

TEST REPORT

Test report no.: 1-3175-01-03/11



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

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

Gigaset Communications GmbH
Frankenstr. 2
46395 Bocholt / GERMANY
Phone: +49 2871 91-0
Fax: +49 287 191-62857
Contact: Uwe Alt
e-mail: uwe.alt@gigaset.com
Phone: +49 287 191-2857

Manufacturer

Gigaset Communications GmbH
Frankenstr. 2
46395 Bocholt / GERMANY

Test standard/s

| | |
|----------------|--|
| 47 CFR Part 15 | Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices |
| RSS - 210 | Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment |

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

Test item

| | |
|---------------------------|----------------------------------|
| Kind of test item: | Corded/Cordless Phone |
| Model name: | Gigaset DX800A all in one |
| FCC ID: | TVU-DX800A |
| IC: | 8023A-DX800A |
| Frequency: | 2402MHz – 2480MHz |
| Power supply: | 115 V AC by main |
| Temperature range: | -20 °C to +55 °C |



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.

Test performed:

Andreas Keller

Test report authorised:

Stefan Bös

1 Table of contents

1 Table of contents2

2 General information3

 2.1 Notes.....3

 2.2 Application details.....3

3 Test standard/s3

4 Test environment.....3

5 Test item.....4

6 Test laboratories sub-contracted4

7 Summary of measurement results5

8 RF measurements6

 8.1 Description of test setup6

 8.1.1 Radiated measurements.....6

 8.1.2 Conducted measurements.....7

 8.2 Additional comments7

 8.3 RSP100 test report cover sheet / performance test data8

9 Measurement results.....9

 9.1 Antenna gain.....9

 9.2 Power spectral density10

 9.3 Carrier frequency separation11

 9.4 Number of hopping channels.....13

 9.5 Time of occupancy (dwell time)15

 9.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth16

 9.7 Maximum output power19

 9.8 Band edge compliance conducted23

 9.9 Band edge compliance radiated26

 9.10 TX spurious emissions conducted29

 9.11 TX spurious emissions radiated33

 9.12 RX spurious emissions radiated47

 9.13 TX spurious emissions radiated < 30 MHz.....52

 9.14 TX spurious emissions conducted < 30 MHz.....55

10 Test equipment and ancillaries used for tests.....58

Annex A Photographs of the test setup.....61

Annex B External photographs of the EUT.....63

Annex C Internal photographs of the EUT65

Annex D Document history71

Annex E Further information.....71

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: | 2011-05-30 |
| Date of receipt of test item: | 2011-08-08 |
| Start of test: | 2011-08-08 |
| End of test: | 2011-09-20 |
| Person(s) present during the test: | Mr. Voigt |

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 |
| RSS - 210 | Issue 8 | Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment |

4 Test environment

| | | |
|----------------------------|------------------|---------------------------------------|
| Temperature: | T _{nom} | +24 °C during room temperature tests |
| | T _{max} | +55 °C during high temperature tests |
| | T _{min} | -20 °C during low temperature tests |
| Relative humidity content: | | 55 % |
| Air pressure: | | not relevant for this kind of testing |
| Power supply: | V _{nom} | 115 V AC by main |
| | V _{max} | V |
| | V _{min} | V |

5 Test item

| | | |
|----------------------|---|--|
| Kind of test item | : | Corded/Cordless Phone |
| Type identification | : | Gigaset DX800A all in one |
| S/N serial number | : | Rad. USA Sample 5 Cond. USA Sample 6 |
| HW hardware status | : | S30853-Q3100-R301 |
| SW software status | : | BAS_085 |
| Frequency band [MHz] | : | 2402MHz – 2480MHz (ISM band: 2400MHz – 2483.3MHz) |
| Type of modulation | : | GFSK |
| Number of channels | : | 79 |
| Antenna | : | Printed PCB antenna |
| Power supply | : | 115 V AC by main |
| Temperature range | : | -20°C to +55 °C |

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 RSS 210, Issue 8, Annex 8 | Passed | 2011-09-28 | -/- |

| Test specification clause | Test case | Temperature conditions | Power source voltages | Mode | Pass | Fail | NA | NP | Remark |
|--|---|------------------------|-----------------------|------|---|--|--|--|--------------------------|
| §15.247(b)(4) RSS 210 / A8.4(2) | Antenna gain | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(e) RSS 210 / A8.2(b) | Power spectral density | Nominal | Nominal | GFSK | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Not applicable for FHSS! |
| §15.247(a)(1) RSS 210 / A8.1(b) | Carrier frequency separation | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(a)(1) RSS 210 / A8.1(d) | Number of hopping channels | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(a)(1) (iii) RSS 210 / A8.3(1) | Time of occupancy (dwell time) | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(a)(1) RSS 210 / A8.2(a) | Spectrum bandwidth of a FHSS system 20dB bandwidth | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | complies |
| §15.247(b)(1) RSS-210 / A8.4(2) | Maximum output power | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | complies |
| §15.247(d) RSS-210 / A8.5 | Band edge compliance conducted | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | complies |
| §15.205 RSS-210 / A8.5 | Band edge compliance radiated | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | complies |
| §15.247(d) RSS-210 / A8.5 | TX spurious emissions conducted | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | complies |
| §15.247(d) RSS-210 / A8.5 | TX spurious emissions radiated | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.109 RSS-Gen. | RX spurious emissions radiated | Nominal | Nominal | -/- | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.209(a) RSS-Gen | TX spurious emissions radiated < 30 MHz | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.107(a) | Conducted emissions < 30 MHz | Nominal | Nominal | GFSK | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |

Note: NA = Not Applicable; NP = Not Performed

8 RF measurements

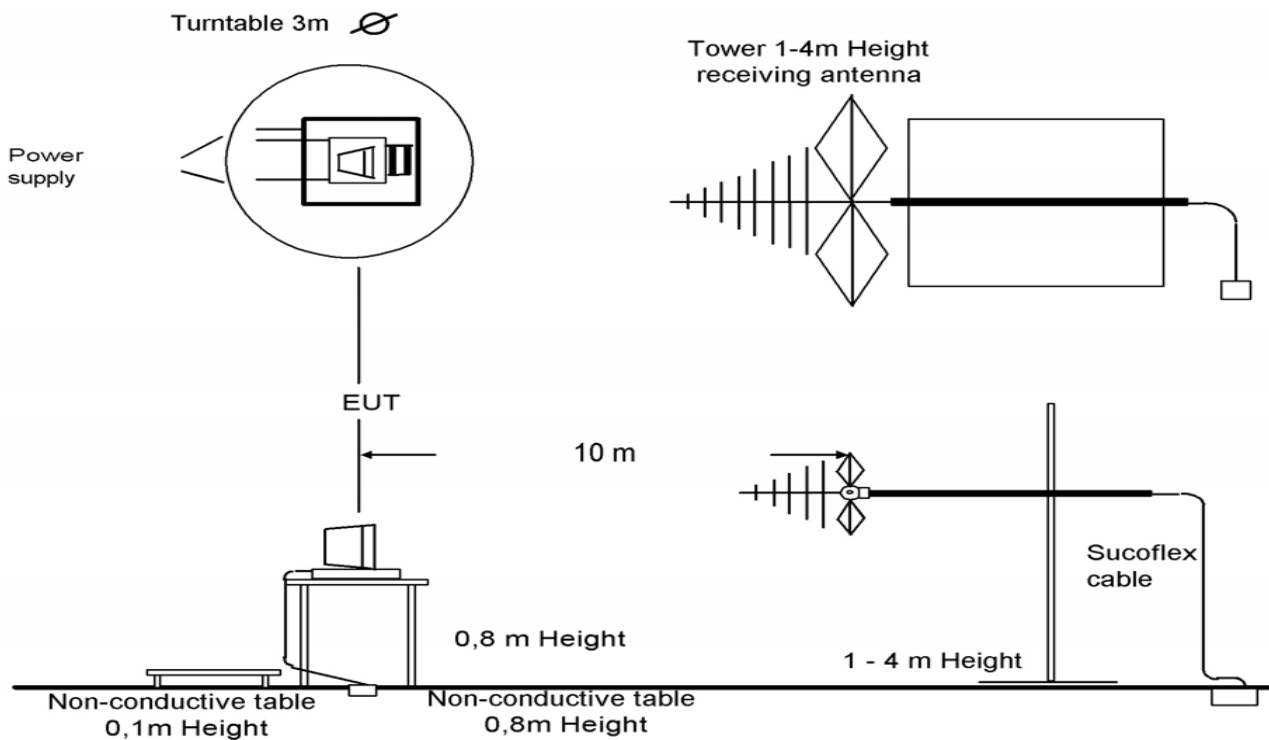
8.1 Description of test setup

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 analysers 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

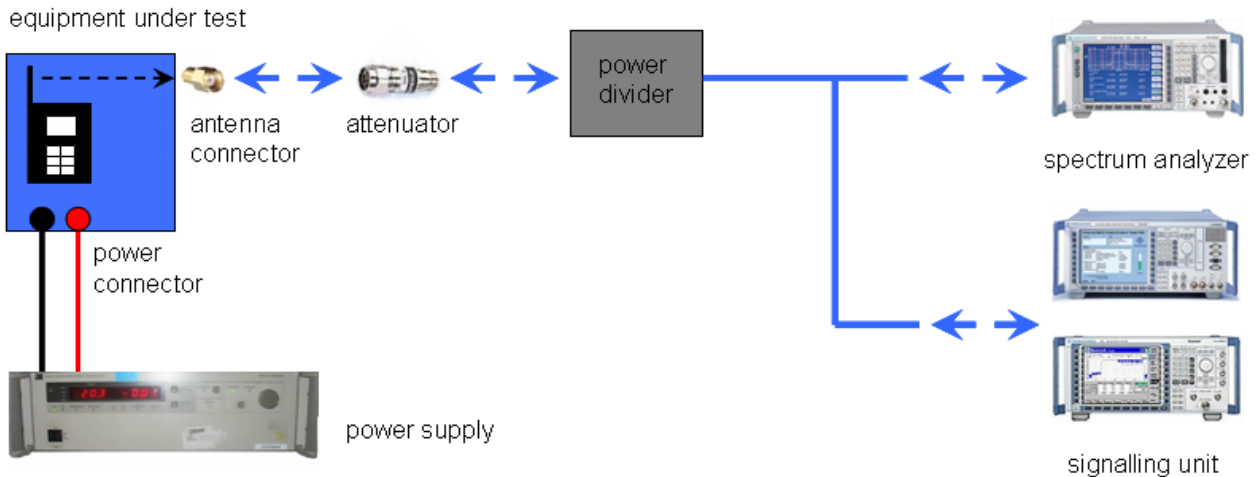
| | |
|-----------------|---------------------|
| 9 kHz - 30 MHz: | active loop antenna |
| 30 MHz – 1 GHz: | tri-log antenna |
| > 1 GHz: | horn antenna |

All measurements are done in accordance with the Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems DA 00-705 and Appendix A "BLUETOOTH® APPROVALS"

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CBT) by air link using signalling antenna.

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

8.2 Additional comments

The Bluetooth® word mark and logos are owned by the Bluetooth SIG Inc. and any use of such marks by Cetecom ICT Services GmbH is under license.

Reference documents: None

Special test descriptions: Customer provided test set-up

Configuration descriptions: TX tests: were performed with DH5 packets and static PRBS pattern payload. RX/Standby tests: BT test mode enabled, scan enabled, TX Idle

Test mode:

- Bluetooth Test mode loop back enabled (EUT is controlled over CBT/CMU)
- Special software is used. EUT is transmitting pseudo random data by itself

8.3 RSP100 test report cover sheet / performance test data

| | | |
|--|---|---|
| Test report number | : | 1-3175-01-03/11 |
| Equipment model number | : | Gigaset DX800A all in one |
| Certification number | : | 8023A-DX800A |
| Manufacturer (complete address) | : | Gigaset Communications GmbH Frankenstr. 2 46395 Bocholt / GERMANY |
| Tested to radio standards specification no. | : | RSS 210, Issue 8, Annex 8 |
| Open area test site IC No. | : | IC 3462C-1 |
| Frequency range | : | ISM band 2400 MHz to 2483.5 MHz (lowest channel 2402 MHz, highest channel 2480 MHz) |
| RF-power (max.) | : | Cond.: 2.0mW (GFSK modulation) EIRP: 2.5mW (GFSK modulation) |
| Occupied bandwidth (99%-BW) | : | 938kHz (GFSK modulation) |
| Type of modulation | : | GFSK |
| Emission designator (TRC-43) | : | 938KFXD (GFSK modulation) |
| Antenna information | : | Printed PCB antenna |
| Transmitter spurious (worst case) [dB μ V/m @ 3m]: | | 44.9 dB μ V/m @ 1250 MHz |
| Receiver spurious (worst case) [dB μ V/m @ 3m]: | | 44.3 dB μ V/m @ 1250 MHz |

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:

2011-09-28

Andreas Keller

Date

Name

Signature



9 Measurement results

9.1 Antenna gain

Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

Measurement parameters:

| Measurement parameter | |
|-----------------------|----------|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | 3 MHz |
| Resolution bandwidth: | 3 MHz |
| Span: | 5 MHz |
| Trace-Mode: | Max hold |

Limits:

| FCC | IC |
|------------------------|----------------------------|
| CFR Part 15.247 (b)(4) | RSS 210, Issue 8, A 8.4(2) |
| Antenna Gain | |
| 6 dBi | |

Results:

| T_{nom} | V_{nom} | lowest channel 2402 MHz | middle channel 2441 MHz | highest channel 2480 MHz |
|--|-----------|----------------------------|----------------------------|-----------------------------|
| Conducted power [dBm] Measured with GFSK modulation | | 2.8 | 2.9 | 2.5 |
| Radiated power [dBm] Measured with GFSK modulation | | 3.9 | 3.8 | 3.7 |
| Gain [dBi] Calculated | | 1.1 | 0.9 | 1.2 |

Result: The result of the measurement is passed.

9.2 Power spectral density

Description:

Measurement of the power spectral density of a digital modulated system. This requirement is only valid for digitally modulated systems without hopping functionality.

Measurement:

| Measurement parameter | |
|-----------------------|----------|
| Detector: | Peak |
| Sweep time: | 500 s |
| Video bandwidth: | 3 kHz |
| Resolution bandwidth: | 3 kHz |
| Span: | 150 kHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|----------------------------|
| CFR Part 15.247 (e) | RSS 210, Issue 8, A 8.2(b) |
| Power Spectral Density | |
| For digitally modulated systems the transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration. | |

Results:

| Modulation | Power spectral density [dBm/3kHz] | | |
|-------------------------|--|----------|----------|
| | 2412 MHz | 2437 MHz | 2462 MHz |
| Frequency | | | |
| GFSK | Not required for hopping systems! | | |
| Pi/4 DQPSK | | | |
| 8DPSK | | | |
| Measurement uncertainty | ± 1.5 dB | | |

9.3 Carrier frequency separation

Description:

Measurement of the carrier frequency separation of a hopping system. The carrier frequency separation is constant for all modulation-modes. We use GFSK-modulation to show compliance. EUT in hopping mode.

Measurement:

| Measurement parameter | |
|-----------------------|----------|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | 100 kHz |
| Resolution bandwidth: | 100 kHz |
| Span: | 4 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|---|----------------------------|
| CFR Part 15.247 (a)(1) | RSS 210, Issue 8, A 8.1(b) |
| Carrier Frequency Separation | |
| Minimum 25 kHz or two-thirds of the 20 dB bandwidth of the hopping system whichever is greater. | |

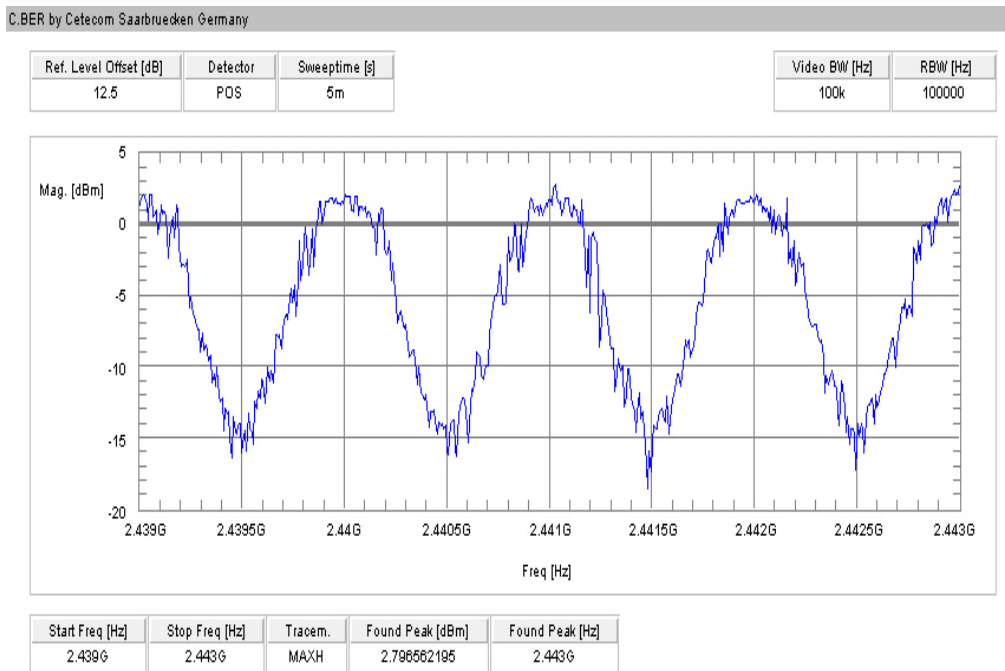
Result:

| | |
|------------------------------|---------|
| Carrier frequency separation | ~ 1 MHz |
|------------------------------|---------|

Result: [The result of the measurement is passed.](#)

Plot:

Plot 1: Carrier frequency separation (GFSK modulation)



9.4 Number of hopping channels

Description:

Measurement of the total number of used hopping channels. The number of hopping channels is constant for all modulation-modes. We use GFSK-modulation to show compliance. EUT in hopping mode.

Measurement:

| Measurement parameter | |
|-----------------------|--|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | 500 kHz |
| Resolution bandwidth: | 500 kHz |
| Span: | Plot 1: 2400 – 2445 MHz Plot 2: 2445 – 2485 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|----------------------------|
| CFR Part 15.247 (a)(1) | RSS 210, Issue 8, A 8.1(d) |
| Number of hopping channels | |
| At least 15 non overlapping hopping channels | |

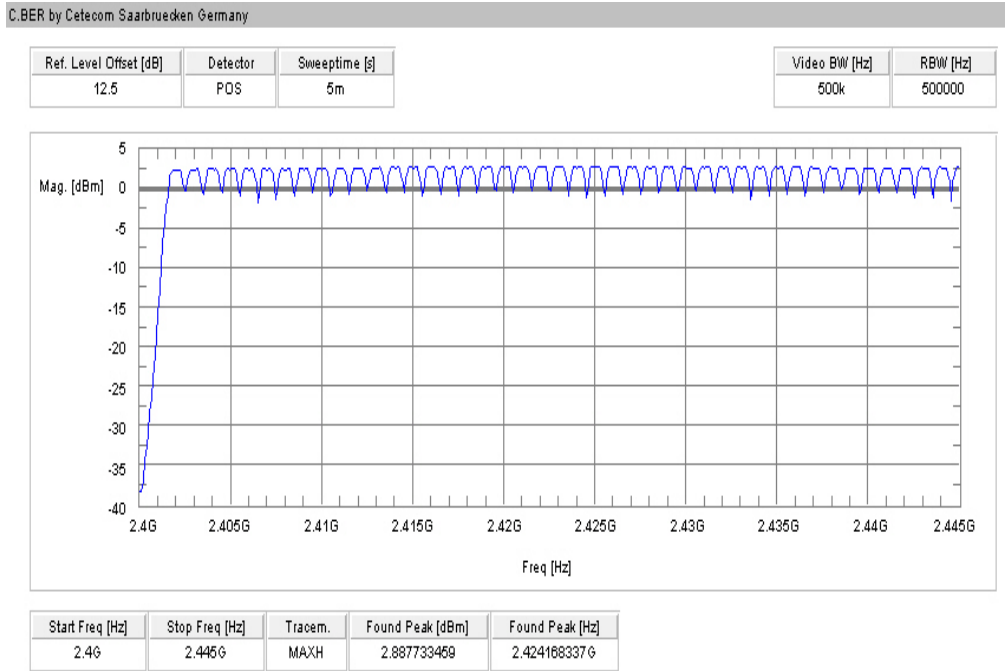
Result:

| | |
|----------------------------|----|
| Number of hopping channels | 79 |
|----------------------------|----|

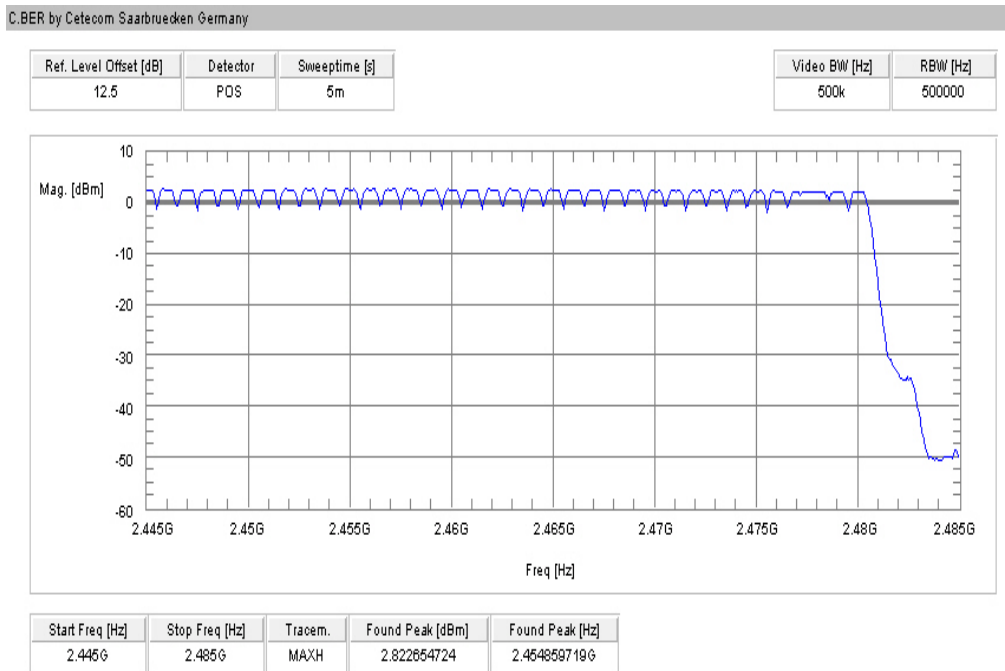
Result: [The result of the measurement is passed.](#)

Plots:

Plot 1: Number of hopping channels (GFSK modulation)



Plot 2: Number of hopping channels (GFSK modulation)



9.5 Time of occupancy (dwell time)

Measurement:

For Bluetooth® devices no measurements mandatory depending on the fixed requirements according to the Bluetooth® Core Specifications!

For Bluetooth® devices:

The channel staying time of 0.4 s within a 31.6 second period in data mode is constant for Bluetooth® devices and independent from the packet type (packet length). The calculation for a 31.6 second period is as follows:

Channel staying time = time slot length * hop rate / number of hopping channels * 31.6 s

Example for a DH1 packet (with a maximum length of one time slot)
 Channel staying time = $625 \mu\text{s} * 1600 * 1/\text{s} / 79 * 31.6 \text{ s} = 0.4 \text{ s}$ (in a 31.6 s period)

For multi-slot packets the hopping is reduced according to the length of the packet.

Example for a DH3 packet (with a maximum length of three time slots)
 Channel staying time = $3 * 625 \mu\text{s} * 1600/3 * 1/\text{s} / 79 * 31.6 \text{ s} = 0.4 \text{ s}$ (in a 31.6 s period)

Example for a DH5 packet (with a maximum length of five time slots)
 Channel staying time = $5 * 625 \mu\text{s} * 1600/5 * 1/\text{s} / 79 * 31.6 \text{ s} = 0.4 \text{ s}$ (in a 31.6 s period)

This is according to the Bluetooth® Core Specification V2.0 & V2.1 & V3.0 & V4.0 (+ critical errata) for all Bluetooth® devices.

The following table shows the relations:

| Packet Size | Pulse Width [ms] * | Max. number of transmissions per channel in 31.6 sec |
|-------------|--------------------|--|
| DH1 | 0.366 | 640 |
| DH3 | 1.622 | 214 |
| DH5 | 2.870 | 128 |

* according to Bluetooth® specification

Results:

| Packet Size | Pulse Width [ms]* | Max. number of transmissions in 31.6 sec | Dwell time [Pulse width * Number of transmissions] |
|-------------|-------------------|--|--|
| DH1 | 0.366 | 640 | 234.2 ms |
| DH3 | 1.622 | 214 | 347.1 ms |
| DH5 | 2.870 | 128 | 367.4 ms |

Limits:

| FCC | IC |
|---|----------------------------|
| CFR Part 15.247 (a)(1)(iii) | RSS 210, Issue 8, A 8.3(1) |
| Time of occupancy (dwell time) | |
| The frequency hopping operation shall have an average time of occupancy on any frequency not exceeding 0.4 seconds within a duration in seconds equal to the number of hopping frequencies multiplied by 0.4. | |

Result: The result of the measurement is passed.

9.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Description:

Measurement of the 20dB bandwidth of the modulated signal. The measurement is performed according to the "Measurement Guidelines" (DA 00-705, March 30, 2000). EUT in single channel mode.

Measurement:

| Measurement parameter | |
|-----------------------|----------|
| Detector: | Peak |
| Sweep time: | 2 s |
| Video bandwidth: | 30 kHz |
| Resolution bandwidth: | 10 kHz |
| Span: | 3 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|---|----------------------------|
| CFR Part 15.247 (a)(1) | RSS 210, Issue 8, A 8.2(a) |
| Spectrum bandwidth of a FHSS system – 20 dB bandwidth | |
| GFSK < 1000 kHz | |

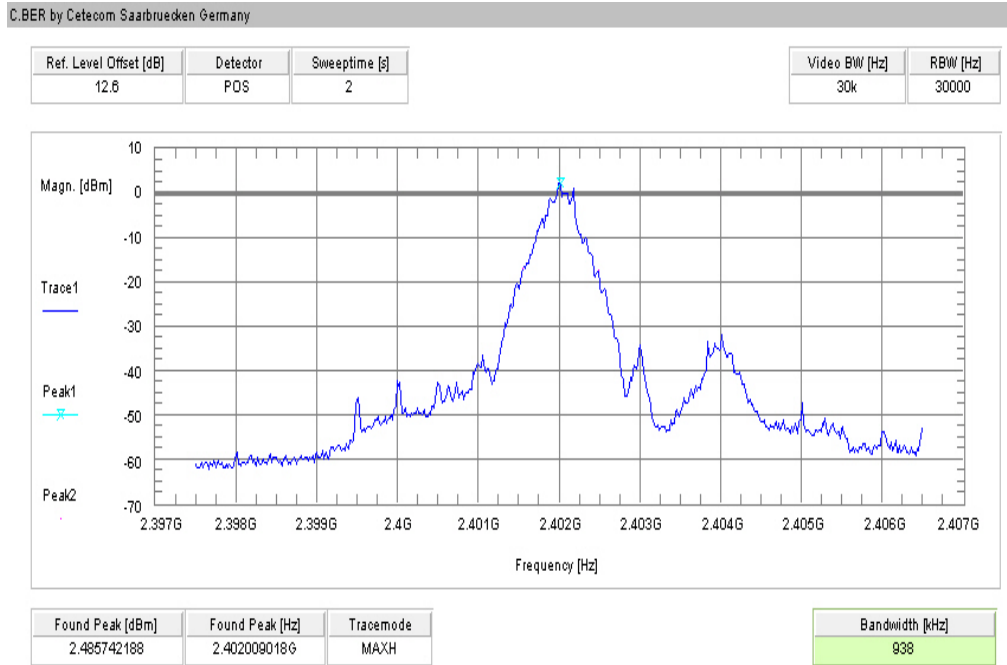
Results:

| Modulation Frequency | 20 dB BANDWIDTH [kHz] | | |
|-------------------------|-----------------------|----------|----------|
| | 2402 MHz | 2441 MHz | 2480 MHz |
| GFSK | 938 | 938 | 938 |
| Measurement uncertainty | ± 10 kHz | | |

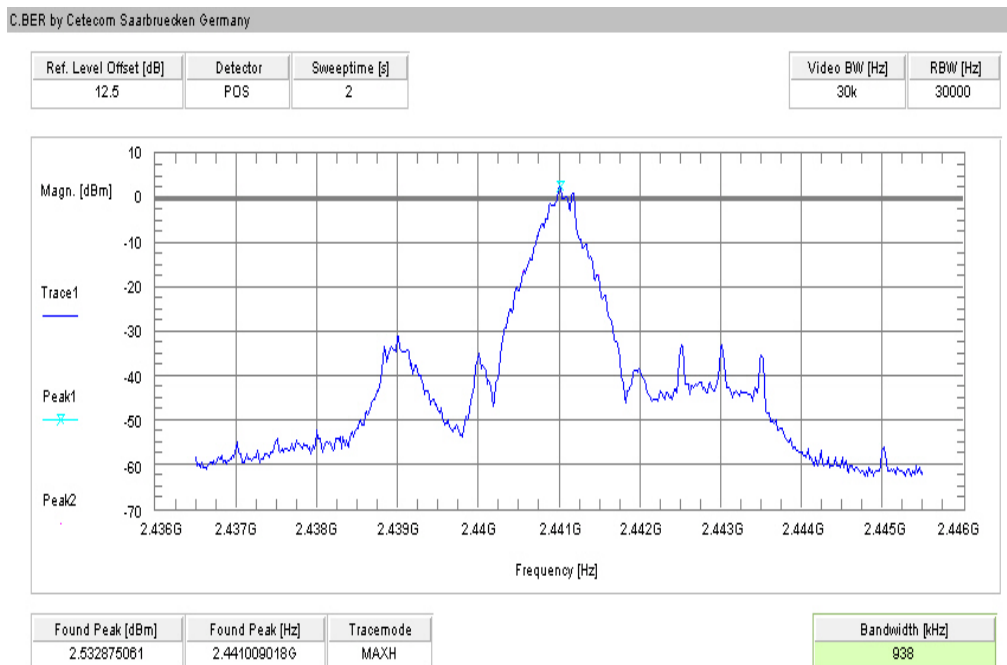
Result: The result of the measurement is passed.

Plots:

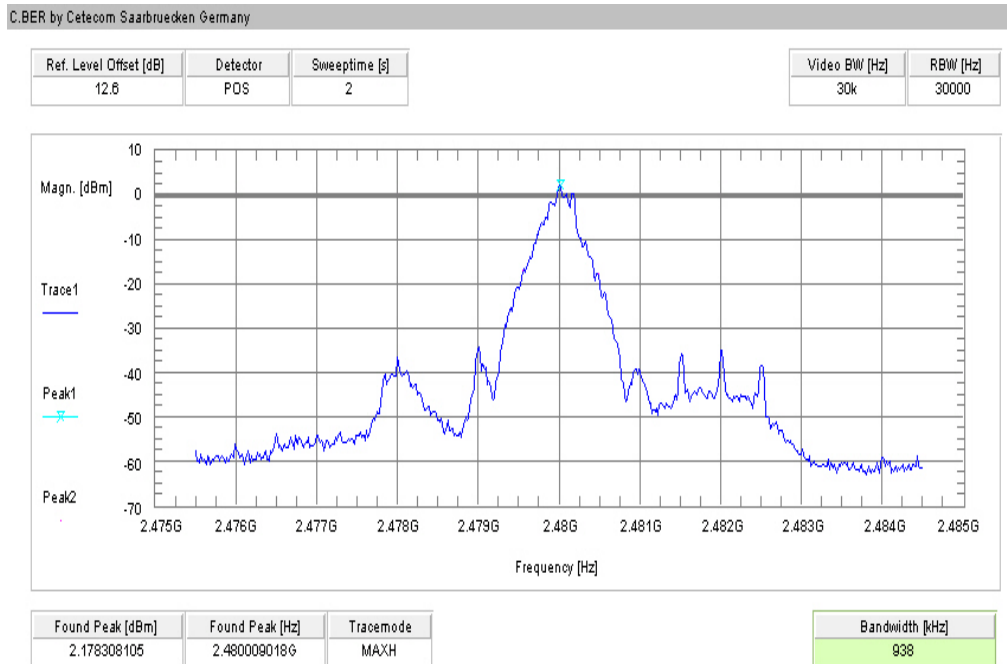
Plot 1: lowest channel – 2402 MHz, GFSK modulation



Plot 2: middle channel – 2441 MHz, GFSK modulation



Plot 3: highest channel – 2480 MHz, GFSK modulation



9.7 Maximum output power

Description:

Measurement of the maximum output power conducted and radiated. EUT in single channel mode.

Measurement:

| Measurement parameter | |
|-----------------------|----------|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | 3 MHz |
| Resolution bandwidth: | 3 MHz |
| Span: | 3 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|----------------------------|
| CFR Part 15.247 (b)(1) | RSS 210, Issue 8, A 8.4(2) |
| Maximum output power | |
| [Conducted: 0.125 W – antenna gain max. 6 dBi] Systems using more than 75 hopping channels: Conducted: 1.0 W – antenna gain max. 6 dBi | |

Results:

| Modulation Frequency | Maximum output power conducted [dBm] | | |
|-------------------------|--------------------------------------|----------|----------|
| | 2402 MHz | 2441 MHz | 2480 MHz |
| GFSK | 2.8 | 2.9 | 2.5 |
| Measurement uncertainty | ± 1 dB | | |

Result: The result of the measurement is passed.

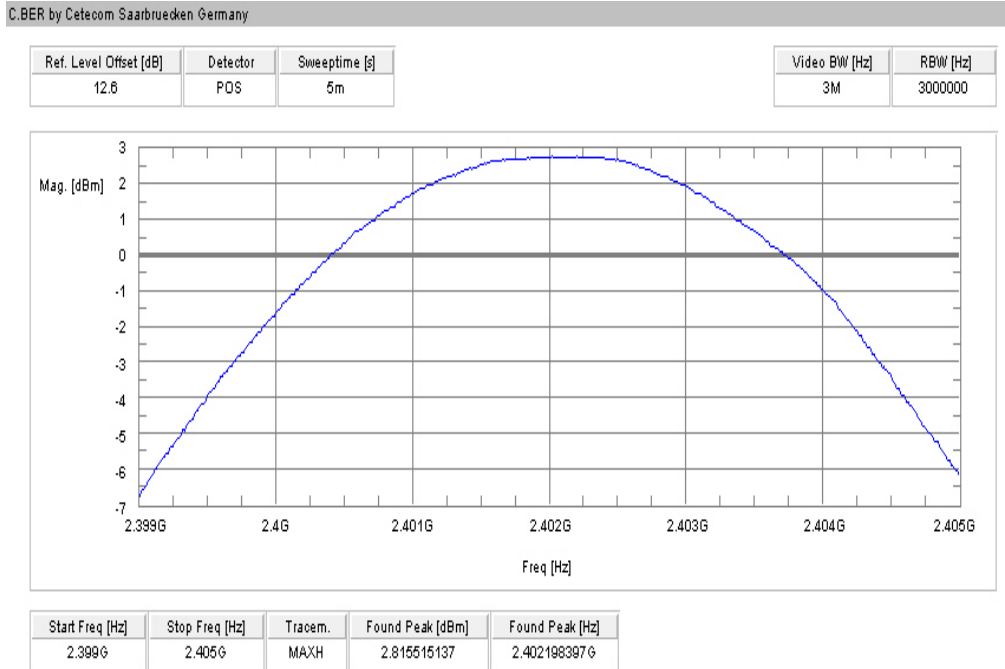
Results:

| Modulation Frequency | Maximum output power radiated - EIRP [dBm] | | |
|-------------------------|--|----------|----------|
| | 2402 MHz | 2441 MHz | 2480 MHz |
| GFSK | 3.9 | 3.8 | 3.7 |
| Measurement uncertainty | ± 3 dB | | |

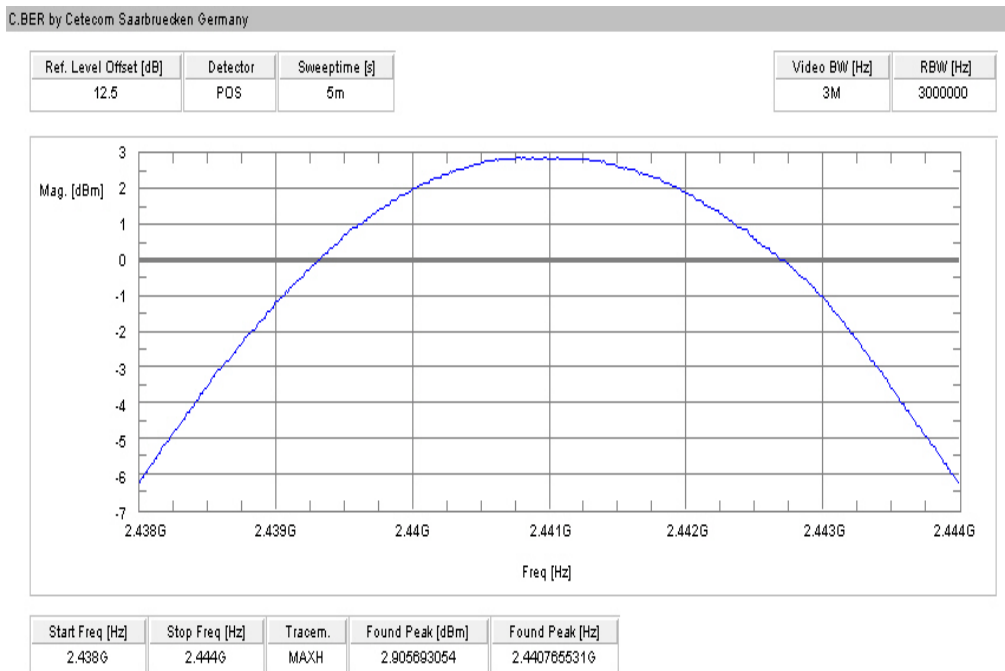
Result: The result of the measurement is passed.

Plots:

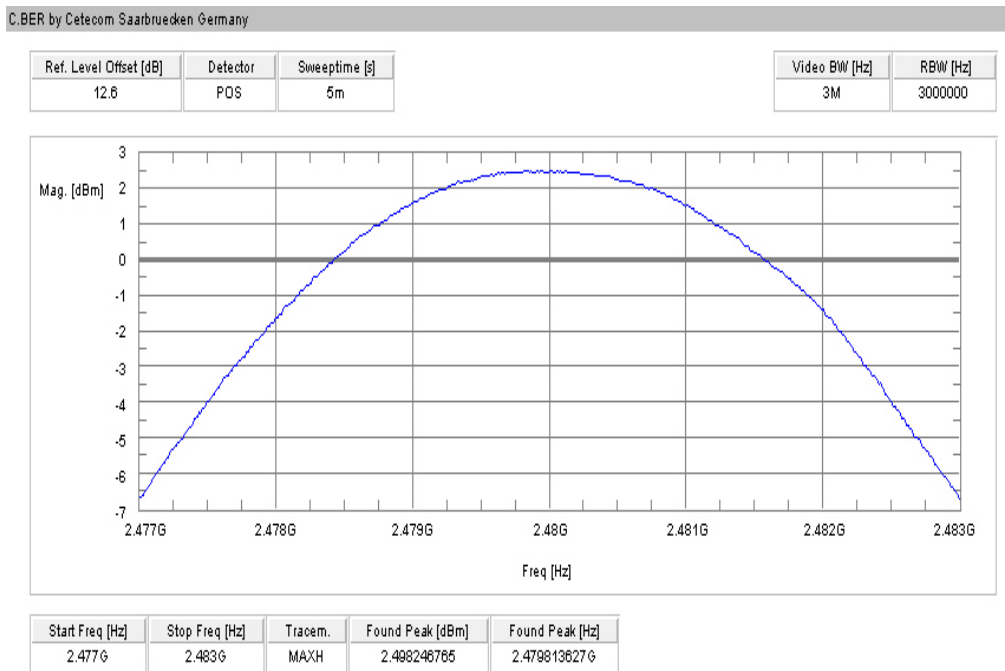
Plot 1: lowest channel – 2402 MHz, GFSK modulation



Plot 2: middle channel – 2441 MHz, GFSK modulation



Plot 3: highest channel – 2480 MHz, GFSK modulation



9.8 Band edge compliance conducted

Description:

Measurement of the conducted band edge compliance. EUT is measured at the lower and upper band edge in single channel and hopping mode. The measurement is repeated for all modulations.

Measurement:

| Measurement parameter | |
|-----------------------|---|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | 500 kHz |
| Resolution bandwidth: | 100 kHz |
| Span: | Lower Band Edge: 2395 – 2405 MHz Higher Band Edge: 2478 – 2489 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|--|-------------------------|
| CFR Part 15.247 (d) | RSS 210, Issue 8, A 8.5 |
| Band edge compliance conducted | |
| <p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.</p> | |

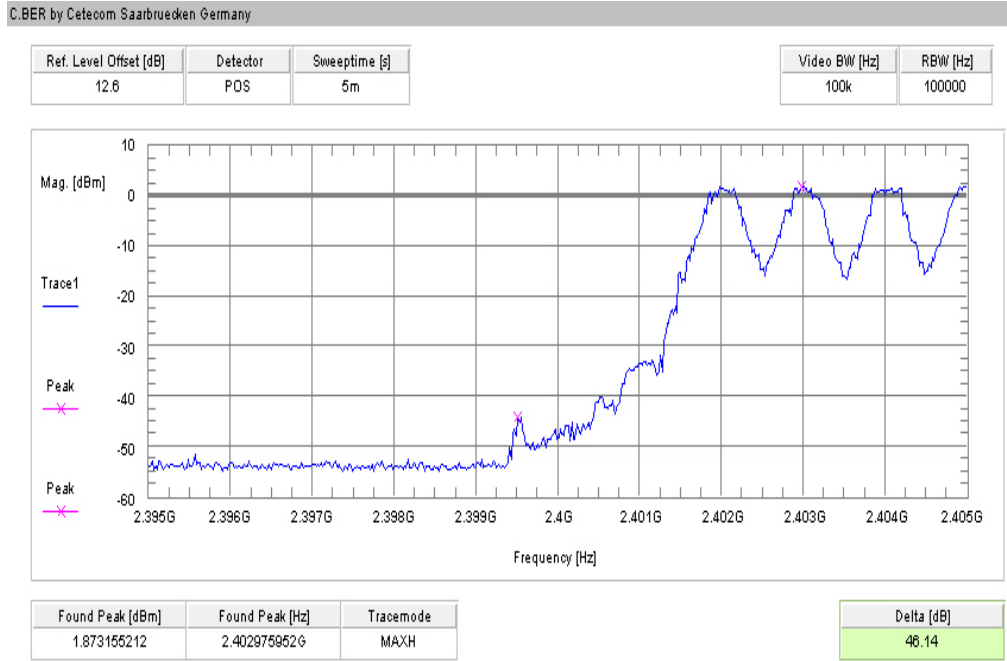
Results:

| Scenario Modulation | Band edge compliance conducted [dB] | | |
|-------------------------------|-------------------------------------|------------|-------|
| | GFSK | Pi/4 DQPSK | 8DPSK |
| Lower band edge – hopping off | > 20 dB | -/- | -/- |
| Lower band edge – hopping on | > 20 dB | -/- | -/- |
| Upper band edge – hopping off | > 20 dB | -/- | -/- |
| Upper band edge – hopping on | > 20 dB | -/- | -/- |
| Measurement uncertainty | ± 1.5 dB | | |

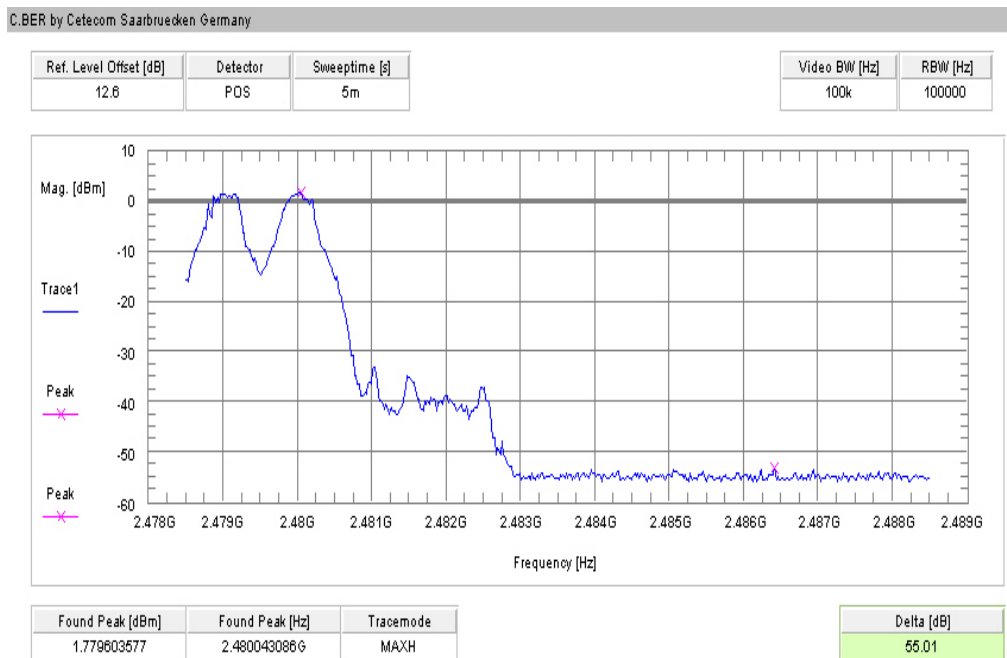
Result: The result of the measurement is passed.

Plots:

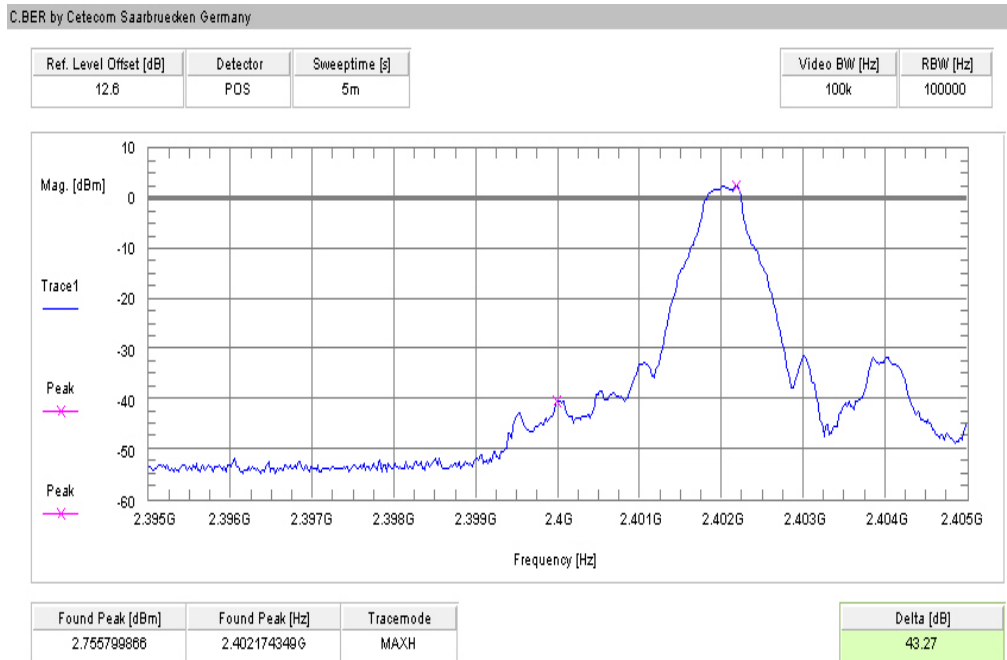
Plot 1: Lower band edge – hopping on, GFSK modulation



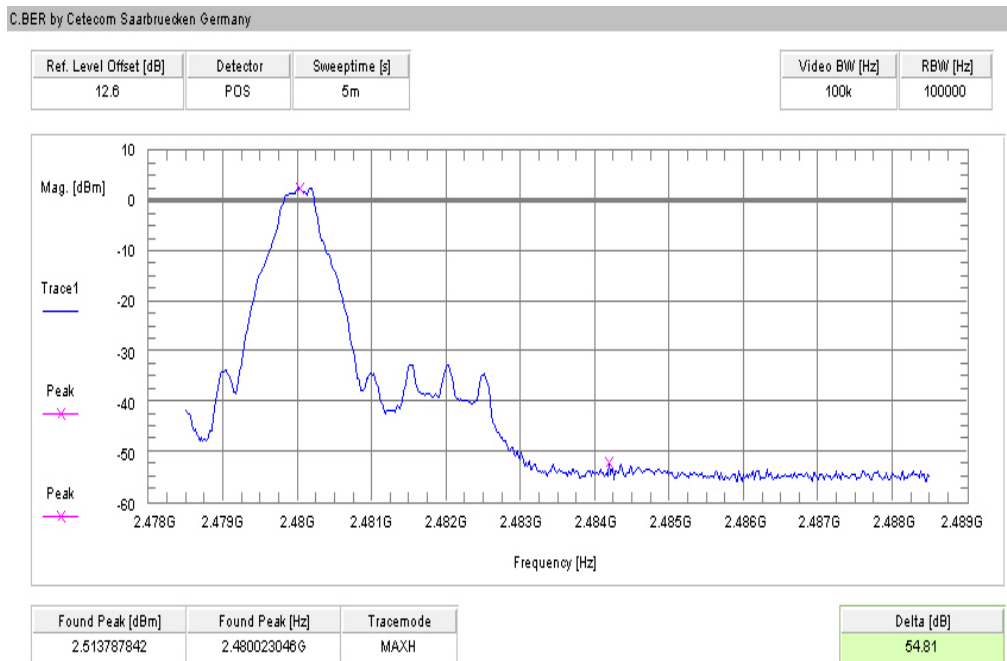
Plot 2: Upper band edge – hopping on, GFSK modulation



Plot 3: Lower band edge – hopping off, GFSK modulation



Plot 4: Upper band edge – hopping off, GFSK modulation



9.9 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit channel is channel 00 for the lower restricted band and channel 78 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

Measurement:

| Measurement parameter | |
|-----------------------|---|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | 10 Hz |
| Resolution bandwidth: | 1 MHz |
| Span: | Lower Band: 2300 – 2400 MHz Higher Band: 2480 – 2500 MHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|---|-------------------------|
| CFR Part 15.205 | RSS 210, Issue 8, A 8.5 |
| Band edge compliance radiated | |
| <p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).</p> | |
| 54 dB μ V/m AVG | |

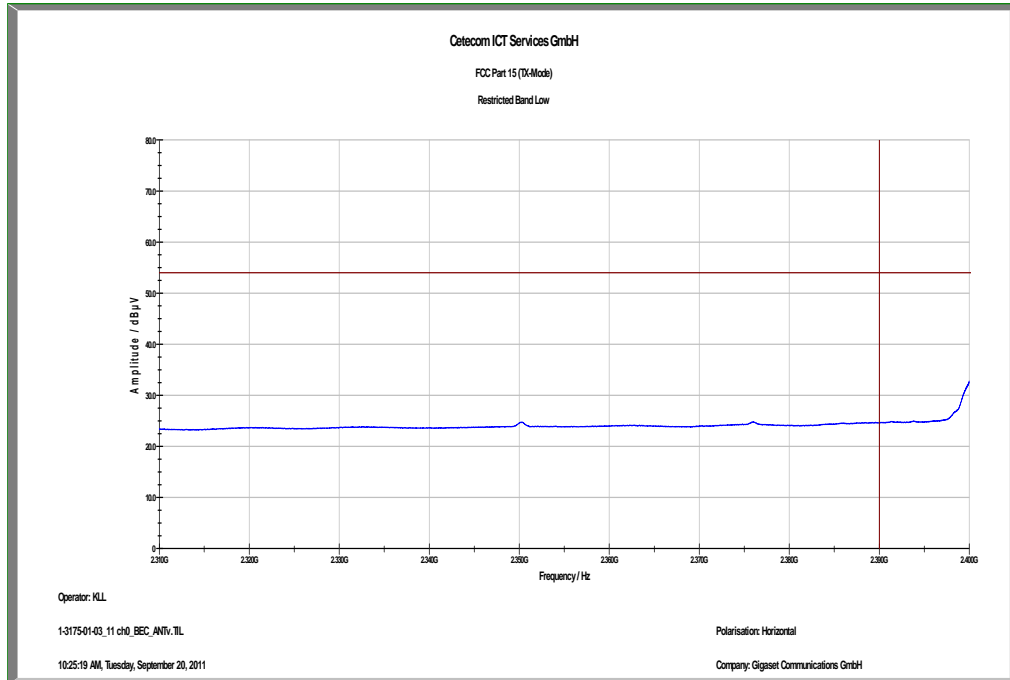
Results:

| Scenario | Band edge compliance radiated [dB μ V/m] | | |
|-------------------------|--|------------|-------|
| | GFSK | Pi/4 DQPSK | 8DPSK |
| Modulation | | | |
| Lower restricted band | < 54 | -/- | -/- |
| Upper restricted band | < 54 | -/- | -/- |
| Measurement uncertainty | \pm 3 dB | | |

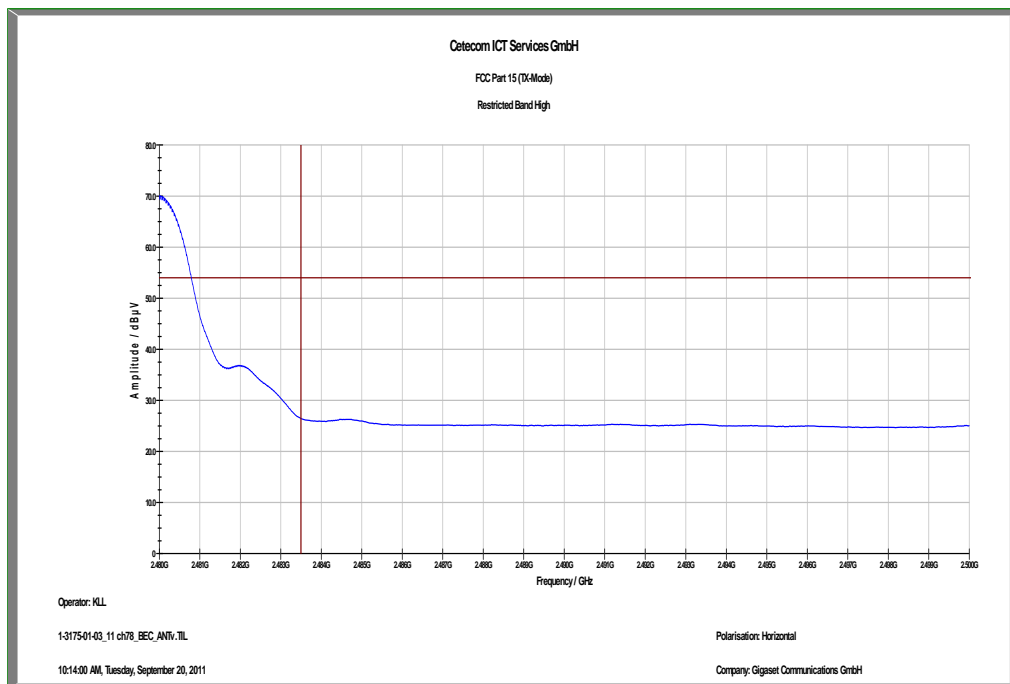
Result: The result of the measurement is passed.

Plots:

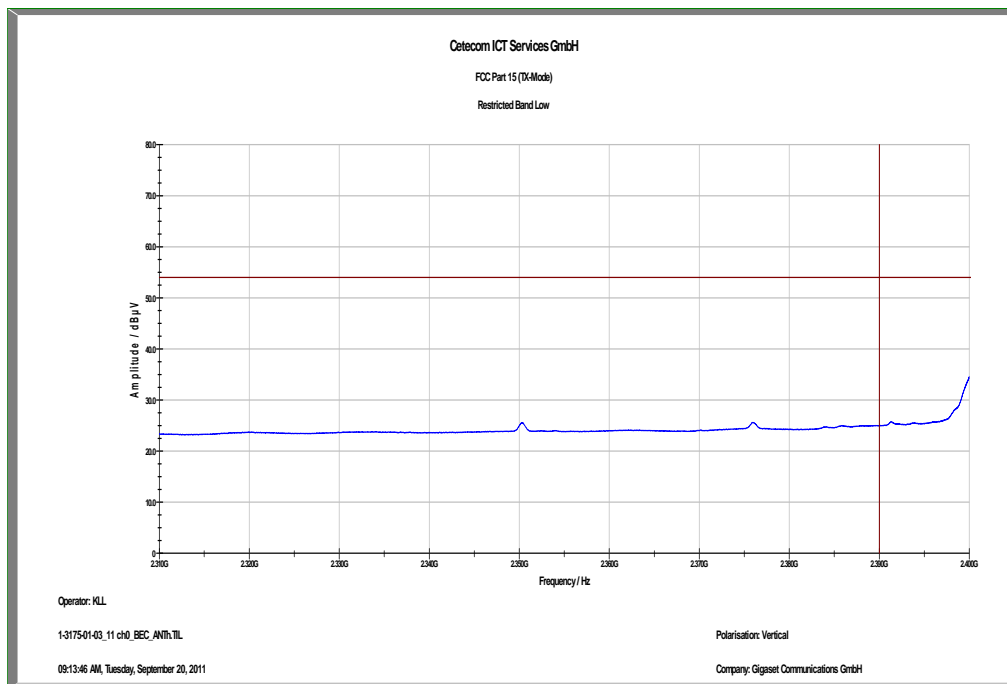
Plot 1: Lower band edge, GFSK modulation, vertical polarization



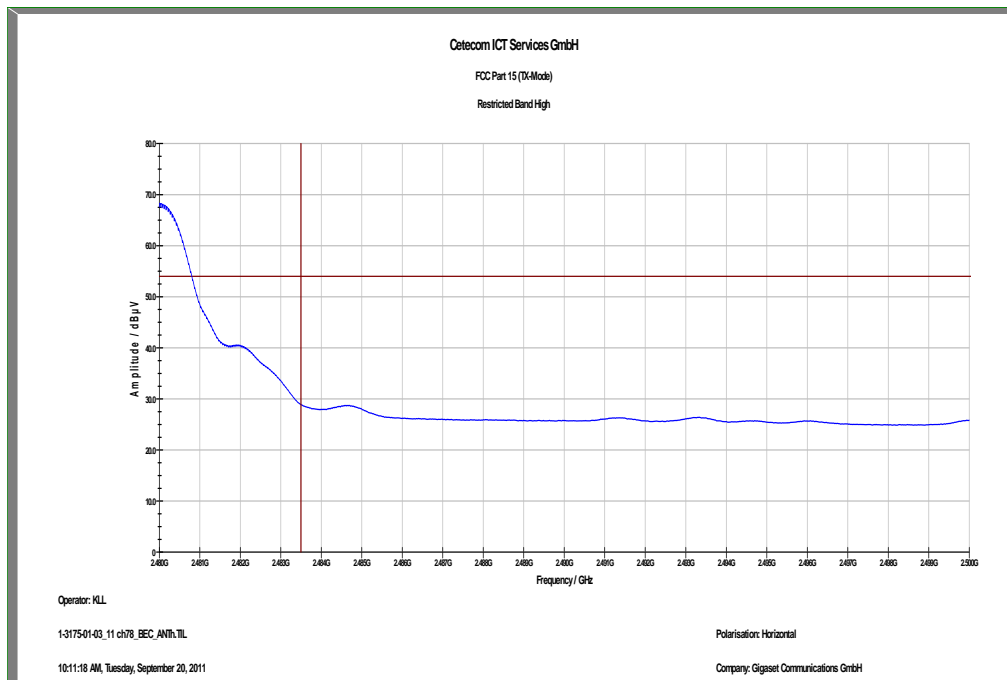
Plot 2: Upper band edge, GFSK modulation, vertical polarization



Plot 3: Lower band edge, GFSK modulation, horizontal polarization



Plot 4: Upper band edge, GFSK modulation, horizontal polarization



9.10 TX spurious emissions conducted

Description:

Measurement of the conducted spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is repeated for all modulations.

Measurement:

| Measurement parameter | |
|-----------------------|--|
| Detector: | Peak |
| Sweep time: | Auto |
| Video bandwidth: | F < 1 GHz: 500 kHz F > 1 GHz: 500 kHz |
| Resolution bandwidth: | F < 1 GHz: 100 kHz F > 1 GHz: 100 kHz |
| Span: | 9 kHz to 25 GHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | IC |
|---|-------------------------|
| CFR Part 15.247(d) | RSS 210, Issue 8, A 8.5 |
| TX spurious emissions conducted | |
| <p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required</p> | |

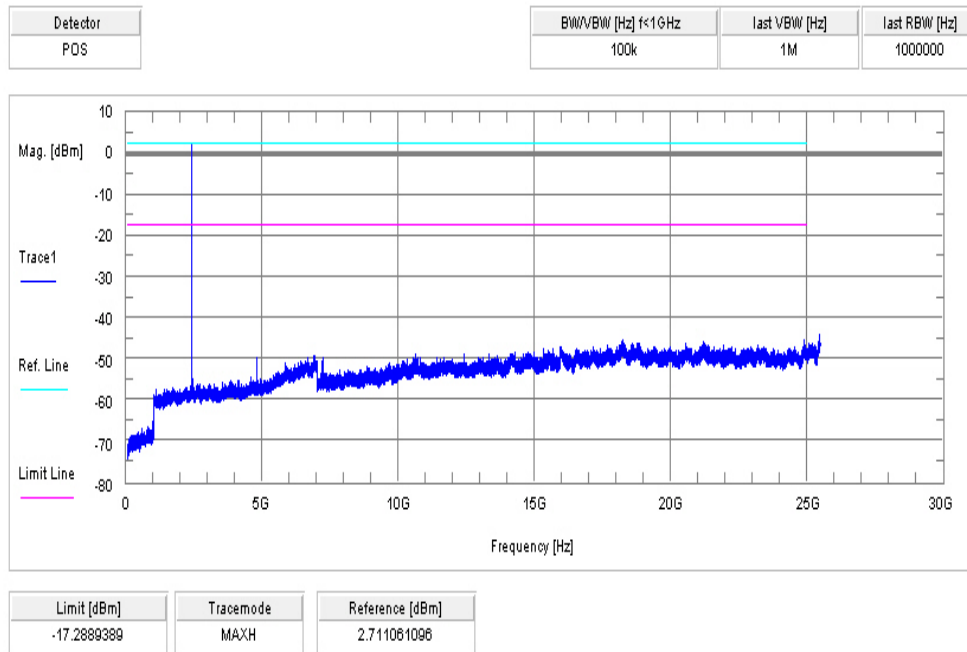
Results:

| TX spurious emissions conducted | | | | | |
|---------------------------------|--|-----------------------------|-----------------------------------|--|---------------------|
| GFSK - mode | | | | | |
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 2402 | | 2.7 | 30 dBm | | Operating frequency |
| <i>No critical peaks found</i> | | | -20 dBc | | complies |
| | | | | | |
| 2441 | | 2.8 | 30 dBm | | Operating frequency |
| <i>No critical peaks found</i> | | | -20 dBc | | complies |
| | | | | | |
| 2480 | | 2.5 | 30 dBm | | Operating frequency |
| <i>No critical peaks found</i> | | | -20 dBc | | complies |
| | | | | | |
| Measurement uncertainty | | ± 3 dB | | | |

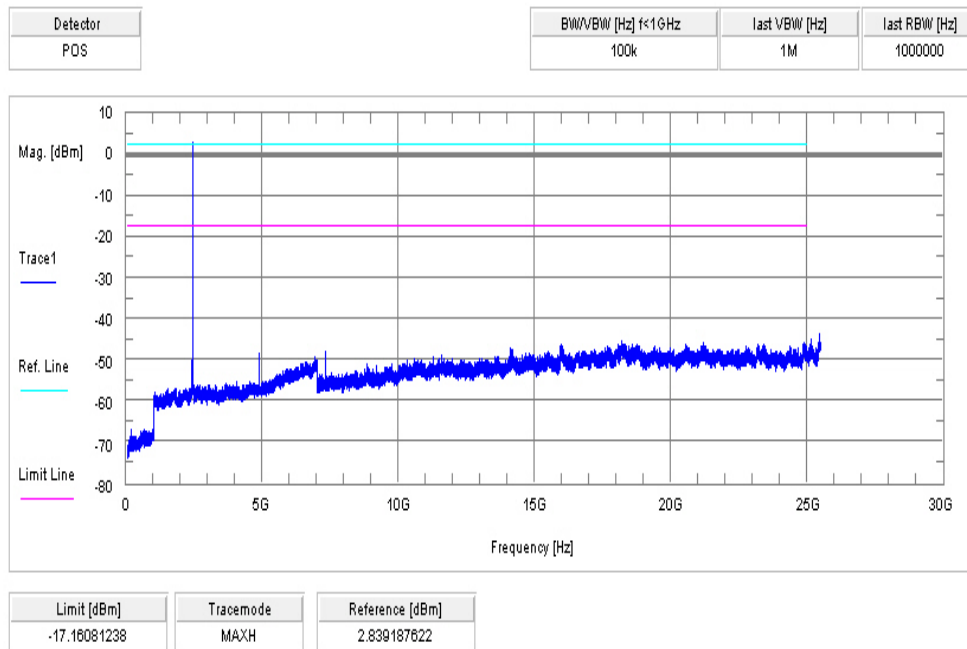
Result: The result of the measurement is passed.

Plots:

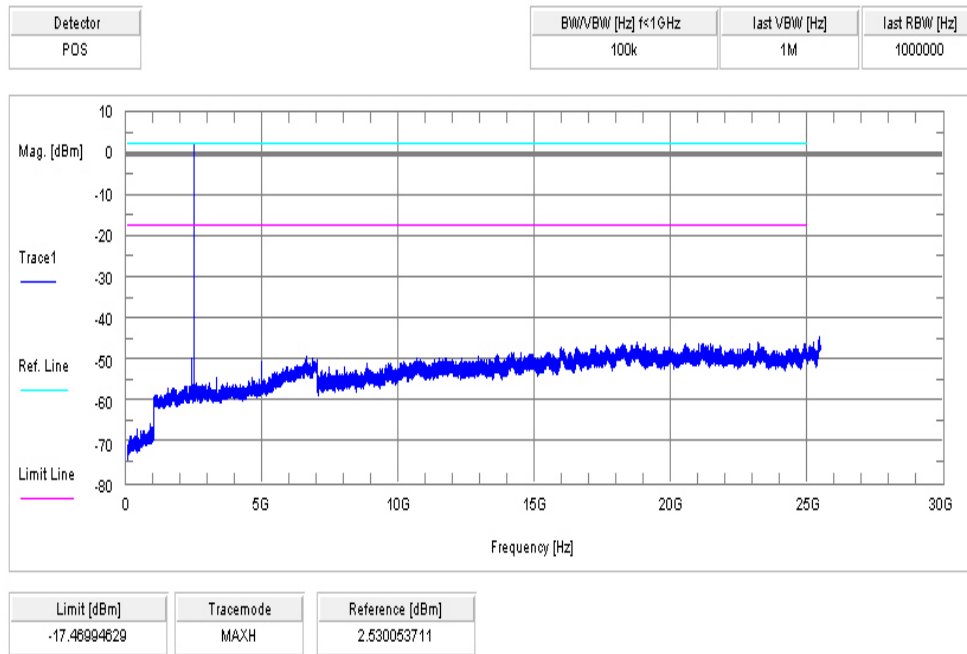
Plot 1: lowest channel – 2402 MHz, GFSK modulation



Plot 2: middle channel – 2441 MHz, GFSK modulation



Plot 3: highest channel – 2480 MHz, GFSK modulation



9.11 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is performed in DH5 mode.

Measurement:

| Measurement parameter | |
|-----------------------|---|
| Detector: | Peak / Quasi Peak |
| Sweep time: | Auto |
| Video bandwidth: | Sweep: 100 kHz Remeasurement: 10 Hz |
| Resolution bandwidth: | F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz |
| Span: | 30 MHz to 25 GHz |
| Trace-Mode: | Max Hold |
| Measured Modulation: | <input checked="" type="checkbox"/> GFSK <input type="checkbox"/> Pi/4 DQPSK <input type="checkbox"/> 8DPSK |

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

Limits:

| FCC | | IC | |
|---|-------------------------|-------------------------|--|
| CFR Part 15.247(d) | | RSS 210, Issue 8, A 8.5 | |
| TX spurious emissions radiated | | | |
| <p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</p> | | | |
| §15.209 | | | |
| Frequency (MHz) | Field strength (dBµV/m) | Measurement distance | |
| 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] | | | | | | | | |
|---|----------|----------------|----------|----------|----------------|----------|----------|----------------|
| 2402 MHz | | | 2441 MHz | | | 2480 MHz | | |
| F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] | F [MHz] | Detector | Level [dBµV/m] |
| 1150 | PK | 40.2 | 1150 | PK | 41.2 | 1250 | PK | 43.7 |
| 1250 | PK | 44.8 | 1250 | PK | 44.9 | 1450 | PK | 39.7 |
| 1450 | PK | 39.8 | 1450 | PK | 38.9 | 4960 | PK | 44.1 |
| 4804 | PK | 39.1 | 1750 | PK | 28.9 | 7440 | PK | 37.4 |
| 7206 | PK | 37.2 | 4882 | PK | 42.9 | | | |
| 9608 | PK | Noise floor | 7323 | PK | 37.9 | | | |
| 12010 | PK | Noise floor | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Measurement uncertainty | | | ± 3 dB | | | | | |

Result: The result of the measurement is passed.

Plots:

Plot 1: 30 MHz to 1 GHz, TX mode, channel 00, vertical & horizontal polarization 13175110104F_DA.Rtf

Common Information

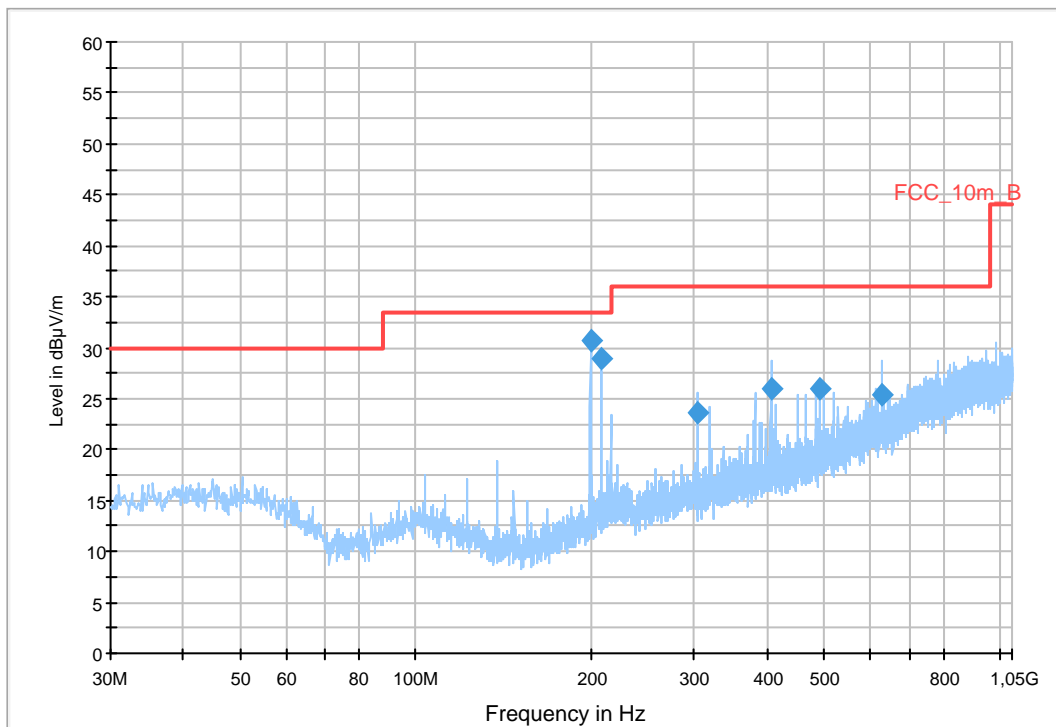
EUT: Saturn DX800A
 Serial Number: USA Sample 5
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: TX BT Ch. 0
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |

FCC_10m(B)_3



Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 199.069650 | 30.7 | 1000.0 | 120.000 | 98.0 | V | 170.0 | 11.6 | 2.8 | 33.5 | |
| 207.313200 | 29.0 | 1000.0 | 120.000 | 98.0 | V | -6.0 | 12.0 | 4.5 | 33.5 | |
| 302.731800 | 23.6 | 1000.0 | 120.000 | 98.0 | V | 271.0 | 14.6 | 12.4 | 36.0 | |
| 406.524000 | 25.9 | 1000.0 | 120.000 | 170.0 | H | 8.0 | 17.0 | 10.1 | 36.0 | |
| 492.454200 | 26.0 | 1000.0 | 120.000 | 170.0 | H | 170.0 | 18.5 | 10.0 | 36.0 | |
| 630.313200 | 25.4 | 1000.0 | 120.000 | 170.0 | H | 80.0 | 21.0 | 10.6 | 36.0 | |

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch
FW 1.0

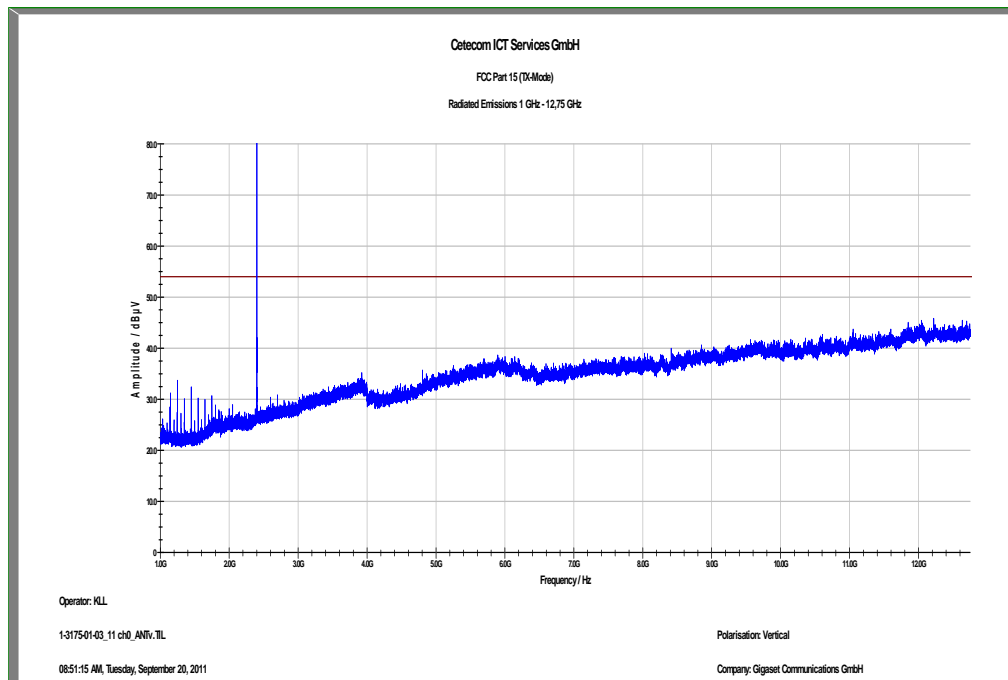
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

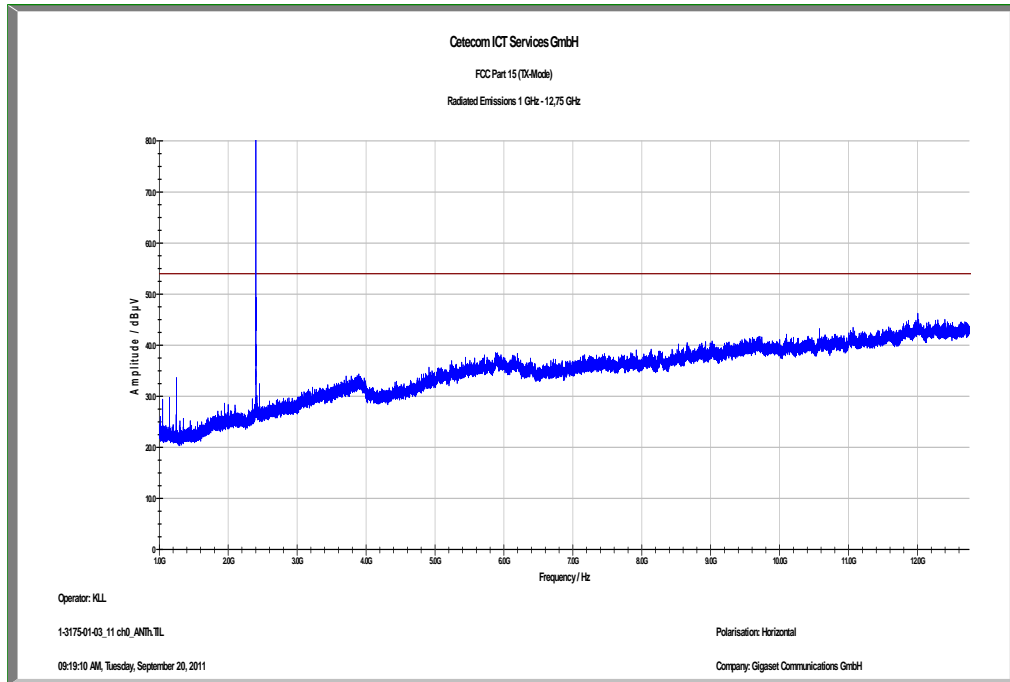
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

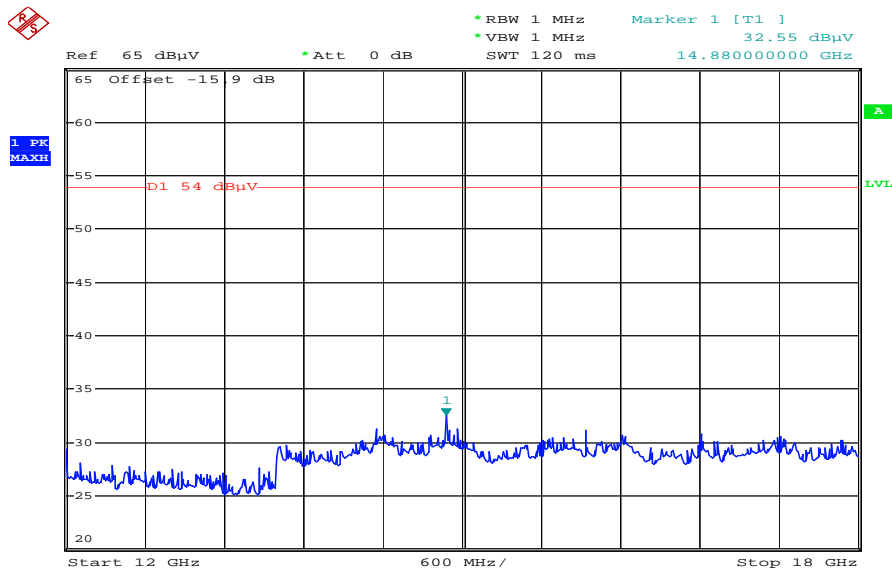
Plot 2: 1 GHz to 12.75 GHz, TX mode, channel 00, vertical polarization



Plot 3: 1 GHz to 12.75 GHz, TX mode, channel 00, horizontal polarization

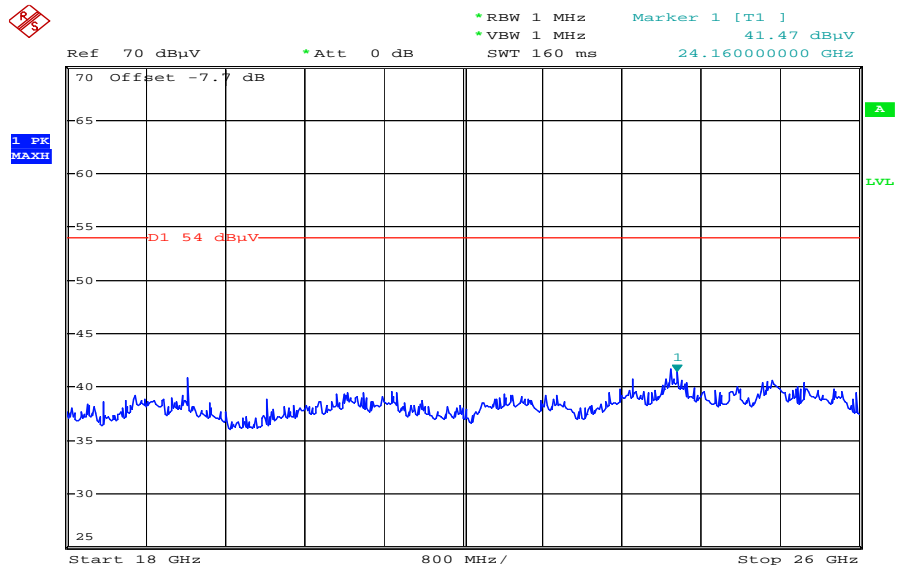


Plot 4: 12 GHz to 18 GHz, TX mode, channel 00, vertical & horizontal polarization



Date: 20.SEP.2011 14:14:43

Plot 5: 18 GHz to 26 GHz, TX mode, channel 00, vertical & horizontal polarization



Date: 20.SEP.2011 14:21:25

Plot 6: 30 MHz to 1 GHz, TX mode, channel 39, vertical & horizontal polarization 13175110104F_DB.Rtf

Common Information

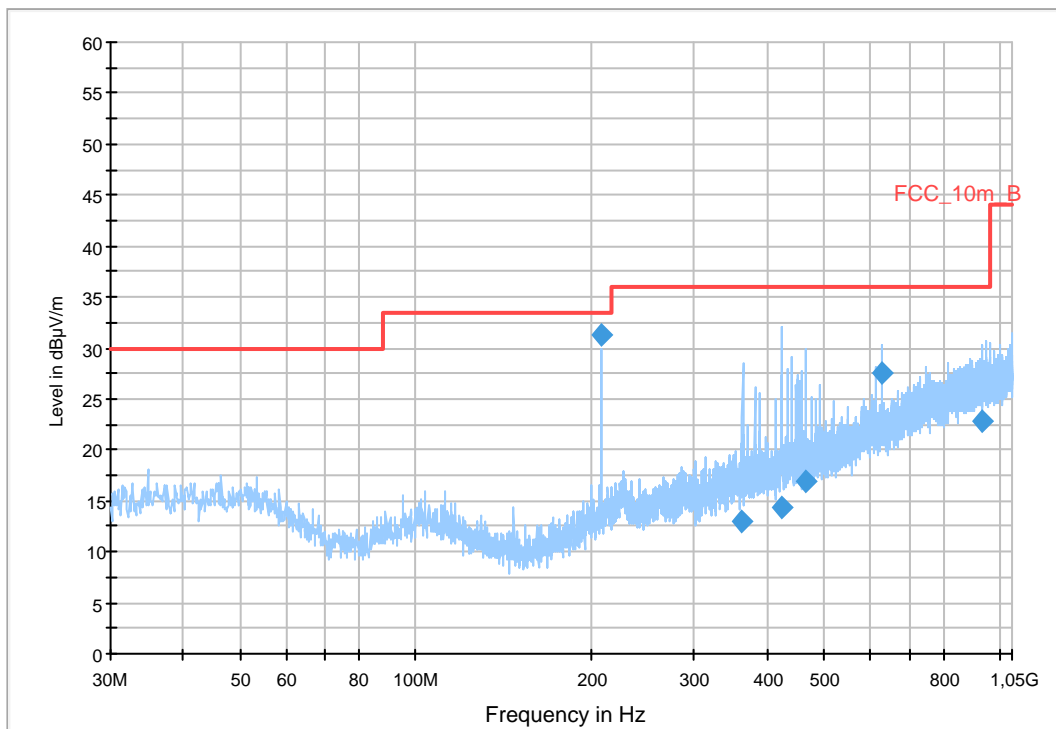
EUT: Saturn DX800A
 Serial Number: USA Sample 5
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: TX BT Ch. 39
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

| Subrange | Step Size | Detectors | IF BW | Meas. Time | Preamp |
|----------------|-----------|-----------|---------|------------|--------|
| 30 MHz - 2 GHz | 60 kHz | QPK | 120 kHz | 1 s | 20 dB |

FCC_10m(B)_3



Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) | Comment |
|-----------------|--------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------|---------|
| 207.386550 | 31.3 | 1000.0 | 120.000 | 98.0 | V | -6.0 | 12.0 | 2.2 | 33.5 | |
| 362.453700 | 13.0 | 1000.0 | 120.000 | 115.0 | V | 172.0 | 16.3 | 23.0 | 36.0 | |
| 423.522600 | 14.4 | 1000.0 | 120.000 | 170.0 | H | 285.0 | 17.3 | 21.6 | 36.0 | |
| 465.971550 | 17.0 | 1000.0 | 120.000 | 170.0 | H | 106.0 | 18.0 | 19.0 | 36.0 | |
| 630.385350 | 27.5 | 1000.0 | 120.000 | 145.0 | H | 86.0 | 21.0 | 8.5 | 36.0 | |
| 933.010500 | 22.8 | 1000.0 | 120.000 | 98.0 | H | 94.0 | 25.3 | 13.2 | 36.0 | |

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch
FW 1.0

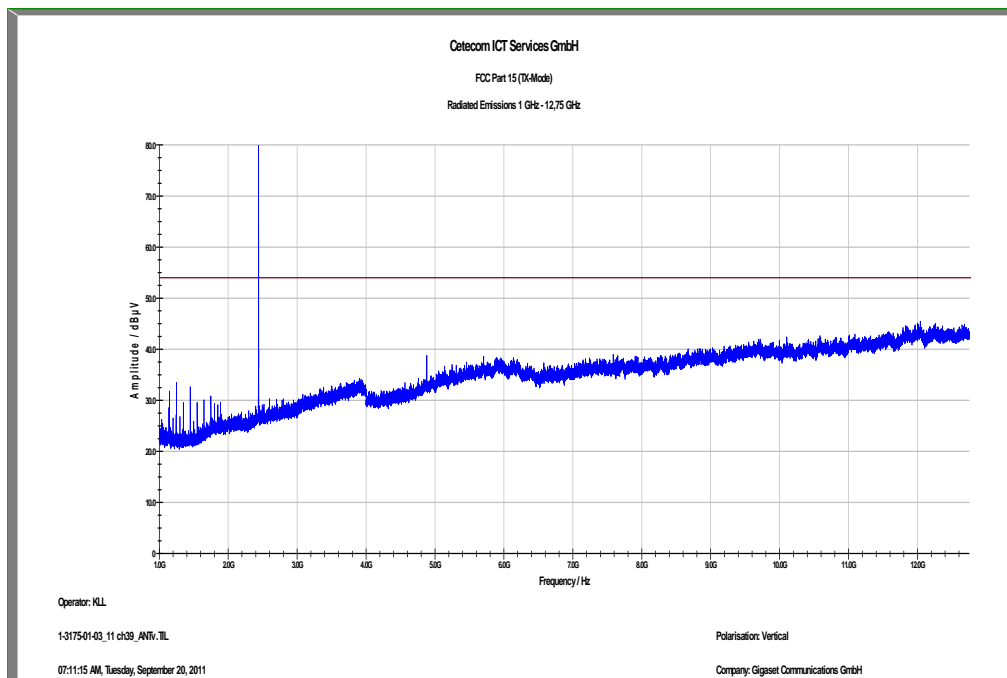
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

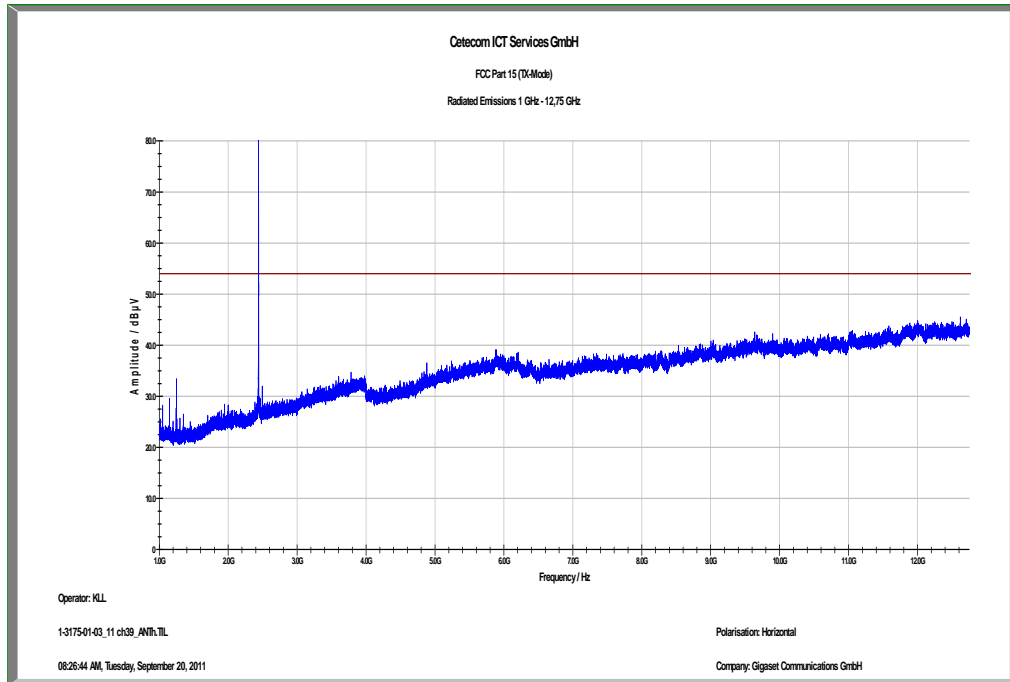
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

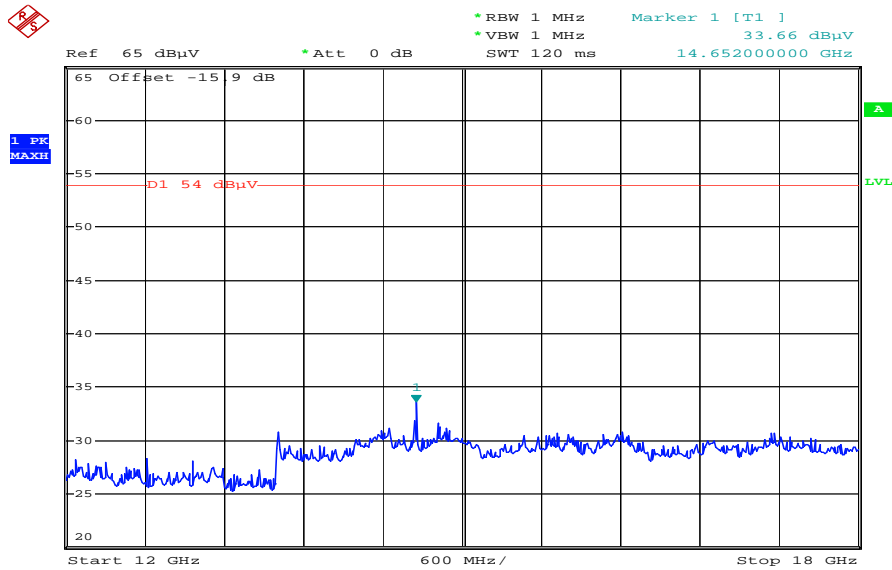
Plot 7: 1 GHz to 12.75 GHz, TX mode, channel 39, vertical polarization



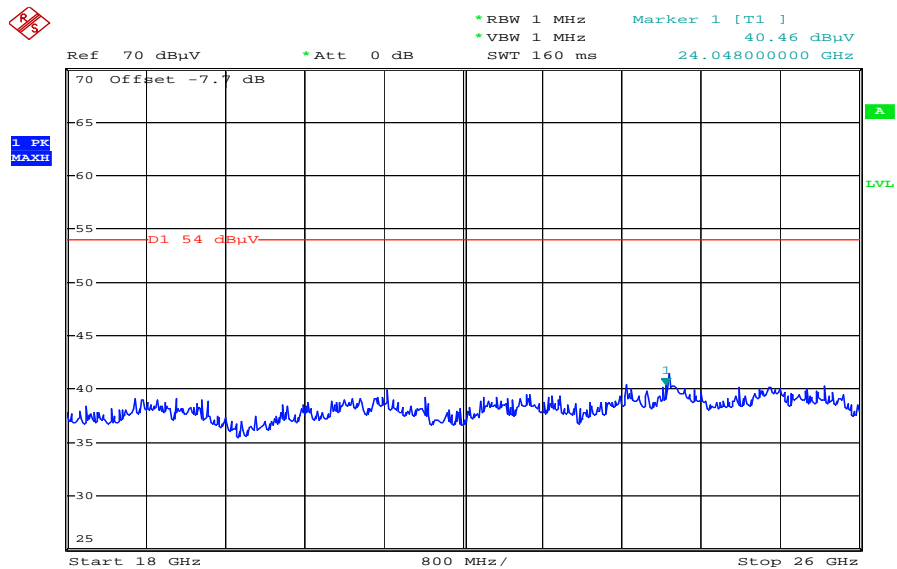
Plot 8: 1 GHz to 12.75 GHz, TX mode, channel 39, horizontal polarization



Plot 9: 12 GHz to 18 GHz, TX mode, channel 39, vertical & horizontal polarization



Plot 10: 18 GHz to 26 GHz, TX mode, channel 39, vertical & horizontal polarization



Date: 20.SEP.2011 14:20:28

Plot 11: 30 MHz to 1 GHz, TX mode, channel 78, vertical & horizontal polarization 13175110104F_DC.Rtf

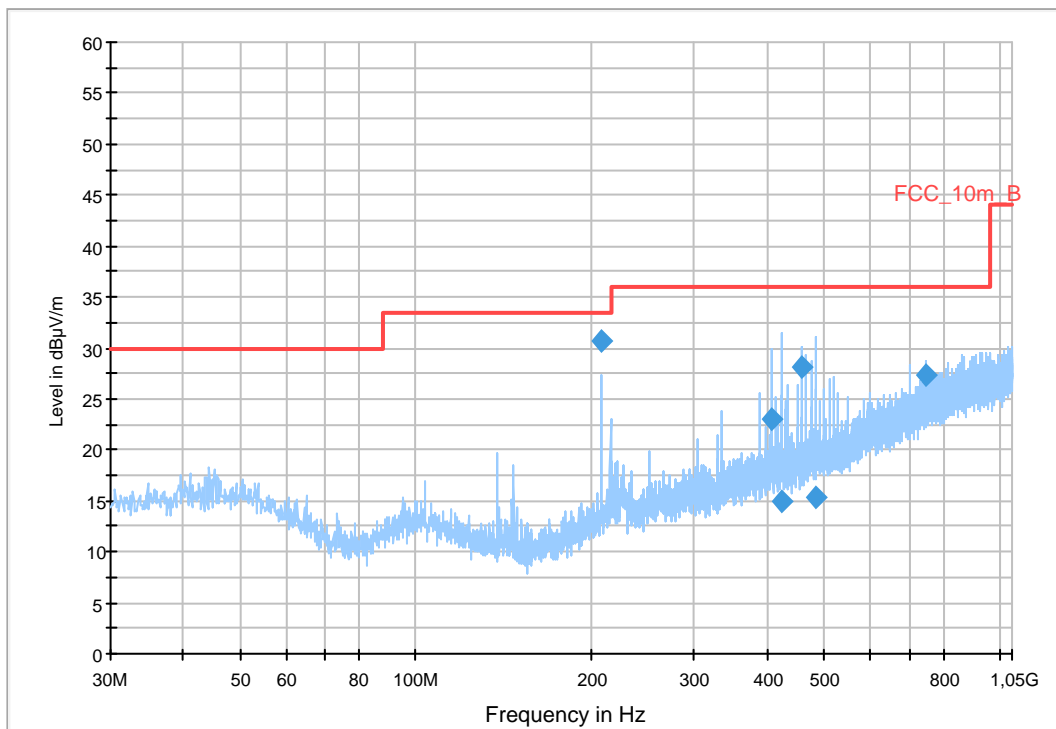
Common Information

EUT: Saturn DX800A
 Serial Number: USA Sample 5
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: TX BT Ch. 78
 Operator Name: LAN
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dB μ V/m
Subrange **Step Size** **Detectors** **IF BW** **Meas. Time** **Preamp**
 30 MHz - 2 GHz 60 kHz QPK 120 kHz 1 s 20 dB

FCC_10m(B)_3



Final Result 1

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|---------|
| 207.378750 | 30.7 | 1000.0 | 120.000 | 98.0 | V | 170.0 | 12.0 | 2.8 | 33.5 | |
| 406.551000 | 23.0 | 1000.0 | 120.000 | 98.0 | V | 196.0 | 17.0 | 13.0 | 36.0 | |
| 422.668050 | 15.0 | 1000.0 | 120.000 | 170.0 | H | 90.0 | 17.3 | 21.0 | 36.0 | |
| 458.309250 | 28.2 | 1000.0 | 120.000 | 170.0 | H | 91.0 | 17.8 | 7.8 | 36.0 | |
| 484.690050 | 15.3 | 1000.0 | 120.000 | 120.0 | H | 102.0 | 18.4 | 20.7 | 36.0 | |
| 749.984400 | 27.4 | 1000.0 | 120.000 | 170.0 | H | 274.0 | 23.7 | 8.6 | 36.0 | |

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch
FW 1.0

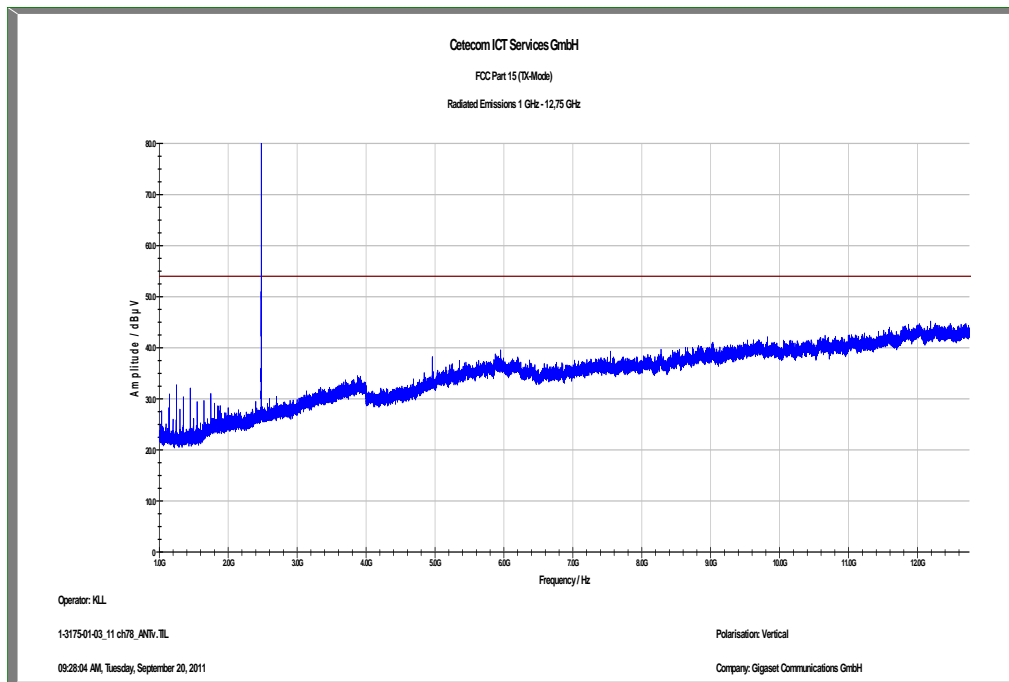
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

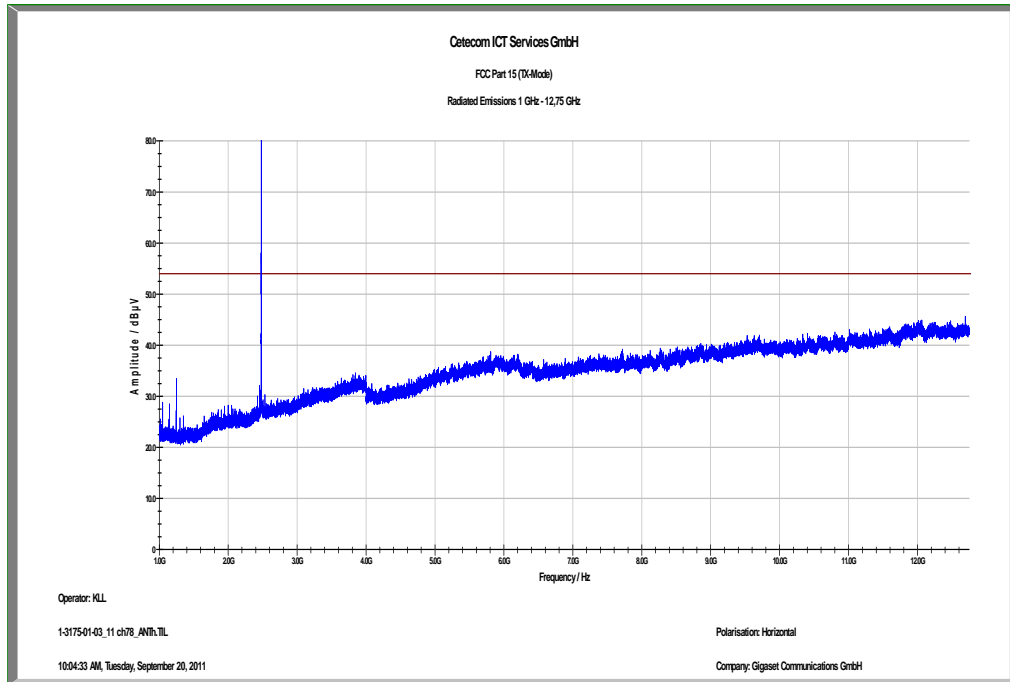
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

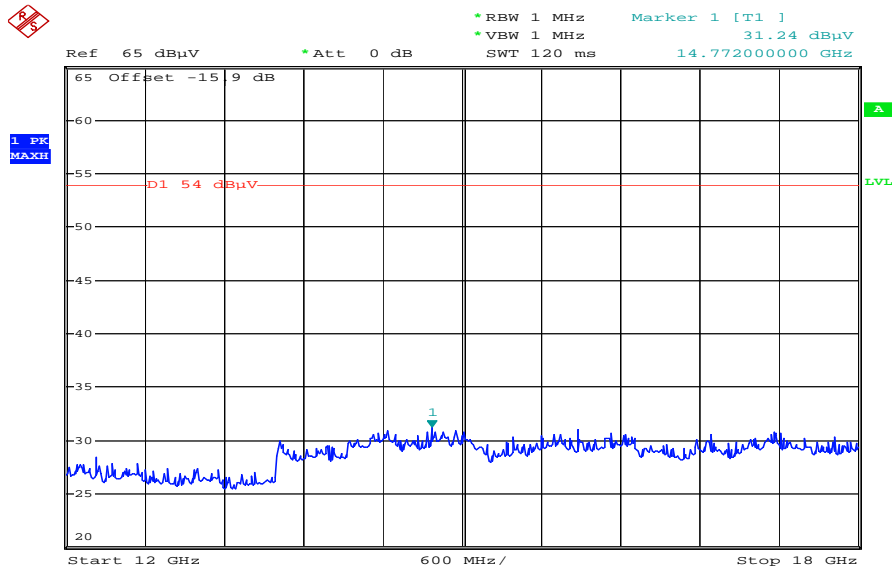
Plot 12: 1 GHz to 12.75 GHz, TX mode, channel 78, vertical polarization



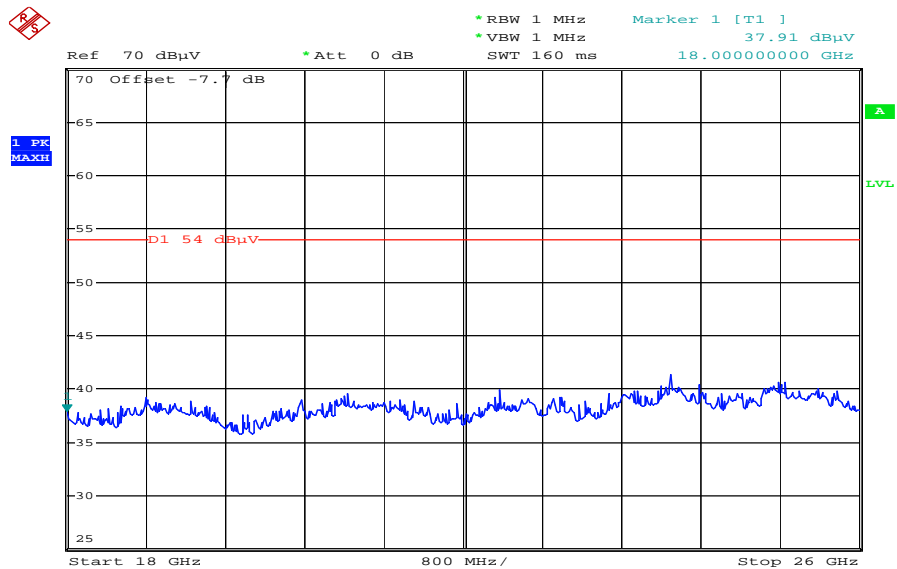
Plot 13: 1 GHz to 12.75 GHz, TX mode, channel 78, horizontal polarization



Plot 14: 12 GHz to 18 GHz, TX mode, channel 78, vertical & horizontal polarization



Plot 15: 18 GHz to 26 GHz, TX mode, channel 78, vertical & horizontal polarization



Date: 20.SEP.2011 14:19:30

9.12 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode. The EUT is detached so all oscillators are active.

Measurement:

| Measurement parameter | |
|-----------------------|--|
| Detector: | Peak / Quasi peak |
| Sweep time: | Auto |
| Video bandwidth: | Sweep: 100 kHz Remeasurement: 10 Hz |
| Resolution bandwidth: | F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz |
| Span: | 30 MHz to 25 GHz |
| Trace-Mode: | Max Hold |

Limits:

| FCC | | IC | |
|--------------------------------|-------------------------------|------------------------|--|
| CFR Part 15.109 | | RSS Gen, Issue 2, 4.10 | |
| RX Spurious Emissions Radiated | | | |
| Frequency (MHz) | Field strength (dB μ V/m) | Measurement distance | |
| 30 - 88 | 30.0 | 10 | |
| 88 - 216 | 33.5 | 10 | |
| 216 - 960 | 36.0 | 10 | |
| Above 960 | 54.0 | 3 | |

Results:

| RX spurious emissions radiated [dB μ V/m] | | |
|---|----------|----------------------|
| F [MHz] | Detector | Level [dB μ V/m] |
| 1150 | PK | 40.4 |
| 1250 | PK | 44.3 |
| 1350 | PK | 37.2 |
| 1450 | PK | 34.8 |
| 1650 | PK | 29.4 |
| Measurement uncertainty | | ± 3 dB |

Result: The result of the measurement is passed.

Plot 1: 30 MHz to 1 GHz, RX mode, vertical & horizontal polarization 13175110104F_DD.Rtf

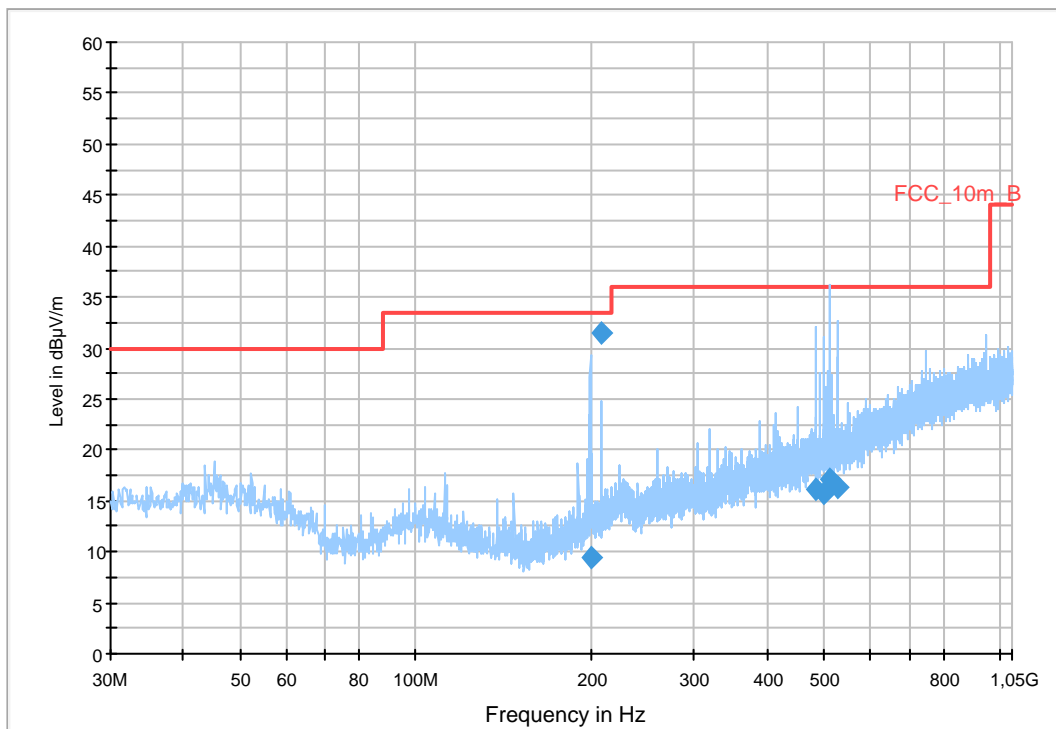
Common Information

EUT: Saturn DX800A
 Serial Number: USA Sample 5
 Test Description: FCC part 15 class B @ 10 m
 Operating Conditions: BT idle
 Operator Name: LAN
 Comment: AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dB μ V/m
Subrange **Step Size** **Detectors** **IF BW** **Meas. Time** **Preamp**
 30 MHz - 2 GHz 60 kHz QPK 120 kHz 1 s 20 dB

FCC_10m(B)_3



Final Result 1

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|-------------|--------------|---------------|------------|-------------|----------------------|---------|
| 199.645800 | 9.5 | 1000.0 | 120.000 | 170.0 | V | 172.0 | 11.7 | 24.0 | 33.5 | |
| 207.343800 | 31.4 | 1000.0 | 120.000 | 98.0 | V | -6.0 | 12.0 | 2.1 | 33.5 | |
| 484.461150 | 16.2 | 1000.0 | 120.000 | 170.0 | H | 284.0 | 18.4 | 19.8 | 36.0 | |
| 500.184450 | 15.8 | 1000.0 | 120.000 | 170.0 | H | 80.0 | 18.7 | 20.2 | 36.0 | |
| 510.488550 | 17.2 | 1000.0 | 120.000 | 170.0 | H | 106.0 | 18.8 | 18.8 | 36.0 | |
| 527.167050 | 16.3 | 1000.0 | 120.000 | 170.0 | H | 90.0 | 19.1 | 19.7 | 36.0 | |

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Subrange 1

Frequency Range: 30 MHz - 2 GHz

Receiver: Receiver [ESCI 3]
@ GPIB0 (ADR 20), SN 100083/003, FW 4.42

Signal Path: without Notch
FW 1.0

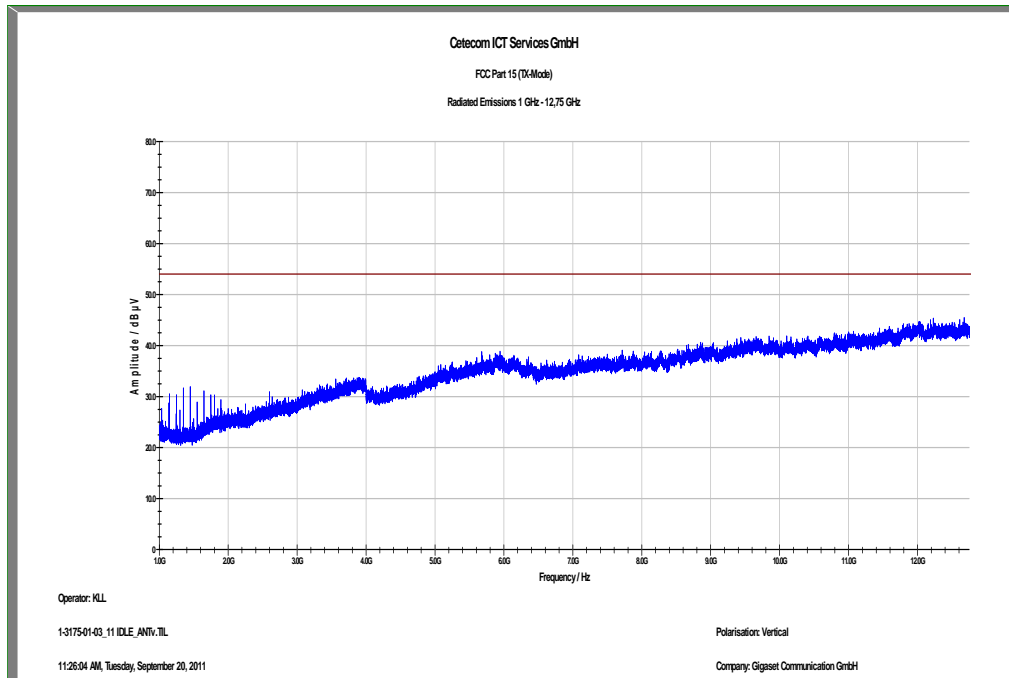
Antenna: VULB 9163
SN 9163-295, FW ---
Correction Table (vertical): VULP6113
Correction Table (horizontal): VULP6113
Correction Table (vertical): Cable_EN_1GHz (1005)
Correction Table (horizontal): Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]
@ GPIB0 (ADR 8), FW REV 3.12

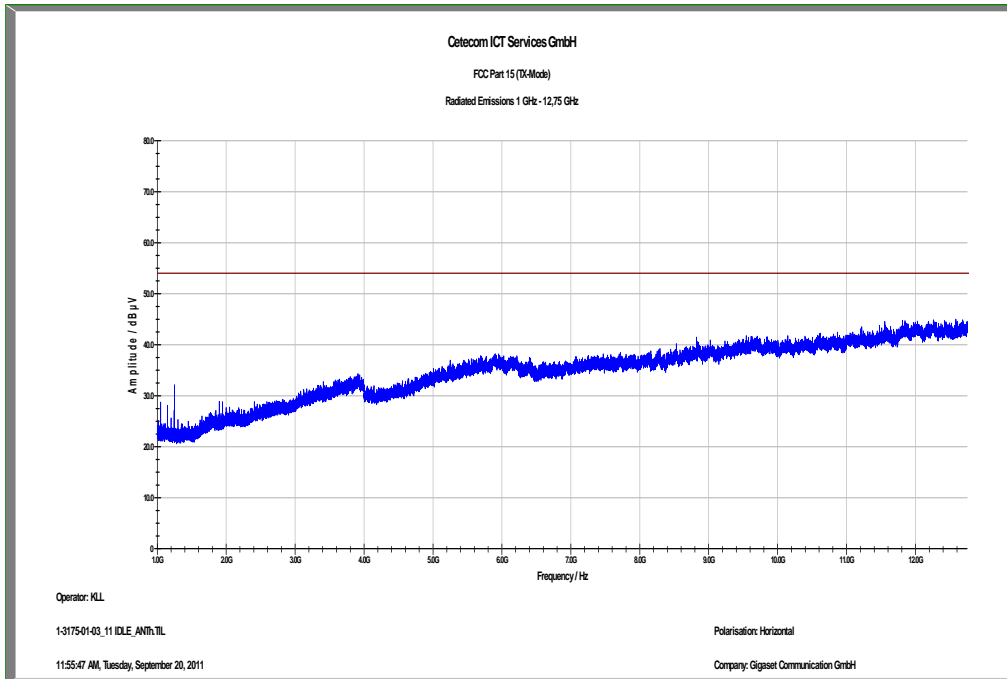
Turntable: Turntable [EMCO Turntable]
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

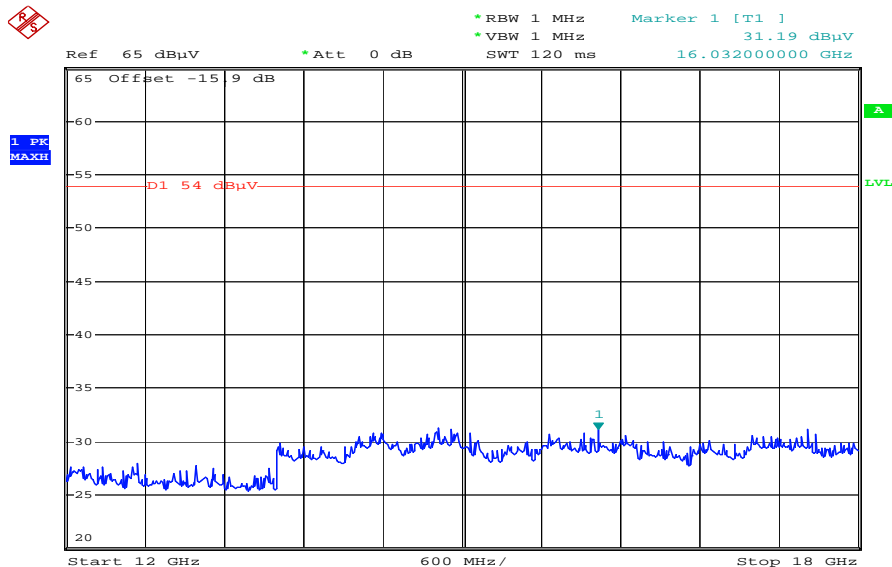
Plot 2: 1 GHz to 12.75 GHz, RX mode, vertical polarization



Plot 3: 1 GHz to 12.75 GHz, RX mode, horizontal polarization

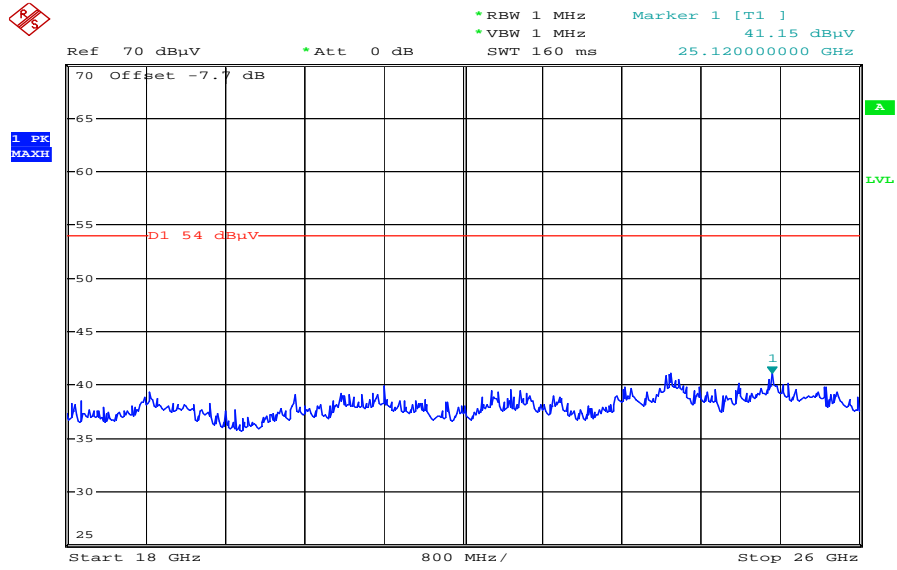


Plot 4: 12 GHz to 18 GHz, RX mode, vertical & horizontal polarization



Date: 20.SEP.2011 14:10:23

Plot 5: 18 GHz to 26 GHz, RX mode, vertical & horizontal polarization



Date: 20.SEP.2011 14:22:22

9.13 TX spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 39. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 78 will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

| Measurement parameter | |
|-----------------------|--|
| Detector: | Peak / Quasi peak |
| 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 15.209(a) | | RSS 210, Issue 8, 2.2 |
| TX spurious emissions radiated < 30 MHz | | |
| Frequency (MHz) | Field strength (dBµV/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 |

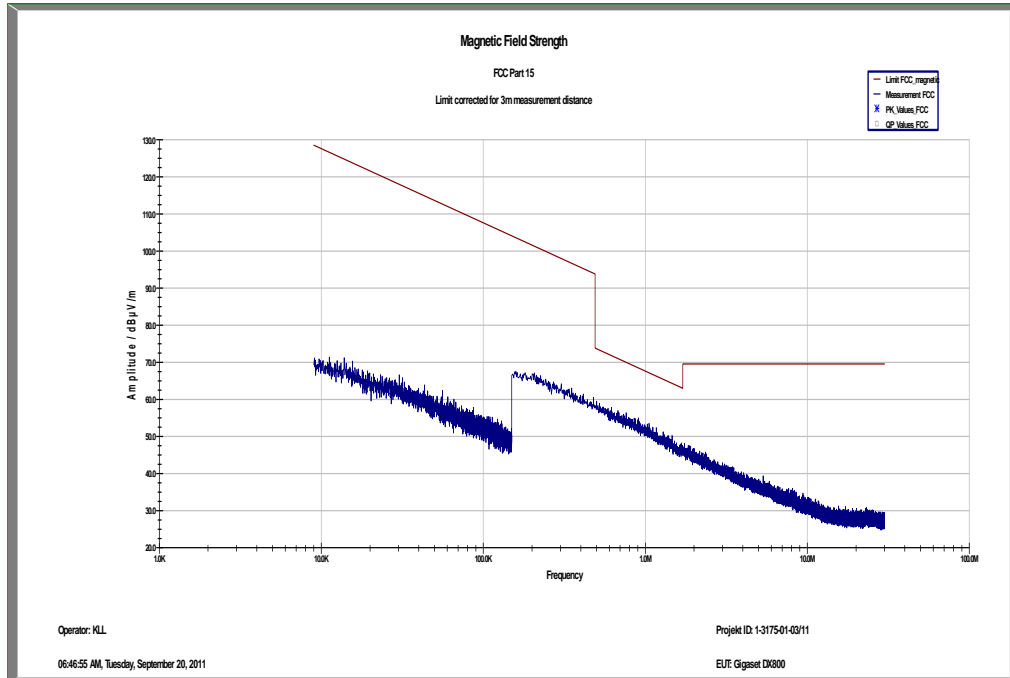
Results:

| TX spurious emissions radiated < 30 MHz [dBµV/m] | | |
|--|----------|----------------|
| F [MHz] | Detector | Level [dBµV/m] |
| No critical peaks found | | |
| | | |
| Measurement uncertainty | ± 3 dB | |

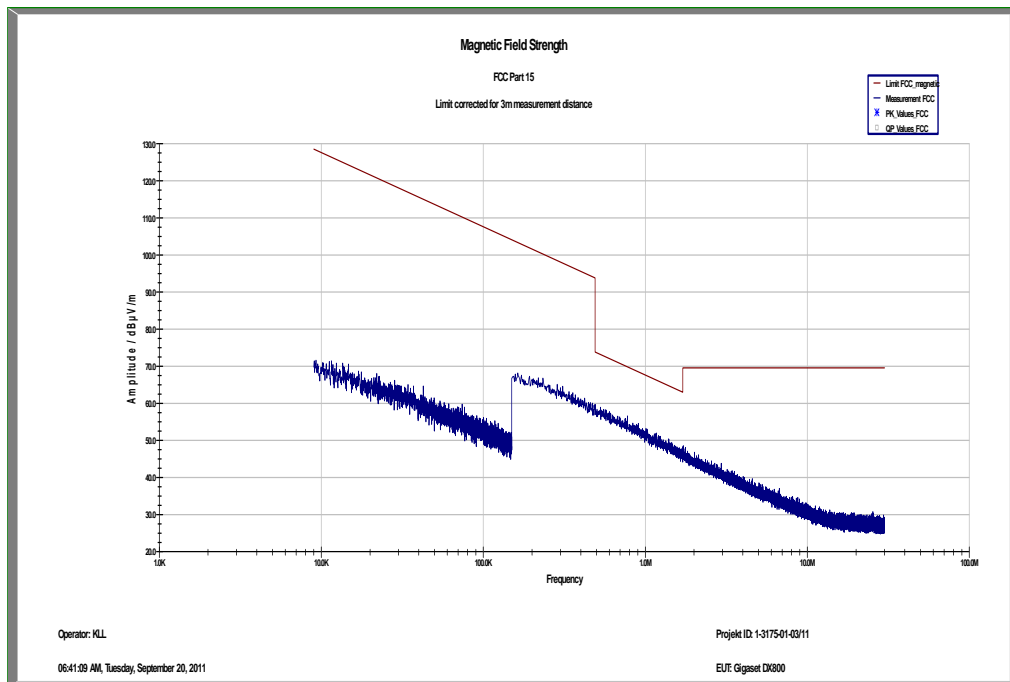
Result: The result of the measurement is passed.

Plots:

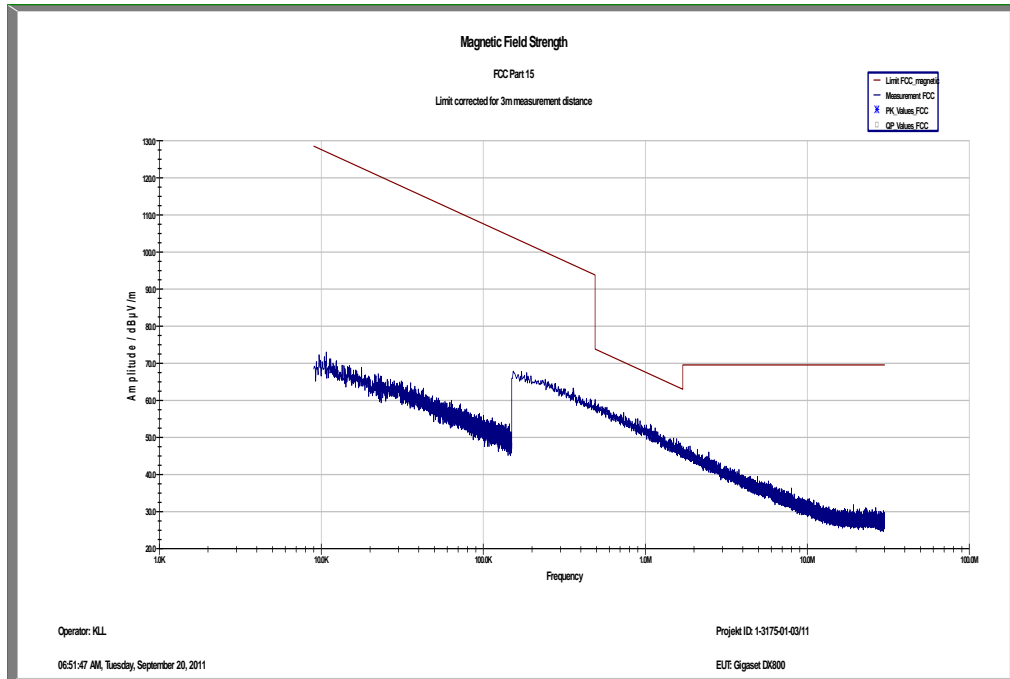
Plot 1: 9 kHz to 30 MHz, TX mode, channel 00



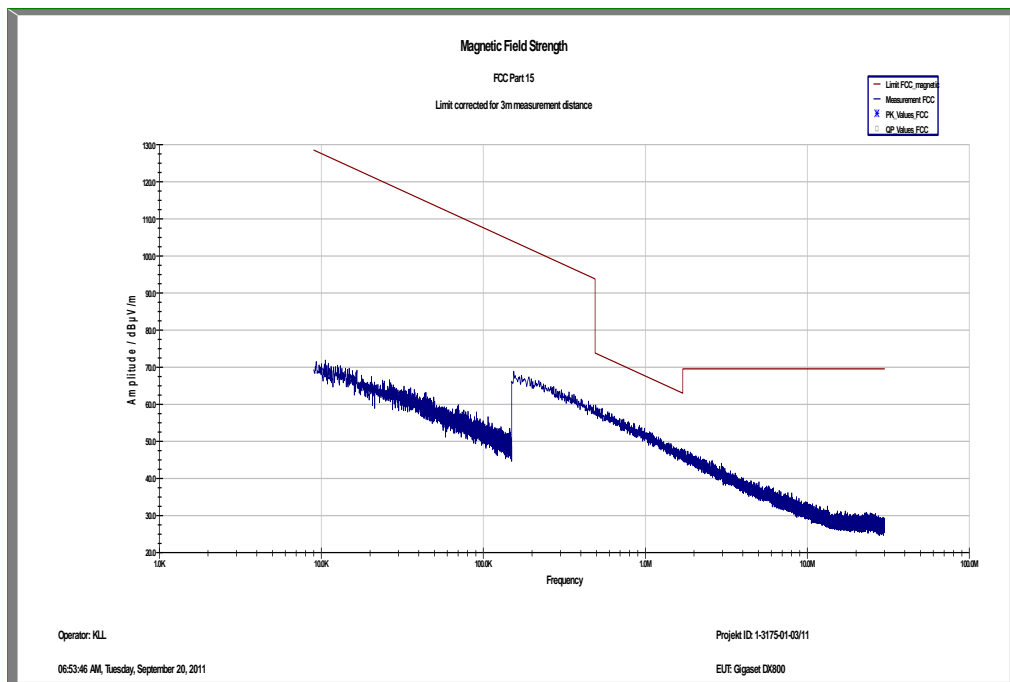
Plot 2: 9 kHz to 30 MHz, TX mode, channel 39



Plot 3: 9 kHz to 30 MHz, TX mode, channel 78



Plot 4: 9 kHz to 30 MHz, RX mode



9.14 TX spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 39. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 78 will be measured too. The measurement is performed in the mode with the highest output power. 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

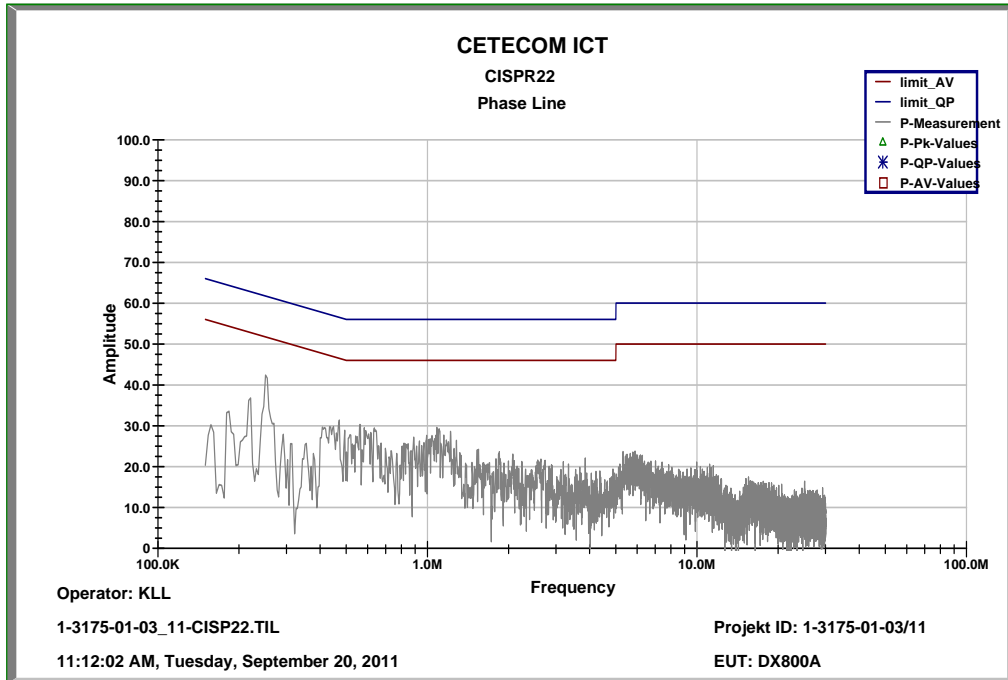
Results:

| TX spurious emissions conducted < 30 MHz [dBµV/m] | | |
|---|----------|----------------|
| F [MHz] | Detector | Level [dBµV/m] |
| No critical peaks found | | |
| | | |
| Measurement uncertainty | ± 3 dB | |

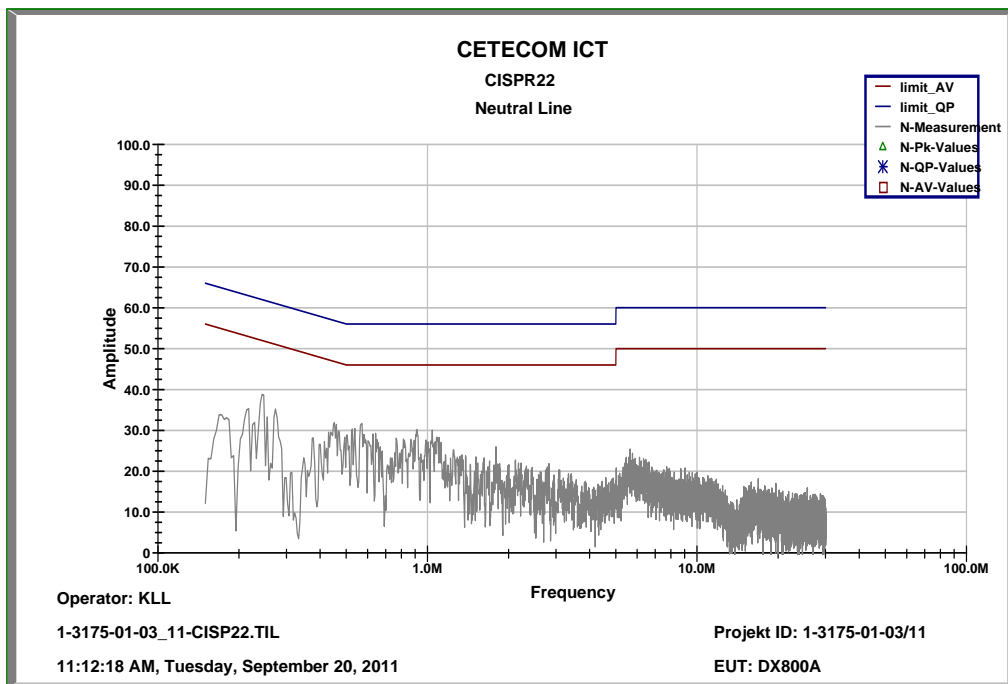
Result: The result of the measurement is passed.

Plots:

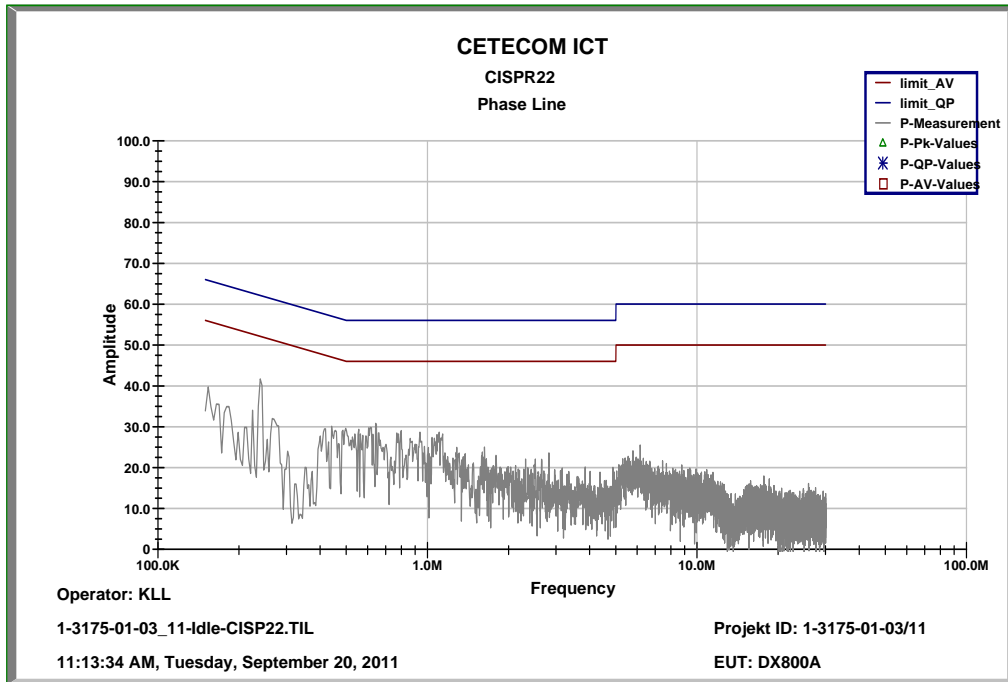
Plot 1: 9 kHz to 30 MHz, TX mode, phase line



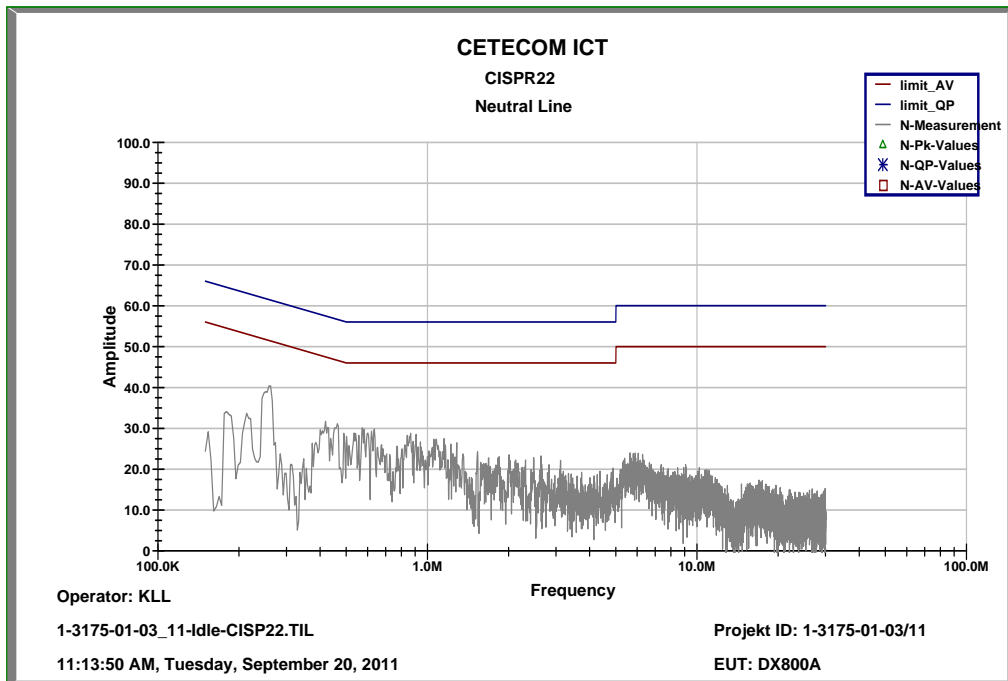
Plot 2: 9 kHz to 30 MHz, TX mode, neutral line



Plot 3: 9 kHz to 30 MHz, RX mode, phase line



Plot 4: 9 kHz to 30 MHz, RX mode, 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 (Labor/Item).

| No. | Lab / Item | Equipment | Type | Manufact. | Serial No. | INV. No Cetecom | Kind of Calibration | Last Calibration | Next Calibration |
|-----|------------|---|-----------------------|-----------------|----------------|-----------------|---------------------|------------------|------------------|
| 1 | n. a. | Amplifier | JS42-00502650-28-5A | MITEQ | 1084532 | 300003379 | ev | | |
| 2 | n. a. | Antenna Tower | Model 2175 | ETS-LINDGREN | 64762 | 300003745 | izw | | |
| 3 | n. a. | Positioning Controller | Model 2090 | ETS-LINDGREN | 64672 | 300003746 | izw | | |
| 4 | n. a. | Turntable Interface-Box | Model 105637 | ETS-LINDGREN | 44583 | 300003747 | izw | | |
| 5 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 295 | 300003787 | k | 01.04.2010 | 01.04.2012 |
| 6 | n. a. | Spectrum-Analyzer | FSU26 | R&S | 200809 | 300003874 | k | 10.01.2011 | 10.01.2013 |
| 7 | n. a. | Spectrum Analyzer 20 Hz - 50 GHz | FSU50 | R&S | 200012 | 300003443 | ve | 01.07.2010 | 01.07.2012 |
| 8 | n. a. | Switch / Control Unit | 3488A | HP Meßtechnik | | 300001691 | ne | | |
| 9 | n. a. | Power Supply DC | NGPE 40/40 | R&S | 388 | 400000078 | viKI! | 13.09.2010 | 13.09.2012 |
| 10 | n. a. | Power Sensor 50 Ohms, 10 MHz - 18 GHz, 1 nW - 20 mW | NRV-Z1 | R&S | 833894/011 | 300002681-0010 | k | 09.09.2010 | 09.09.2012 |
| 11 | n. a. | Hygro-Thermometer | -/, 5-45°C, 20-100%rF | Thies Clima | -/- | 400000080 | k | 04.08.2011 | 04.08.2012 |
| 12 | n. a. | Vector Signal Generator, 300 kHz to 2.2 GHz | SMIQ03B | R&S | 835541/055 | 300002681-0001 | k | 25.08.2008 | 25.08.2011 |
| 13 | n. a. | Vector Signal Generator, 300 kHz to 2.2 GHz | SMIQ03B | R&S | 835541/056 | 300002681-0002 | k | 26.08.2008 | 26.08.2011 |
| 14 | n. a. | Signal Generator 0.01/2 - 20 GHz, Frequ. Resol. 0.1Hz | SMP02 | R&S | 835133/011 | 300002681-0003 | k | 26.08.2008 | 26.08.2011 |
| 15 | n. a. | Dual Channel Power Meter | NRVD | R&S | 835430/044 | 300002681-0004 | k | 13.09.2010 | 13.09.2012 |
| 16 | n. a. | Signal Analyzer 20Hz-26.5GHz-150 to + 30 DBM | FSIQ26 | R&S | 835540/018 | 300002681-0005 | k | 07.01.2010 | 07.01.2012 |
| 17 | n. a. | Frequency Standard (Rubidium Frequency Standard) | MFS (Rubidium) | R&S (Datum) | 002 | 300002681-0009 | Ve | 13.09.2010 | 13.09.2012 |
| 18 | n. a. | Directional Coupler | 101020010 | Krytar | 70215 | 300002840 | ev | | |
| 19 | n. a. | DC-Blocker | 8143 | Inmet Corp. | none | 300002842 | ne | | |
| 20 | n. a. | Powersplitter | 6005-3 | Inmet Corp. | | 300002841 | ev | | |
| 21 | n. a. | Temperature Test Chamber | VT 4002 | Heraeus Voetsch | 58566046820010 | 300003019 | Ve | 28.05.2009 | 28.08.2011 |
| 22 | n. a. | CBT | CBT | R&S | 100185 | 300003416 | viKI! | 13.09.2010 | 13.09.2012 |

| | | | | | | | | | |
|----|--------------|--|--------------------------------------|----------------------|------------|-----------|-------|------------|------------|
| | | (Bluetooth Tester + EDR Signalling) | 1153.9000K35 | | | | | | |
| 23 | n. a. | Spectrum Analyzer 9kHz to 30GHz - 140..+30dBm | FSP30 | R&S | 100886 | 300003575 | k | 07.09.2010 | 07.09.2012 |
| 24 | n. a. | CBT-K57 Software-Option for CBT/CBT32 | CBT-K57 | R&S | 101051 | 300003910 | ne | | |
| 25 | n. a. | Isolating Transformer | RT5A | Grundig | 8041 | 300001626 | g | | |
| 26 | n. a. | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2818A03450 | 300001040 | Ve | 08.01.2009 | 08.01.2012 |
| 27 | n. a. | Coaxial Attenuator 30dB/500W | 8325 | Bird | 1530 | 300001595 | ev | | |
| 28 | n. a. | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115 | EMCO | 8812-3088 | 300001032 | viKI! | 11.05.2011 | 11.05.2013 |
| 29 | n. a. | Active Loop Antenna | 6502 | EMCO | 2210 | 300001015 | ne | | |
| 30 | n. a. | Anechoic chamber | FAC 3/5m | MWB / TDK | 87400/02 | 300000996 | | 23.03.2009 | |
| 31 | Spec.A. 2_2e | System rack for EMI measurement solution | 85900 | HP I.V. | * | 300000222 | ne | | |
| 32 | 9 | Artificial Mains 9 kHz to 30 MHz | ESH3-Z5 | R&S | 828576/020 | 300001210 | Ve | 06.01.2010 | 06.01.2012 |
| 33 | n. a. | Relais Matrix | 3488A | HP Meßtechnik | 2719A15013 | 300001156 | ne | | |
| 34 | n. a. | Relais Matrix | PSU | R&S | 890167/024 | 300001168 | ne | | |
| 35 | n. a. | Isolating Transformer | RT5A | Grundig | 9242 | 300001263 | ne | | |
| 36 | n. a. | Three-Way Power Splitter, 50 Ohm | 11850C | HP Meßtechnik | | 300000997 | ne | | |
| 37 | n. a. | Switch / Control Unit | 3488A | HP | 2605e08770 | 300001443 | ne | | |
| 38 | n. a. | Amplifier | js42-00502650-28-5a | Parzich GMBH | 928979 | 300003143 | ne | | |
| 39 | n. a. | Band Reject filter | WRCG1855/1910-1835/1925-40/8SS | Wainwright | 7 | 300003350 | ev | | |
| 40 | n. a. | Band Reject filter | WRCG2400/2483-2375/2505-50/10SS | Wainwright | 11 | 300003351 | ev | | |
| 41 | n. a. | TILE-Software Emission | Quantum Change, Modell TILE-ICS/FULL | EMCO | none | 300003451 | ne | | |
| 42 | n. a. | Highpass Filter | WHKX2.9/18G-12SS | Wainwright | 1 | 300003492 | ev | | |
| 43 | n. a. | Highpass Filter | WHK1.1/15G-10SS | Wainwright | 3 | 300003255 | ev | | |
| 44 | n. a. | Highpass Filter | WHKX7.0/18G-8SS | Wainwright | 18 | 300003789 | ne | | |
| 45 | n. a. | PSA Spectrum Analyzer 3 Hz - 26.5 GHz | E4440A | Agilent Technologies | MY48250080 | 300003812 | k | 08.09.2010 | 08.09.2012 |
| 46 | n. a. | MXG Microwave Analog Signal Generator | N5183A | Agilent Technologies | MY47420220 | 300003813 | k | 13.09.2010 | 13.09.2012 |
| 47 | n. a. | RF Filter Section 9kHz - 1GHz | N9039A | Agilent Technologies | MY48260003 | 300003825 | viKI! | 08.09.2010 | 08.09.2012 |
| 48 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 371 | 300003854 | viKI! | 17.12.2008 | 17.12.2011 |
| 49 | 45 | Switch-Unit | 3488A | HP Meßtechnik | 2719A14505 | 300000368 | g | | |

| | | | | | | | | | |
|----|-------|---|-------------------|---------------------|---------------------|-----------|----|------------|------------|
| 50 | 50 | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2920A04466 | 300000580 | ne | | |
| 51 | n. a. | software | SPS_PHE 1.4f | Spitzberger & Spieß | B5981; 5D1081;B5979 | 300000210 | ne | | |
| 52 | n. a. | EMI Test Receiver | ESCI 1166.5950.03 | R&S | 100083 | 300003312 | k | 05.01.2011 | 05.01.2013 |
| 53 | n. a. | Analyzer-Reference-System (Harmonics and Flicker) | ARS 16/1 | SPS | A3509 07/0 0205 | 300003314 | k | 14.07.2011 | 14.07.2013 |

Agenda: Kind of Calibration

| | | | |
|------|--|-----|--|
| k | calibration / calibrated | EK | limited calibration |
| ne | not required (k, ev, izw, zw not required) | zw | cyclical maintenance (external cyclical maintenance) |
| ev | periodic self verification | izw | internal cyclical maintenance |
| Ve | long-term stability recognized | g | blocked for accredited testing |
| vkl! | Attention: extended calibration interval | * | next calibration ordered / currently in progress |
| NK! | Attention: not calibrated | | |

Annex A Photographs of the test setup

Photo documentation:

Photo 1:



Photo 2:



Photo 3:

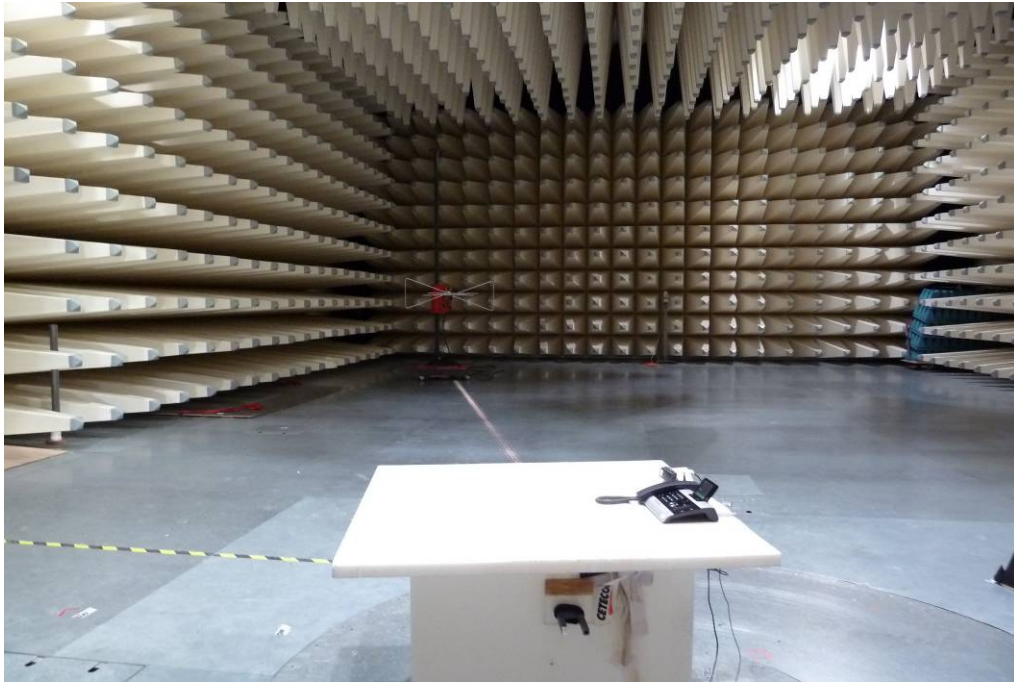
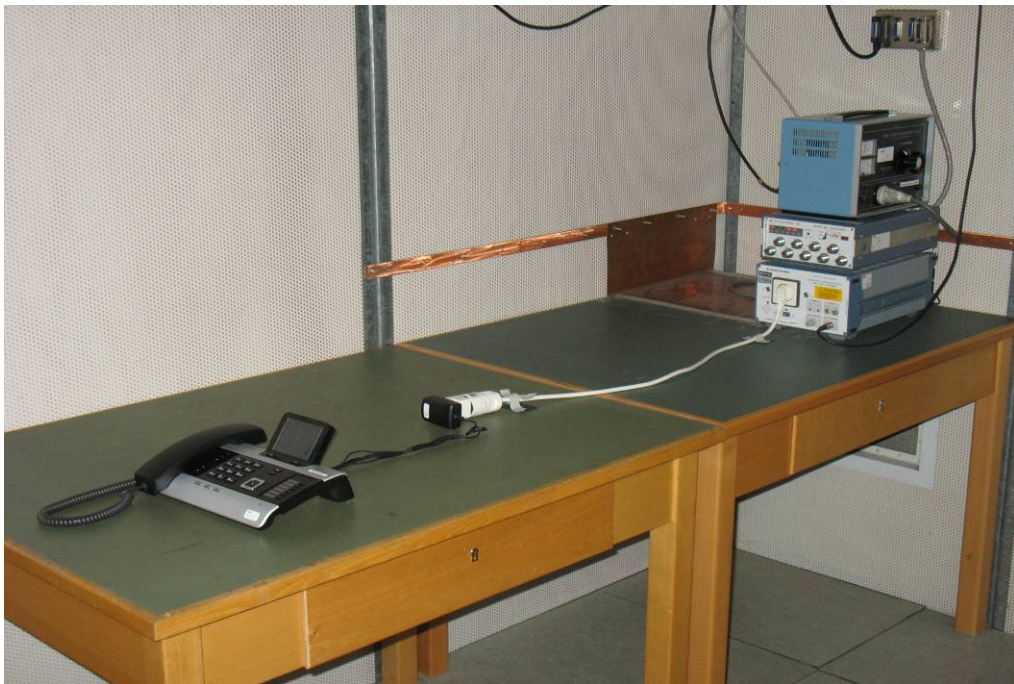


Photo 4:



Annex B External photographs of the EUT

Photo documentation:

Photo 1:



Photo 2:



Photo 3:



Photo 4:



Annex C Internal photographs of the EUT

Photo documentation:

Photo 1:

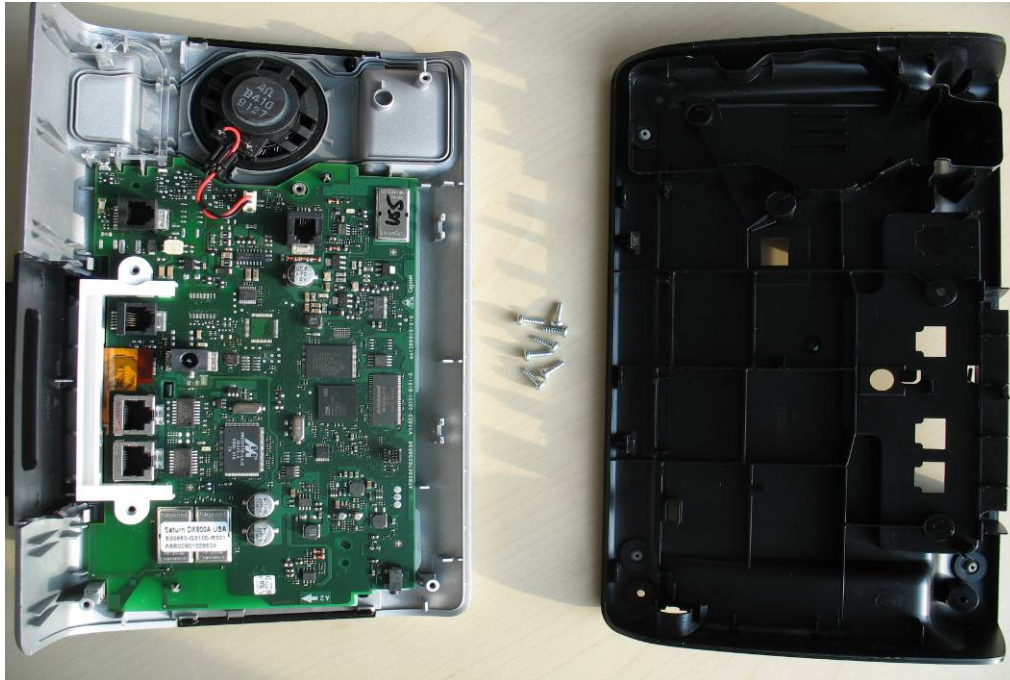


Photo 2:

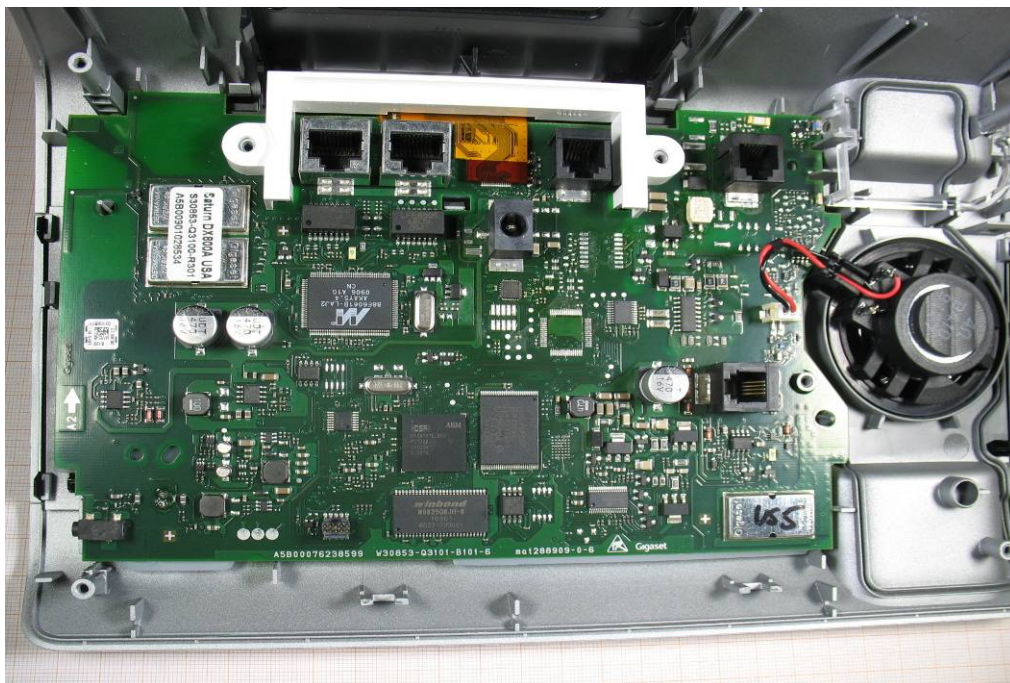


Photo 3:

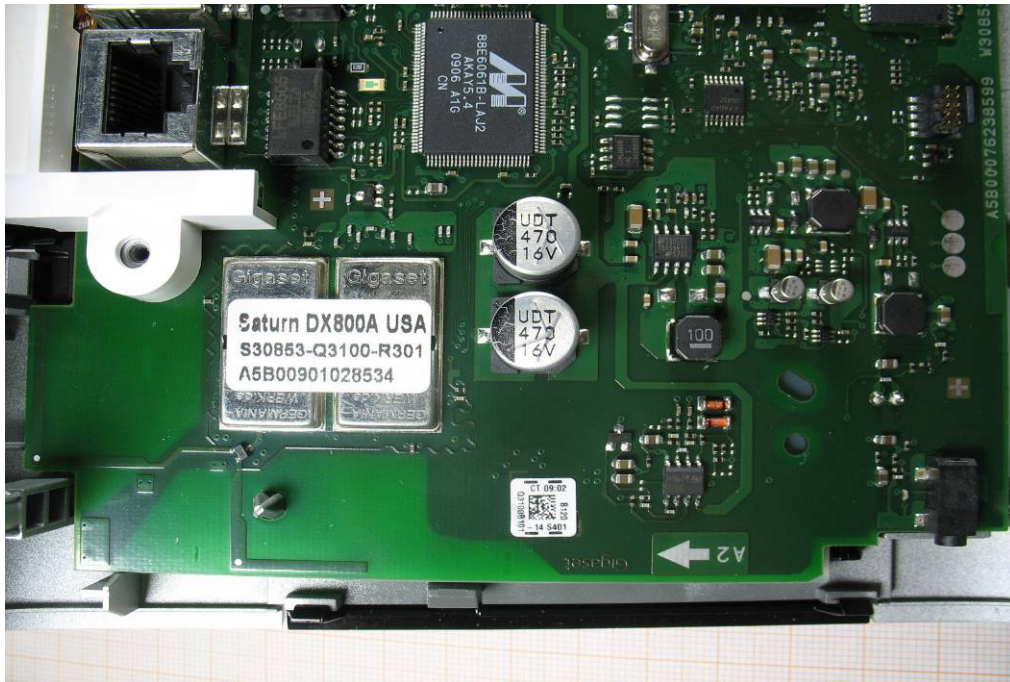


Photo 4:

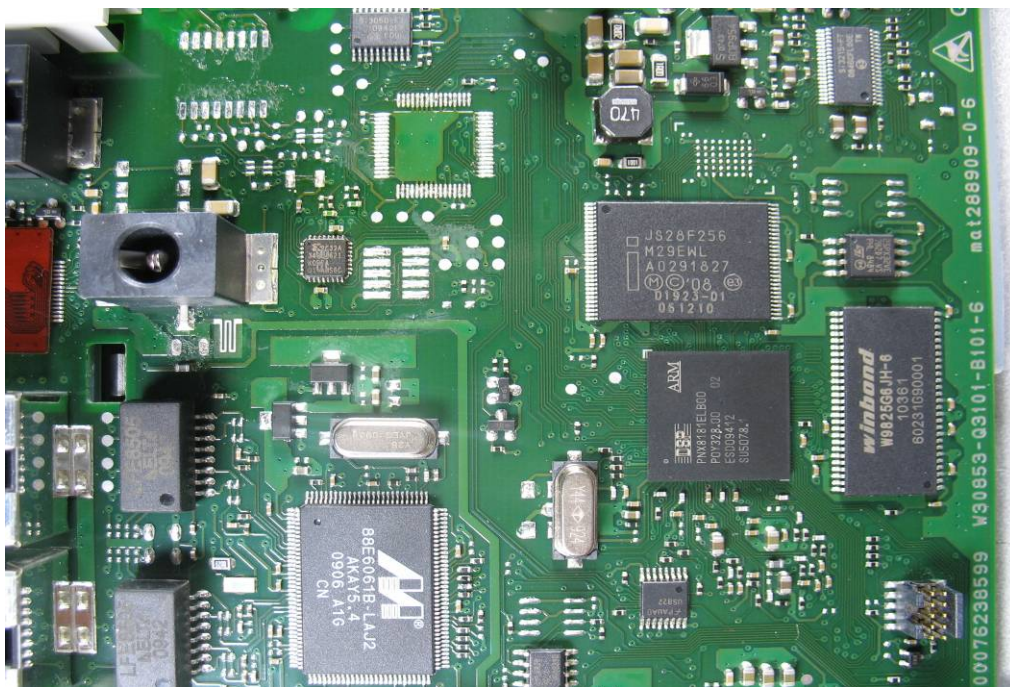


Photo 5:

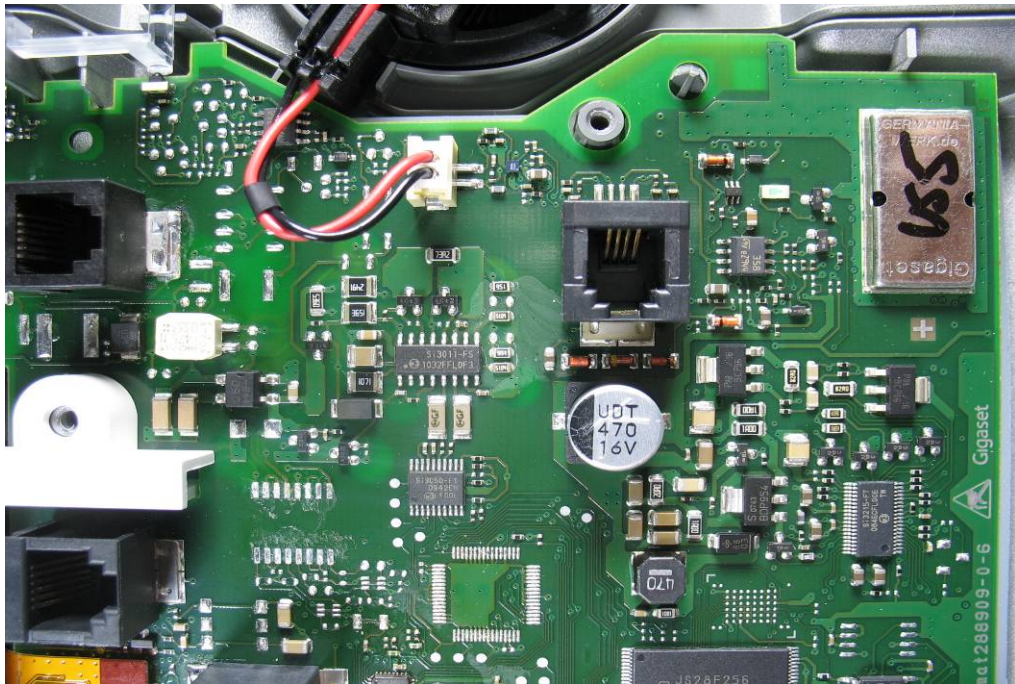


Photo 6:



Photo 7:



Photo 8:



Photo 9:



Photo 10:



Photo 11:

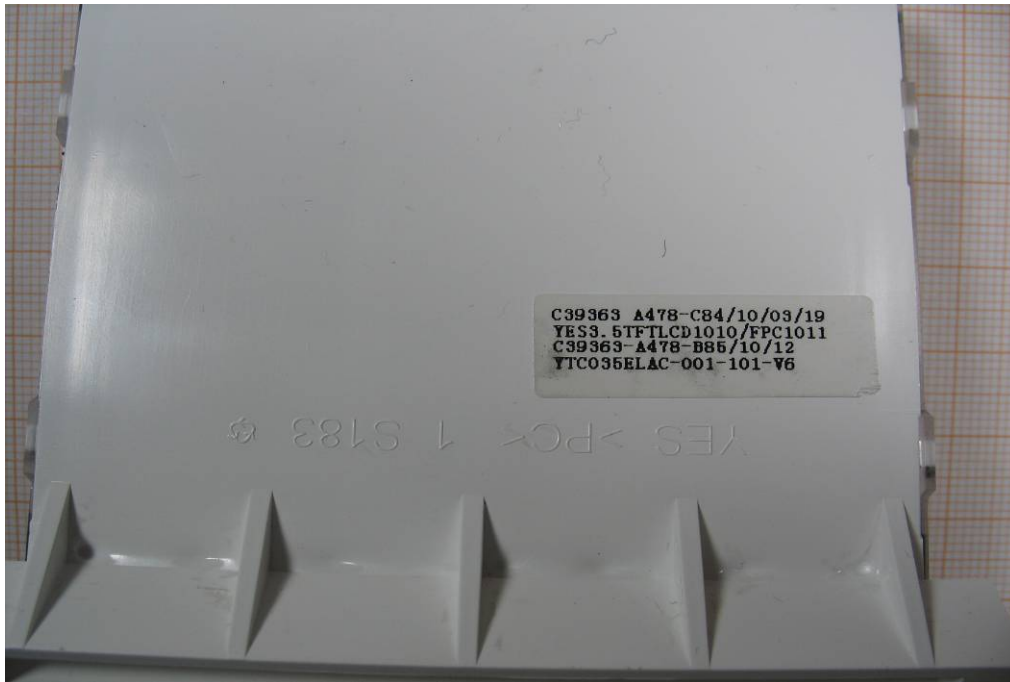


Photo 12:

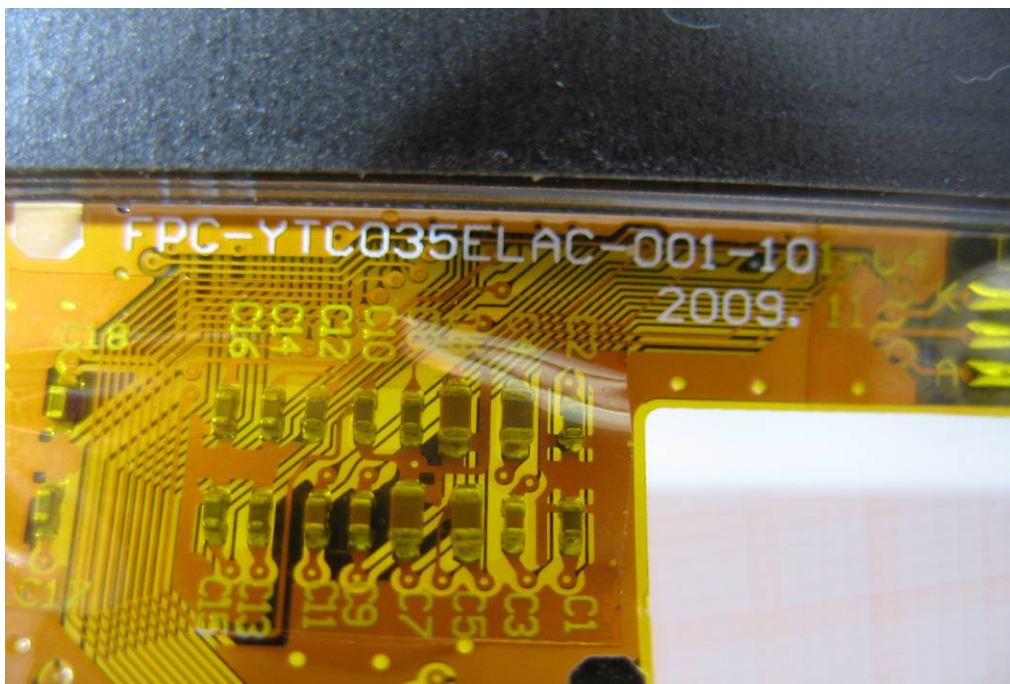
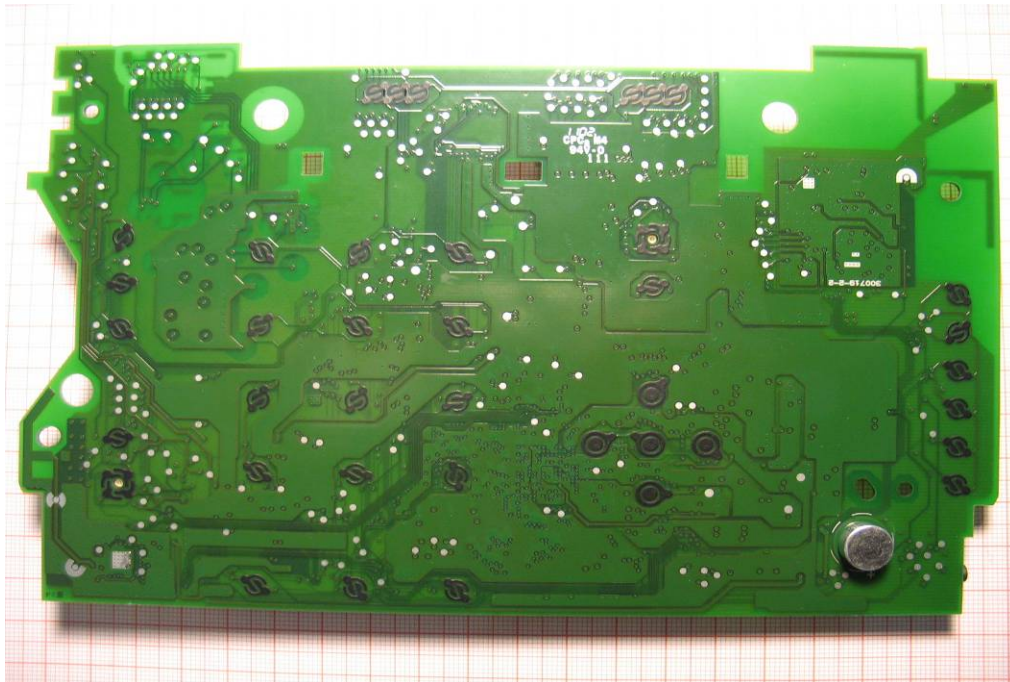


Photo 13:



Annex D Document history

| Version | Applied changes | Date of release |
|---------|-----------------|-----------------|
| 1.0 | Initial release | 2011-09-28 |

Annex E 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 |