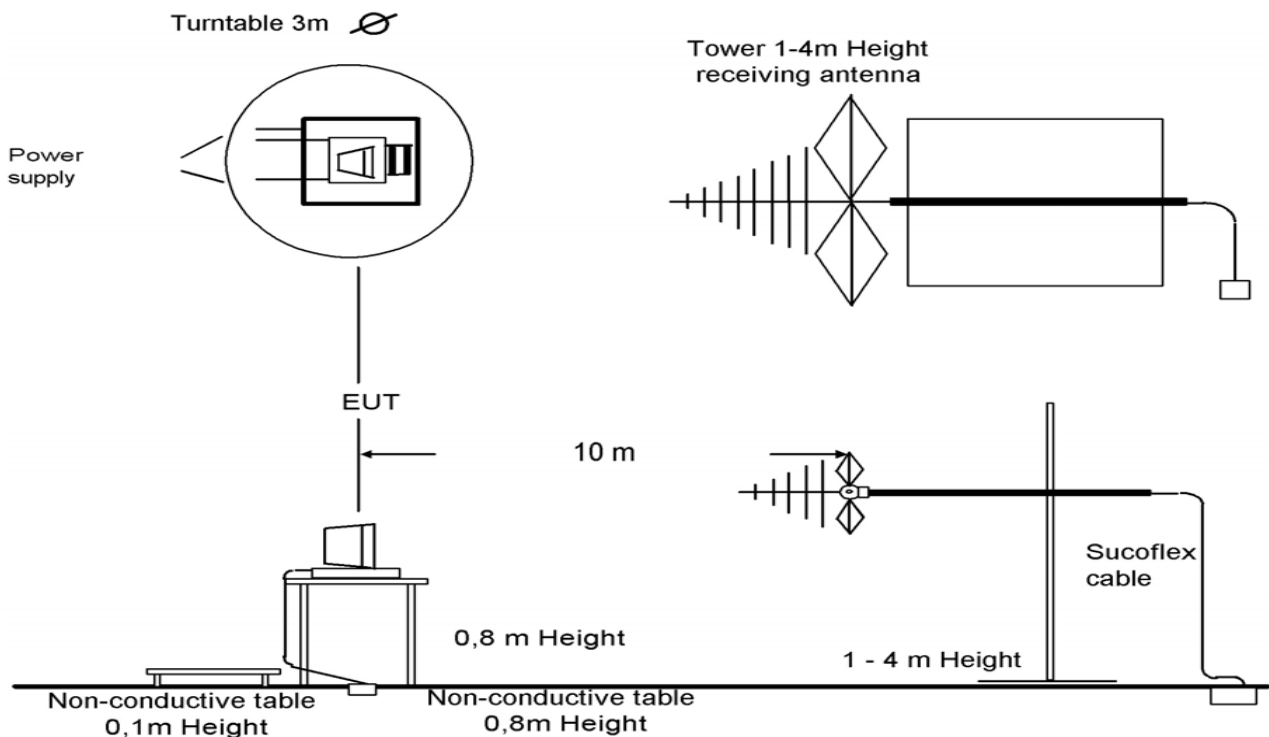
### 8.1 Description of test setup

#### 8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2009 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2009 clause 4.2.

Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



Picture 1: Diagram radiated measurements

|                 |                     |
|-----------------|---------------------|
| 9 kHz - 30 MHz: | active loop antenna |
| 30 MHz – 1 GHz: | tri-log antenna     |
| > 1 GHz:        | horn antenna        |

The EUT is powered by an external power supply with nominal voltage

### 8.1.2 Additional comments

Reference documents:       None

Special test descriptions:   None

Configuration descriptions:   None

Test mode:                   ☒   Normal operation, no special test mode available.

☐   Special software was used.

## 8.2 RSP100 test report cover sheet / performance test data

|                                             |   |                                                                                                  |
|---------------------------------------------|---|--------------------------------------------------------------------------------------------------|
| Test report number                          | : | 1-3880/11-01-02-B                                                                                |
| Equipment model number                      | : | BEA-T1B, mono, 3x1                                                                               |
| Certification number                        | : | 4680A-210193                                                                                     |
| Manufacturer (complete address)             | : | B.E.A. S.A.<br>5 Allée des Noisetiers Parc Scientifique du Sart-Tilman<br>4031 Angleur / Belgium |
| Tested to radio standards specification no. | : | RSS 210, Issue 8, Annex 7                                                                        |
| Open area test site IC No.                  | : | IC 3462C-1                                                                                       |
| Frequency range                             | : | 24.075 GHz to 24.175 GHz                                                                         |
| Center Frequency (measured)                 | : | 24.16 GHz                                                                                        |
| RF-field strength [dBμV] (max.) in 3 m      | : | 110.7 dBμV                                                                                       |
| Occupied bandwidth (99%-BW)                 | : | 667 kHz                                                                                          |
| Type of modulation                          | : | -/-                                                                                              |
| Emission designator (TRC-43)                | : | 667kN0N                                                                                          |
| Antenna information                         | : | Integrated patch antenna                                                                         |
| Transmitter spurious (worst case) in 3 m    | : | 74.0 dBμV/m (2 <sup>nd</sup> harmonic)                                                           |
| Receiver spurious (worst case)              | : | n.a. - no receiver mode                                                                          |

### ATTESTATION:

### DECLARATION OF COMPLIANCE:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

### Laboratory manager:

2012-03-12

René Oelmann



Date

Name

Signature



## 9 Measurement results

### 9.1 Field strength of emissions (wanted signal)

#### Description:

Measurement of the maximum radiated field strength of the wanted signal.

#### Measurement:

| Measurement parameter |              |
|-----------------------|--------------|
| Detector:             | Pos-Peak     |
| Sweep time:           | Auto         |
| Video bandwidth:      | Auto         |
| Resolution bandwidth: | 1 MHz        |
| Span:                 | max. 100 MHz |
| Trace-Mode:           | Max Hold     |

#### Limits:

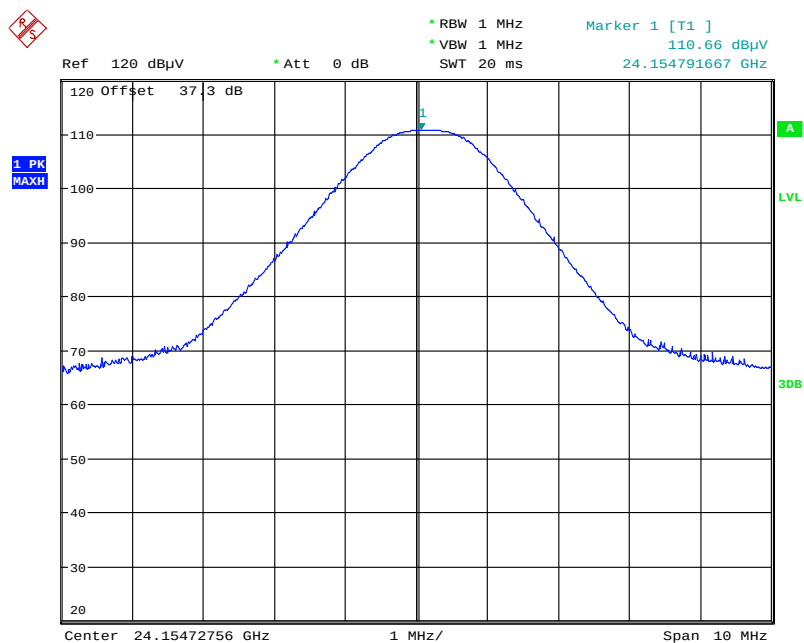
| FCC                                                                                                                               |                                     | IC                   |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------|
| CFR Part 15.245(b)                                                                                                                |                                     | RSS - 210, Annex 7   |
| Field strength of emissions                                                                                                       |                                     |                      |
| The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following: |                                     |                      |
| Frequency<br>[ GHz ]                                                                                                              | Field Strength<br>[ mV/m / dBμV/m ] | Measurement distance |
| 24075 – 24175                                                                                                                     | 2500 / 128                          | 3                    |

#### Result:

| TEST CONDITIONS                     | Maximum field strength |                                  |                                    |
|-------------------------------------|------------------------|----------------------------------|------------------------------------|
|                                     | Frequency<br>[ GHz ]   | Field strength<br>E [mV/m] @ 3 m | Field strength<br>e [dBμV/m] @ 3 m |
| T <sub>nom</sub> / V <sub>nom</sub> | 24.1548                | 342.8                            | 110.7                              |
| Measurement uncertainty             | ± 3 dB                 |                                  |                                    |

**Result:** The measurement is passed.

Plot 1:



Date: 22.NOV.2011 14:21:52

## 9.2 Occupied bandwidth (99% bandwidth)

### Description:

Measurement of the 99% bandwidth of the wanted signal.

### Measurement:

| Measurement parameter |          |
|-----------------------|----------|
| Detector:             | Peak     |
| Sweep time:           | Auto     |
| Video bandwidth:      | 100 kHz  |
| Resolution bandwidth: | 100 kHz  |
| Span:                 | 100 MHz  |
| Trace-Mode:           | Max Hold |

### Results:

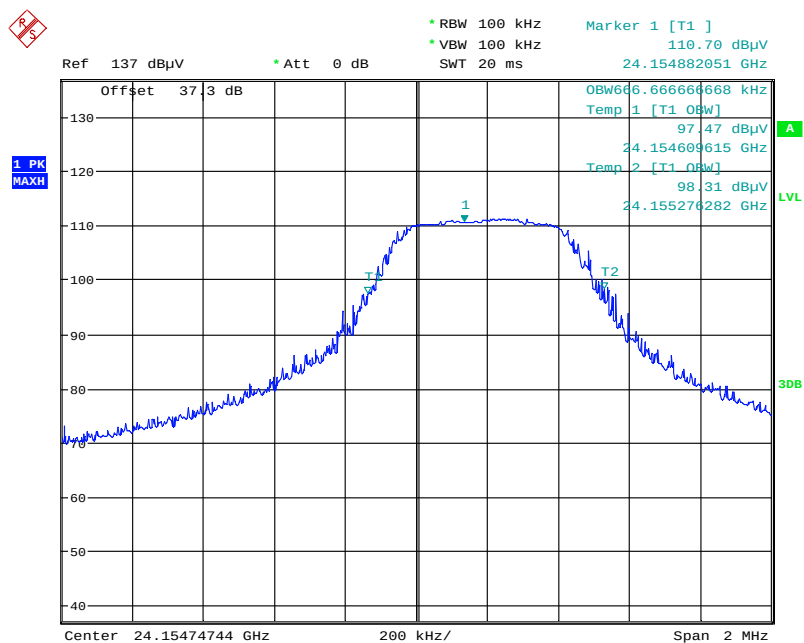
| TEST CONDITIONS               | Occupied bandwidth   |                               |                 |
|-------------------------------|----------------------|-------------------------------|-----------------|
|                               | Frequency<br>[ GHz ] | Occupied bandwidth<br>[ MHz ] | see plot<br>no. |
| $T_{nom} / V_{nom}$           | 24.1549              | 0.6667                        | 2               |
| $T_{nom} / V_{min} - V_{max}$ | 24.1549              | 26.9231                       | 3               |
| Measurement uncertainty       | $\pm 3$ dB           |                               |                 |

### Note:

When measuring the 99% occupied bandwidth the power supply voltage was varied from 4.75 V<sub>DC</sub> to 5.25 V<sub>DC</sub>.

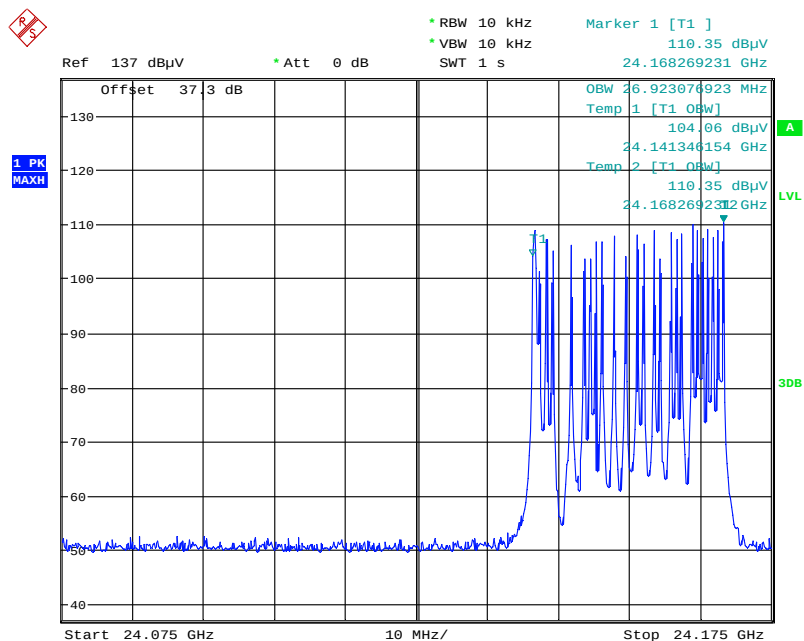
**Result:** The measurement is passed.

Plot 2: (with fixed power supply voltage: 5.0 V<sub>DC</sub>)



Date: 22.NOV.2011 13:00:42

Plot 3: (with variation of power supply voltage: 4.75 V<sub>DC</sub> - 5.25 V<sub>DC</sub>)



Date: 22.NOV.2011 13:07:11

### 9.3 Field strength of emissions (radiated spurious)

#### Description:

Measurement of the radiated spurious emissions in transmit mode.

#### Measurement:

| Measurement parameter |                                        |
|-----------------------|----------------------------------------|
| Detector:             | Peak / Quasi Peak                      |
| Sweep time:           | Auto                                   |
| Video bandwidth:      | Auto                                   |
| Resolution bandwidth: | F < 1 GHz: 100 kHz<br>F > 1 GHz: 1 MHz |
| Frequency range:      | 30 MHz to 100 GHz                      |
| Trace-Mode:           | Max Hold                               |

#### Limits:

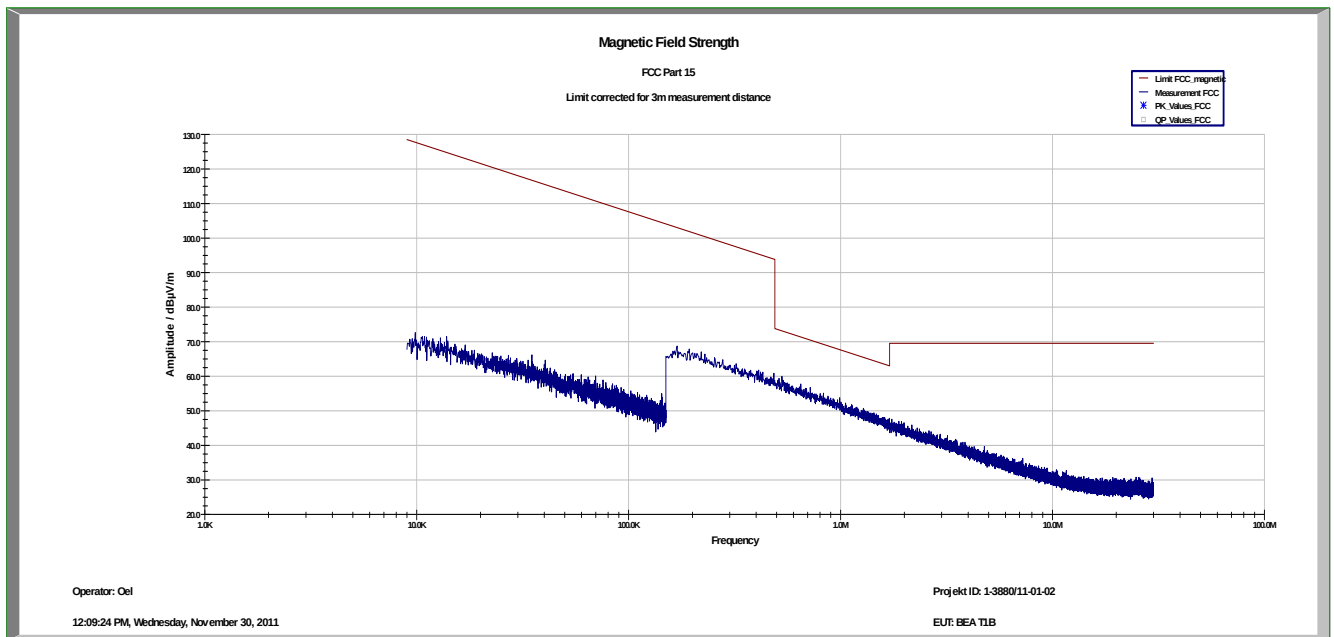
| FCC                                                                                                                                                                                                                                                      |                               | IC                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------|
| CFR Part 15.209(a)                                                                                                                                                                                                                                       |                               | RSS - GEN            |
| Radiated Spurious Emissions                                                                                                                                                                                                                              |                               |                      |
| Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation. |                               |                      |
| Frequency (MHz)                                                                                                                                                                                                                                          | Field Strength (dB $\mu$ V/m) | Measurement distance |
| 0.009 – 0.490                                                                                                                                                                                                                                            | 2400/F(kHz)                   | 300                  |
| 0.490 – 1.705                                                                                                                                                                                                                                            | 24000/F(kHz)                  | 30                   |
| 1.705 – 30.0                                                                                                                                                                                                                                             | 30                            | 30                   |
| 30 – 88                                                                                                                                                                                                                                                  | 30.0                          | 10                   |
| 88 – 216                                                                                                                                                                                                                                                 | 33.5                          | 10                   |
| 216 – 960                                                                                                                                                                                                                                                | 36.0                          | 10                   |
| Above 960                                                                                                                                                                                                                                                | 54.0                          | 3                    |

**Results:**

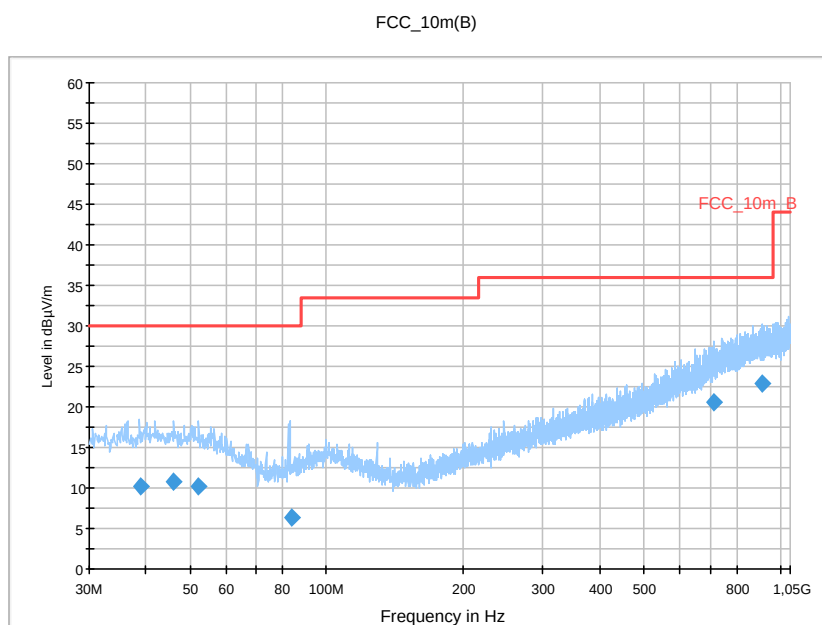
| TX Spurious Emissions Radiated [dBμV/m] |          |                |                 |          |                |                          |          |                |
|-----------------------------------------|----------|----------------|-----------------|----------|----------------|--------------------------|----------|----------------|
| Lowest                                  |          |                | Middle          |          |                | Highest                  |          |                |
| Frequency [GHz]                         | Detector | Level [dBμV/m] | Frequency [GHz] | Detector | Level [dBμV/m] | Frequency [GHz]          | Detector | Level [dBμV/m] |
| No critical peaks found!                |          |                | 48.314          | AVG      | 74.0           | No critical peaks found! |          |                |
|                                         |          |                | 71.659          | Peak     | 50.2           |                          |          |                |
|                                         |          |                | 72.468          | Peak     | 46.5           |                          |          |                |
|                                         |          |                | 73.277          | Peak     | 44.2           |                          |          |                |
|                                         |          |                | 74.087          | Peak     | 42.5           |                          |          |                |
|                                         |          |                |                 |          |                |                          |          |                |
|                                         |          |                |                 |          |                |                          |          |                |
| Measurement uncertainty                 |          |                | ± 3 dB          |          |                |                          |          |                |

**Result:** The measurement is passed.

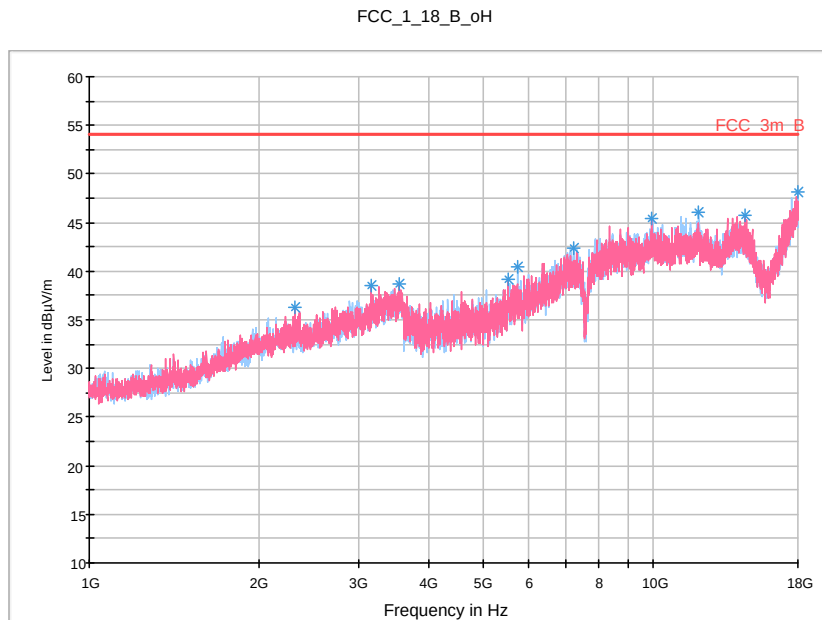
Plot 4: 9 kHz - 30 MHz



Plot 5: 30 MHz to 1 GHz, horizontal/vertical polarization

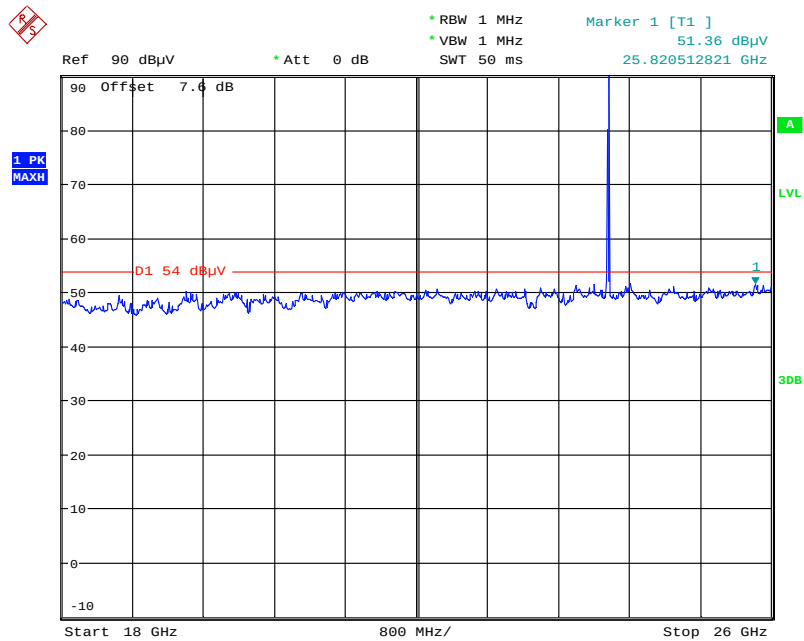


Plot 6: 1 GHz to 18 GHz, horizontal/vertical polarization



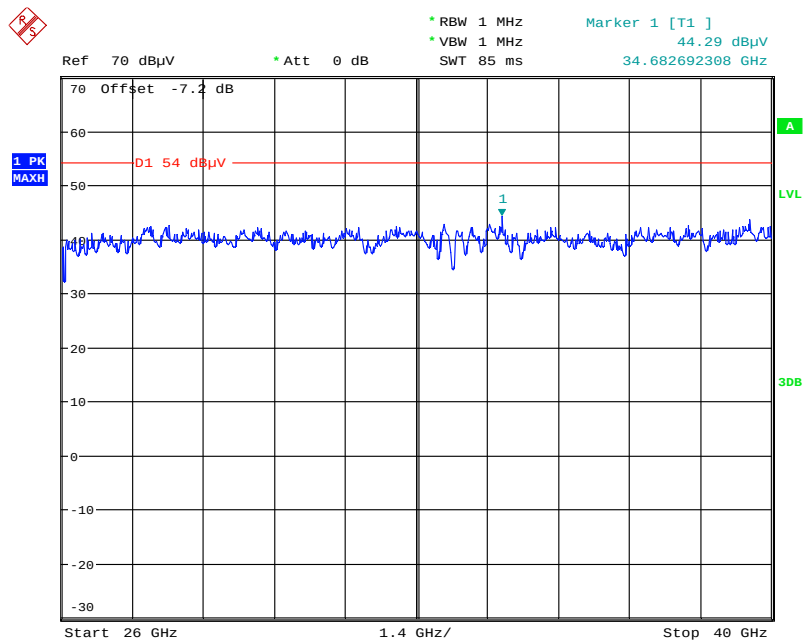


Plot 7: 18 GHz to 26 GHz, horizontal / vertical polarization (plot shows wanted signal)



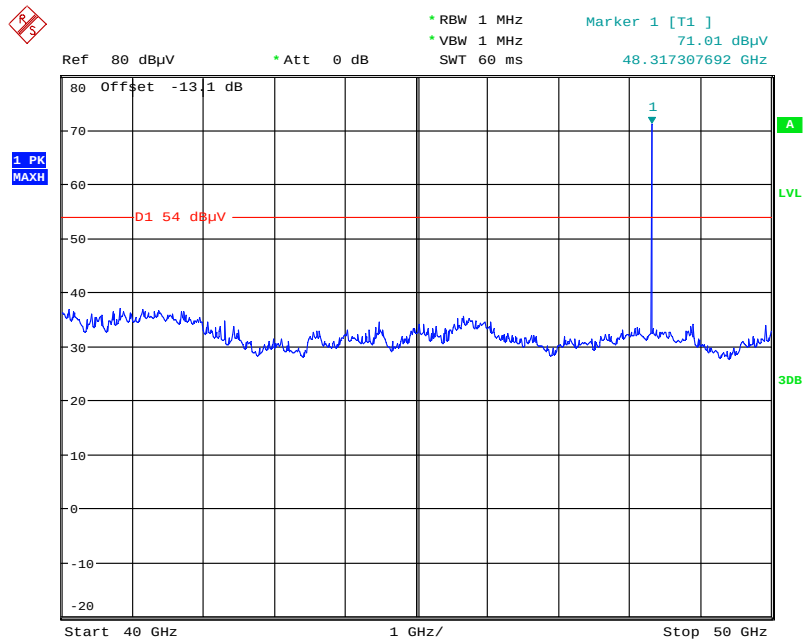
Date: 23.NOV.2011 07:32:15

Plot 8: 26 GHz to 40 GHz, horizontal / vertical polarization



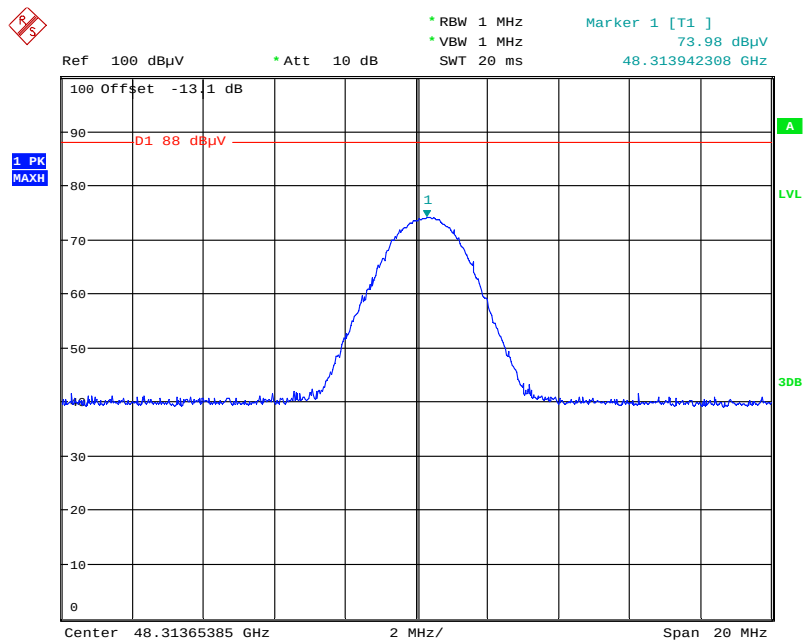
Date: 23.NOV.2011 07:44:15

Plot 9: 40 GHz to 50 GHz, horizontal / vertical polarization



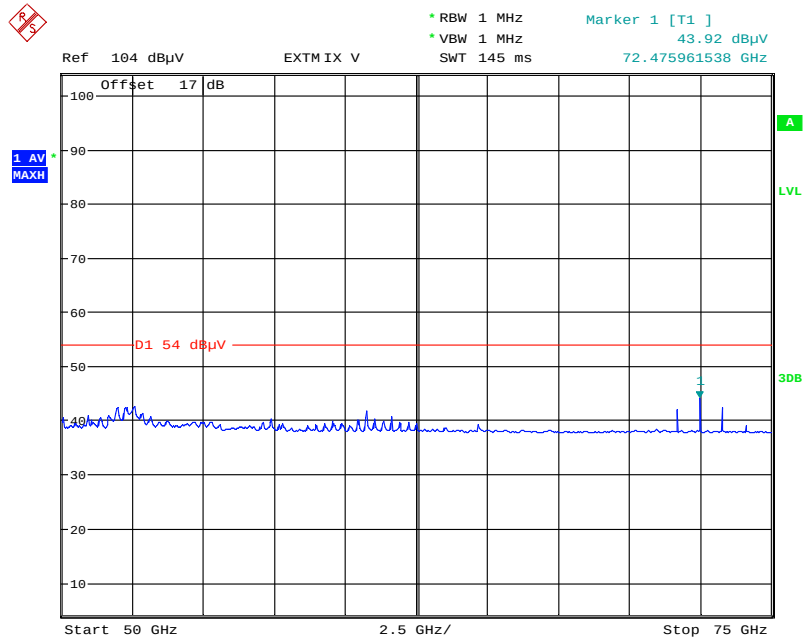
Date: 23.NOV.2011 07:51:13

Plot 20: 48.31 GHz (2<sup>nd</sup> harmonic), horizontal / vertical polarization



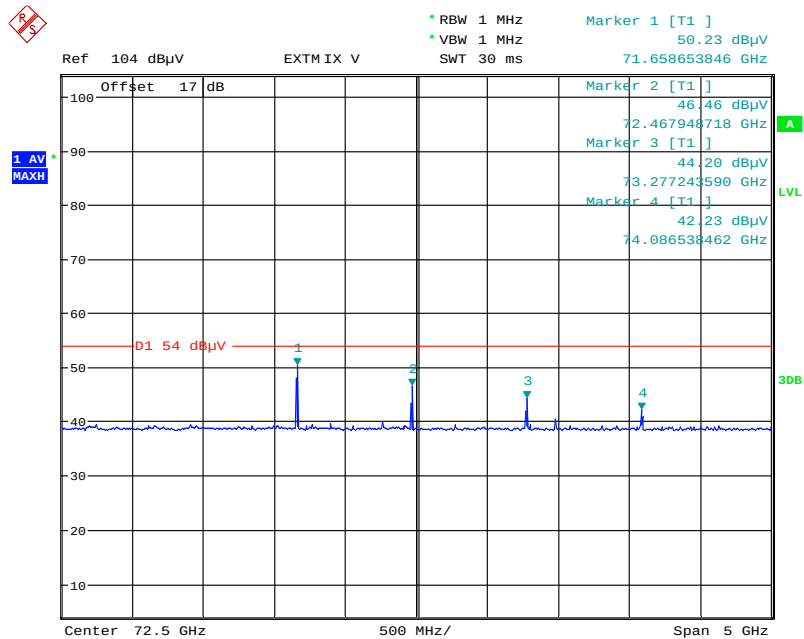
Date: 23.NOV.2011 07:53:35

Plot 31: 50 GHz to 75 GHz, horizontal / vertical polarization



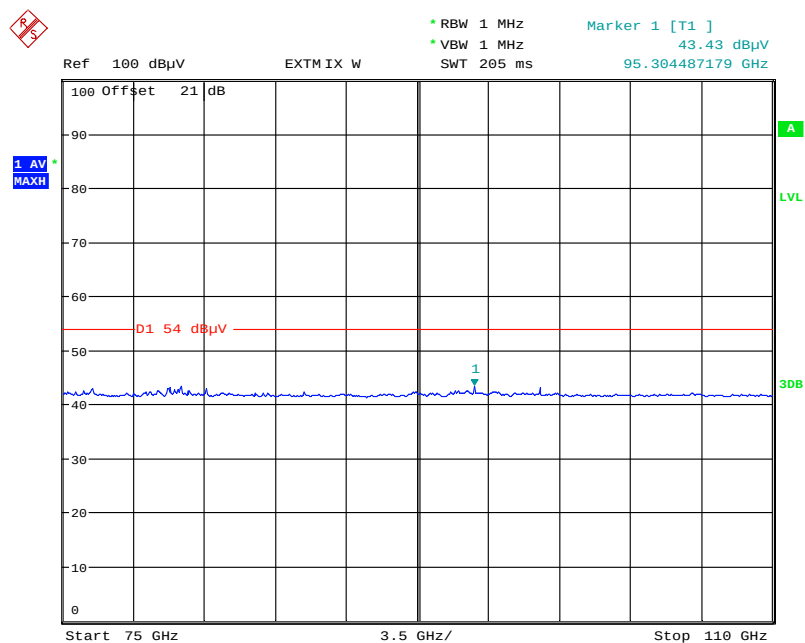
Date: 22.NOV.2011 11:10:15

Plot 42: 72.47 GHz (3<sup>rd</sup> harmonic), horizontal / vertical polarization



Date: 22.NOV.2011 11:37:47

Plot 5: 75 GHz to 110 GHz, horizontal / vertical polarization



Date: 22.NOV.2011 11:49:26

## 9.4 Conducted spurious emissions < 30 MHz

### Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. Both power lines, phase and neutral line, are measured. Found peaks are re-measured with average and quasi peak detection to show compliance to the limits.

### Measurement:

| Measurement parameter |                                            |
|-----------------------|--------------------------------------------|
| Detector:             | Peak - Quasi Peak / Average                |
| Sweep time:           | Auto                                       |
| Video bandwidth:      | F < 150 kHz: 200 Hz<br>F > 150 kHz: 9 kHz  |
| Resolution bandwidth: | F < 150 kHz: 1 kHz<br>F > 150 kHz: 100 kHz |
| Span:                 | 9 kHz to 30 MHz                            |
| Trace-Mode:           | Max Hold                                   |

### Limits:

| FCC                                   |                           | IC                     |
|---------------------------------------|---------------------------|------------------------|
| CFR Part 15.207(a)                    |                           | ICES-003, Issue 4      |
| Conducted Spurious Emissions < 30 MHz |                           |                        |
| Frequency (MHz)                       | Quasi-Peak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) |
| 0.15 – 0.5                            | 66 to 56*                 | 56 to 46*              |
| 0.5 – 5                               | 56                        | 46                     |
| 5 – 30.0                              | 60                        | 50                     |

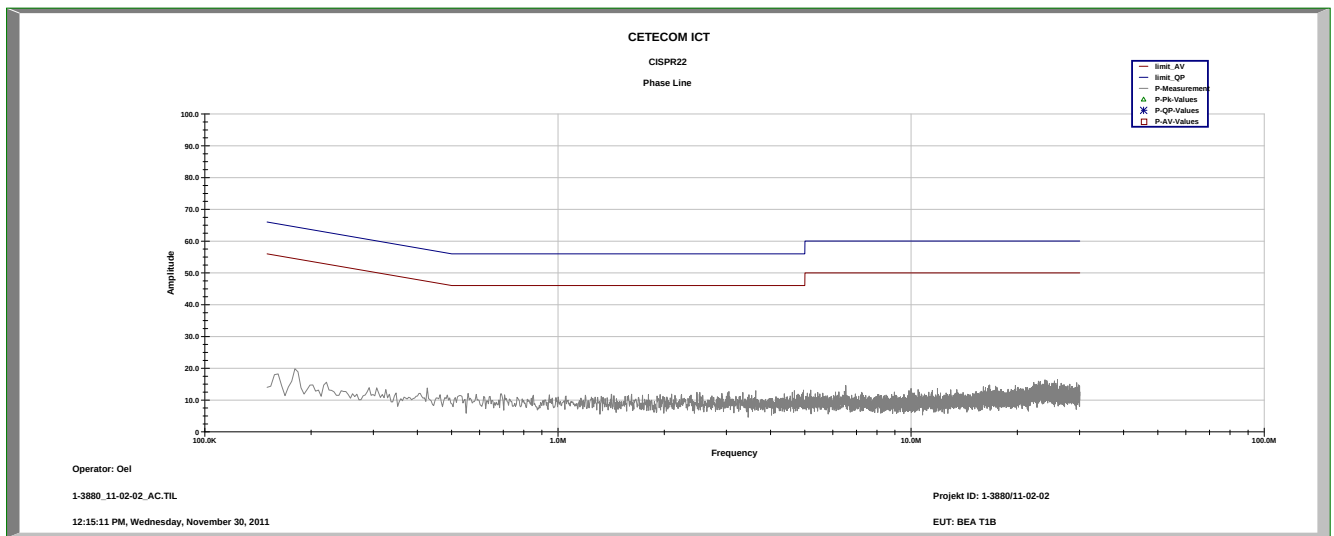
\*Decreases with the logarithm of the frequency

### Results:

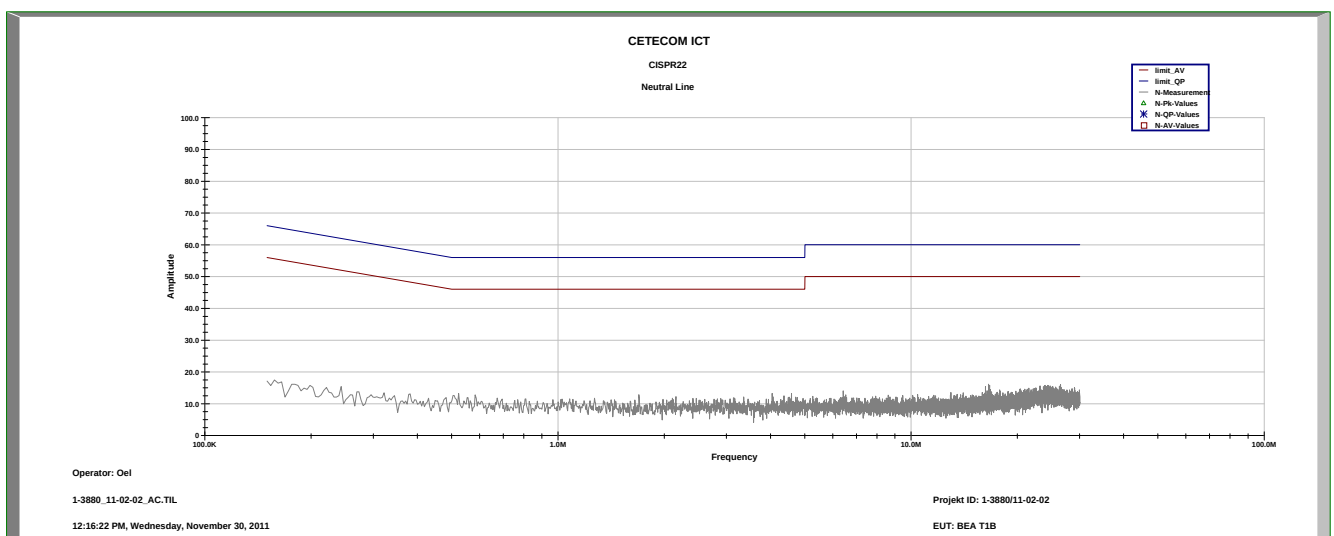
| Conducted Spurious Emissions < 30 MHz [dB $\mu$ V/m] |            |                      |
|------------------------------------------------------|------------|----------------------|
| F [MHz]                                              | Detector   | Level [dB $\mu$ V/m] |
| No critical peaks found!                             |            |                      |
| Measurement uncertainty                              | $\pm 3$ dB |                      |

**Result:** The measurement is passed.

Plot 6: Phase line



Plot 7: Neutral line



## 10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

| No | Equipment/Type                             | Manuf.      | Serial Nr. | Inv. No. Cetecom | Last Calibration                   | Next Calibration |
|----|--------------------------------------------|-------------|------------|------------------|------------------------------------|------------------|
| 1  | Anechoic chamber                           | MWB         | 87400/02   | 300000996        | Monthly verification               |                  |
| 2  | System-Rack 85900                          | HP I.V.     | *          | 300000222        | n.a.                               |                  |
| 3  | Measurement System 1                       |             |            |                  |                                    |                  |
| 4  | PSA-Spektrumanalysator 3 Hz - 26.5 GHz     | Agilent     | MY48250080 | 300003812        | 08.09.2010                         | 08.09.2012       |
| 5  | EMI Preselector 9 kHz - 1 GHz (N9039A)     | Agilent     | MY48260003 | 300003825        | 08.09.2010                         | 08.09.2012       |
| 6  | Microwave Analog Signal Generator (N5183A) | Agilent     | MY47420220 | 300003813        | 08.09.2010                         | 08.09.2012       |
| 7  | PC                                         | F+W         |            |                  | n.a.                               |                  |
| 8  | TILE                                       | TILE        |            |                  | n.a.                               |                  |
| 9  | TRILOG Super Broadband Antenna (VULB9163)  | Schwarzbeck | 371        | 300003854        | Monthly verification (System cal.) |                  |
| 10 | Double Ridged Antenna 3115                 | EMCO        | 3088       | 300001032        | Monthly verification (System cal.) |                  |
| 11 | Active Loop Antenna 6502                   | EMCO        | 2210       | 300001015        | Monthly verification (System cal.) |                  |
| 12 | Switch / Control Unit 3488A                | HP          | 2719A15013 | 300001156        | n.a.                               |                  |
| 13 | Power Supply 6032A                         | HP          | 2818A03450 | 300001040        | 08.01.2009                         | 08.01.2012       |
| 14 | Busisolator                                | Kontron     |            | 300001056        | n.a.                               |                  |
| 15 | Leitungsteiler 11850C                      | HP          |            | 300000997        | Monthly verification (System cal.) |                  |
| 16 | Power attenuator 8325                      | Byrd        | 1530       | 300001595        | Monthly verification (System cal.) |                  |
| 17 | Band reject filter WRCG1855/1910           | Wainwright  | 7          | 300003350        | Monthly verification (System cal.) |                  |
| 18 | Band reject filter WRCG2400/2483           | Wainwright  | 11         | 300003351        | Monthly verification (System cal.) |                  |
| 19 | Hochpassfilter WHK1.1/15G-10SS             | Wainwright  | 3          | 300003255        | Monthly verification (System cal.) |                  |
| 20 | Hochpassfilter WHKX2.9/18G-12SS            | Wainwright  | 1          | 300003492        | Monthly verification (System cal.) |                  |
| 21 | Hochpassfilter WHKX7.0/18G-8SS             | Wainwright  | 18         | 300003789        | Monthly verification (System cal.) |                  |
| 22 | Switch / Control Unit 3488A                | HP          | 2605e08770 | 300001443        | n.a.                               |                  |
| 23 | Trenntrafo RT5A                            | Grundig     | 9242       | 300001263        | n.a.                               |                  |
| 24 | Relais Matrix PSU                          | R&S         | 890167/024 | 300001168        | n.a.                               |                  |
| 25 | Netznachbildung ESH3-Z5                    | R&S         | 828576/020 | 300001210        | n.a.                               |                  |
| 26 | Control Computer                           | F+W         | FW0502032  | 300003303        | -/-                                | -/-              |
| 27 | Trilog Antenna VULB 9163                   | Schwarzbeck | 295        | 300003787        | 01.04.2010                         | 01.04.2012       |
| 28 | Amplifier - 0518C-138                      | Veritech    | -/-        | -/-              | -/-                                | -/-              |
| 29 | Switch - 3488A                             | HP          |            | 300000368        | -/-                                | -/-              |
| 30 | EMI Test receiver - ESCI                   | R&S         | 100083     | 300003312        | 05.01.2011                         | 05.01.2013       |
| 31 | Turntable Controller - 1061 3M             | EMCO        | 1218       | 300000661        | -/-                                | -/-              |
| 32 | Tower Controller / 1051 Controller         | EMCO        | 1262       | 300000625        | -/-                                | -/-              |
| 33 | Tower - 1051                               | EMCO        | 1262       | 300000625        | -/-                                | -/-              |
| 34 | Ultra Notch-Filter Rejected band Ch. 62    | WRCD        | 9          | -/-              | -/-                                | -/-              |
| 35 | Spectrum Analyser FSU50                    | R&S         | 200012     | 300003443        | 01.07.2010                         | 01.07.2012       |
| 36 | Spectrum Analyser 8565E                    | HP          | 3738A00773 | 300001665        | 08.01.2010                         | 08.01.2012       |
| 37 | Amplifier 0.1 to 26.0 GHz 83017A           | HP          | 00419      | 300002267        | 10.03.2011                         | 10.03.2012       |
| 38 | DC Power supply 6038A                      | HP          | 2848A07027 | 300001174        | 07.01.2009                         | 07.01.2012       |
| 39 | RF-cable                                   | H & S       |            | -/-              | cyclic verification                |                  |
| 40 | SGH 12.0 to 18.0 GHz, 639                  | narda       | 8402       | 300000787        | -/-                                | -/-              |
| 41 | SGH 18.0 to 27.0 GHz, 638                  | narda       | 8205       | 300002442        | -/-                                | -/-              |
| 42 | SGH 27.0 to 40.0 GHz, 637                  | narda       | 7911       | 300001751        | -/-                                | -/-              |
| 43 | SGH 33.0 to 50.0 GHz, 2324-20              | Flann       | 57         | -/-              | -/-                                | -/-              |
| 44 | SGH 50 to 75 GHz, 2524-20                  | Flann       | -/-        | 300001983        | -/-                                | -/-              |
| 45 | Mixer 50 to 75 GHz, FS-Z75                 | R&S         | 100099     | 300003949        | 19.01.2011                         | 19.01.2012       |
| 46 | SGH 75 to 110 GHz, 2724-20                 | Flann       | -/-        | 300002338        | -/-                                | -/-              |
| 47 | Mixer 75 to 110 GHz, SAM-110-7             | R&S         | 002        | 300004155        | 01.02.2011                         | 01.08.2012       |

## Annex A Photographs of the test setup

Photo 1:

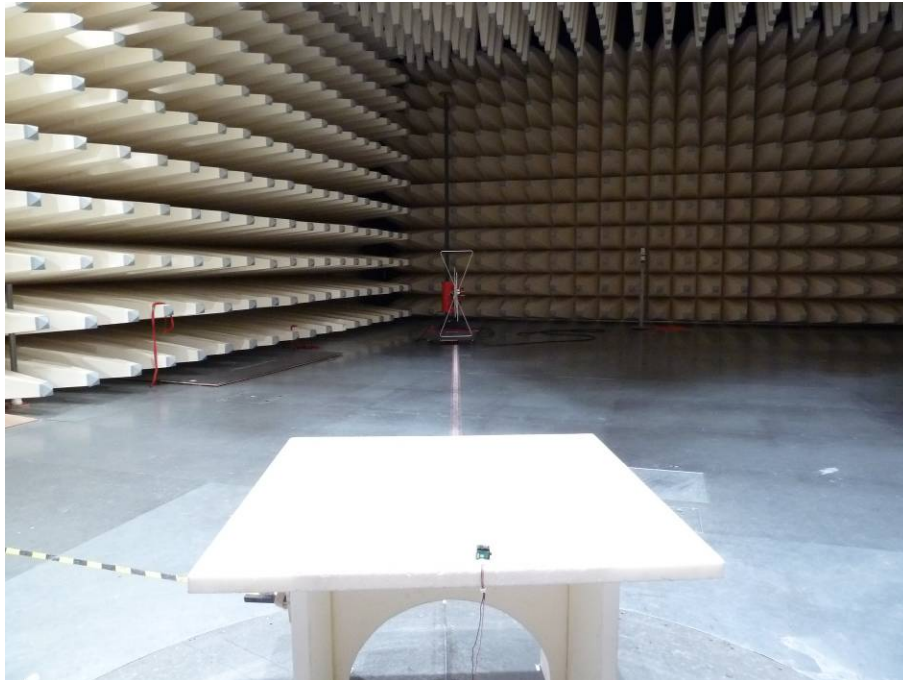


Photo 2:

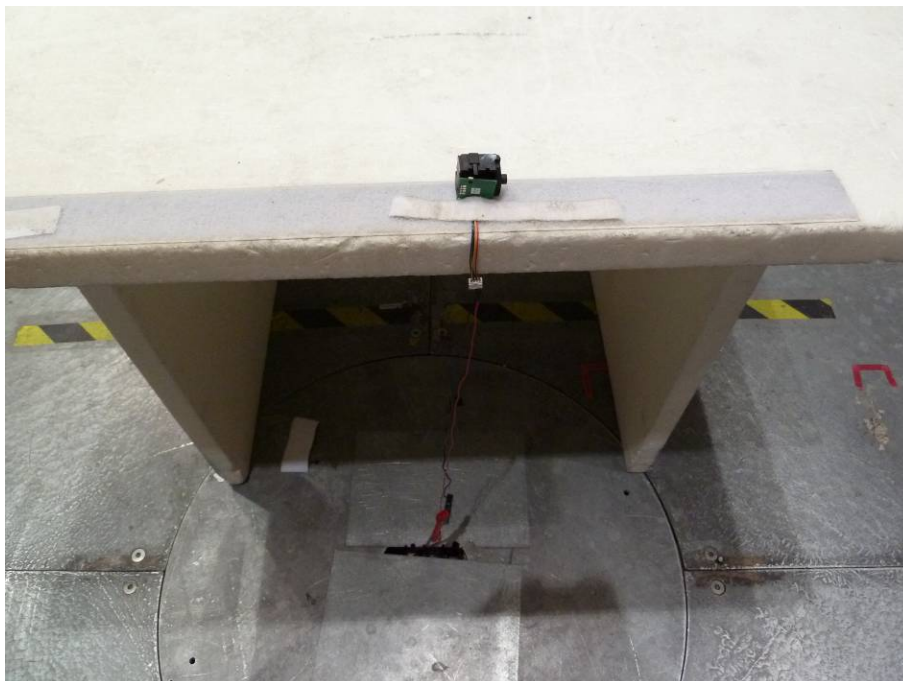




Photo 3:

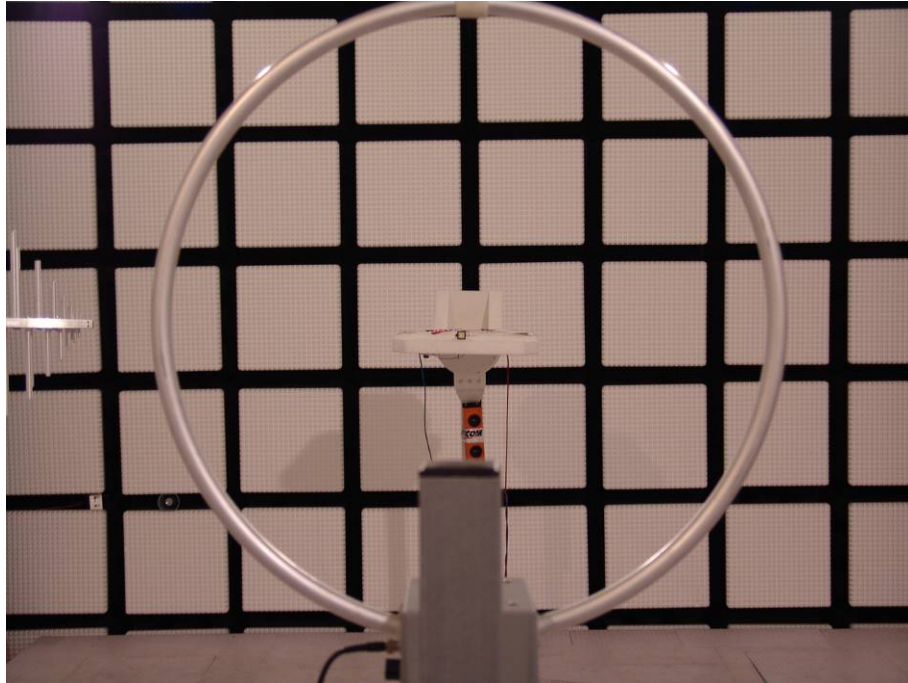


Photo 4:

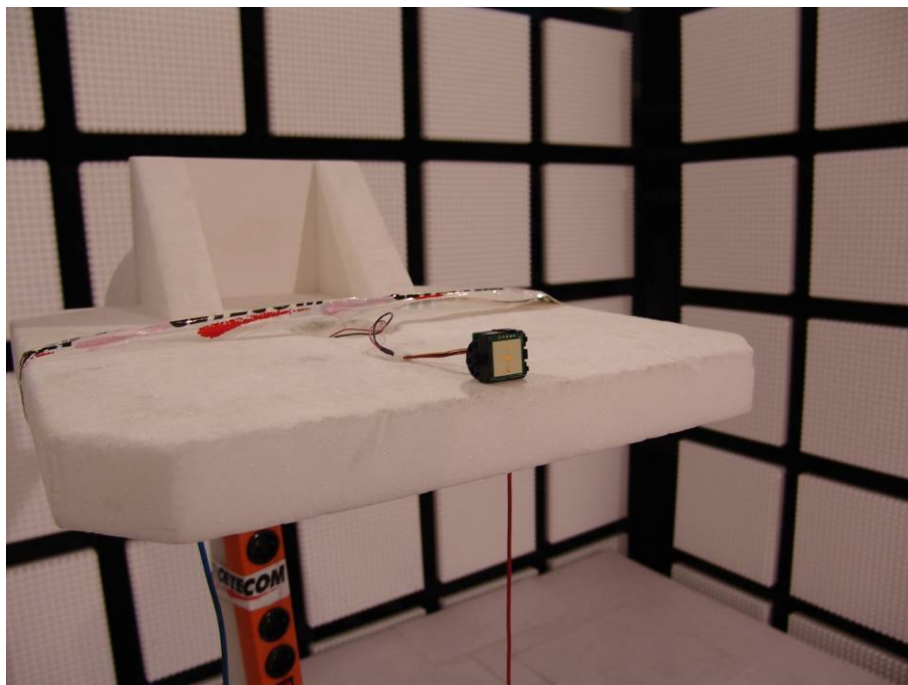


Photo 5:



## Annex B External photographs of the EUT

Photo 1:

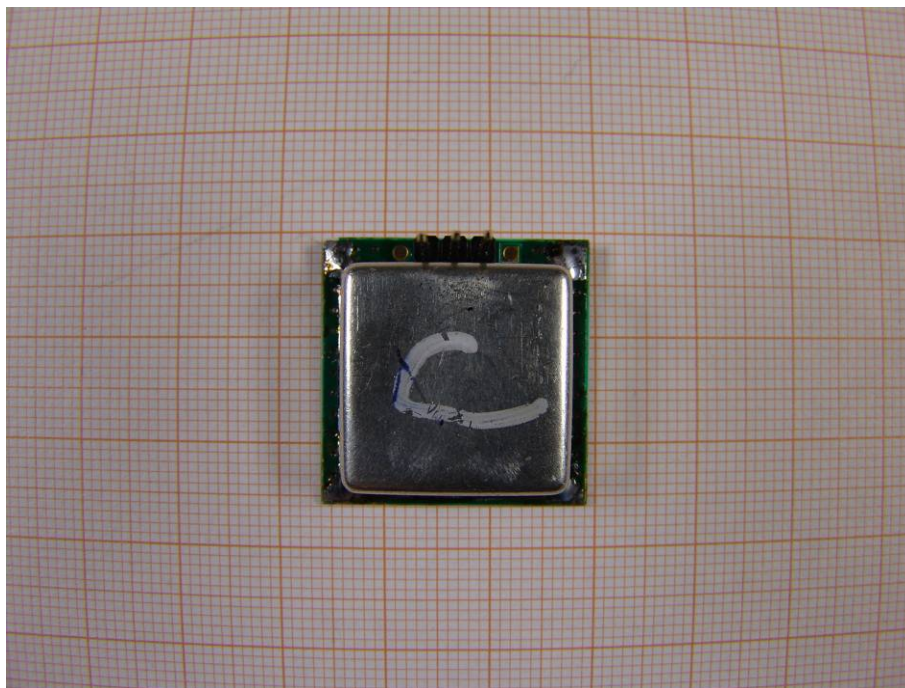


Photo 2:

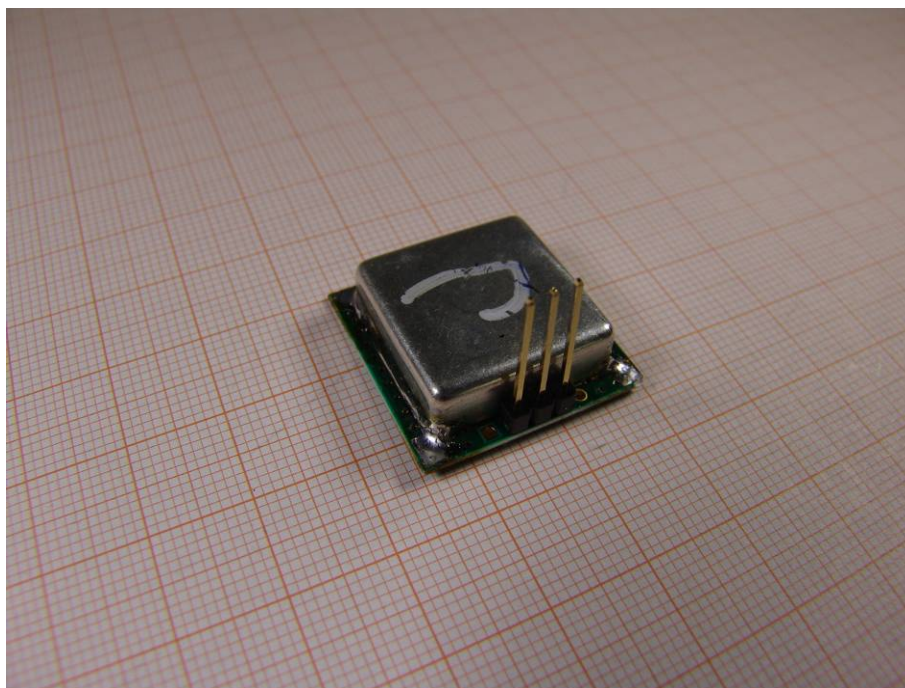




Photo 3:

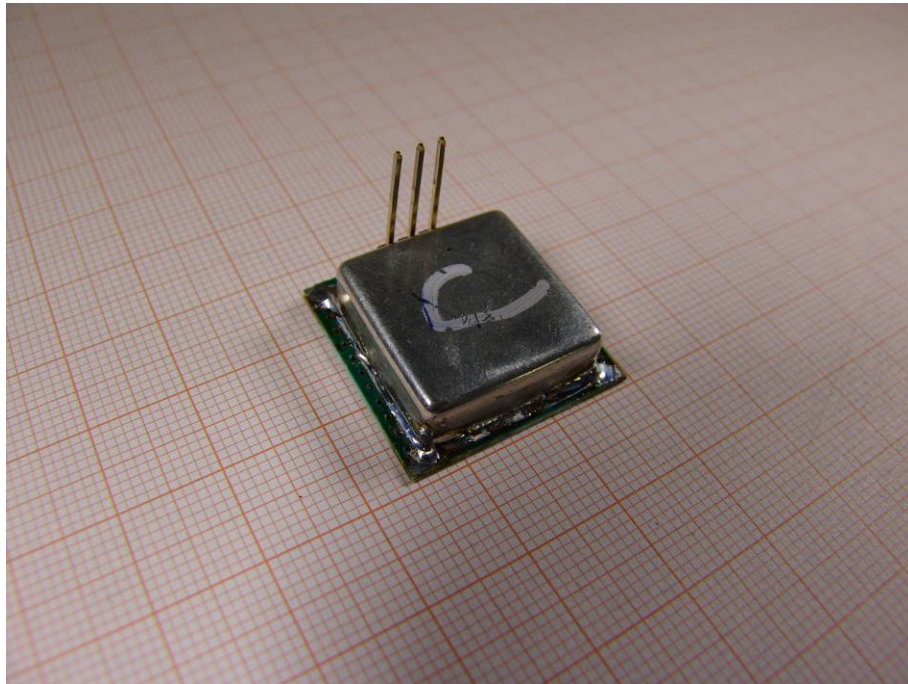


Photo 4:

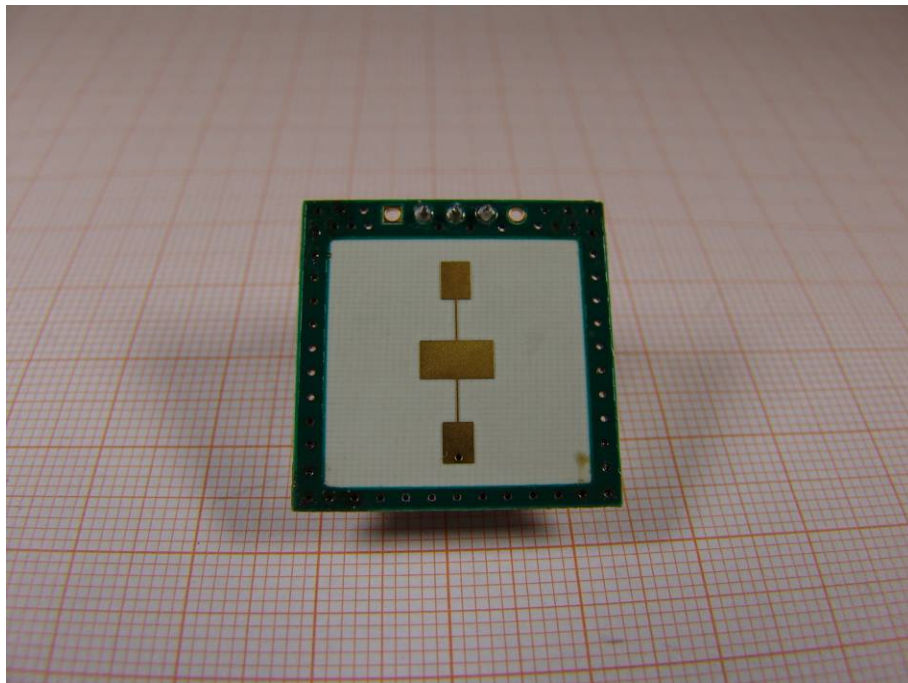


Photo 5:

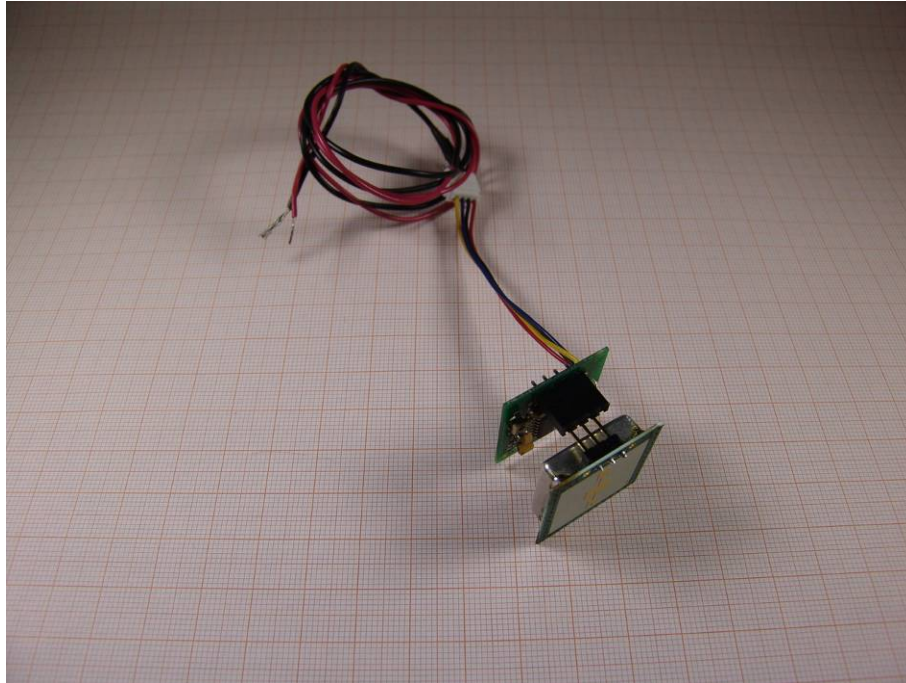


Photo 6:

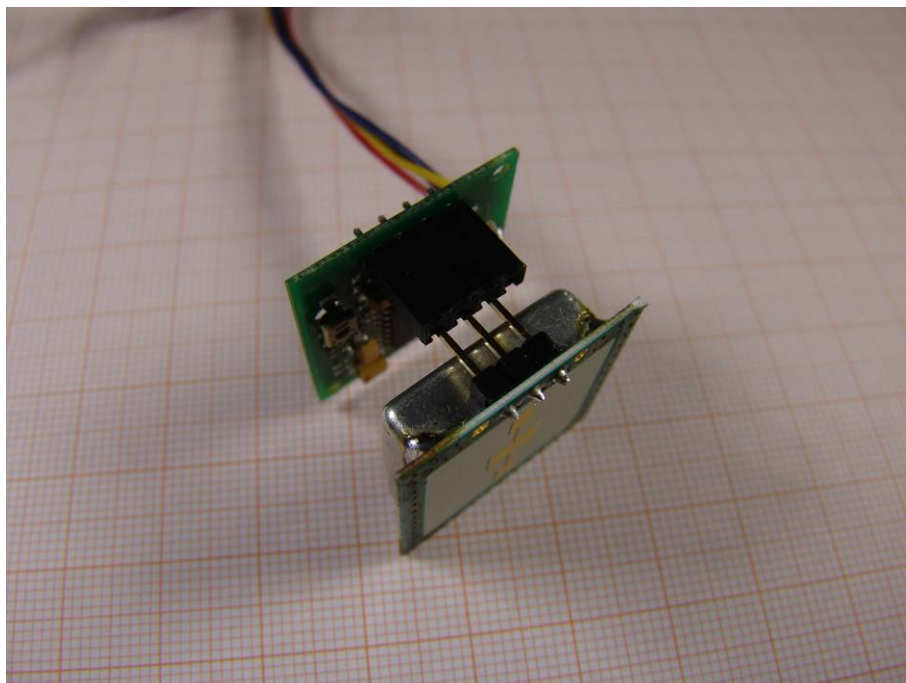


Photo 7:

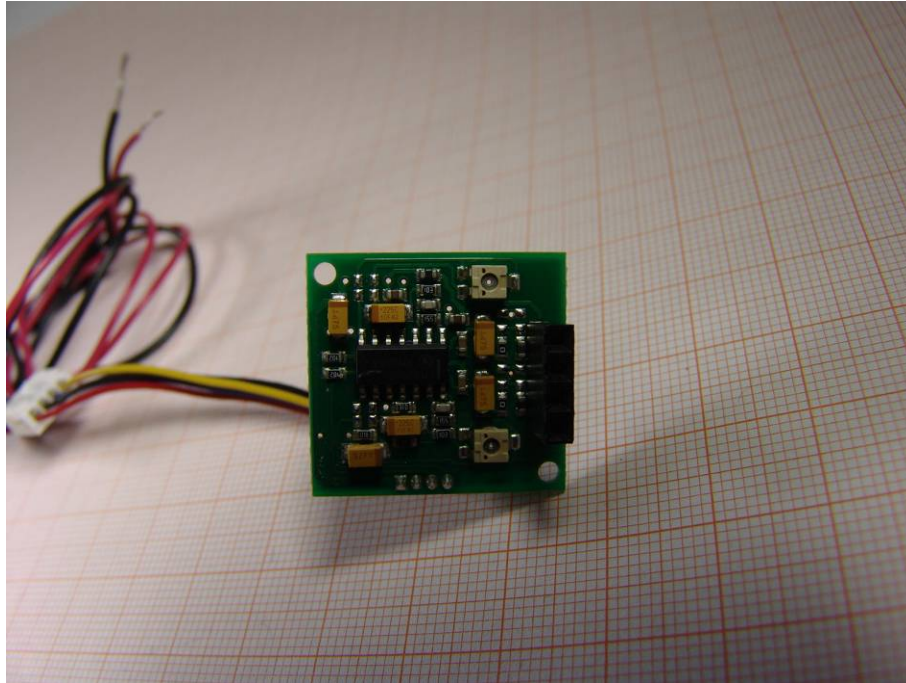


Photo 8:

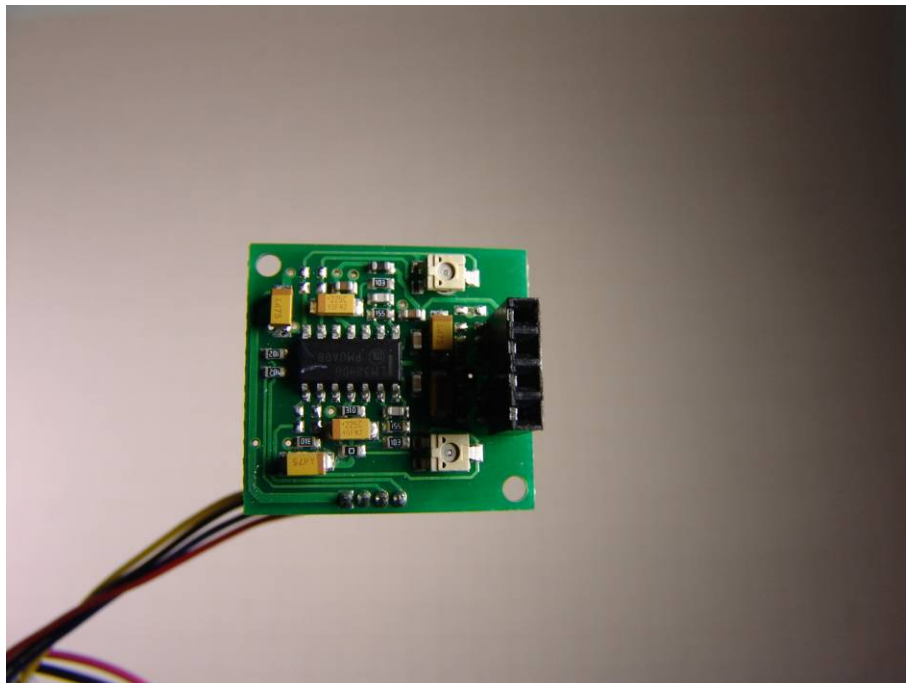
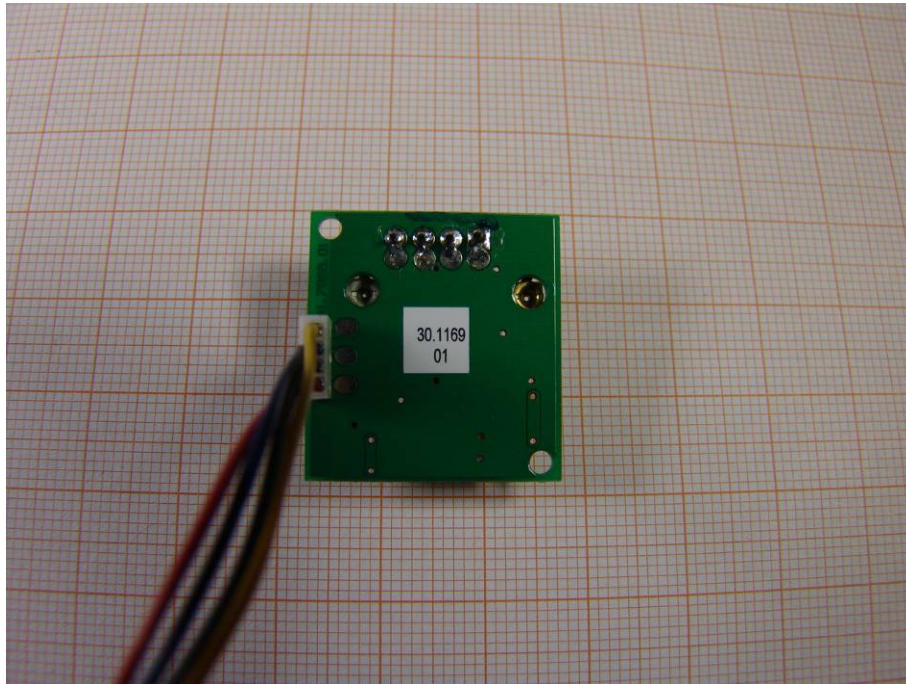




Photo 9:



**Annex C Document history**

| Version | Applied changes                             | Date of release |
|---------|---------------------------------------------|-----------------|
| 1       | Initial release                             | 2011-12-01      |
| 2       | editorial changes (test report cover sheet) | 2012-03-12      |

**Annex D Further information****Glossary**

|          |   |                                                |
|----------|---|------------------------------------------------|
| AVG      | - | Average                                        |
| DUT      | - | Device under test                              |
| EMC      | - | Electromagnetic Compatibility                  |
| EN       | - | European Standard                              |
| EUT      | - | Equipment under test                           |
| ETSI     | - | European Telecommunications Standard Institute |
| FCC      | - | Federal Communication Commission               |
| FCC ID   | - | Company Identifier at FCC                      |
| HW       | - | Hardware                                       |
| IC       | - | Industry Canada                                |
| Inv. No. | - | Inventory number                               |
| N/A      | - | Not applicable                                 |
| PP       | - | Positive peak                                  |
| QP       | - | Quasi peak                                     |
| S/N      | - | Serial number                                  |
| SW       | - | Software                                       |