

TEST REPORT

Annex to Test Report No.: 1-2977-28-02/11-B



Testing Laboratory

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Accredited Test Laboratory:

The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAkKS registration number: D-PL-12076-01-01

Area of Testing: Radio Satellite Communications

Applicant

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Phone: +46 70 71 95 73 6

Manufacturer

Sony Ericsson Mobile Communications AB
Nya Vattentornet
22188 Lund/Sweden

Test Standard/s

47 CFR Part 15

Title 47 of the Code of Federal Regulations; Chapter I
Part 15 - Radio frequency devices

ICES-003 Issue 4

Spectrum Management and Telecommunications Policy
Interference-Causing Equipment Standard

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

Test item

Kind of test item: Mobile Phone GPRS/EDGE 850/900/1800/1900; UMTS FDD I/III/VI; BT2.1 + EDR; WLAN; A-GPS
Model name: AAD-3880111-BV
FCC ID: PY7A3880111
IC: 4170B-A3880111
Frequency: GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 MHz
UMTS: 826.4 – 848.6 MHz, 1852.4 – 1907.6 MHz
Power supply: 3.70 V DC by Li-Polymer Battery and Power Supply
Temperature range: -30 °C to +60 °C

Test performed:

2011-06-15 Stefan Bös

Test Report authorised:

2011-06-15 Jakob Reschke

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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.

2.2 Application details

| | |
|------------------------------------|------------|
| Date of receipt of order: | 2011-04-04 |
| Date of receipt of test item: | 2011-04-04 |
| Start of test: | 2011-04-04 |
| End of test: | 2011-05-06 |
| Person(s) present during the test: | -/- |

3 Test standard/s

| Test Standard | Version | Test Standard Description |
|------------------|---------|---|
| 47 CFR Part 15 | 2009-10 | Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices |
| ICES-003 Issue 4 | 2004-04 | Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard |

4 Test Environment

| | | |
|----------------------------|-----------|--|
| Temperature: | T_{nom} | +24 °C during room temperature tests |
| | T_{max} | +60 °C during high temperature test |
| | T_{min} | -30 °C during low temperature test |
| Relative humidity content: | | 35 % |
| Air pressure: | | not relevant for this kind of testing |
| Power supply: | V_{nom} | 3.70 V DC by Li-Polymer Battery and Power Supply |
| | V_{max} | 4.40 V |
| | V_{min} | 3.30 V |

5 Test item

| | | |
|----------------------|---|---|
| Kind of test item | : | Mobile Phone GPRS/EDGE 850/900/1800/1900; UMTS FDD I/II/V/VI; BT2.1 + EDR; WLAN; A-GPS |
| Type identification | : | AAD-3880111-BV |
| S/N serial number | : | Rad. CB5A1CHJTB, CB5A1CHJXK Cond. CB5A1CHJYL, CB5A1CHJYZ |
| HW hardware status | : | AP1 |
| SW software status | : | 4.0.A0.110 |
| Frequency band [MHz] | : | GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 MHz UMTS: 826.4 – 848.6 MHz, 1852.4 – 1907.6 MHz |
| Type of modulation | : | GMSK; 8-PSK, QPSK |
| Number of channels | : | 300 (PCS1900) and 125 (PCS850) |
| Antenna | : | Integrated antenna |
| Power supply | : | 3.70 V DC by Li-Polymer Battery and Power Supply |
| Temperature range | : | -30°C to +60 °C |

HDMI was turned on with traffic (Worst case)

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 | CFR Part 15.107, 15.109 ICES-003, Issue 4 | passed | 2011-06-15 | -/- |

7.1 Receiver

| Test Case | temperature conditions | power source voltages | Pass | Fail | NA | NP | Results (max.) |
|--|------------------------|-----------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|----------------|
| RX-Spurious Emissions Conducted < 30 MHz | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Spurious Emissions Radiated | Nominal | Nominal | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

Note:

NA = Not applicable; NP = Not performed

8 Measurement Results

8.1 RX Spurious Emissions Conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to Idle mode. Both power lines, phase and neutral line, are measured. Found peaks are remeasured 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 F > 150 kHz: 9 kHz |
| Resolution bandwidth: | F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz |
| Span: | 9 kHz to 30 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | | IC | |
|--|---------------------|-------------------|--|
| CFR Part 15.107(a) | | ICES-003, Issue 4 | |
| TX Spurious Emissions Conducted < 30 MHz | | | |
| Frequency (MHz) | Quasi-Peak (dBµV/m) | Average (dBµV/m) | |
| 0.15 – 0.5 | 66 to 56* | 56 to 46* | |
| 0.5 – 5 | 56 | 46 | |
| 5 – 30.0 | 60 | 50 | |

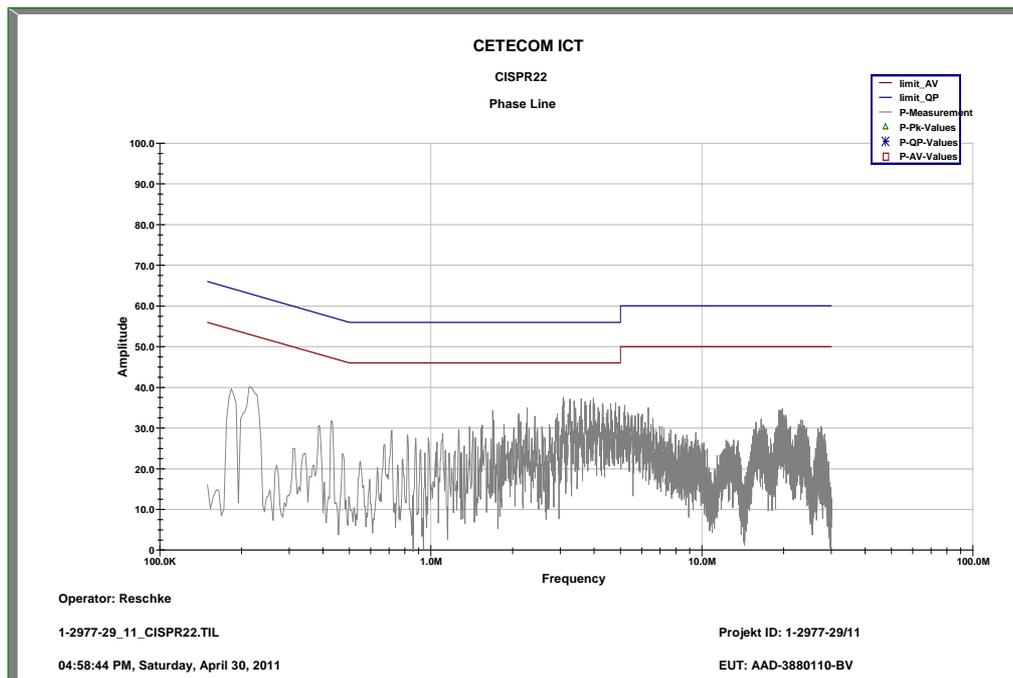
*Decreases with the logarithm of the frequency

Result: Also see plots

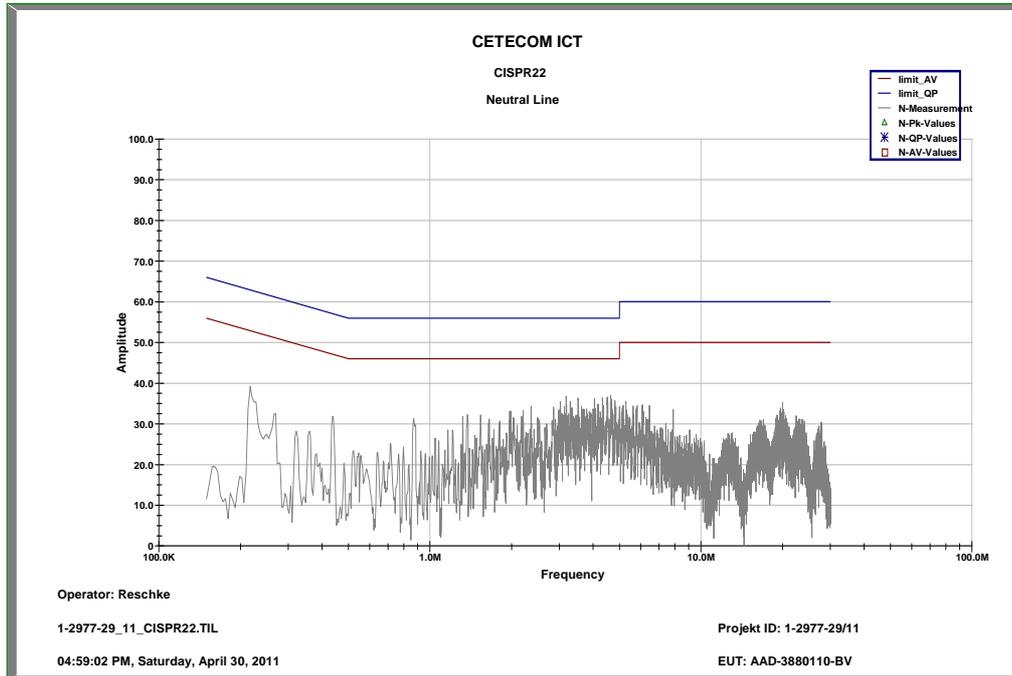
| RX Spurious Emissions Conducted < 30 MHz [dBµV/m] | | |
|---|----------|----------------|
| F [MHz] | Detector | Level [dBµV/m] |
| No critical peaks found | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Measurement uncertainty | ± 3 dB | |

Result: The result of the measurement is passed.

Plot 1: 9 kHz to 30 MHz / Phase Line



Plot 2: 9 kHz to 30 MHz / Neutral Line



8.2 Spurious Emissions Radiated – Receiver Mode

Description:

The measurement was performed in worst case. The EUT was not connected to the CMU 200. So the EUT performs a network search. In this mode all oscillators are active.

Measurement:

| Measurement parameters | |
|------------------------|--|
| Detector: | Below 1 GHz Peak / QuasiPeak Above 1 GHz Peak / Average |
| Sweep time: | 2 sec |
| Video bandwidth: | Below 1 GHz 100 kHz Above 1 GHz 1 MHz |
| Resolution bandwidth: | 1 MHz |
| Span: | 100 MHz Steps |
| Trace-Mode: | Max Hold |

Limits:

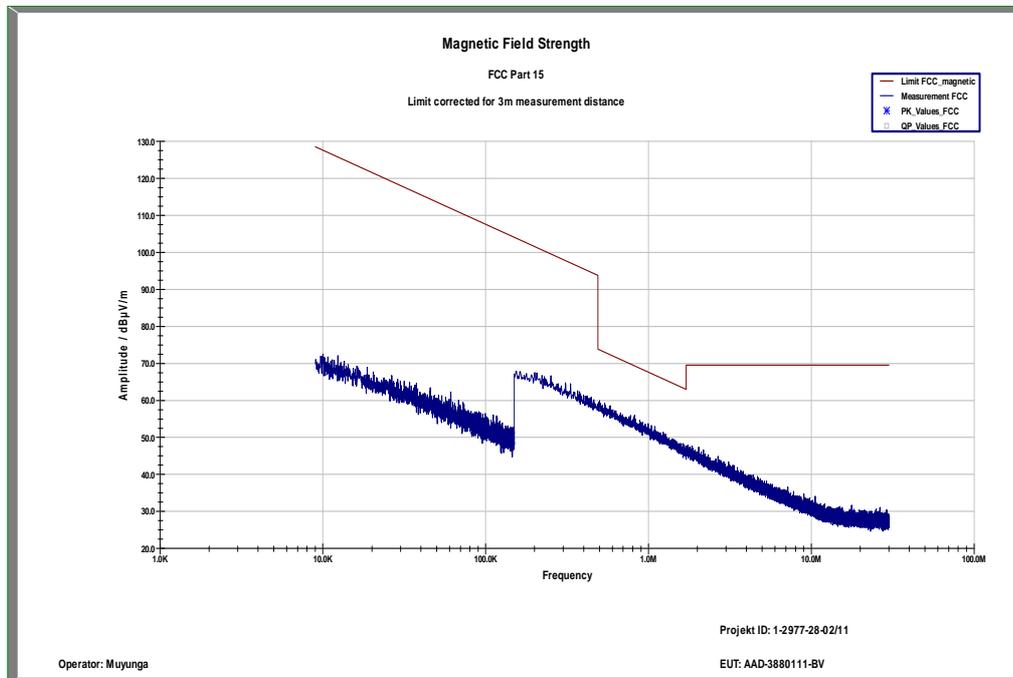
| FCC | | IC | |
|---|-------------------------------|--|--|
| CFR Part 15.109 CFR Part 2.1053 | | RSS Gen, Issue 2, Section 4.10 ICES-003 Issue 4 | |
| Spurious Emissions Radiated – Receiver Mode | | | |
| Frequency (MHz) | Field Strength (dB μ V/m) | Measurement distance (m) | |
| 30 – 88 | 30.0 | 10 | |
| 88 - 216 | 33.5 | 10 | |
| 216 – 960 | 36.0 | 10 | |
| Above 960 | 54.0 | 3 | |

Results:

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|-----------------|--------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------|
| 30.147000 | 14.9 | 15000.000 | 120.000 | 120.0 | V | 213.0 | 12.5 | 15.1 | 30.0 |
| 42.566100 | 15.0 | 15000.000 | 120.000 | 110.0 | V | 226.0 | 13.3 | 15.0 | 30.0 |
| 46.237200 | 14.7 | 15000.000 | 120.000 | 98.0 | V | 311.0 | 13.3 | 15.3 | 30.0 |
| 371.185650 | 16.5 | 15000.000 | 120.000 | 220.0 | H | 43.0 | 16.4 | 19.5 | 36.0 |
| 519.400050 | 17.6 | 15000.000 | 120.000 | 158.0 | H | 17.0 | 19.0 | 18.4 | 36.0 |
| 901.490700 | 24.0 | 15000.000 | 120.000 | 112.0 | H | 94.0 | 25.2 | 12.0 | 36.0 |

Result: The result of the measurement is passed.

Plot 1: Receiver mode up to 30 MHz



Plot 2: Receiver mode (30 MHz - 1 GHz), vertical polarization

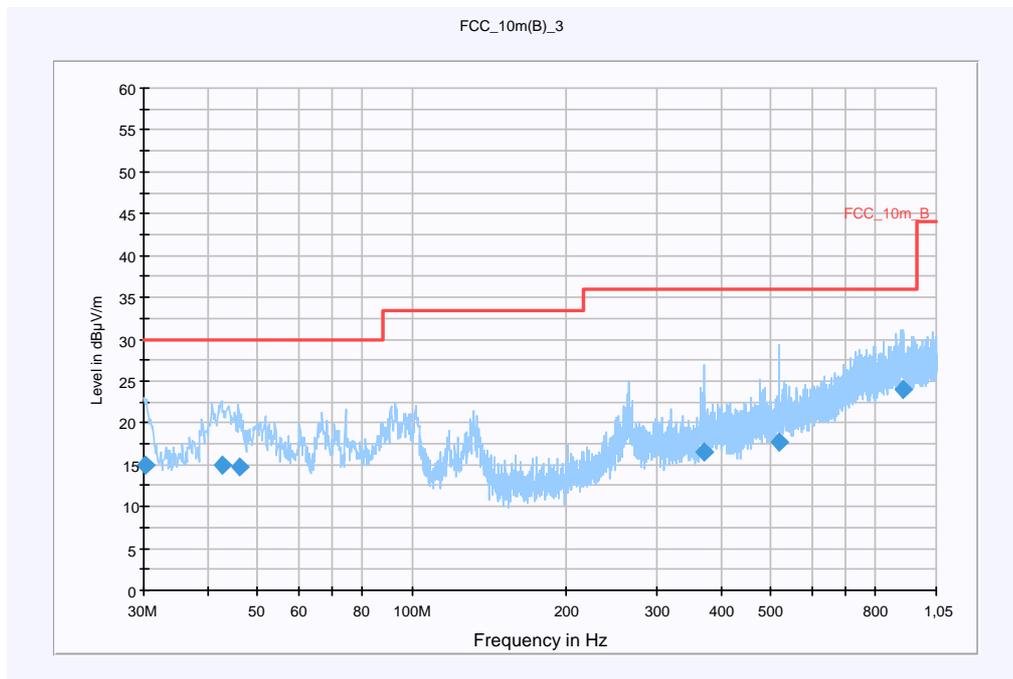
Common Information

EUT: AAD-3880110-BV
Serial Number: CB5A1CHVER IMEI: 00440214-239704-5
Test Description: FCC part 15 class B @ 10 m
Operating Conditions: GSM idle + HDMI out active + charging
Operator Name: Hennemann
Comment: AC: 115 V / 60 Hz

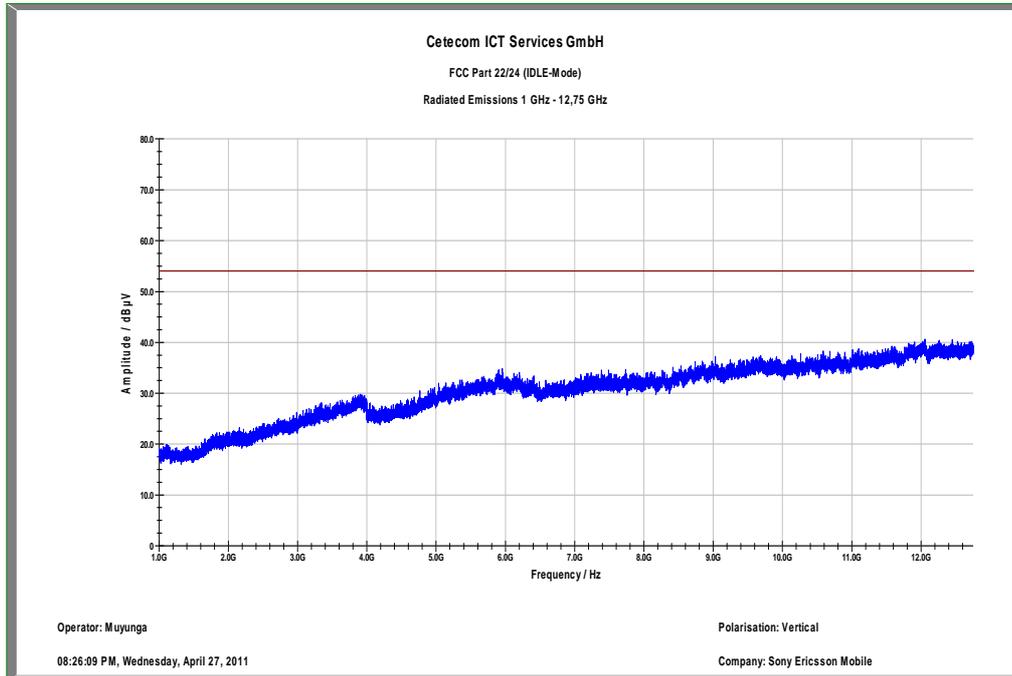
Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
Level Unit: dB μ V/m

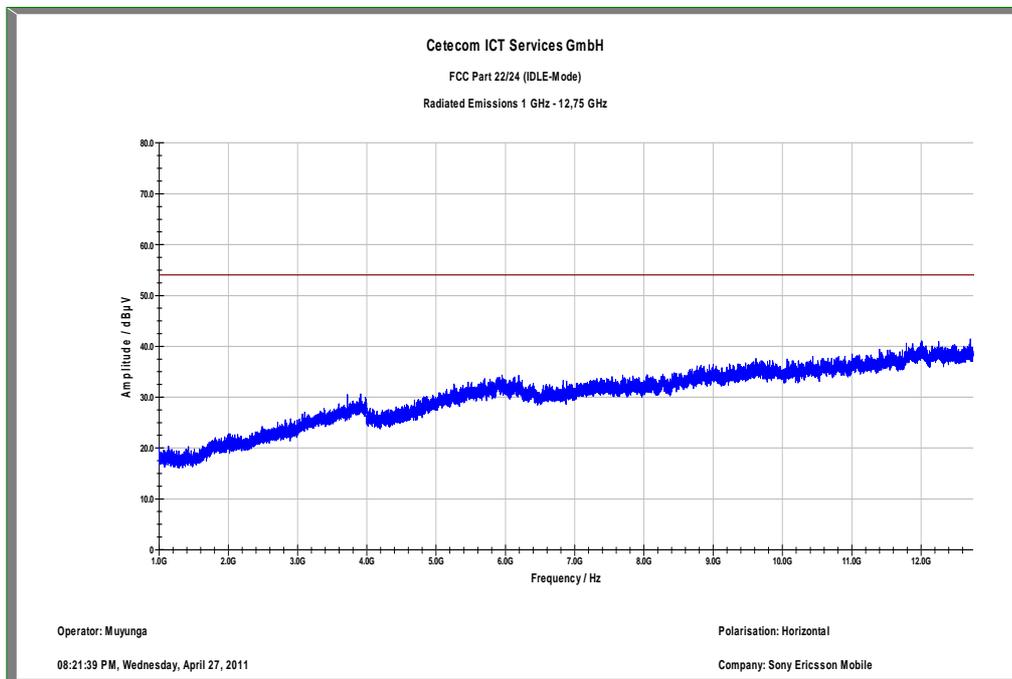
| Subrange | Detectors | IF Bandwidth | Meas. Time | Receiver |
|----------------|-----------|--------------|------------|----------|
| 30 MHz - 2 GHz | QuasiPeak | 120 kHz | 15 s | Receiver |



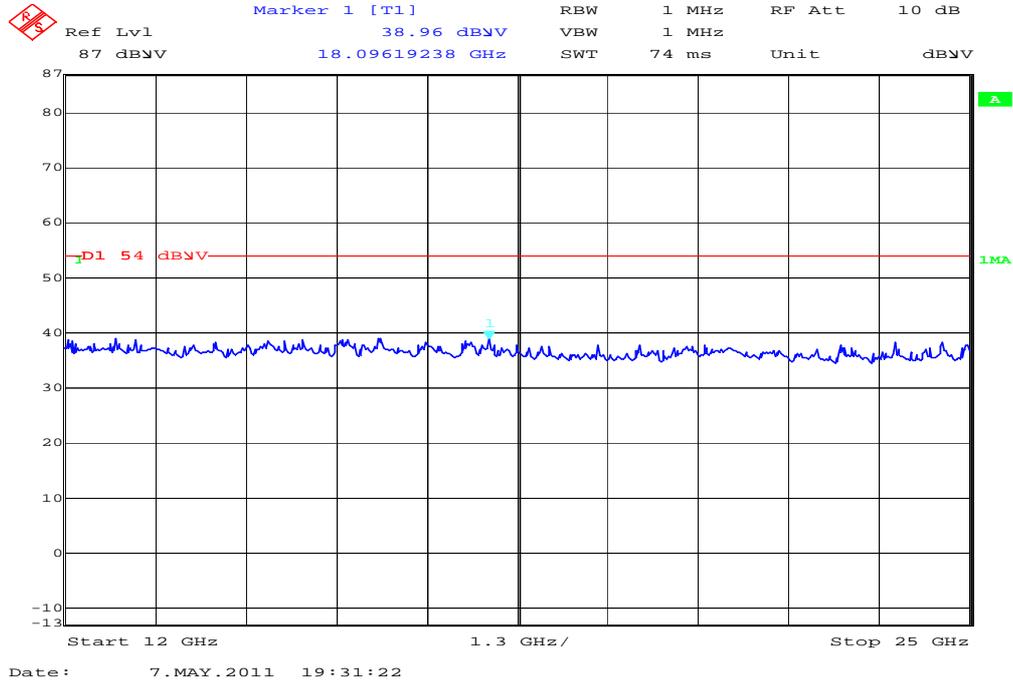
Plot 3: Receiver mode (1 GHz – 12.75 GHz), vertical polarization



Plot 4: Receiver mode (1 GHz – 12.75 GHz), horizontal polarization



Plot 5: Receiver mode (12.75 GHz – 25 GHz), Plot valid for both horizontal and vertical



9 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 (Labor/Item).

| No. | Lab / Item | Equipment | Type | Manufact. | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|--------------|--|--------------------------------------|----------------------|------------|-----------------|---------------------|------------------|------------------|
| 1 | n. a. | Isolating Transformer | RT5A | Grundig | 8041 | 300001626 | g | | |
| 2 | n. a. | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2818A03450 | 300001040 | Ve | 08.01.2009 | 08.01.2012 |
| 3 | n. a. | Coaxial Attenuator 30dB/500W | 8325 | Bird | 1530 | 300001595 | ev | | |
| 4 | n. a. | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115 | EMCO | 8812-3088 | 300001032 | viKI! | 05.03.2009 | 05.09.2011 |
| 5 | n. a. | Active Loop Antenna | 6502 | EMCO | 2210 | 300001015 | ne | | |
| 6 | n. a. | Anechoic chamber | FAC 3/5m | MWB / TDK | 87400/02 | 300000996 | | 23.03.2009 | |
| 7 | Spec.A. 2_2e | System rack for EMI measurement solution | 85900 | HP I.V. | * | 300000222 | ne | | |
| 8 | 9 | Artificial Mains 9 kHz to 30 MHz | ESH3-Z5 | R&S | 828576/020 | 300001210 | Ve | 06.01.2010 | 06.01.2012 |
| 9 | n. a. | Relais Matrix | 3488A | HP Meßtechnik | 2719A15013 | 300001156 | ne | | |
| 10 | n. a. | Relais Matrix | PSU | R&S | 890167/024 | 300001168 | ne | | |
| 11 | n. a. | Isolating Transformer | RT5A | Grundig | 9242 | 300001263 | ne | | |
| 12 | n. a. | Three-Way Power Splitter, 50 Ohm | 11850C | HP Meßtechnik | | 300000997 | ne | | |
| 13 | n. a. | Switch / Control Unit | 3488A | HP | 2605e08770 | 300001443 | ne | | |
| 14 | n. a. | Amplifier | js42-00502650-28-5a | Parzich GMBH | 928979 | 300003143 | ne | | |
| 15 | n. a. | Band Reject filter | WRCG1855/1910-1835/1925-40/8SS | Wainwright | 7 | 300003350 | ev | | |
| 16 | n. a. | Band Reject filter | WRCG2400/2483-2375/2505-50/10SS | Wainwright | 11 | 300003351 | ev | | |
| 17 | n. a. | TILE-Software Emission | Quantum Change, Modell TILE-ICS/FULL | EMCO | none | 300003451 | ne | | |
| 18 | n. a. | Highpass Filter | WHKX2.9/18G-12SS | Wainwright | 1 | 300003492 | ev | | |
| 19 | n. a. | Highpass Filter | WHK1.1/15G-10SS | Wainwright | 3 | 300003255 | ev | | |
| 20 | n. a. | Highpass Filter | WHKX7.0/18G-8SS | Wainwright | 18 | 300003789 | ne | | |
| 21 | n. a. | PSA Spectrum Analyzer 3 Hz - 26.5 GHz | E4440A | Agilent Technologies | MY48250080 | 300003812 | k | 08.09.2010 | 08.09.2012 |
| 22 | n. a. | MXG Microwave Analog Signal Generator | N5183A | Agilent Technologies | MY47420220 | 300003813 | k | 13.09.2010 | 13.09.2012 |
| 23 | n. a. | RF Filter Section 9kHz - 1GHz | N9039A | Agilent Technologies | MY48260003 | 300003825 | viKI! | 08.09.2010 | 08.09.2012 |
| 24 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 371 | 300003854 | viKI! | 17.12.2008 | 17.12.2011 |
| 25 | n. a. | Universal Communication Tester | CMU200 | R&S | 103992 | 300003231 | viKI! | 30.06.2010 | 30.06.2012 |
| 26 | 19 | Double-Ridged Waveguide Horn | 3115 | EMCO | 9107-3697 | 300001605 | Ve | 19.10.2010 | 19.10.2012 |

| | | | | | | | | | |
|----|-------|---|---------|-----------------|-------------|-----------|-----|------------|------------|
| | | Antenna 1-18.0GHz | | | | | | | |
| 27 | n. a. | Isolating Transformer | 913501 | Erfi | | 300001205 | ne | | |
| 28 | 4 | Radiocom. Analyzer | CMTA 54 | R&S | 894043/010 | 300001175 | NK! | 06.06.2007 | |
| 29 | 9 | Signal Generator 0.1-4320 MHz, AM/FM/PHIM/Puls Mod. | SMHU | R&S | 894055/005 | 300001190 | Ve | 05.01.2010 | 05.01.2013 |
| 30 | 10 | Signal Generator 0.1-2000 MHz | SMH | R&S | 864219/033 | 300001410 | Ve | 18.08.2010 | 18.08.2013 |
| 31 | n. a. | DC Power Supply 0 – 32V | 1108-32 | Heiden | 001802 | 300001383 | Ve | 23.06.2010 | 23.06.2013 |
| 32 | n. a. | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2920A04590 | 300001041 | Ve | 08.01.2009 | 08.01.2012 |
| 33 | n. a. | Temperature Test Chamber | VT 4002 | Heraeus Voetsch | 521/83761 | 300002326 | Ve | 28.05.2009 | 28.05.2011 |
| 34 | n. a. | Audio Analyzer 2Hz - 300 kHz | UPD | R&S | 841074/009 | 300001236 | k | 08.01.2010 | 08.01.2012 |
| 35 | n. a. | Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM | FSIQ26 | R&S | 835111/0004 | 300002678 | Ve | 04.11.2010 | 04.11.2012 |
| 36 | n. a. | Temperature Test Chamber | T-40/50 | CTS GmbH | 064023 | 300003540 | vk! | 04.06.2009 | 04.06.2011 |

Agenda: Kind of Calibration

k calibration / calibrated
 ne not required (k, ev, izw, zw not required)
 ev periodic self verification
 Ve long-term stability recognized
 vk! Attention: extended calibration interval
 NK! Attention: not calibrated

EK limited calibration
 zw cyclical maintenance (external cyclical maintenance)
 izw internal cyclical maintenance
 g blocked for accredited testing
 *) next calibration ordered / currently in progress