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consulting - testing - certification >>>

TEST REPORT

Test report no.: 1-3325/11-02-03-A



DAkkS
Deutsche
Akreditierungsstelle
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

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

FLIR Systems AB
Rinkebyvägen 19
SE-182 11 Danderyd / SWEDEN
Phone: +46 (0) 8 753 27 50
Contact: Göran Skedung
e-mail: goran.skedung@flir.se
Phone: +46 87 53 27 59

Manufacturer

FLIR Systems AB
Rinkebyvägen 19
SE-182 11 Danderyd / SWEDEN

| Test standard/s | |
|------------------------|--|
| 47 CFR Part 15 | 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 |

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

Test Item

Kind of test item: Infrared Camera
Model name: FLIR-E49001
FCC ID: ZLV-FLIRE49001
IC: 5306A-FLIRE49001
Frequency [MHz]: ISM-band: 2400 MHz to 2483.5 MHz
(lowest channel 00 – 2402 MHz,
highest channel 78 – 2480 MHz)
Technology tested: Bluetooth®, +EDR
Antenna: Integrated antenna
Power Supply: 3.7 V DC by Li-polymer battery
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 report authorised:

Stefan Bös
Senior Testing Manager

Test performed:

Andreas Luckenbill

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2 General information

2.1 Notes and disclaimer

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 generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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

2.2 Application details

| | |
|------------------------------------|------------|
| Date of receipt of order: | 2012-01-24 |
| Date of receipt of test item: | 2012-01-26 |
| Start of test: | 2012-01-26 |
| End of test: | 2012-01-31 |
| Person(s) present during the test: | -/- |

3 Test standard/s

| Test standard | Date | Test standard description |
|-------------------|---------|---|
| 47 CFR Part 15 | 2010-10 | Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices |
| RSS - 210 Issue 8 | 2010-12 | 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} | +22 °C during room temperature tests |
| | T_{max} | +55 °C during high temperature tests |
| | T_{min} | -20 °C during low temperature tests |
| Relative humidity content: | | 33 % |
| Barometric pressure: | | not relevant for this kind of testing |
| Power supply: | V_{nom} | 3.7 V DC by Li-polymer battery |
| | V_{max} | -/- |
| | V_{min} | -/- |

5 Test item

| | |
|------------------------|---|
| Kind of test item : | Infrared Camera |
| Type identification : | FLIR-E49001 |
| S/N serial number : | Rad. 49000002 Cond. 49000011 |
| HW hardware status : | T198045 rev 01 |
| SW software status : | version 1.14.8 |
| Frequency band [MHz] : | ISM-band: 2400 MHz to 2483.5 MHz (lowest channel 00 – 2402, highest channel 78 – 2480) |
| Type of modulation : | FHSS technology with GFSK, Pi/4 DQPSK and 8 DPSK |
| Number of channels : | 79 |
| Antenna : | Integrated antenna |
| Power supply : | 3.7 V DC by Li-polymer battery |
| 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 | 2012-02-23 | -/- |

| 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 type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Antenna pattern supplied by applicant |
| §15.247(e) RSS 210 / A8.2(b) | Power spectral density | Nominal | Nominal | GFSK Pi/4 DQPSK 8 DPSK | <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 Pi/4 DQPSK 8 DPSK | <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 Pi/4 DQPSK 8 DPSK | <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 Pi/4 DQPSK 8 DPSK | <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 Pi/4 DQPSK 8 DPSK | <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 Pi/4 DQPSK 8 DPSK | <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 Pi/4 DQPSK 8 DPSK | <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 type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | -/- |
| §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

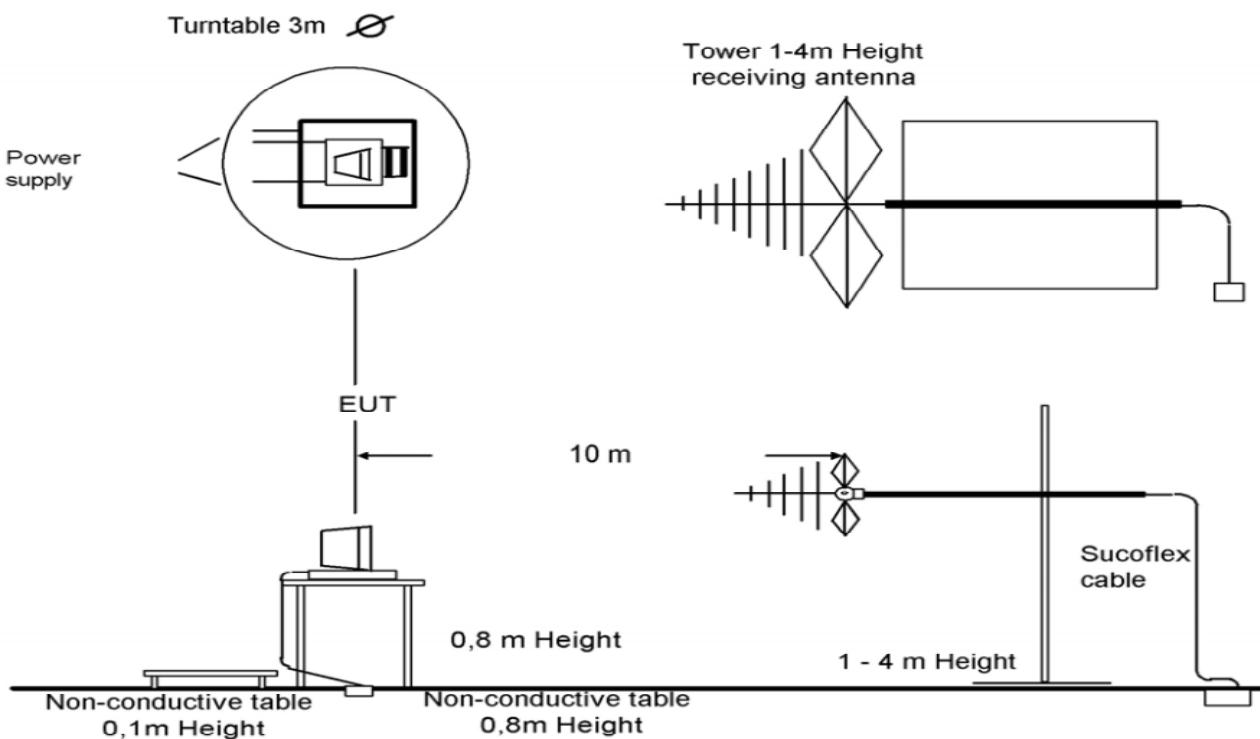
8.1 Description of test setup

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

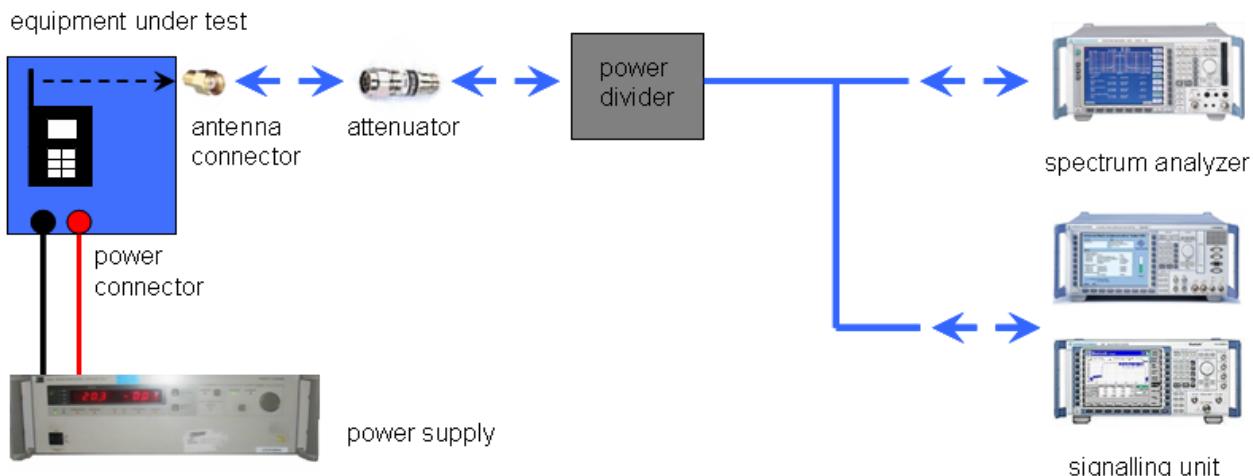
| | |
|-----------------|---------------------|
| 9 kHz - 30 MHz: | active loop antenna |
| 30 MHz – 1 GHz: | tri-log antenna |
| > 1 GHz: | horn antenna |

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 (CMU200 or other) 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: None

Configuration descriptions: TX tests: were performed with x-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 | : | 1-3325/11-02-03-A |
| Equipment model number | : | E49001 |
| Certification number | : | 5306A-FLIRE49001 |
| Manufacturer (complete address) | : | FLIR Systems AB Rinkebyvägen 19 SE-182 11 Danderyd / SWEDEN |
| 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 [W] (max.) | : | Cond.: 1.14 mW (GFSK modulation) EIRP: 0.39 mW (GFSK modulation)* Cond.: 0.73 mW (Pi/4-DQPSK modulation) EIRP: 0.26 mW (Pi/4-DQPSK modulation) Cond.: 0.73 mW (8DPSK modulation) EIRP: 0.27 mW (8DPSK modulation) |
| Occupied bandwidth (99%-BW) [kHz] | : | 745 (GFSK modulation) 1125 (Pi/4-DQPSK modulation) 1168 (8DPSK modulation) |
| Type of modulation | : | FHSS technology with GFSK, Pi/4 DQPSK and 8 DPSK modulations. |
| Emission designator (TRC-43) | : | 745KFXD (GFSK modulation) 1M13GXD (Pi/4-DQPSK modulation) 1M17GXD (8DPSK modulation) |
| Antenna information | : | Integrated antenna |
| Transmitter spurious (worst case) [dBμV/m @ 3m]: | | 45 @ 10 GHz (noise floor)* |
| Receiver spurious (worst case) [dBμV/m @ 3m]: | | 45 @ 10 GHz (noise floor)* |

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:

2012-02-23

Andreas Luckenbill

Date

Name

Signature

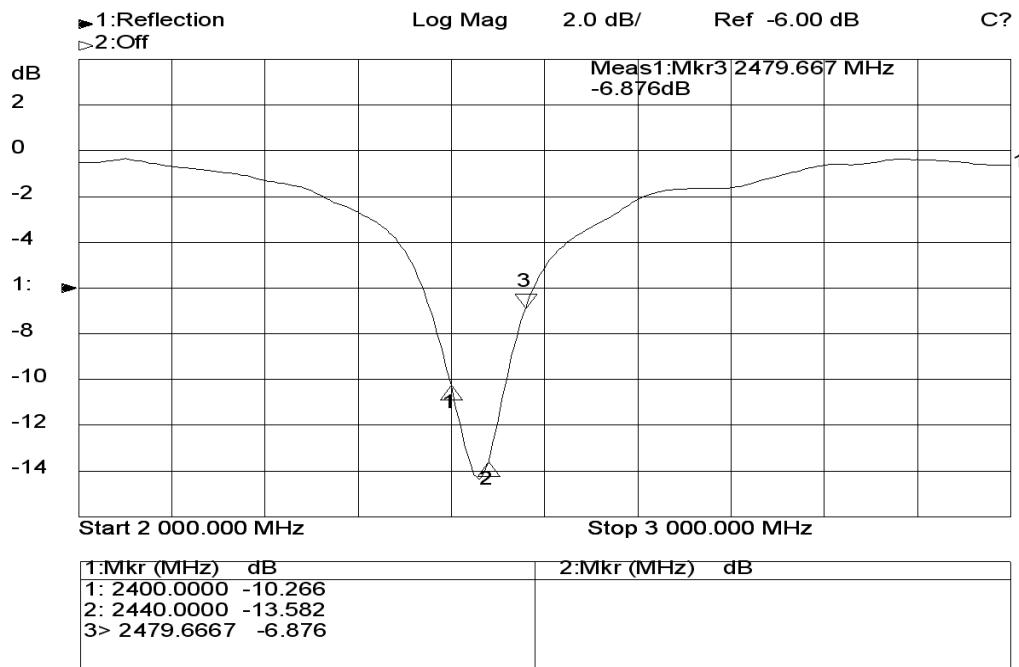


9 Measurement results

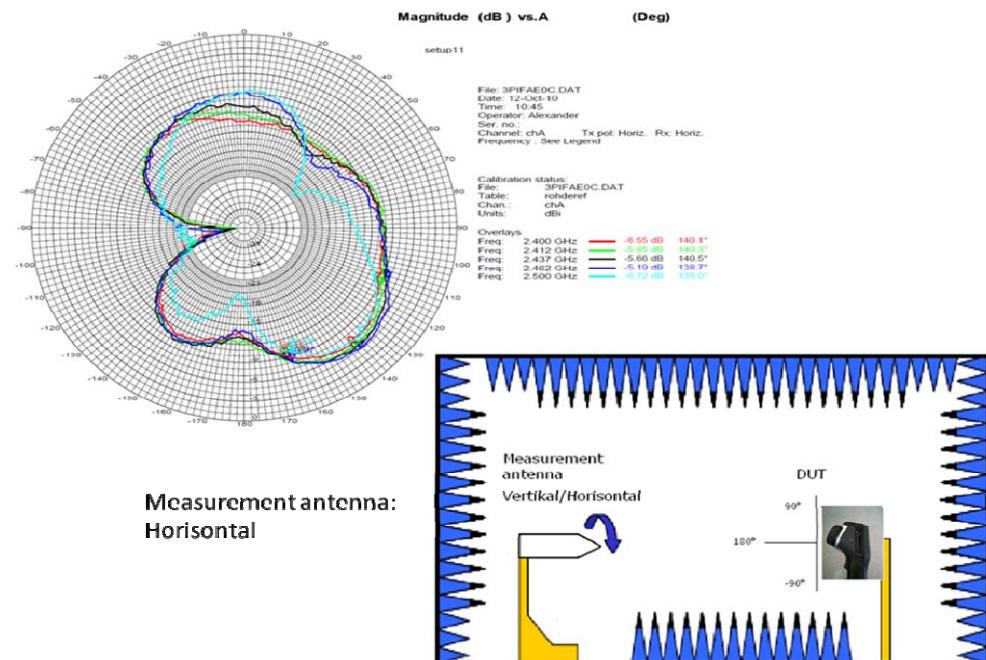
9.1 Antenna gain

The following data of antenna measurements were supplied by the applicant:

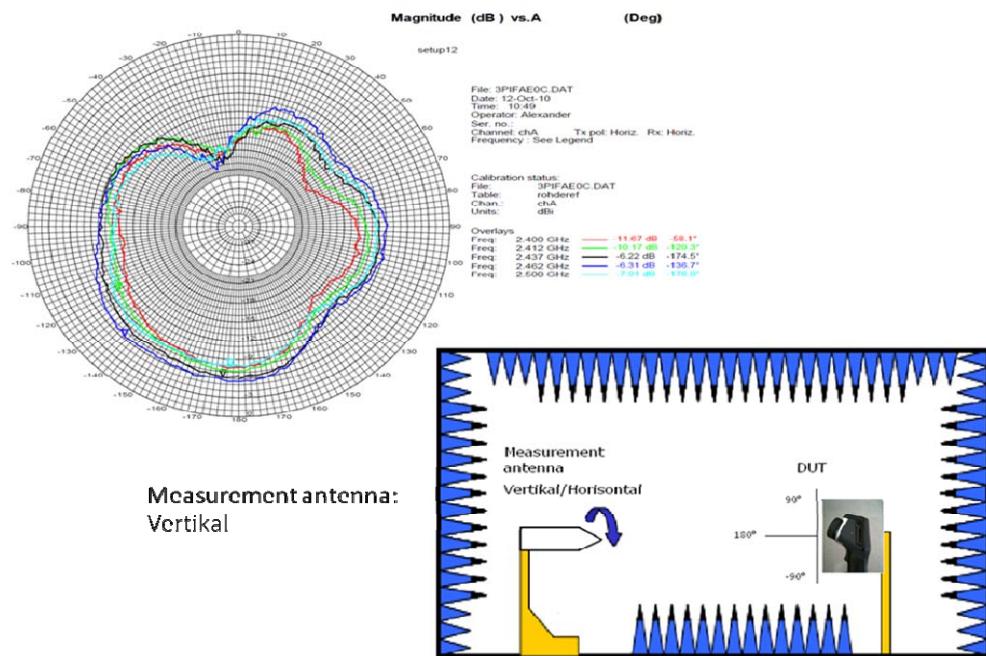
Plot 1:



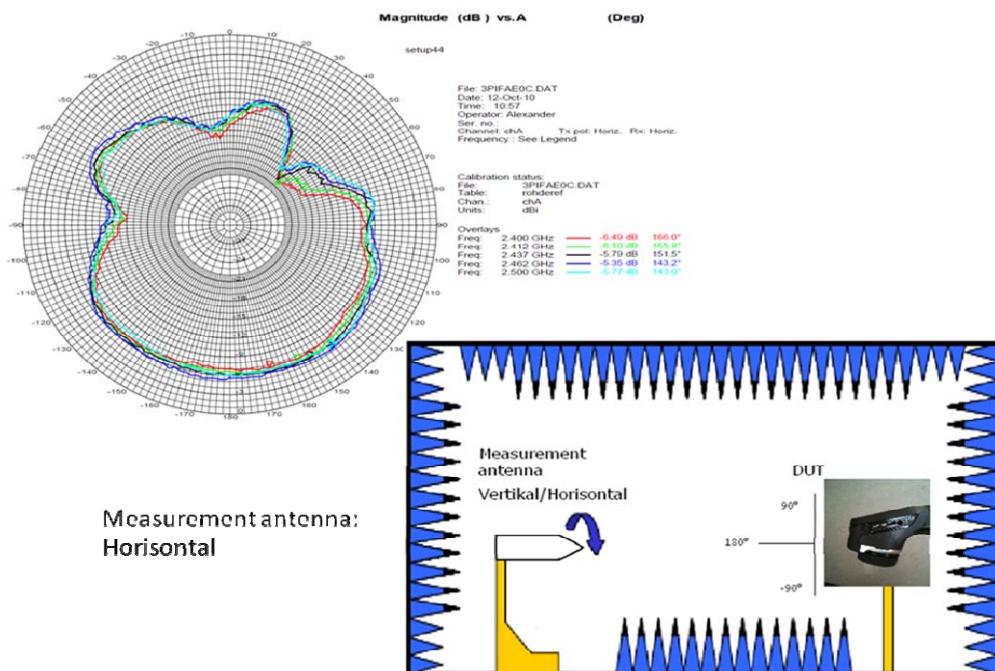
Plot 2:



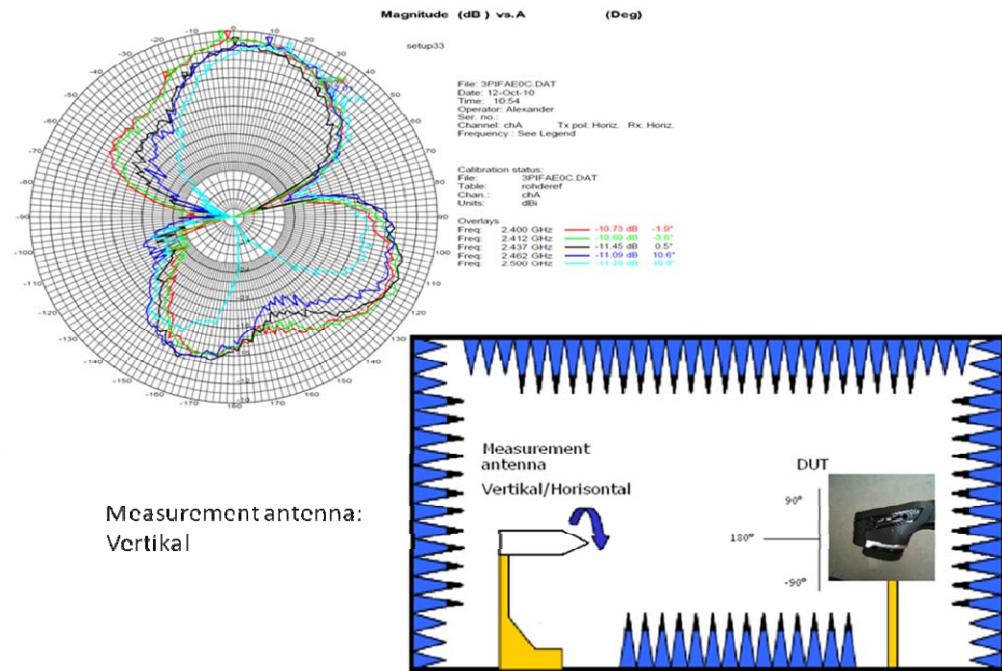
Plot 3:



Plot 4:



Plot 5:



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 |
| GFSK | | | |
| Pi/4 DQPSK | | | |
| 8DPSK | | | |
| Measurement uncertainty | Not required for hopping systems! | | |
| | ± 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 |

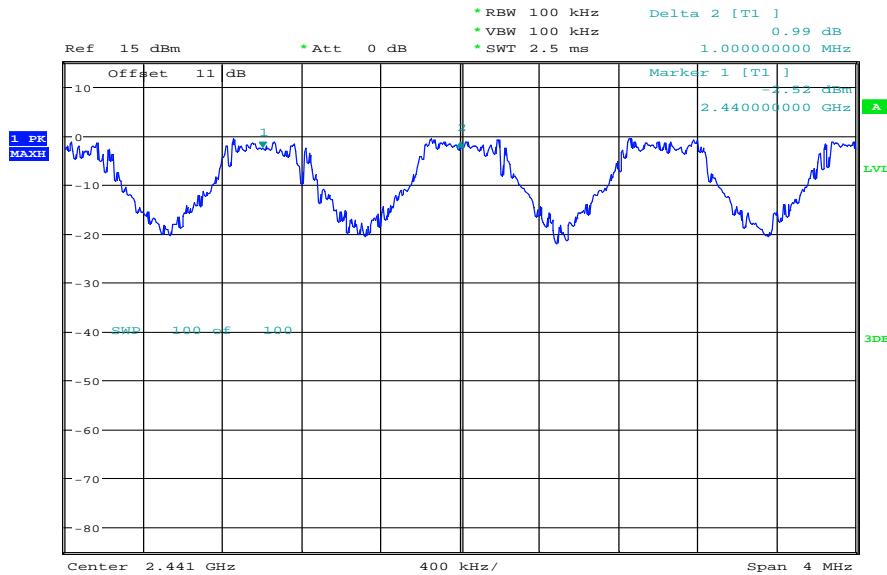
Limits:

| 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 measurement is passed.

Plot:**Plot 1: Carrier frequency separation (GFSK modulation)**

Date: 3.FEB.2012 07:13:25

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 |

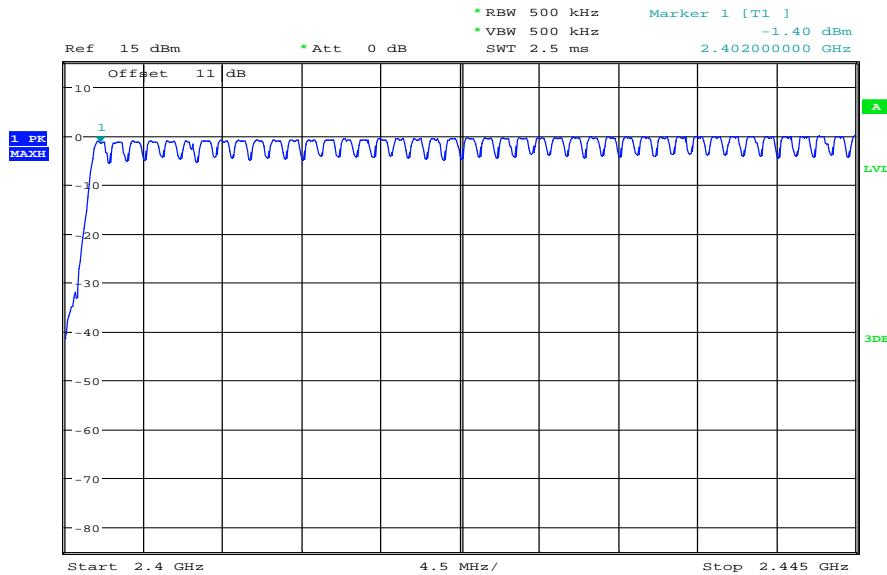
Limits:

| 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 | |

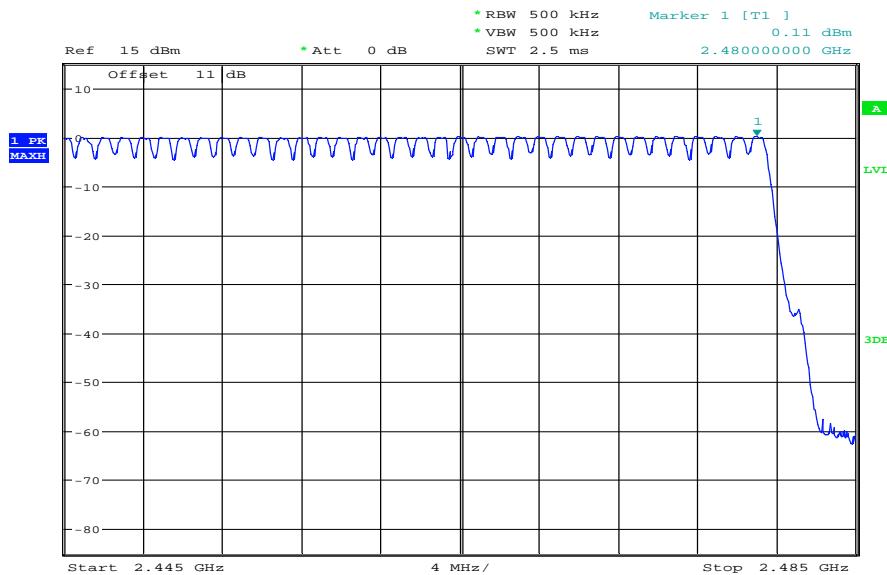
Result:

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

Result: The measurement is passed.

Plots:**Plot 1: Number of hopping channels (GFSK modulation)**

Date: 3.FEB.2012 07:17:27

Plot 2: Number of hopping channels (GFSK modulation)

Date: 3.FEB.2012 07:19:40

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 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 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 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: | 30 kHz |
| Span: | 3 MHz |
| Trace-Mode: | Max Hold |

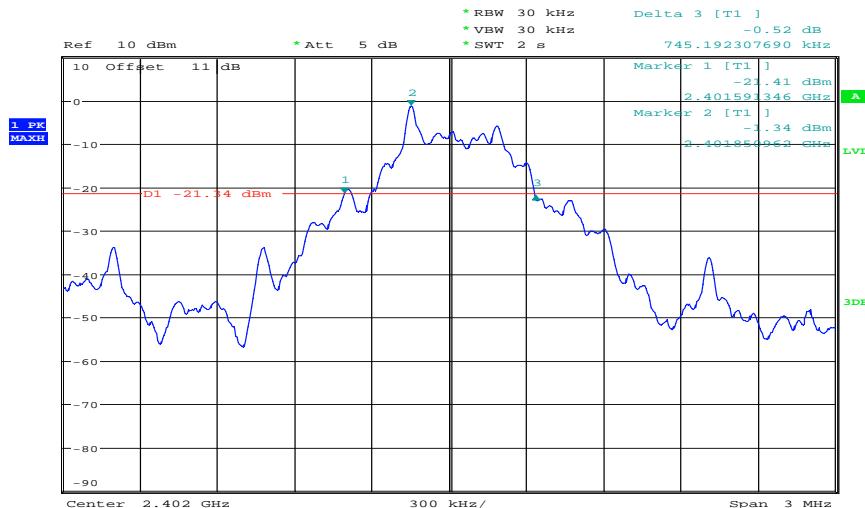
Limits:

| 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 < 1500 kHz Pi/4 DQPSK < 1500 kHz 8DPSK < 1500 kHz | |

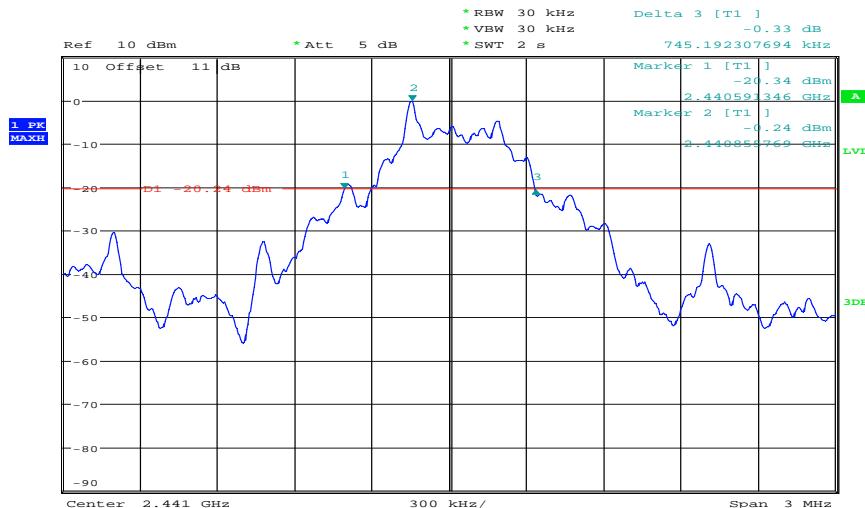
Results:

| Modulation | 20 dB BANDWIDTH [kHz] | | |
|-------------------------|-----------------------|----------|----------|
| | 2402 MHz | 2441 MHz | 2480 MHz |
| GFSK | 745 | 745 | 745 |
| Pi/4 DQPSK | 1120 | 1125 | 1125 |
| 8DPSK | 1168 | 1163 | 1163 |
| Measurement uncertainty | ± 10 kHz | | |

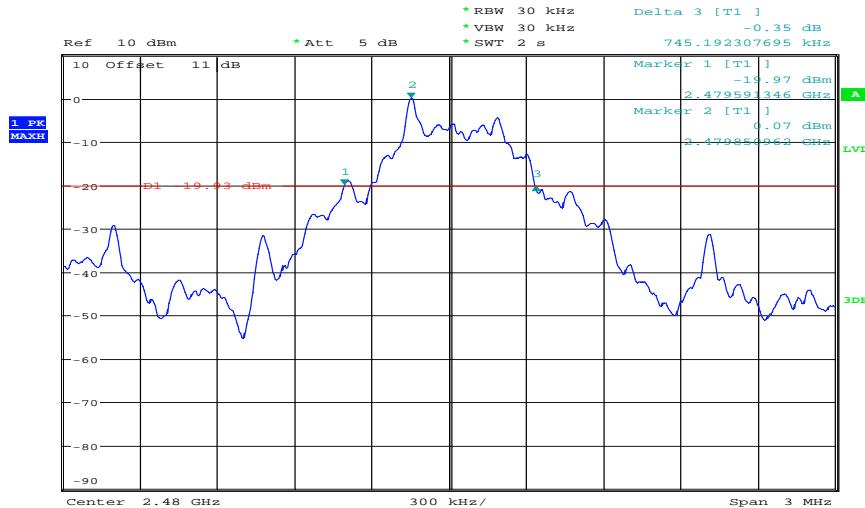
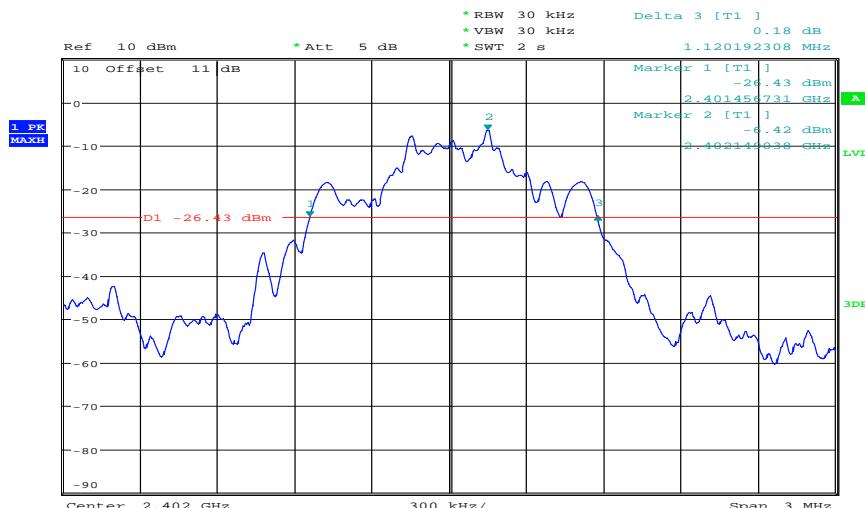
Result: The measurement is passed.

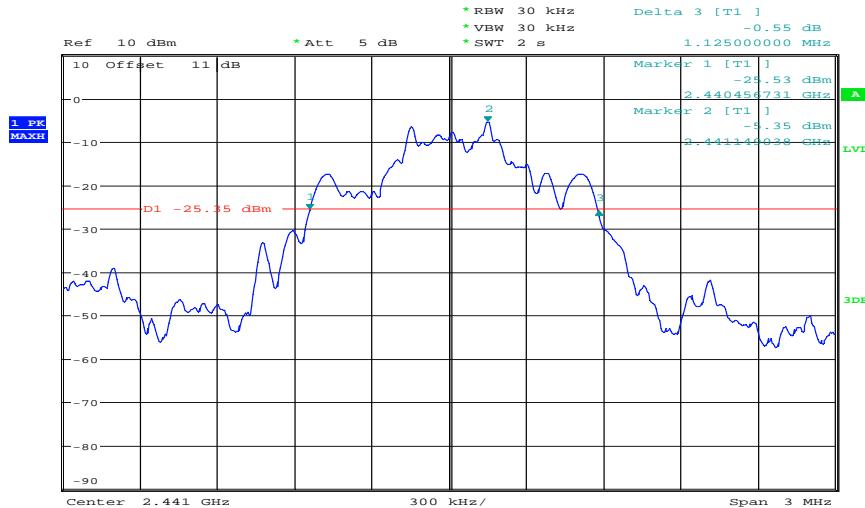
Plots:**Plot 1: lowest channel – 2402 MHz, GFSK modulation**

Date: 25.JAN.2012 13:57:32

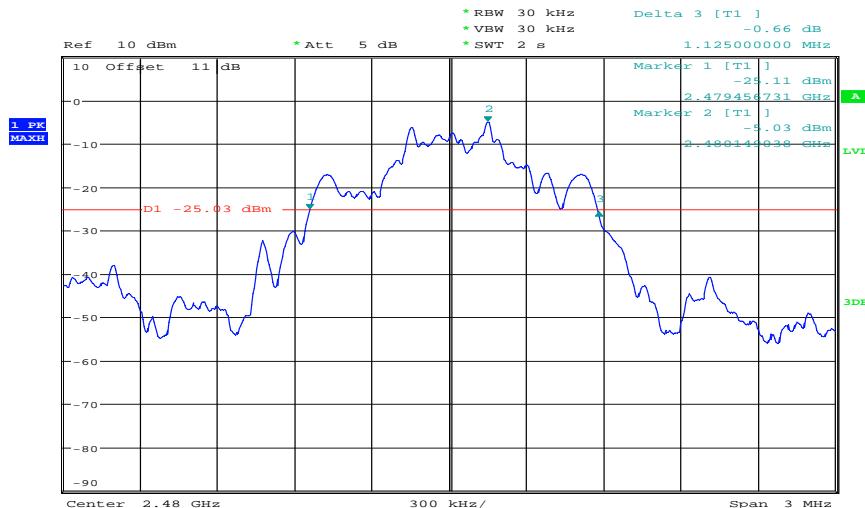
Plot 2: middle channel – 2441 MHz, GFSK modulation

Date: 25.JAN.2012 13:59:03

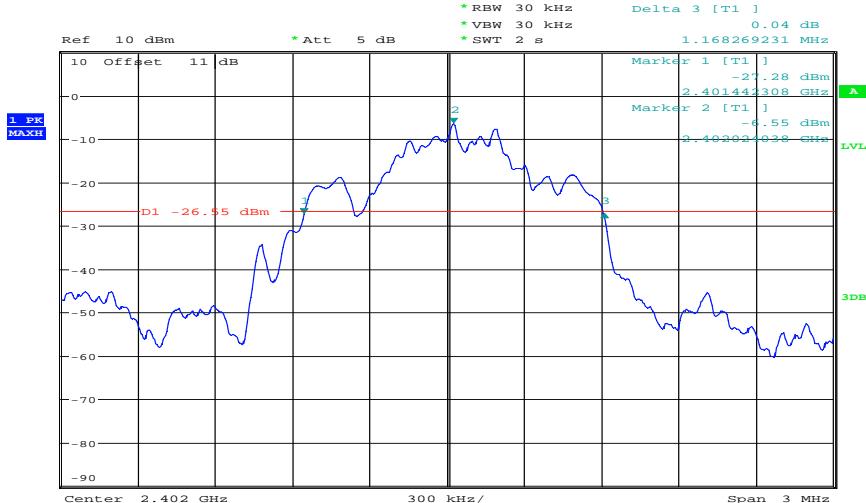
Plot 3: highest channel – 2480 MHz, GFSK modulation**Plot 4:** lowest channel – 2402 MHz, Pi / DQPSK modulation

Plot 5: middle channel – 2441 MHz, Pi / DQPSK modulation

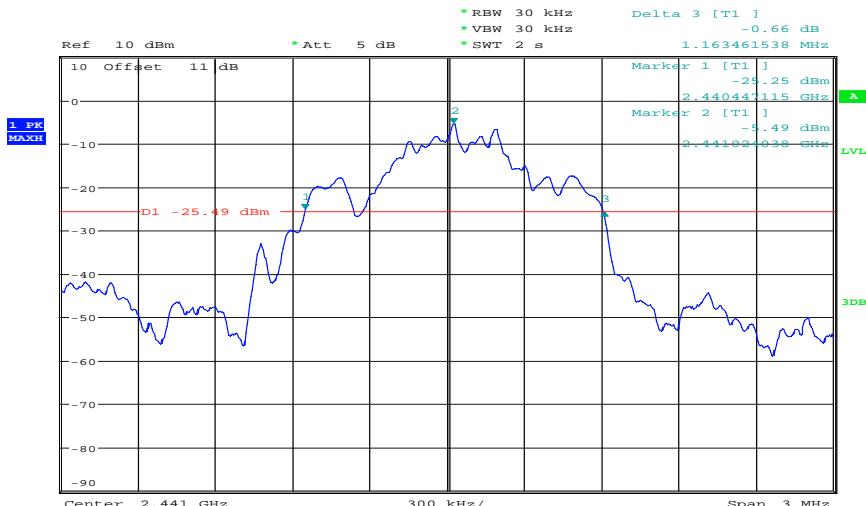
Date: 25.JAN.2012 14:00:06

Plot 6: highest channel – 2480 MHz, Pi / DQPSK modulation

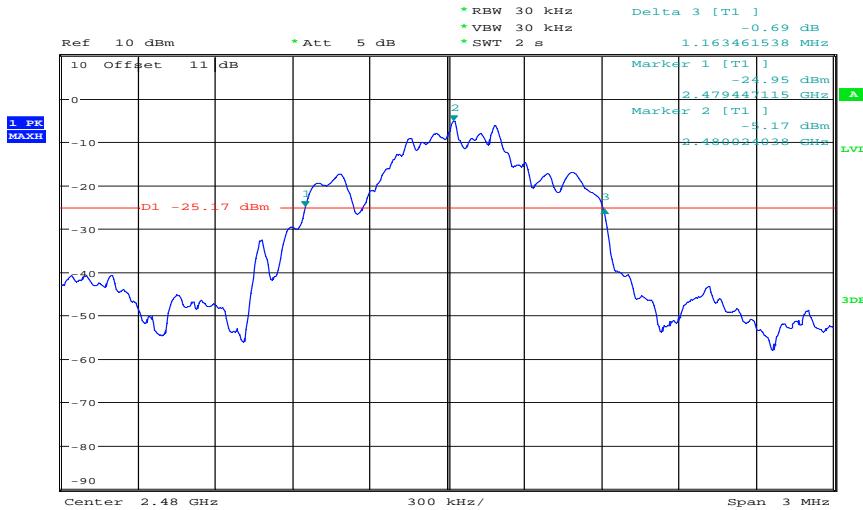
Date: 25.JAN.2012 14:03:17

Plot 7: lowest channel – 2402 MHz, 8 DPSK modulation

Date: 25.JAN.2012 13:54:19

Plot 8: middle channel – 2441 MHz, 8 DPSK modulation

Date: 25.JAN.2012 14:01:06

Plot 9: highest channel – 2480 MHz, 8 DPSK modulation

Date: 25.JAN.2012 14:02:19

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 | |

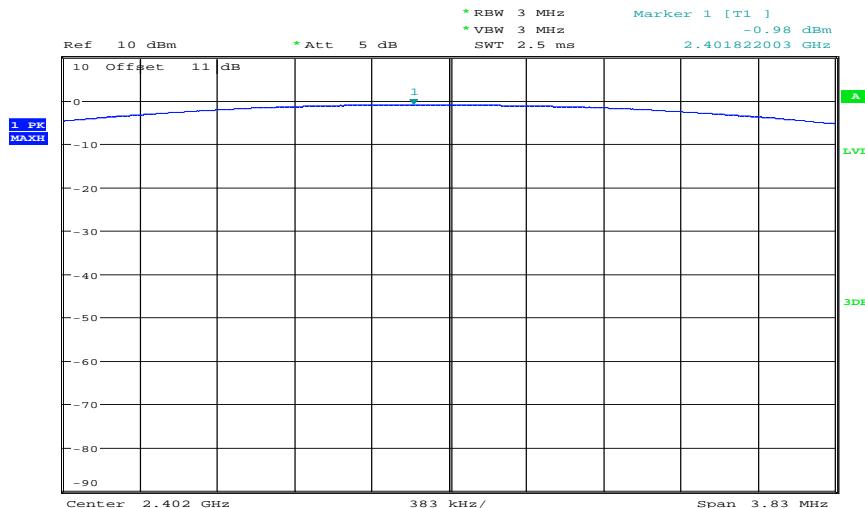
Results:

| Modulation Frequency | Maximum output power conducted [dBm] | | |
|-------------------------|--------------------------------------|----------|----------|
| | 2402 MHz | 2441 MHz | 2480 MHz |
| GFSK | -0.98 | 0.13 | 0.57 |
| Pi/4 DQPSK | -2.87 | -1.77 | -1.35 |
| 8DPSK | -2.86 | -1.74 | -1.34 |
| Measurement uncertainty | ± 1 dB | | |

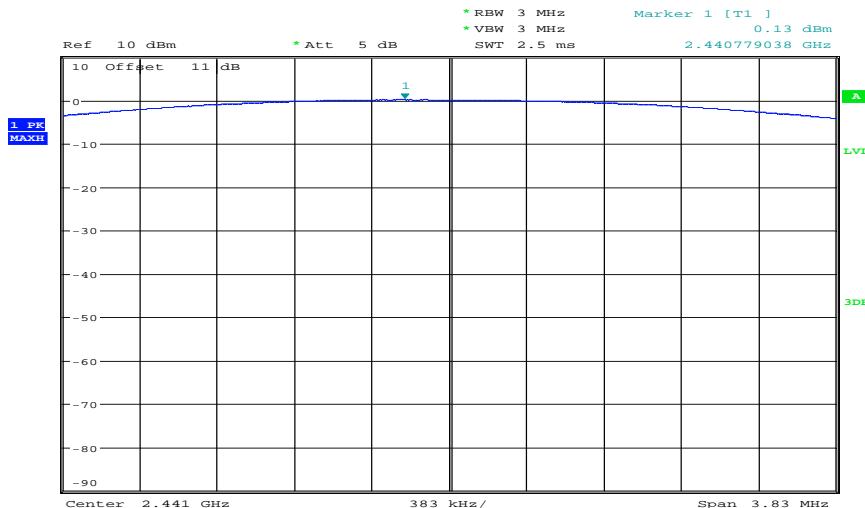
| Modulation | Maximum output power radiated - EIRP [dBm] | | |
|-------------------------|---|----------|----------|
| | 2402 MHz | 2441 MHz | 2480 MHz |
| GFSK | -6.92 | -4.96 | -4.07 |
| Pi/4 DQPSK *) | -8.25 | -6.66 | -5.87 |
| 8DPSK *) | -8.26 | -6.64 | -5.73 |
| Measurement uncertainty | ± 3 dB | | |

*) - Values calculated with max. antenna gain (see chapter 9.1)

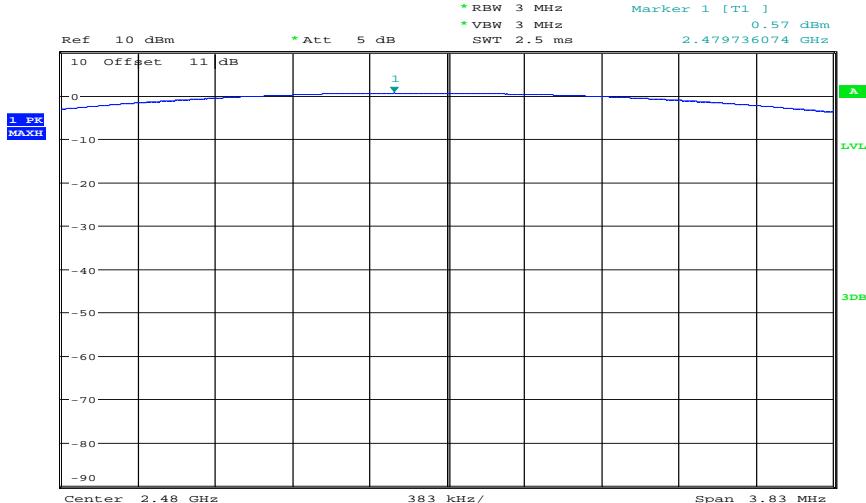
Result: The measurement is passed.

Plots:**Plot 1: lowest channel – 2402 MHz, GFSK modulation**

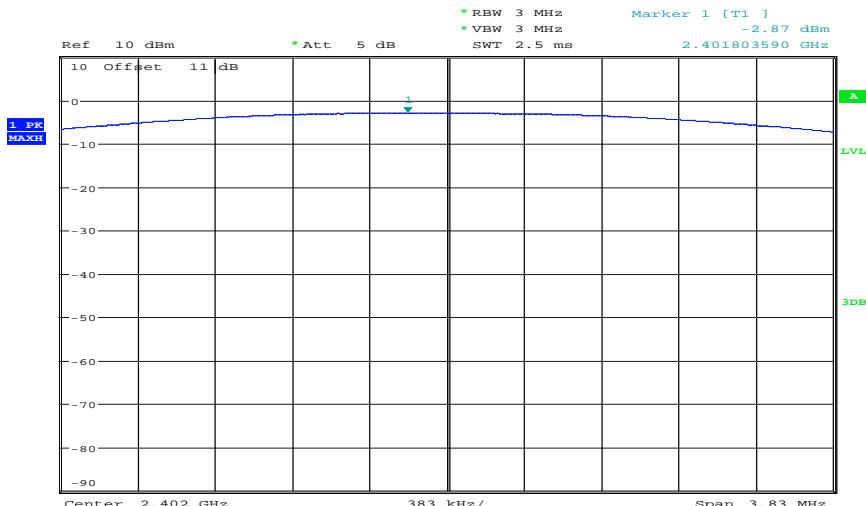
Date: 25.JAN.2012 13:47:45

Plot 2: middle channel – 2441 MHz, GFSK modulation

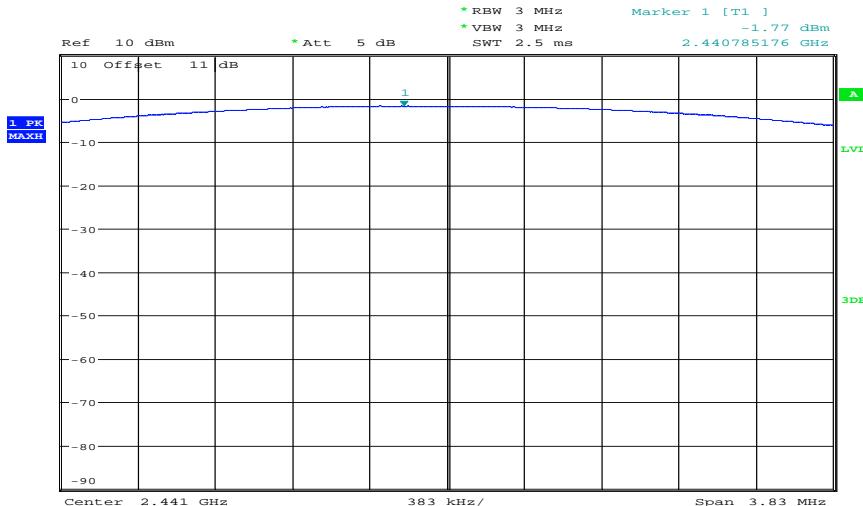
Date: 25.JAN.2012 13:42:32

Plot 3: highest channel – 2480 MHz, GFSK modulation

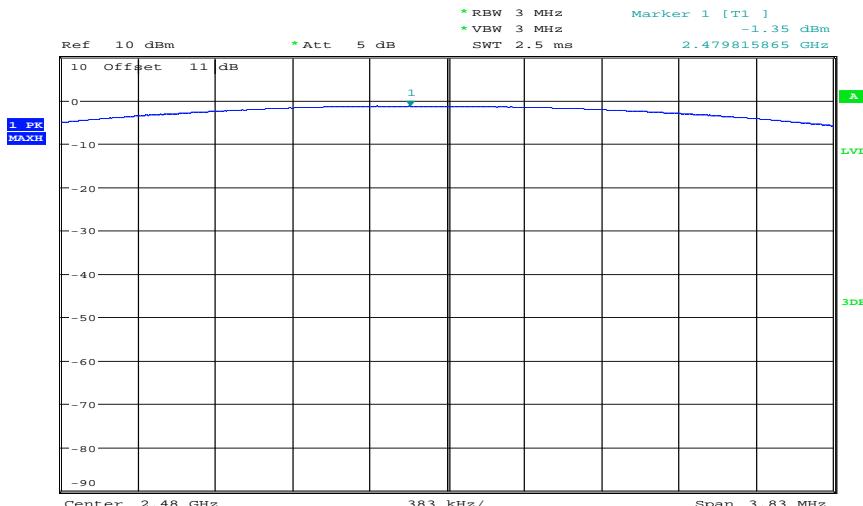
Date: 25.JAN.2012 13:47:03

Plot 4: lowest channel – 2402 MHz, Pi / DQPSK modulation

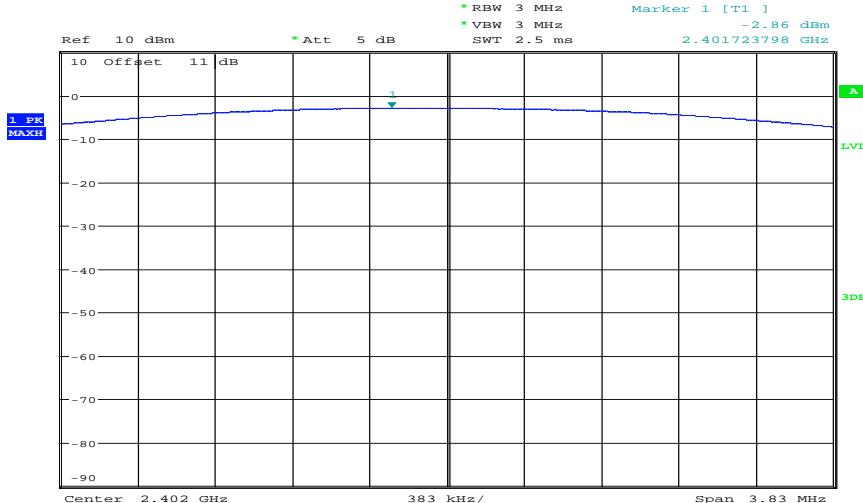
Date: 25.JAN.2012 13:48:22

Plot 5: middle channel – 2441 MHz, Pi / DQPSK modulation

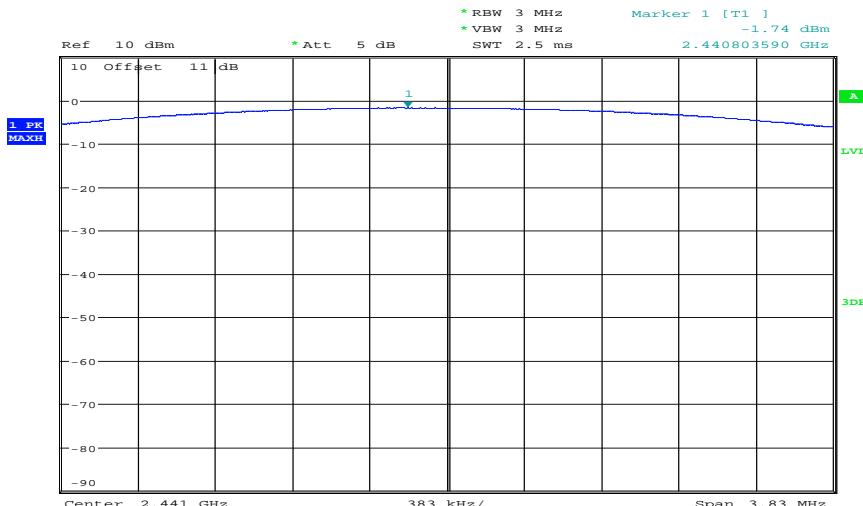
Date: 25.JAN.2012 13:43:29

Plot 6: highest channel – 2480 MHz, Pi / DQPSK modulation

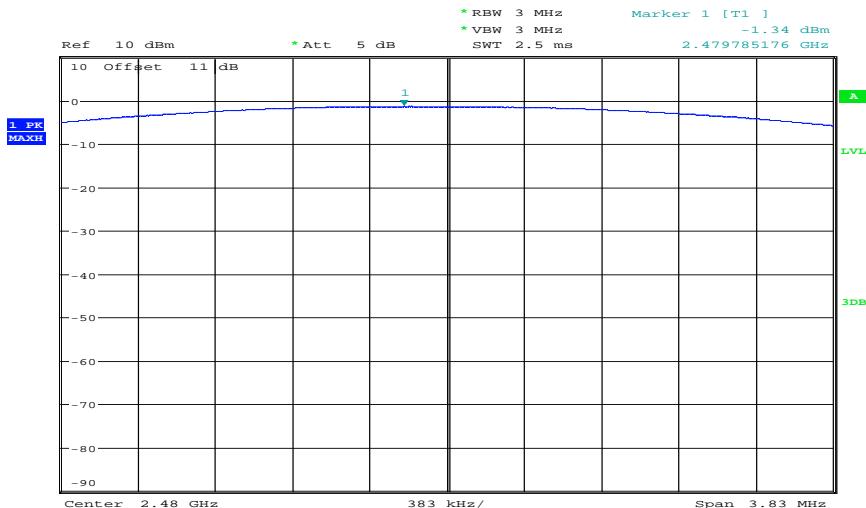
Date: 25.JAN.2012 13:46:27

Plot 7: lowest channel – 2402 MHz, 8 DPSK modulation

Date: 25.JAN.2012 13:49:14

Plot 8: middle channel – 2441 MHz, 8 DPSK modulation

Date: 25.JAN.2012 13:44:24

Plot 9: highest channel – 2480 MHz, 8 DPSK modulation

Date: 25.JAN.2012 13:45:53

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: | 100 kHz |
| Resolution bandwidth: | 100 kHz |
| Span: | Lower Band Edge: 2395 – 2405 MHz Higher Band Edge: 2478 – 2489 MHz |
| Trace-Mode: | Max Hold |

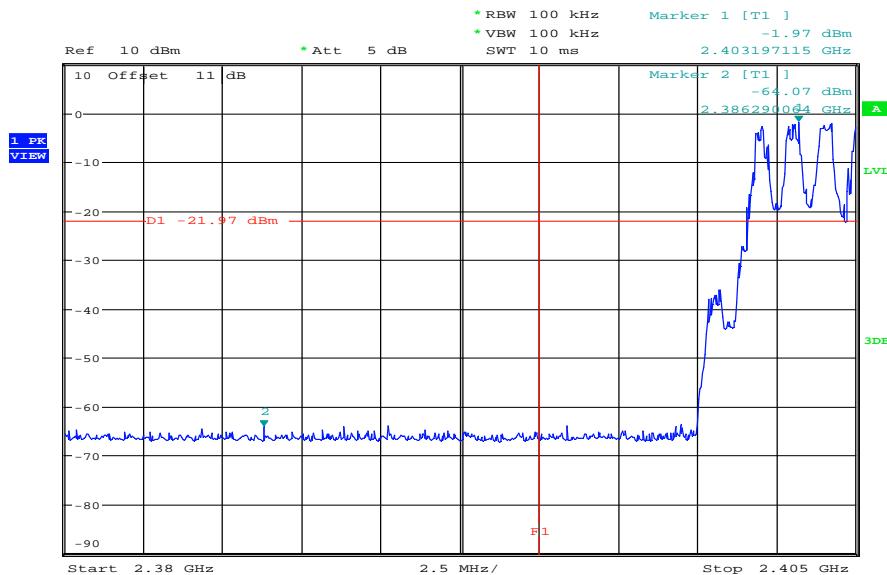
Limits:

| FCC | IC |
|---|-------------------------|
| CFR Part 15.247 (d) | RSS 210, Issue 8, A 8.5 |
| Band edge compliance conducted | |
| 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. | |

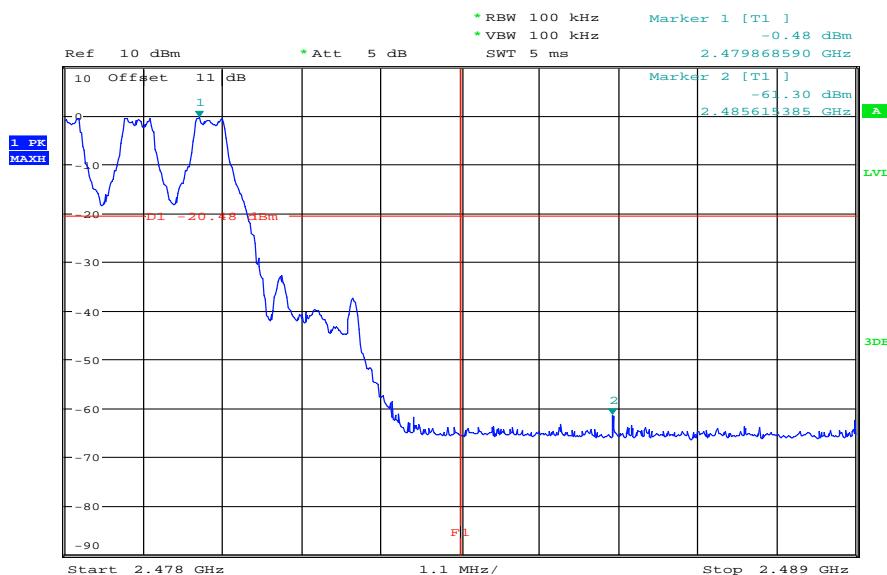
Results:

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

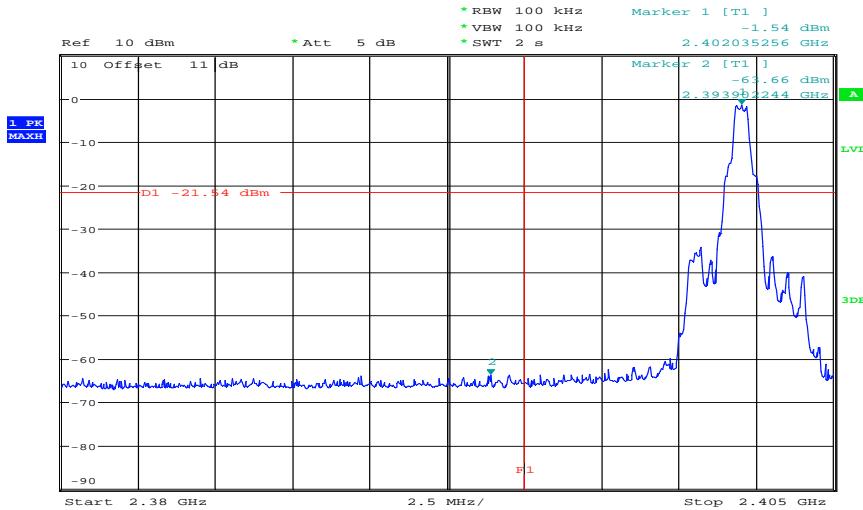
Result: The measurement is passed.

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

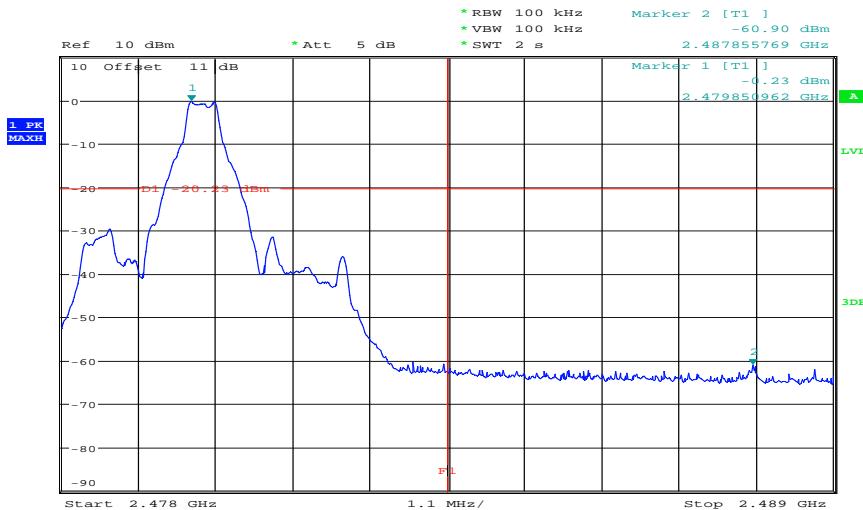
Date: 3.FEB.2012 07:29:32

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

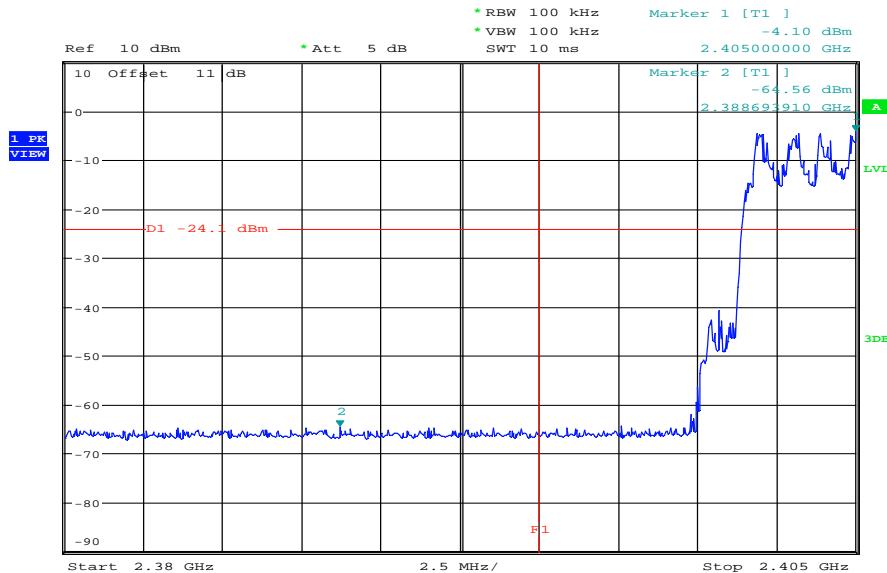
Date: 3.FEB.2012 08:30:04

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

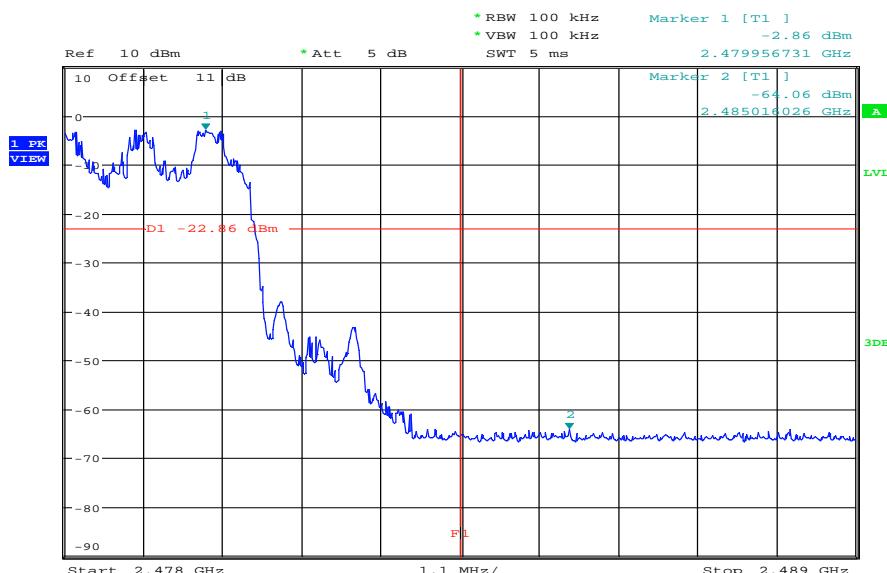
Date: 25.JAN.2012 14:28:51

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

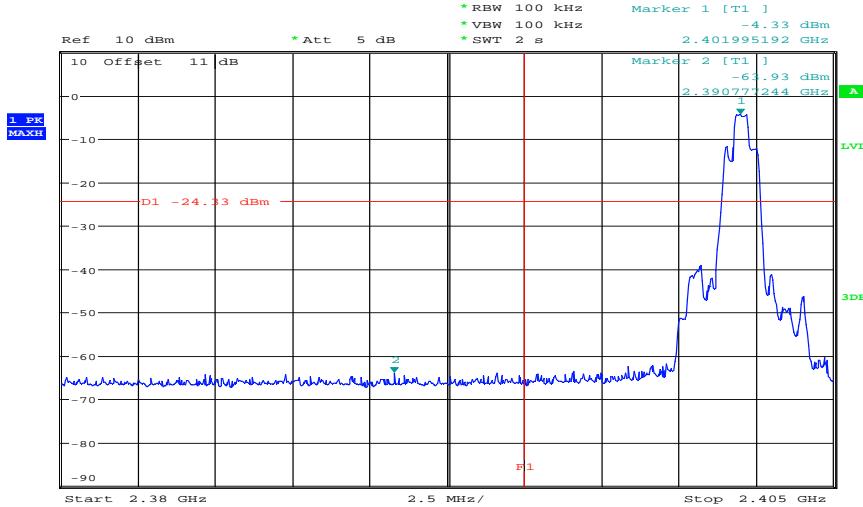
Date: 25.JAN.2012 14:17:58

Plot 5: Lower band edge – hopping on, Pi/4 DQPSK modulation

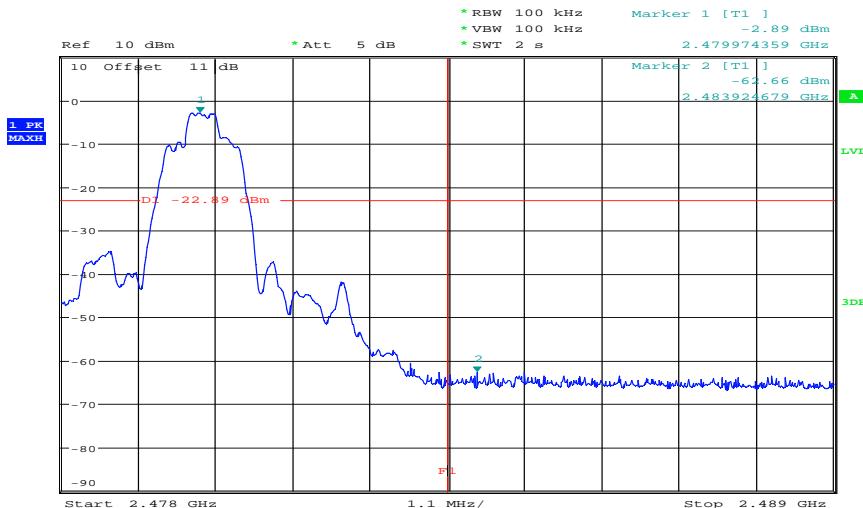
Date: 3.FEB.2012 07:35:50

Plot 6: Upper band edge – hopping on, Pi/4 DQPSK modulation

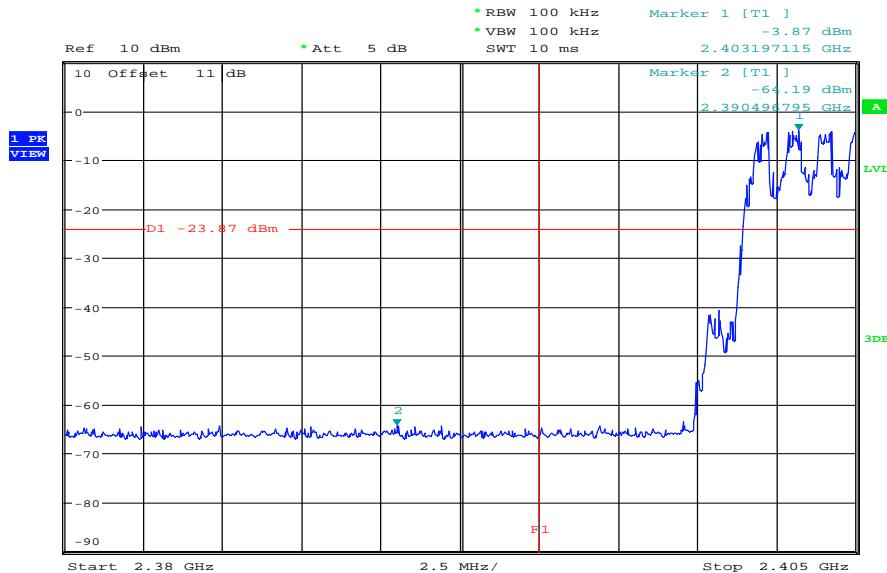
Date: 3.FEB.2012 08:00:54

Plot 7: Lower band edge – hopping off, Pi/4 DQPSK modulation

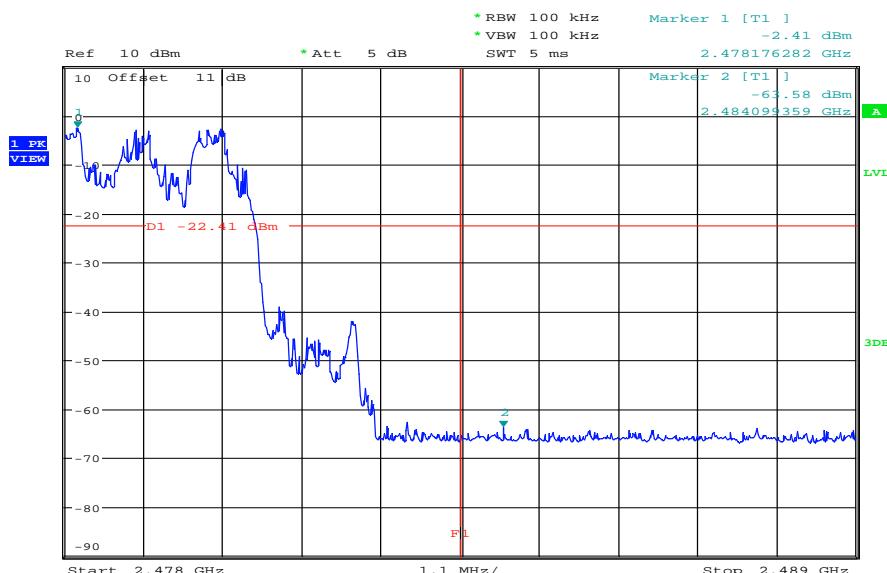
Date: 25.JAN.2012 14:27:48

Plot 8: Upper band edge – hopping off, Pi/4 DQPSK modulation

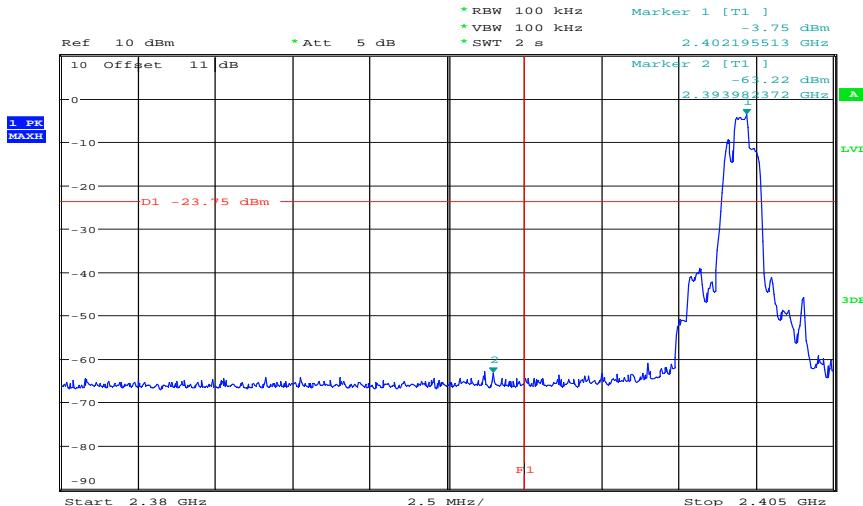
Date: 25.JAN.2012 14:18:55

Plot 9: Lower band edge – hopping on, 8DPSK modulation

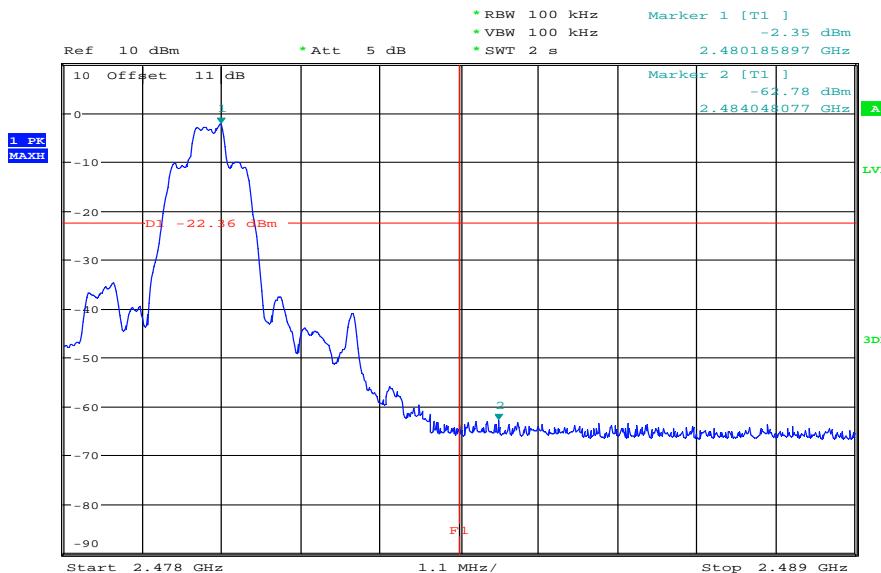
Date: 3.FEB.2012 07:41:37

Plot 10: Upper band edge – hopping on, 8DPSK modulation

Date: 3.FEB.2012 08:09:32

Plot 11: Lower band edge – hopping off, 8DPSK modulation

Date: 25.JAN.2012 14:26:58

Plot 12: Upper band edge – hopping off, 8DPSK modulation

Date: 25.JAN.2012 14:19:43

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 |

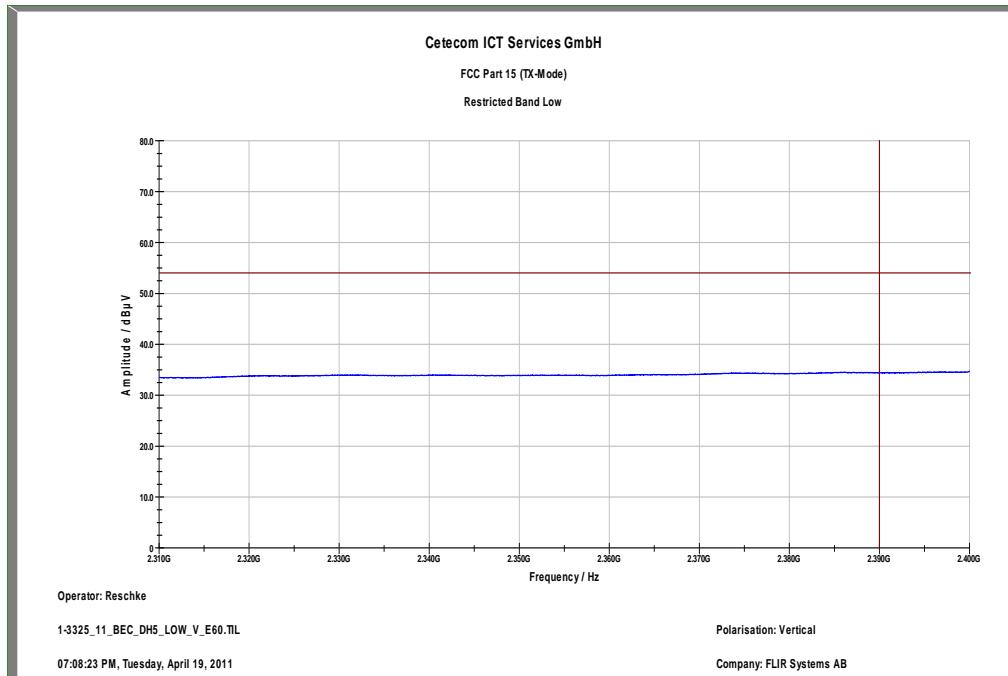
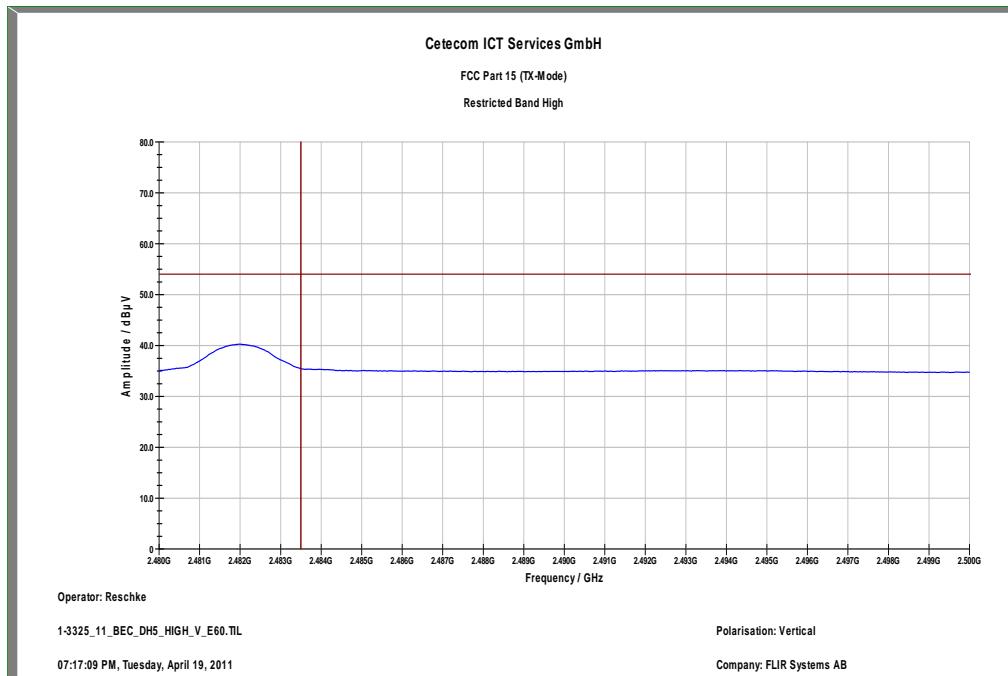
Limits:

| FCC | IC |
|--|-------------------------|
| CFR Part 15.205 | RSS 210, Issue 8, A 8.5 |
| Band edge compliance radiated | |
| 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)). | |
| 54 dB μ V/m AVG | |

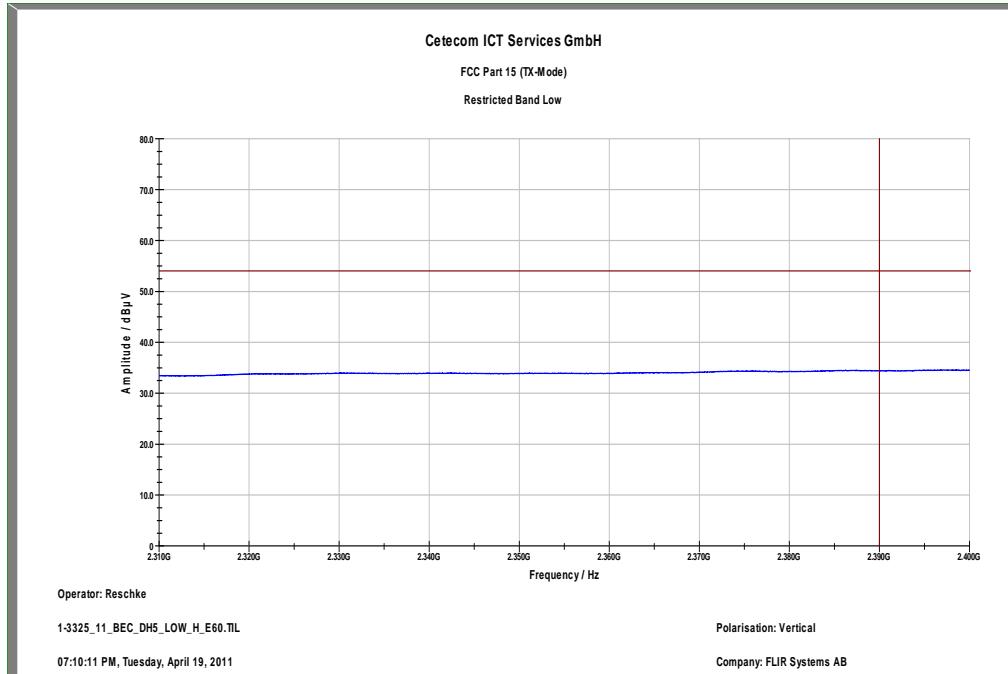
Results: Also see plots

| Scenario | Band edge compliance radiated [dB μ V/m] | | |
|-------------------------|--|---------------------|----------------------|
| | GFSK | Pi/4 DQPSK | 8DPSK |
| Modulation | | | |
| Lower restricted band | < 54 (see plot 1/3) | < 54 (see plot 5/7) | < 54 (see plot 9/11) |
| Upper restricted band | < 54 (see plot 2/4) | < 54 (see plot 6/8) | < 54(see plot 10/12) |
| Measurement uncertainty | ± 3 dB | | |

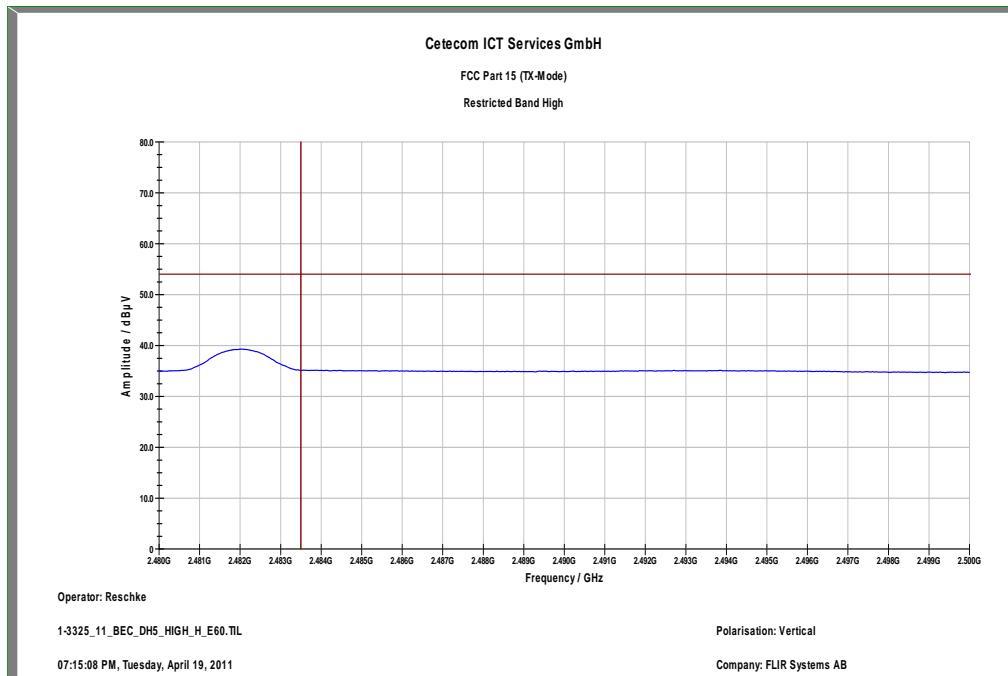
Result: The measurement is passed.

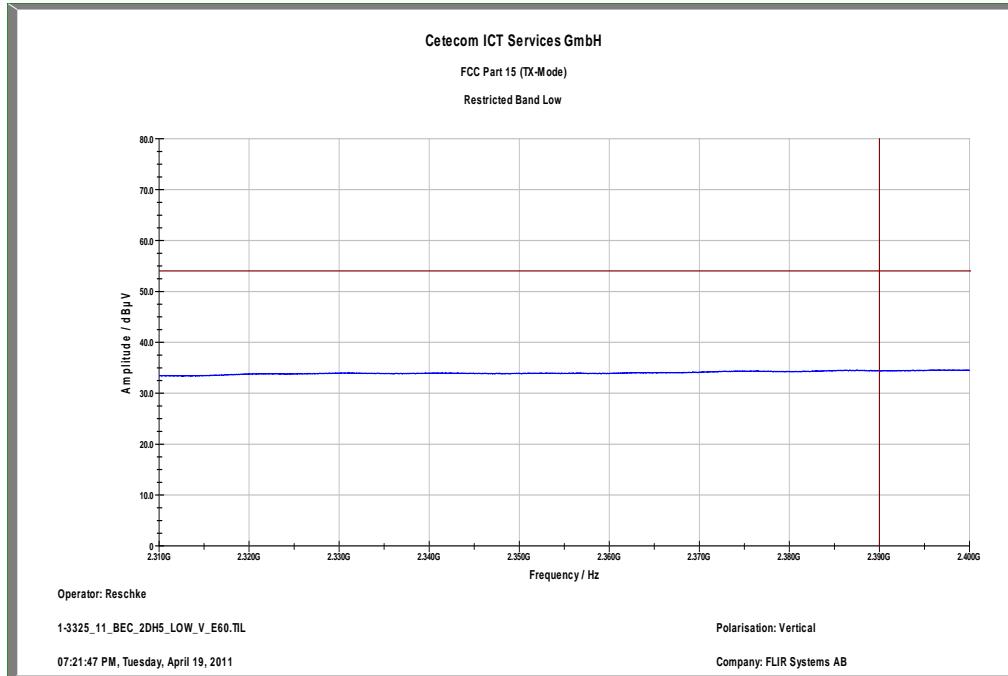
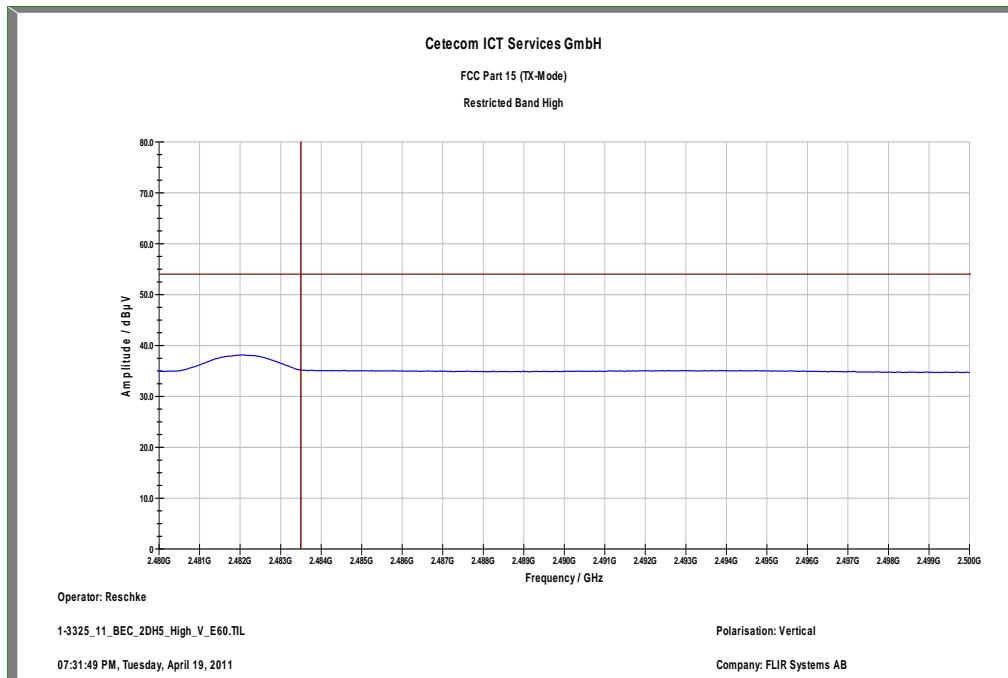
Plots:**Plot 1: GFSK modulation, lower band edge, vertical polarization****Plot 2: GFSK modulation, upper band edge, vertical polarization**

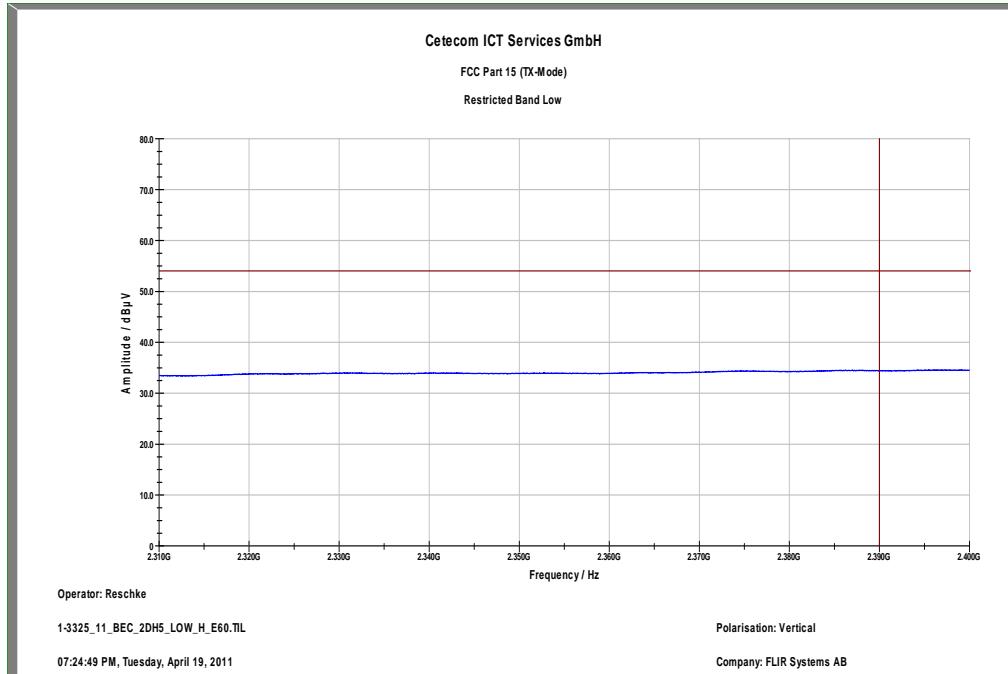
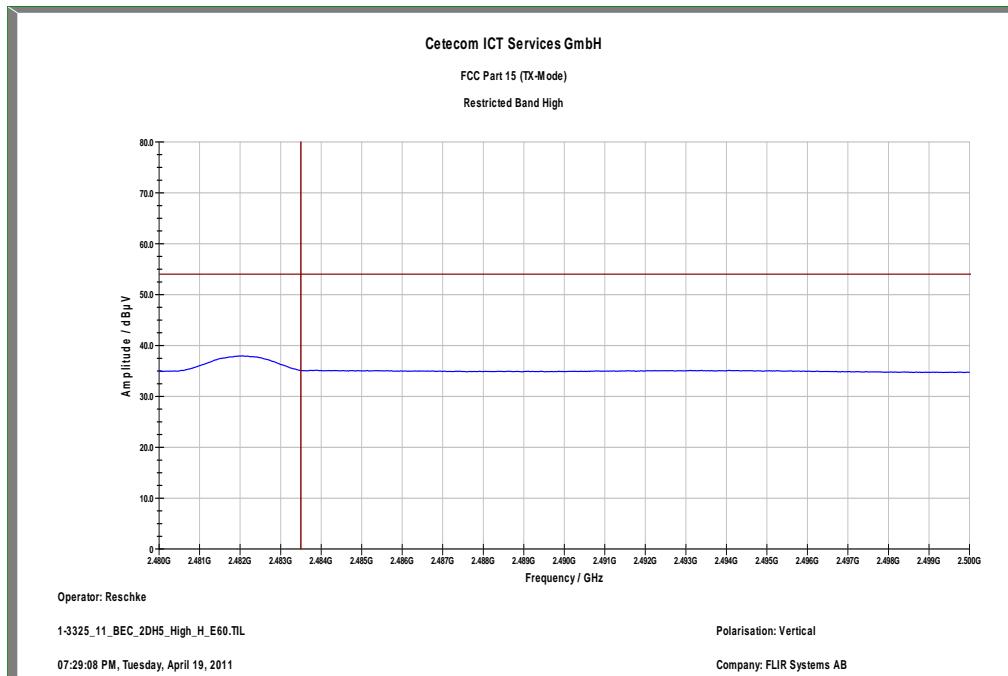
Plot 3: GFSK modulation, lower band edge, horizontal polarization



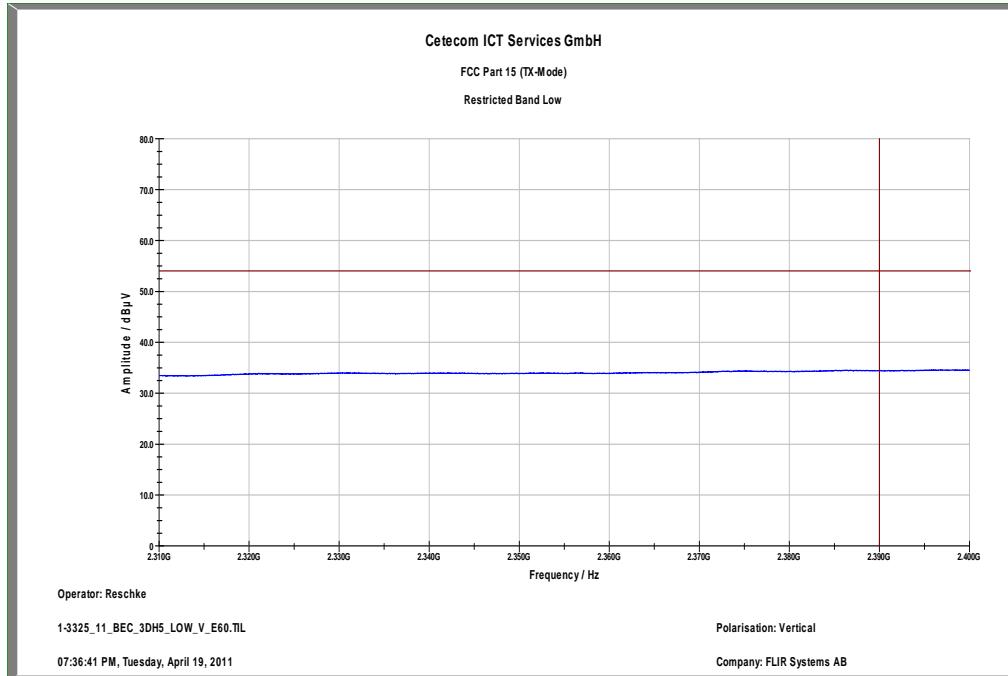
Plot 4: GFSK modulation, upper band edge, horizontal polarization



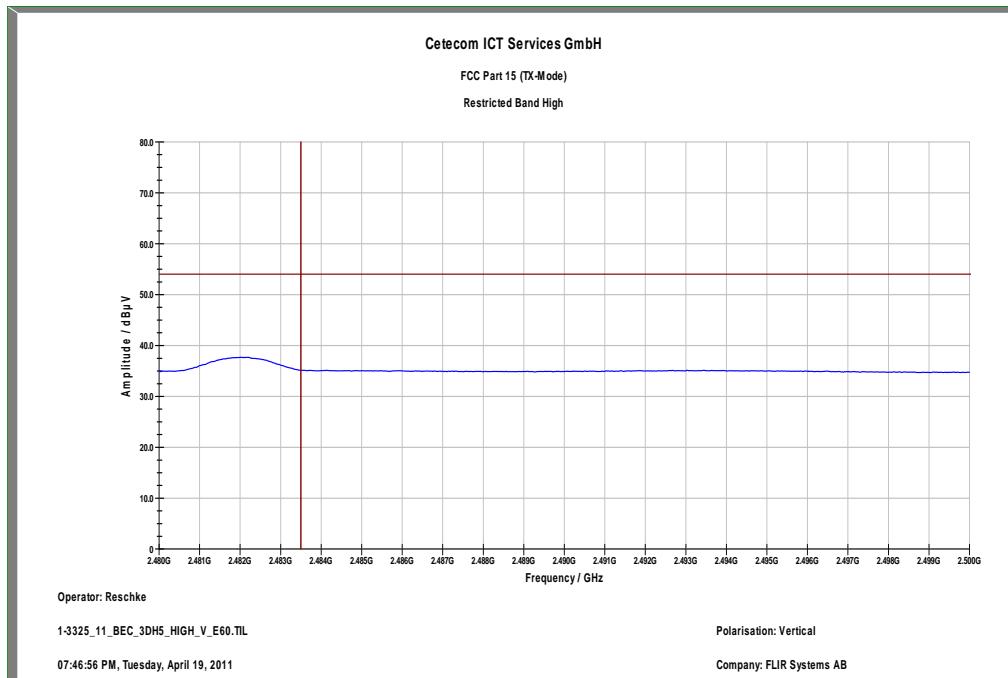
Plot 5: Pi/4 DQPSK modulation, lower band edge, vertical polarization**Plot 6: Pi/4 DQPSK modulation, upper band edge, vertical polarization**

Plot 7: Pi/4 DQPSK modulation, lower band edge, horizontal polarization**Plot 8: Pi/4 DQPSK modulation, upper band edge, horizontal polarization**

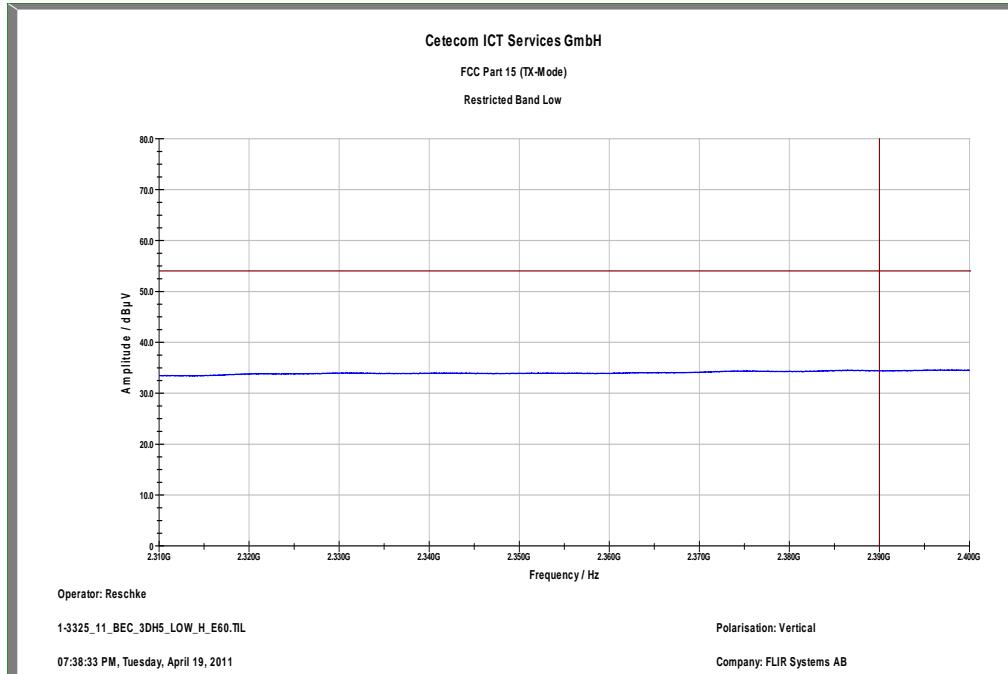
Plot 9: 8 DPSK modulation, lower band edge, vertical polarization



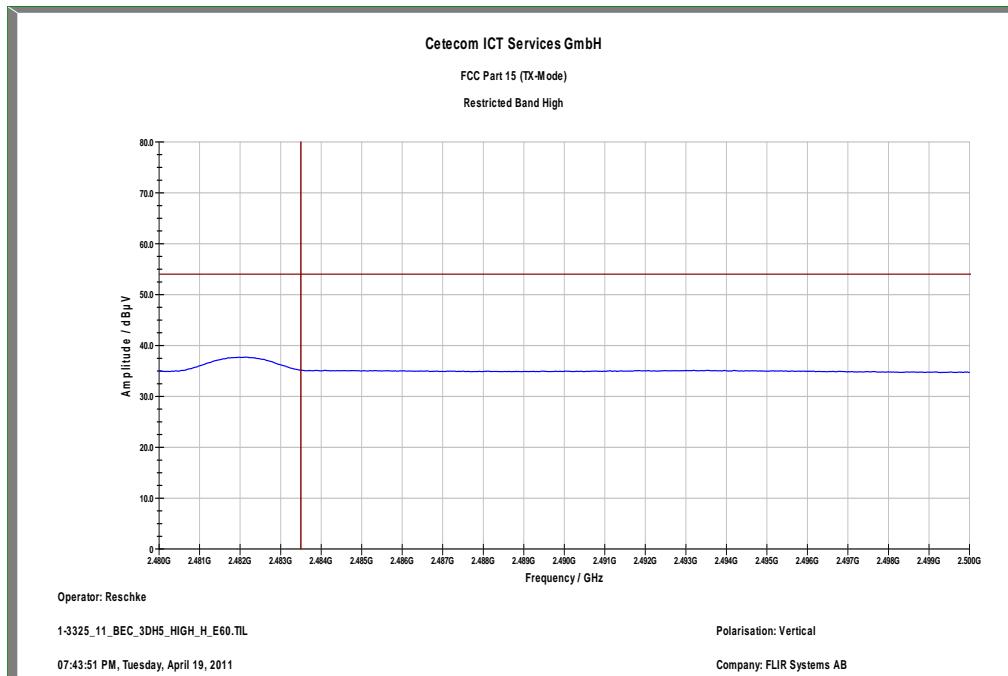
Plot 10: 8 DPSK modulation, upper band edge, vertical polarization



Plot 11: 8 DPSK modulation, lower band edge, horizontal polarization



Plot 12: 8 DPSK modulation, upper band edge, 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: | 0 Hz 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 | |
| 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 | |

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 | | -2.53 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -34.42 | complies |
| | | | | | |
| | | | | | |
| 2441 | | -0.45 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -36.90 | complies |
| | | | | | |
| | | | | | |
| 2480 | | -0.63 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -30.47 | complies |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | | ± 3 dB | | |

Result: The measurement is passed.

Results:

| TX spurious emissions conducted Pi/4-DQPSK - mode | | | | | |
|--|-----------------------------------|-----------------------------|-----------------------------------|--|---------------------|
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 2402 | | -4.05 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -32.09 | complies |
| | | | | | |
| | | | | | |
| 2441 | | -3.22 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -37.75 | complies |
| | | | | | |
| | | | | | |
| 2480 | | -2.67 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -34.22 | complies |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | | ± 3dB | | |

Result: The measurement is passed.

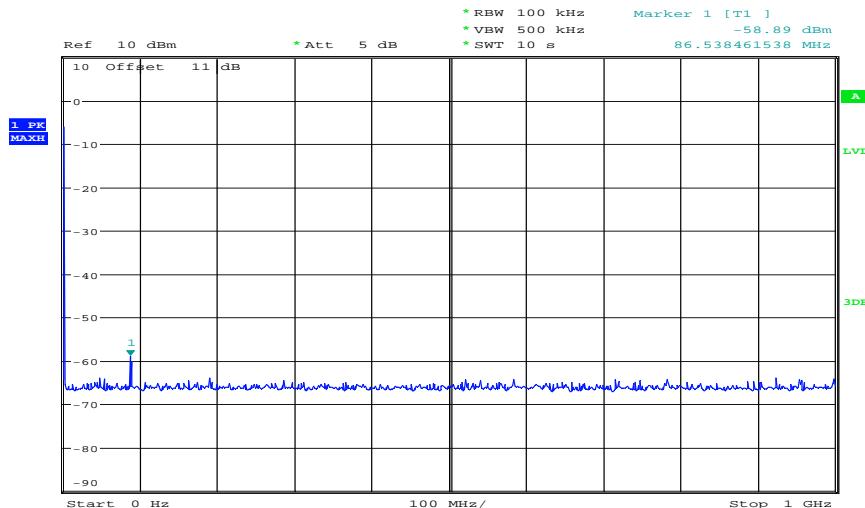
Results:

| TX spurious emissions conducted 8DPSK - mode | | | | | |
|---|-----------------------------------|-----------------------------|-----------------------------------|--|---------------------|
| f [MHz] | | amplitude of emission [dBm] | limit max. allowed emission power | actual attenuation below frequency of operation [dB] | results |
| 2402 | | -4.70 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -30.69 | complies |
| | | | | | |
| | | | | | |
| 2441 | | -3.53 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -35.55 | complies |
| | | | | | |
| | | | | | |
| 2480 | | -2.69 | 30 dBm | | Operating frequency |
| | <i>No critical peaks detected</i> | | -20 dBc | -38.16 | complies |
| | | | | | |
| | | | | | |
| Measurement uncertainty | | | ± 3dB | | |

Result: The measurement is passed.

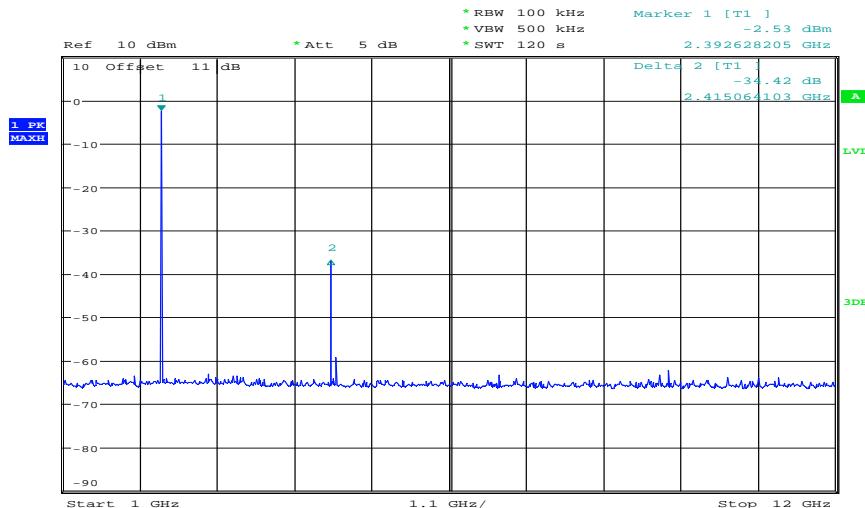
Plots: GFSK modulation

Plot 1: lowest channel – 0 Hz – 1 GHz, GFSK modulation

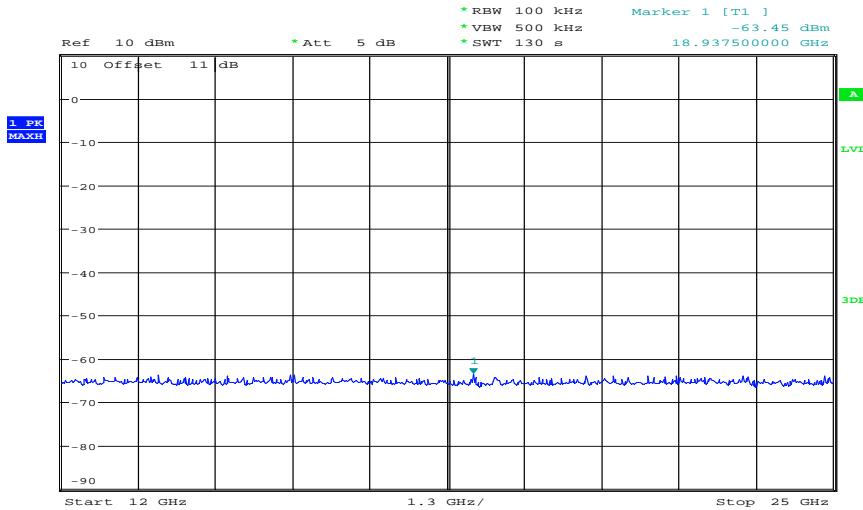


Date: 25.JAN.2012 14:32:21

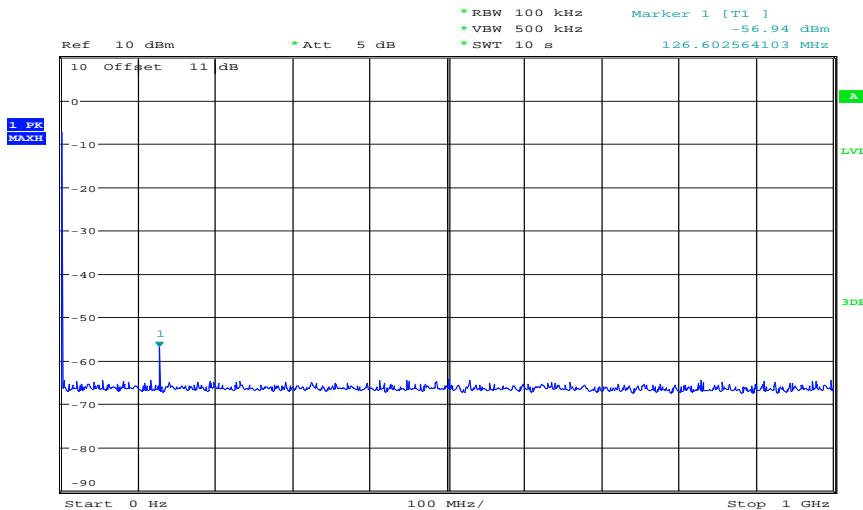
Plot 2: lowest channel – 1 GHz – 12 GHz, GFSK modulation



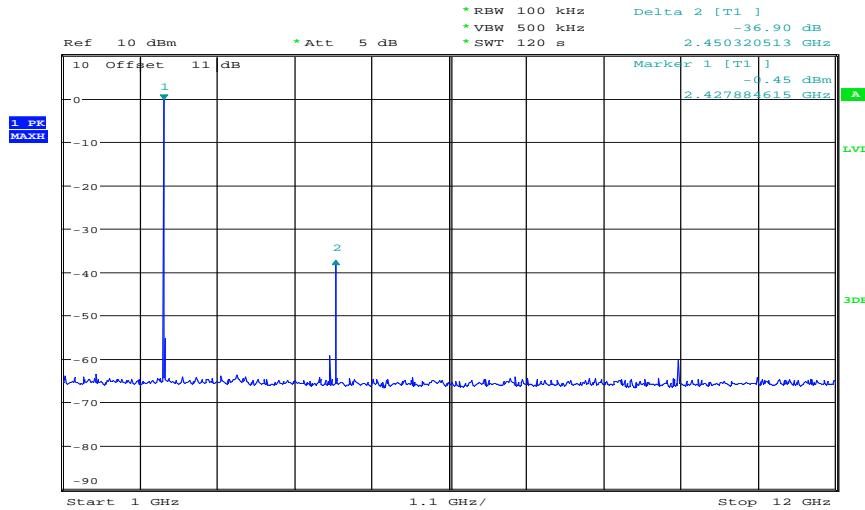
Date: 25.JAN.2012 14:35:53

Plot 3: lowest channel – 12 GHz – 25 GHz, GFSK modulation

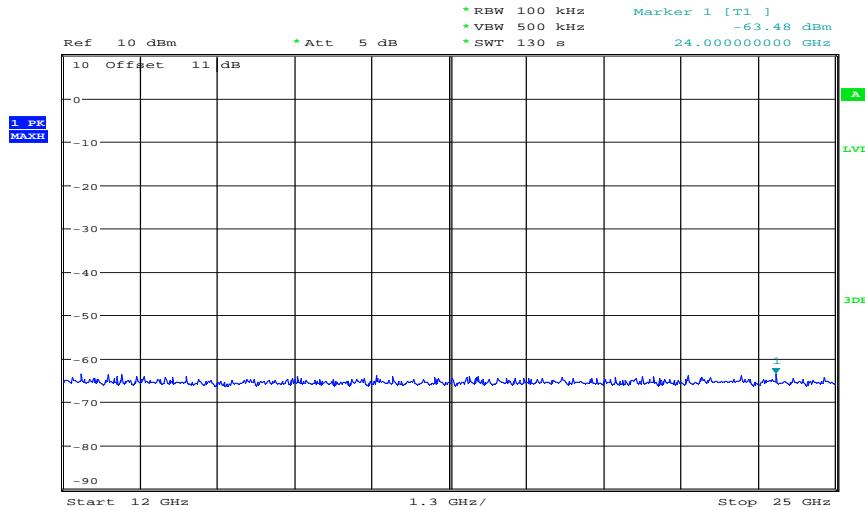
Date: 25.JAN.2012 14:39:32

Plot 4: middle channel – 0 Hz – 1 GHz, GFSK modulation

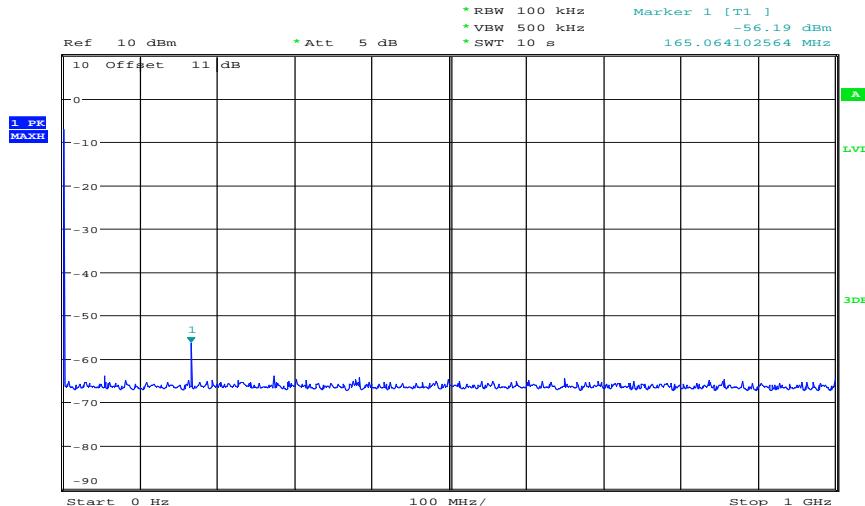
Date: 25.JAN.2012 15:12:20

Plot 5: middle channel – 1 GHz – 12 GHz, GFSK modulation

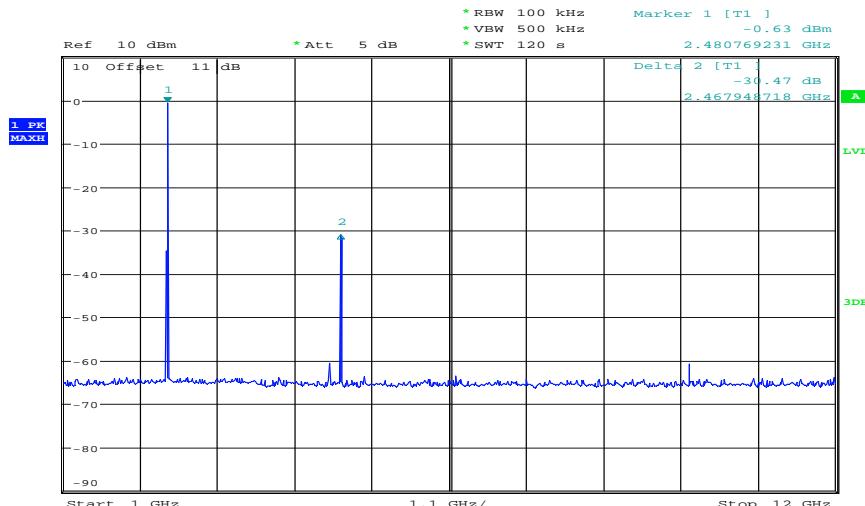
Date: 25.JAN.2012 15:11:34

Plot 6: middle channel – 12 GHz – 25 GHz, GFSK modulation

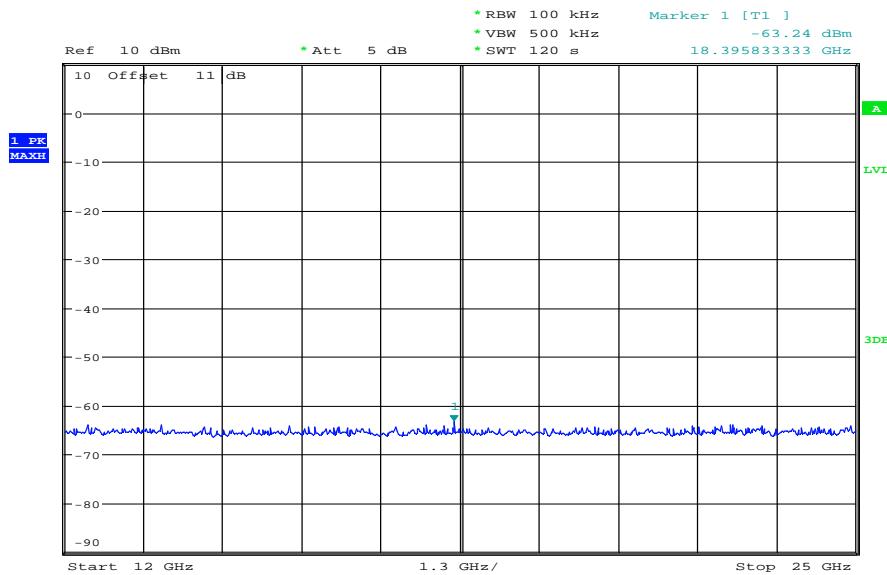
Date: 25.JAN.2012 15:09:11

Plot 7: highest channel – 0 Hz – 1 GHz, GFSK modulation

Date: 25.JAN.2012 15:13:26

Plot 8: highest channel – 1 GHz – 12 GHz, GFSK modulation

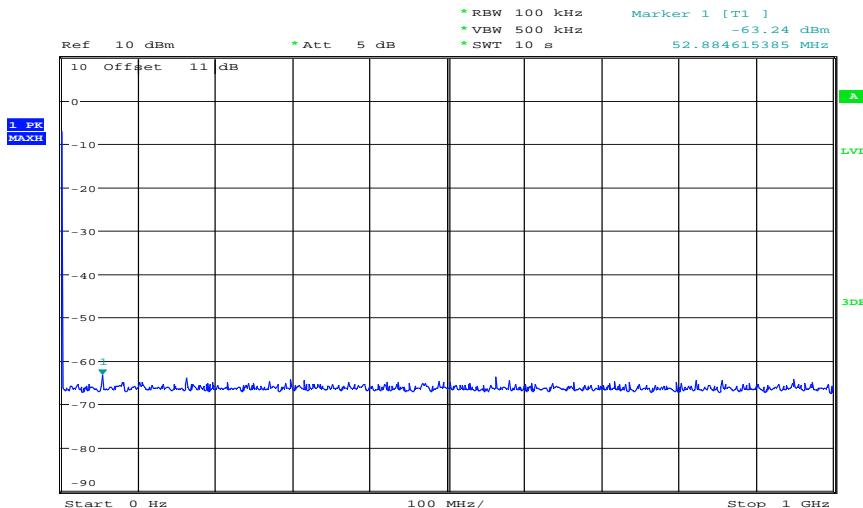
Date: 25.JAN.2012 15:18:32

Plot 9: highest channel – 12 GHz – 25 GHz, GFSK modulation

Date: 25.JAN.2012 15:21:00

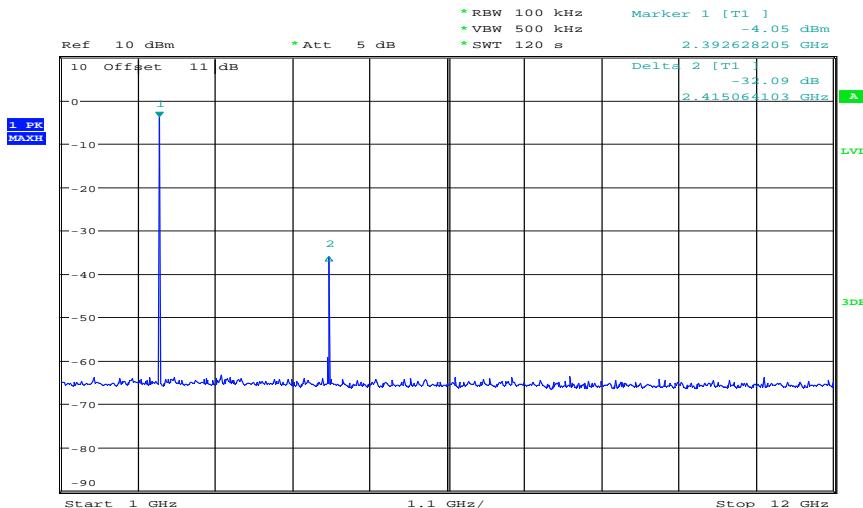
Plots: Pi/4 DQPSK modulation

Plot 10: lowest channel – 0 Hz – 1 GHz, Pi/4 DQPSK modulation

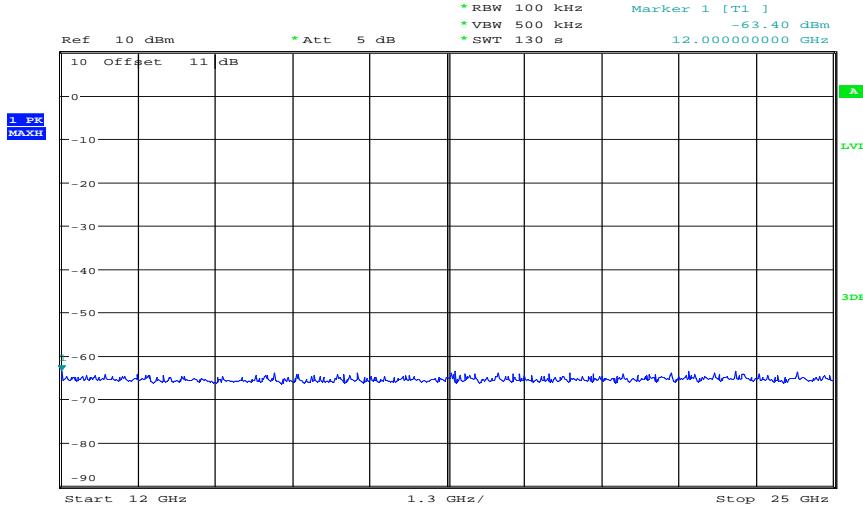


Date: 25.JAN.2012 14:46:56

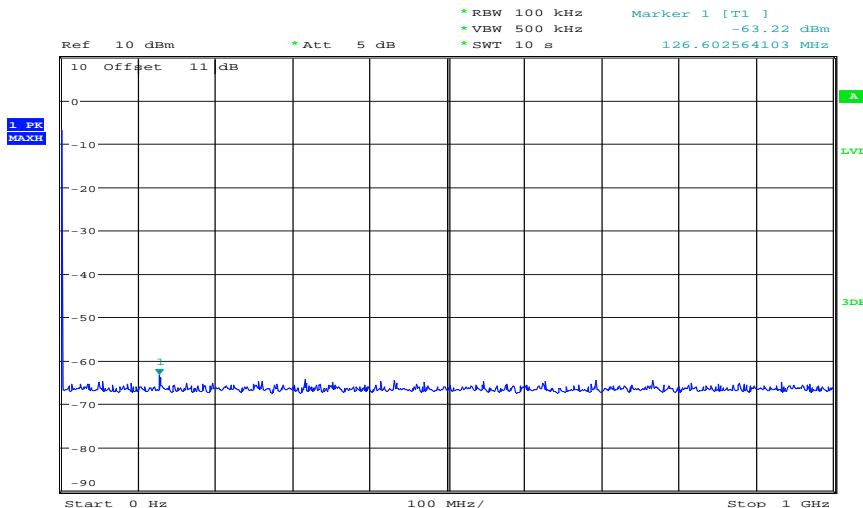
Plot 11: lowest channel – 1 GHz – 12 GHz, Pi/4 DQPSK modulation



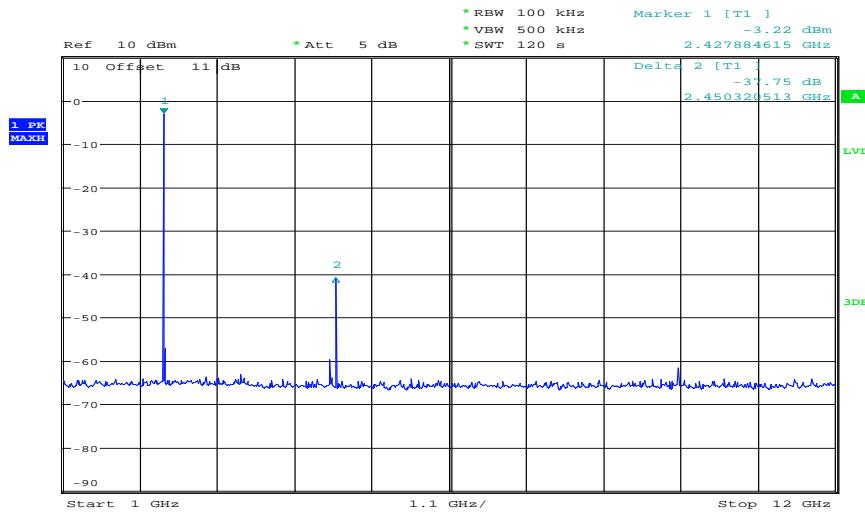
Date: 25.JAN.2012 14:46:08

Plot 12: lowest channel – 12 GHz – 25 GHz, Pi/4 DQPSK modulation

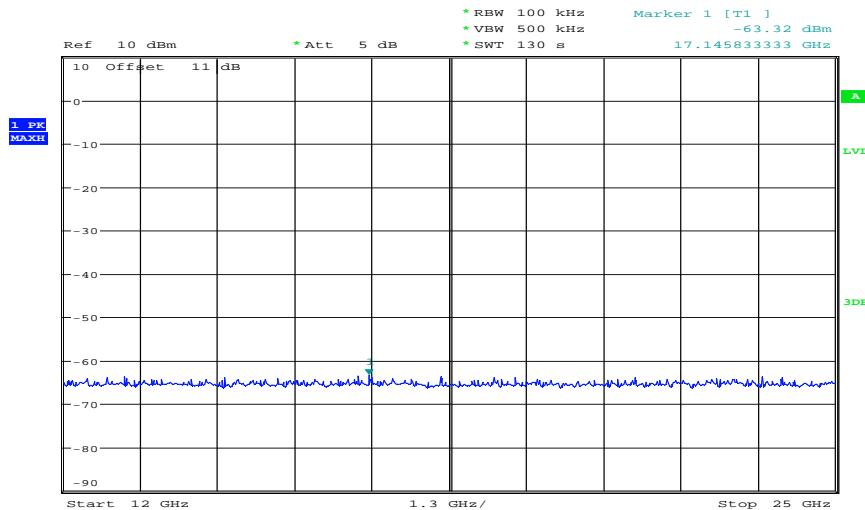
Date: 25.JAN.2012 14:42:37

Plot 13: middle channel – 0 Hz – 1 GHz, Pi/4 DQPSK modulation

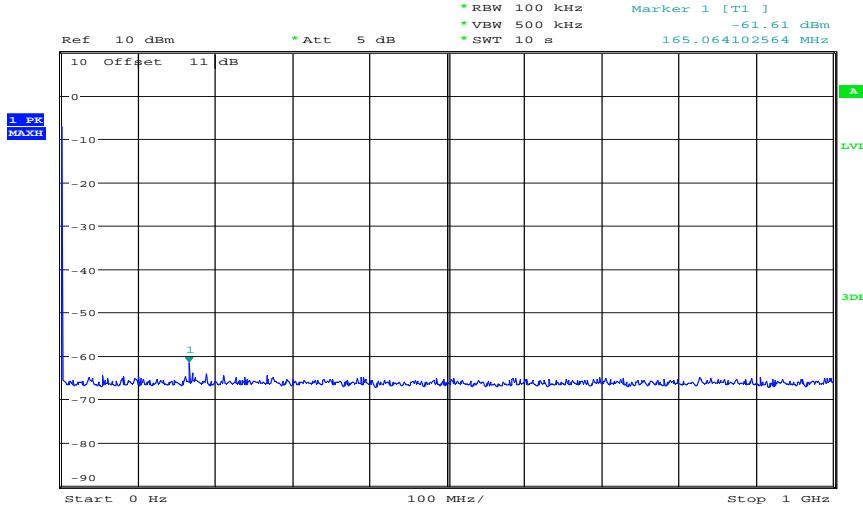
Date: 25.JAN.2012 15:00:14

Plot 14: middle channel – 1 GHz – 12 GHz, Pi/4 DQPSK modulation

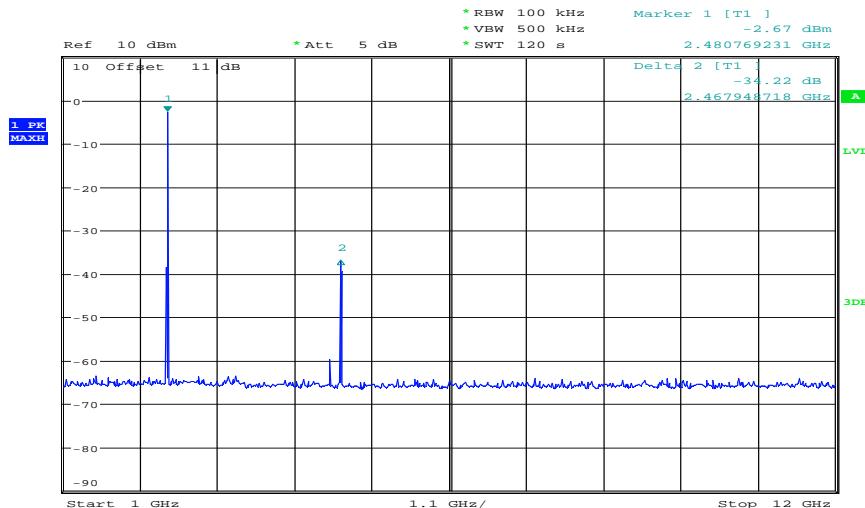
Date: 25.JAN.2012 15:02:52

Plot 15: middle channel – 12 GHz – 25 GHz, Pi/4 DQPSK modulation

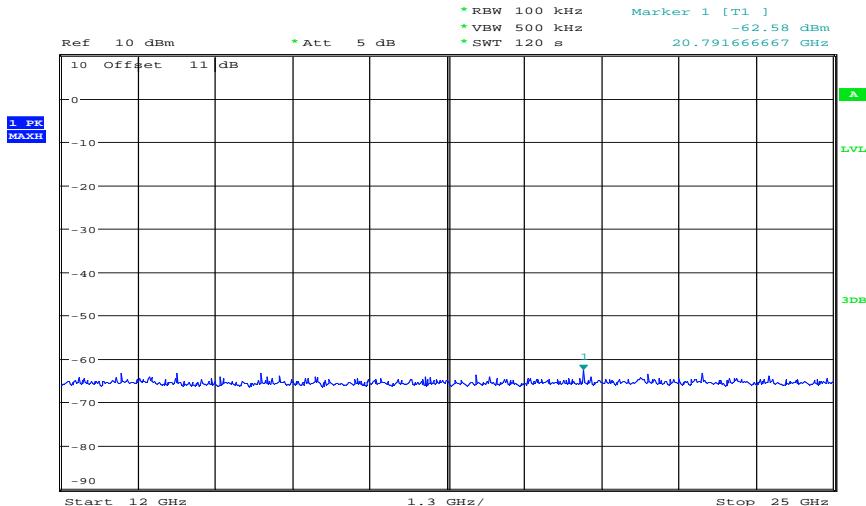
Date: 25.JAN.2012 15:06:20

Plot 16: highest channel – 0 Hz – 1 GHz, Pi/4 DQPSK modulation

Date: 25.JAN.2012 15:28:32

Plot 17: highest channel – 1 GHz – 12 GHz, Pi/4 DQPSK modulation

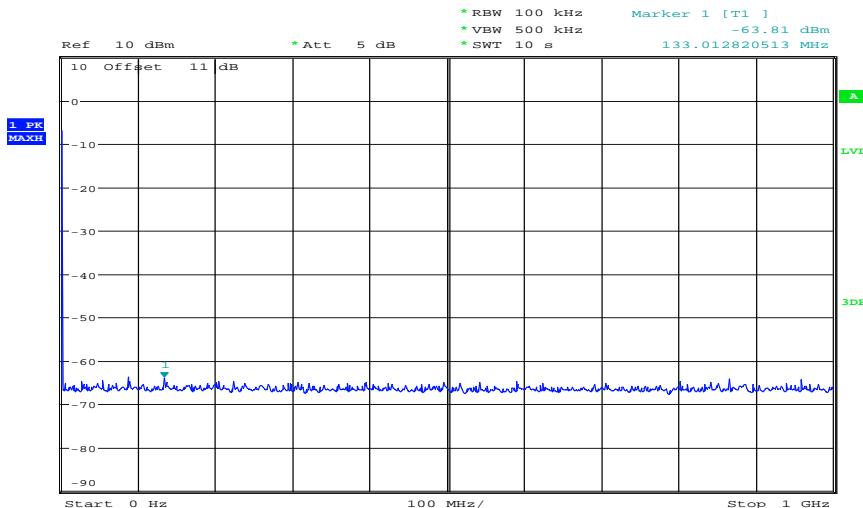
Date: 25.JAN.2012 15:26:38

Plot 18: highest channel – 12 GHz – 25 GHz, Pi/4 DQPSK modulation

Date: 25.JAN.2012 15:23:31

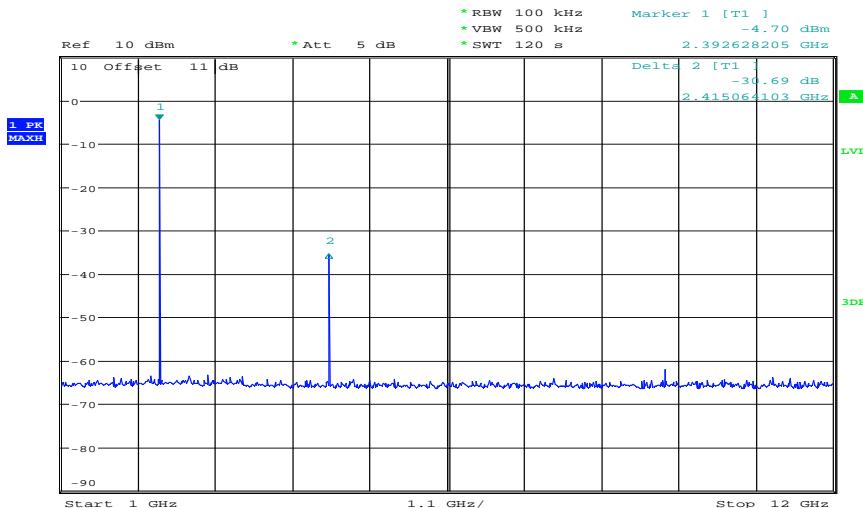
Plots: 8DPSK modulation

Plot 19: lowest channel – 0 Hz – 1 GHz, 8DPSK modulation

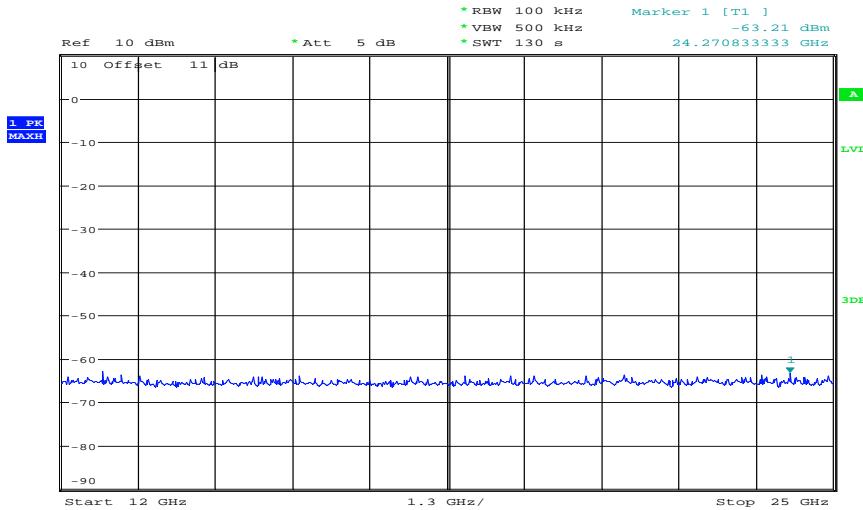


Date: 25.JAN.2012 14:47:54

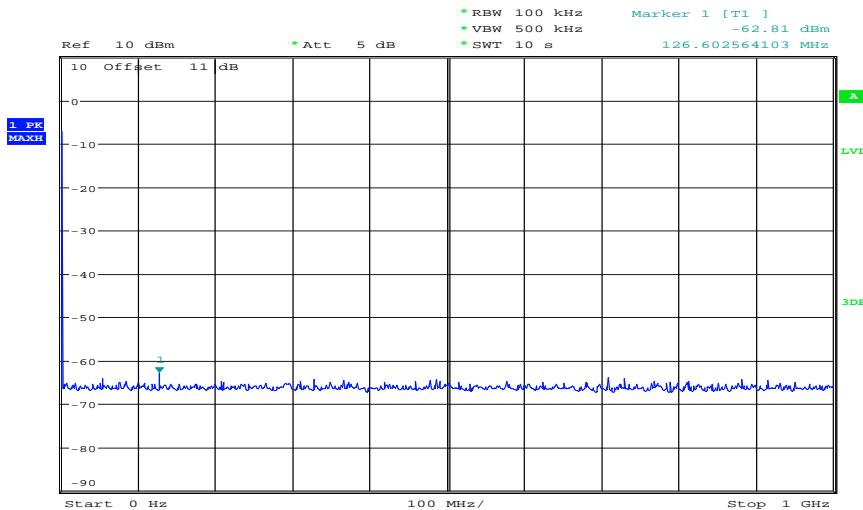
Plot 20: lowest channel – 1 GHz – 12 GHz, 8DPSK modulation



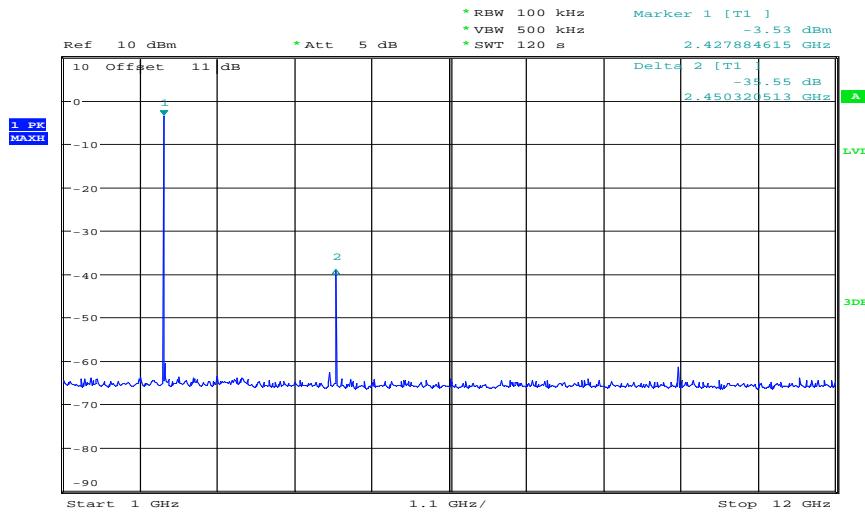
Date: 25.JAN.2012 14:50:31

Plot 21: lowest channel – 12 GHz – 25 GHz, 8DPSK modulation

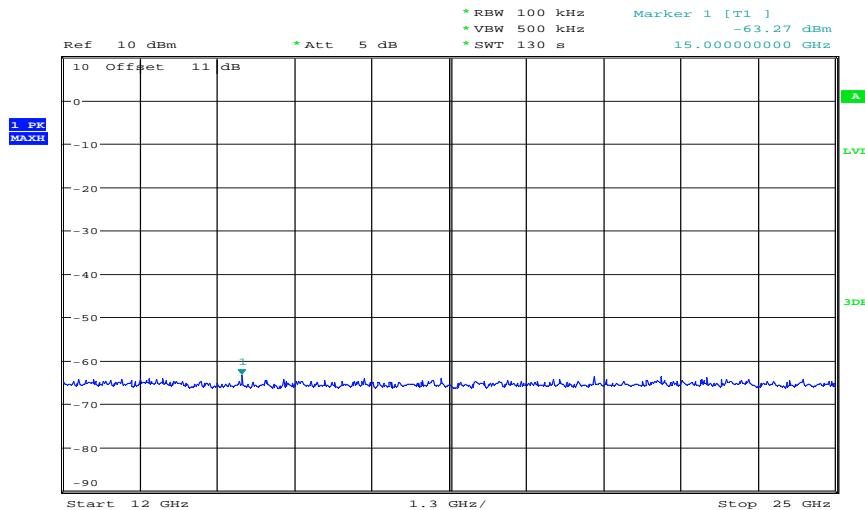
Date: 25.JAN.2012 14:53:08

Plot 22: middle channel – 0 Hz – 1 GHz, 8DPSK modulation

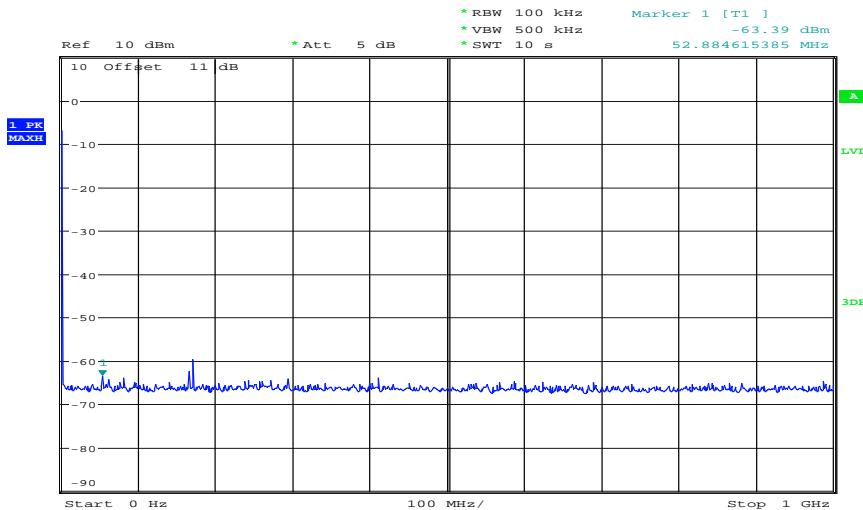
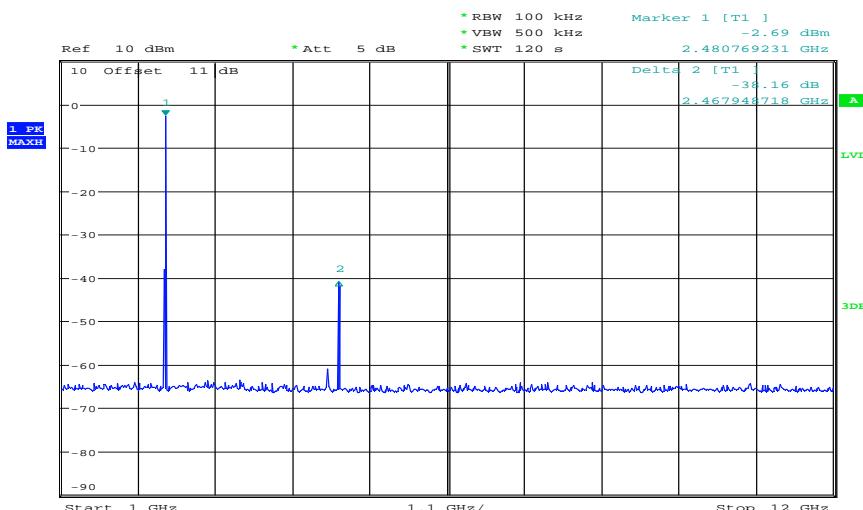
Date: 25.JAN.2012 14:59:31

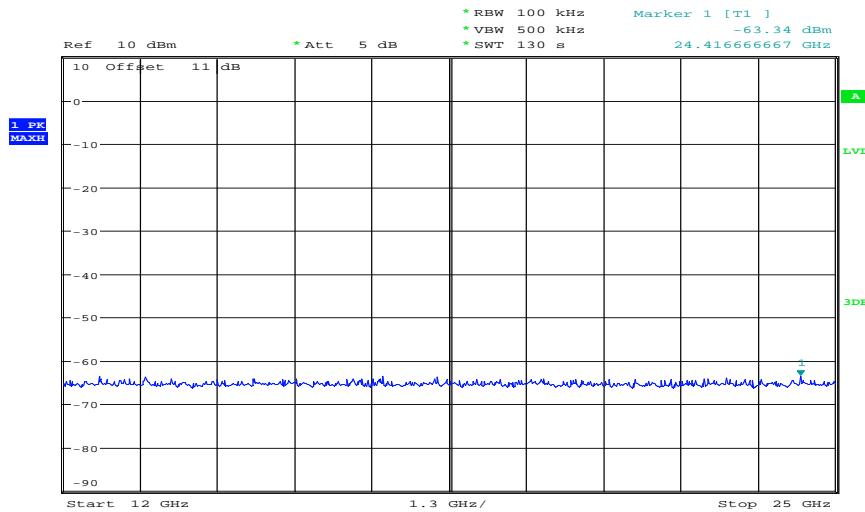
Plot 23: middle channel – 1 GHz – 12 GHz, 8DPSK modulation

Date: 25.JAN.2012 14:58:30

Plot 24: middle channel – 12 GHz – 25 GHz, 8DPSK modulation

Date: 25.JAN.2012 14:55:56

Plot 25: highest channel – 0 Hz – 1 GHz, 8DPSK modulation**Plot 26:** highest channel – 1 GHz – 12 GHz, 8DPSK modulation

Plot 27: highest channel – 1 GHz – 25 GHz, 8DPSK modulation

Date: 25.JAN.2012 15:35:40

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 the mode with the highest output power.

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 | | |
| 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)). | | |
| §15.209 | | |
| 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: Also see plots

| TX spurious emissions radiated [dB μ V/m] | | | | | | | | |
|--|----------|----------------------|--|----------|----------------------|--|----------|----------------------|
| 2402 MHz | | | 2441 MHz | | | 2480 MHz | | |
| F [MHz] | Detector | Level [dB μ V/m] | F [MHz] | Detector | Level [dB μ V/m] | F [MHz] | Detector | Level [dB μ V/m] |
| For emissions below 10 GHz, please take a look at the table below the plots. | | | For emissions below 10 GHz, please take a look at the table below the plots. | | | For emissions below 10 GHz, please take a look at the table below the plots. | | |
| For emissions above 10 GHz, please take a look at the plots. | | | For emissions above 10 GHz, please take a look at the plots. | | | For emissions above 10 GHz, please take a look at the plots. | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Measurement uncertainty | | | ± 3 dB | | | | | |

Result: The measurement is passed.

Plots:

Plot 1: TX mode, lowest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

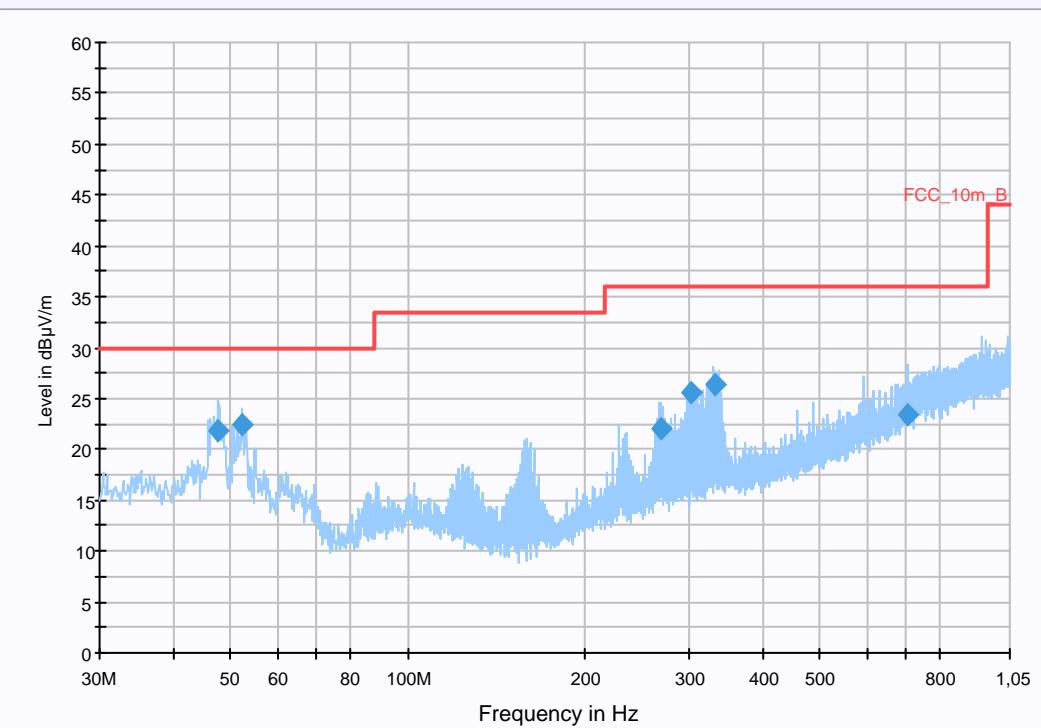
Common Information

EUT: E60
 Serial Number: 49000002
 Test Description: FCC 15
 Operating Conditions: BT testmode, channel 0, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz

Scan Setup: STAN_Fin [EMI radiated]

| | | | | |
|-----------------------------------|--------------------------------------|--------------------------------|---------------------------|-----------------------------|
| Hardware Setup: | Electric Field (NOS) dB μ V/m | | | |
| Level Unit: | | | | |
| Subrange 30 MHz - 2 GHz | Detectors QuasiPeak | IF Bandwidth 120 kHz | Meas. Time 15 s | Receiver Receiver |

FCC_10m(B)_3

**Final Result 1**

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------------|---------|
| 47.790300 | 21.9 | 15000.000 | 120.000 | 100.0 | V | 195.0 | 13.3 | 8.1 | 30.0 | |
| 52.387800 | 22.3 | 15000.000 | 120.000 | 100.0 | V | 82.0 | 13.1 | 7.7 | 30.0 | |
| 268.286850 | 22.0 | 15000.000 | 120.000 | 100.0 | V | 10.0 | 13.8 | 14.0 | 36.0 | |
| 302.326050 | 25.5 | 15000.000 | 120.000 | 100.0 | V | 83.0 | 14.6 | 10.5 | 36.0 | |
| 330.833400 | 26.3 | 15000.000 | 120.000 | 108.0 | V | 94.0 | 15.5 | 9.7 | 36.0 | |
| 701.986800 | 23.5 | 15000.000 | 120.000 | 150.0 | H | 94.0 | 22.5 | 12.5 | 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 4.32 |
| Signal Path: | without Notch FW 1.0 |
| Antenna: | VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: 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

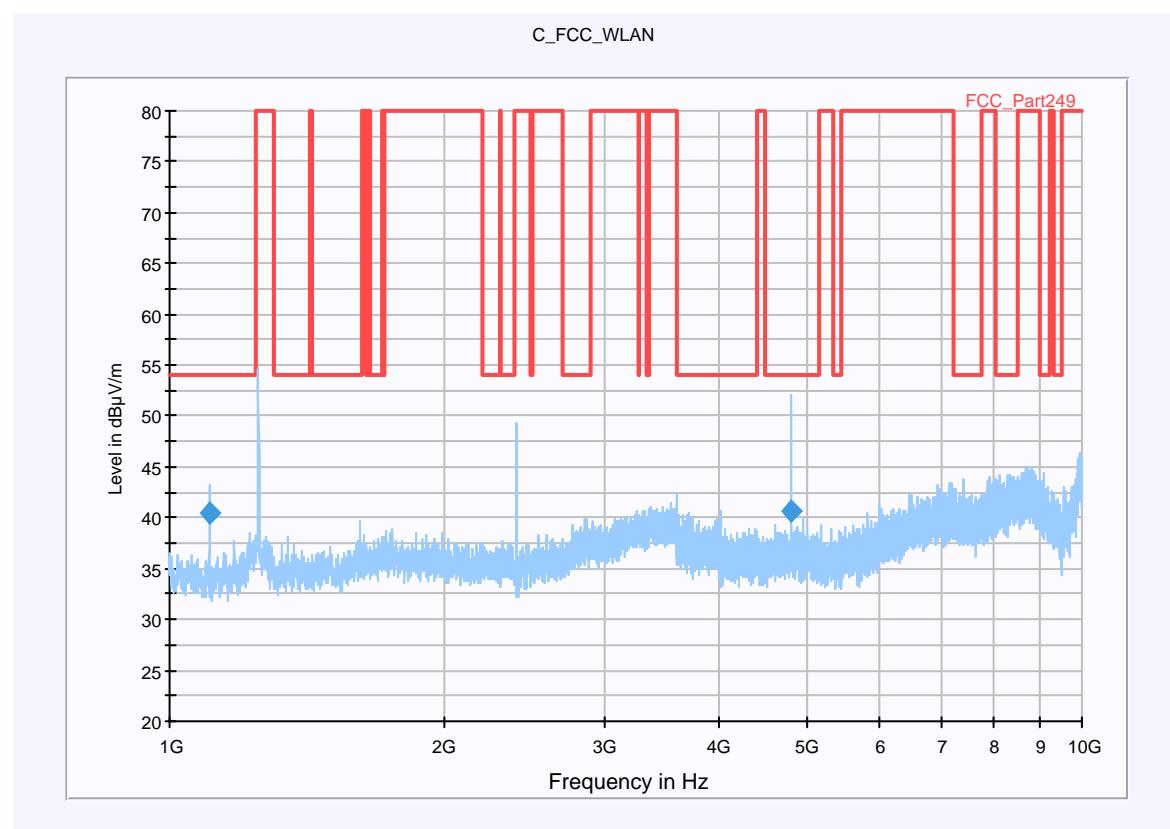
Plot 2: TX mode, lowest channel, 1 GHz to 10 GHz, vertical & horizontal polarization

Common Information

EUT: E60
 Serial Number: 49000002
 Test Description: FCC 15
 Operating Conditions: BT testmode, channel 0, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz

Scan Setup: C_FIN [EMI radiated]

| | | | | |
|-----------------|------------------|---------------------|-------------------|-----------------|
| Hardware Setup: | C_MATRIX | | | |
| Level Unit: | dB μ V/m | | | |
| Subrange | Detectors | IF Bandwidth | Meas. Time | Receiver |
| 1 GHz - 4 GHz | Average | 1 MHz | 0,1 s | ESU |
| 4 GHz - 10 GHz | Average | 1 MHz | 0,1 s | ESU |



Copy of Frequency List 1_2

| Frequency (MHz) | MaxPeak-ClearWrite (dB μ V/m) | MaxPeak-MaxHold (dB μ V/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Comment |
|-----------------|-----------------------------------|--------------------------------|---------------------|----------|--------------------------|------------|---------|
| 1104.628000 | --- | 43.6 | 100.0 | H | 319.0 | -4.8 | D1 |
| 1251.996000 | --- | 55.4 | 100.0 | H | 45.0 | -1.4 | D1 |
| 2402.303000 | --- | 49.2 | 100.0 | V | 225.0 | -2.2 | D1 |
| 4803.726000 | --- | 53.7 | 100.0 | V | 225.0 | 0.8 | D1 |

Final Result 1

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|------------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------------|---------|
| 1104.628000 | 40.4 | 100.0 | 1000.000 | 100.0 | H | 330.0 | -4.8 | 13.6 | 54.0 | |
| 4803.726000 | 40.7 | 100.0 | 1000.000 | 100.0 | V | 213.0 | 0.8 | 13.3 | 54.0 | |

Hardware Setup: EMI radiated\C_MATRIX - [EMI radiated]**Subrange 1**

Frequency Range: 1 GHz - 4 GHz

Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_NOTCH
FW 1.0
Correction Table: LNA_EN (Notch)
Correction Table: 3_5m

Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Subrange 2

Frequency Range: 4 GHz - 10 GHz

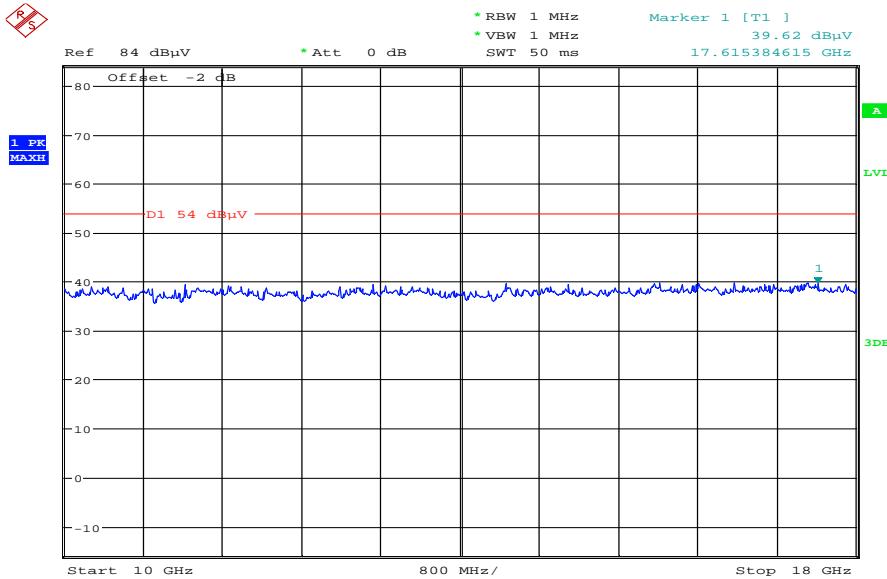
Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_HP
Correction Table: 3_5m
Correction Table: LNA_EN (HP)

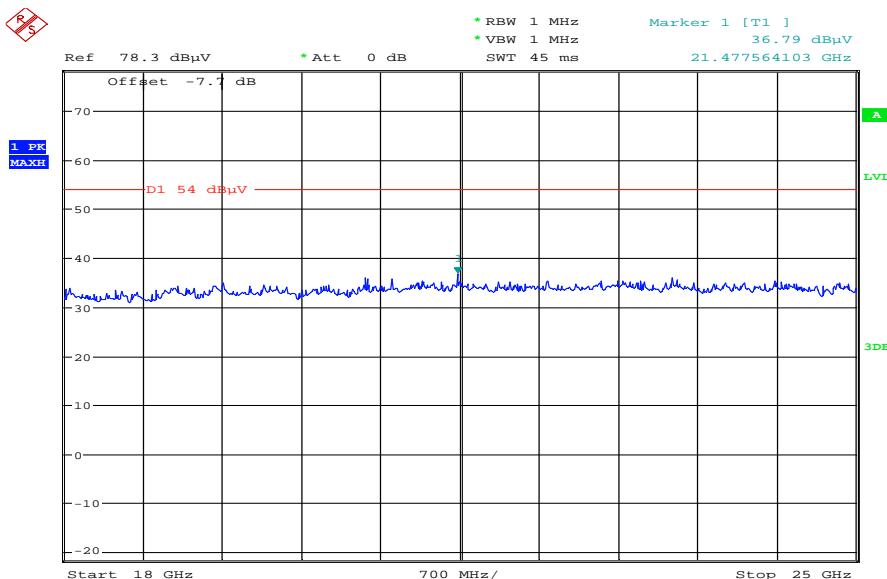
Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Plot 3: TX mode, lowest channel, 10 GHz to 18 GHz, vertical & horizontal polarization

Date: 20.APR.2011 17:43:57

Plot 4: TX mode, lowest channel, 18 GHz to 25 GHz, vertical & horizontal polarization

Date: 20.APR.2011 17:53:47

Plot 5: TX mode, middle channel, 30 MHz to 1 GHz, vertical & horizontal polarization

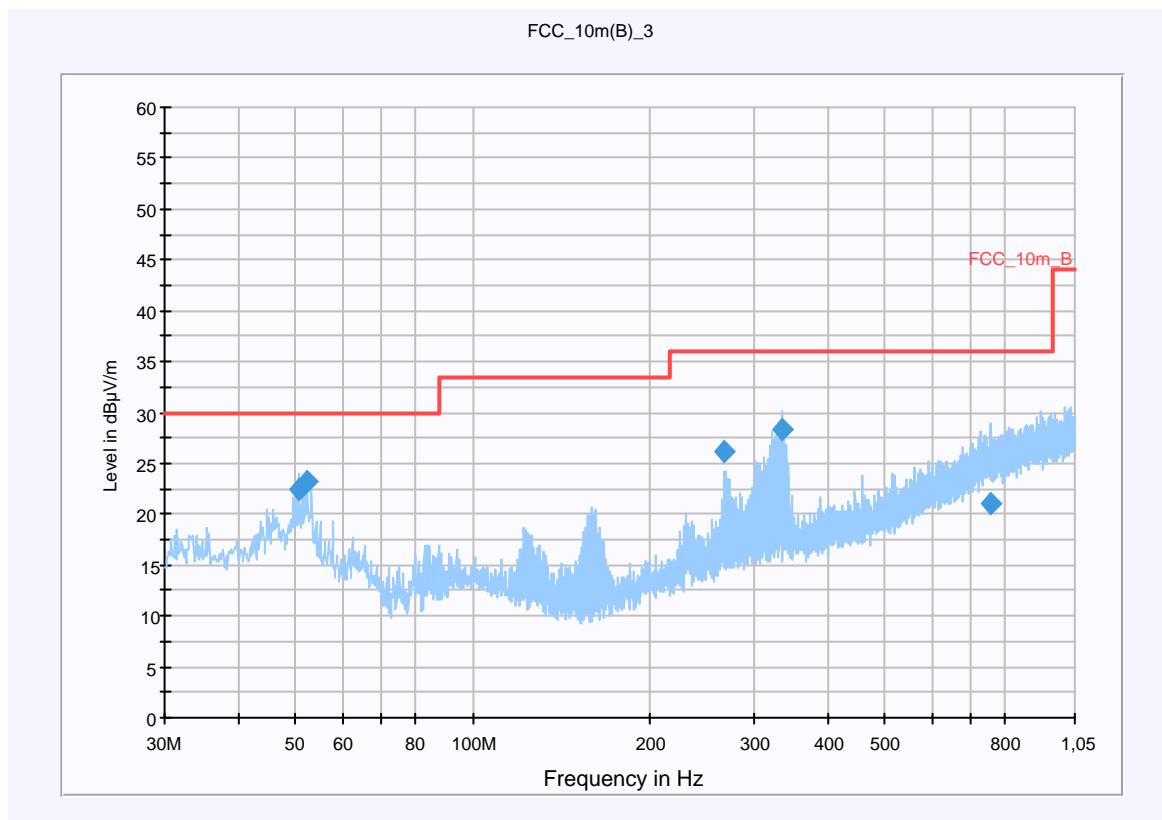
Common Information

EUT: E60
 Serial Number: 49000002
 Test Description: FCC 15
 Operating Conditions: BT testmode, channel 39, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz

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 |



Final Result 1

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------------|---------|
| 50.575200 | 22.4 | 15000.000 | 120.000 | 98.0 | V | 10.0 | 13.3 | 7.6 | 30.0 | |
| 52.399650 | 23.2 | 15000.000 | 120.000 | 98.0 | V | 9.0 | 13.1 | 6.8 | 30.0 | |
| 267.581250 | 26.2 | 15000.000 | 120.000 | 106.0 | V | -6.0 | 13.8 | 9.8 | 36.0 | |
| 335.572050 | 28.3 | 15000.000 | 120.000 | 98.0 | V | 271.0 | 15.6 | 7.7 | 36.0 | |
| 753.651750 | 21.1 | 15000.000 | 120.000 | 148.0 | H | 174.0 | 23.7 | 14.9 | 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: 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

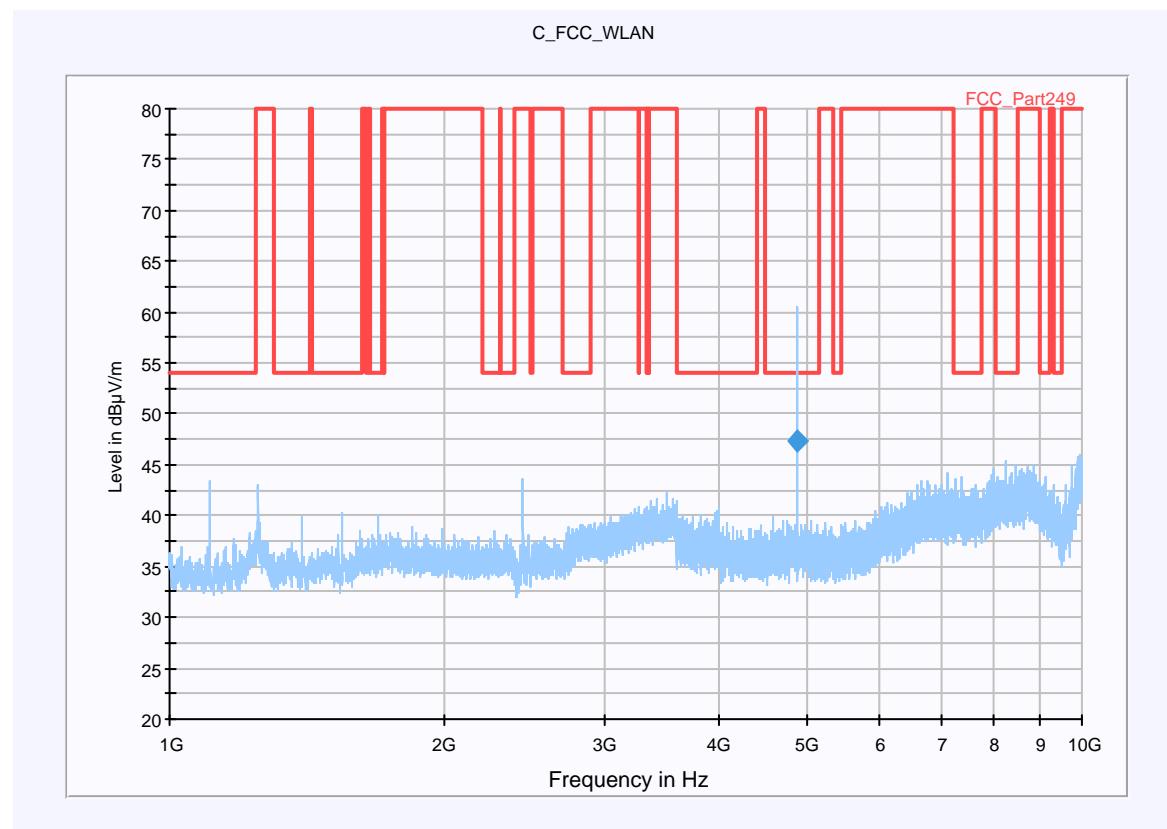
Plot 6: TX mode, middle channel, 1 GHz to 10 GHz, vertical & horizontal polarization

Common Information

EUT: E60
 Serial Number: 49000002
 Test Description: FCC 15
 Operating Conditions: BT testmode, channel 39, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz

Scan Setup: C_FIN [EMI radiated]

| Hardware Setup: | C_MATRIX | IF Bandwidth | Meas. Time | Receiver |
|-----------------|------------------|--------------|------------|----------|
| Level Unit: | dB μ V/m | | | |
| Subrange | Detectors | | | |
| 1 GHz - 4 GHz | Average | 1 MHz | 0,1 s | ESU |
| 4 GHz - 10 GHz | Average | 1 MHz | 0,1 s | ESU |



The carrier signal is slightly suppressed with a 2.4 GHz band rejection filter.

Copy of Data Reduction 1 [1]

| Frequency (MHz) | MaxPeak-MaxHold (dB μ V/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Comment |
|-----------------|--------------------------------|---------------------|----------|--------------------------|------------|---------|
| 1104.400000 | 43.3 | 100.0 | H | 134.0 | -4.8 | |
| 1546.900000 | 40.3 | 100.0 | V | 182.0 | -3.4 | |
| 8249.800000 | 45.3 | 100.0 | V | 47.0 | 6.9 | |
| 8471.800000 | 45.0 | 100.0 | H | 224.0 | 6.8 | |
| 4883.200000 | 59.5 | 100.0 | V | 227.0 | 1.0 | |

Final Result 1

| Frequency (MHz) | Average (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|------------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------------|---------|
| 4884.378000 | 47.3 | 100.0 00 | 1000.000 | 100.0 | V | 215.0 | 1.0 | 6.7 | 54.0 | |

Hardware Setup: EMI radiated\C_MATRIX - [EMI radiated]**Subrange 1**

Frequency Range: 1 GHz - 4 GHz

Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_NOTCH
FW 1.0
Correction Table: LNA_EN (Notch)
Correction Table: 3_5m

Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Subrange 2

Frequency Range: 4 GHz - 10 GHz

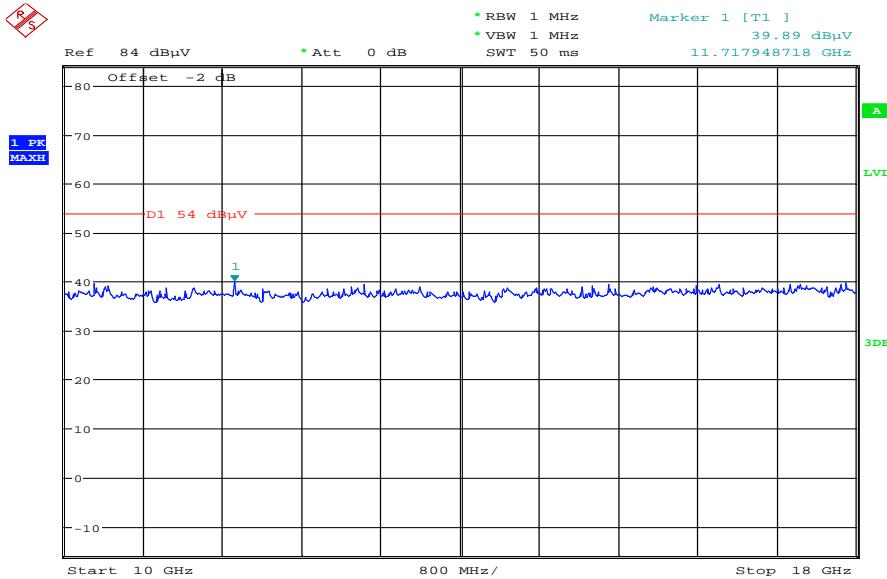
Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_HP
Correction Table: 3_5m
Correction Table: LNA_EN (HP)

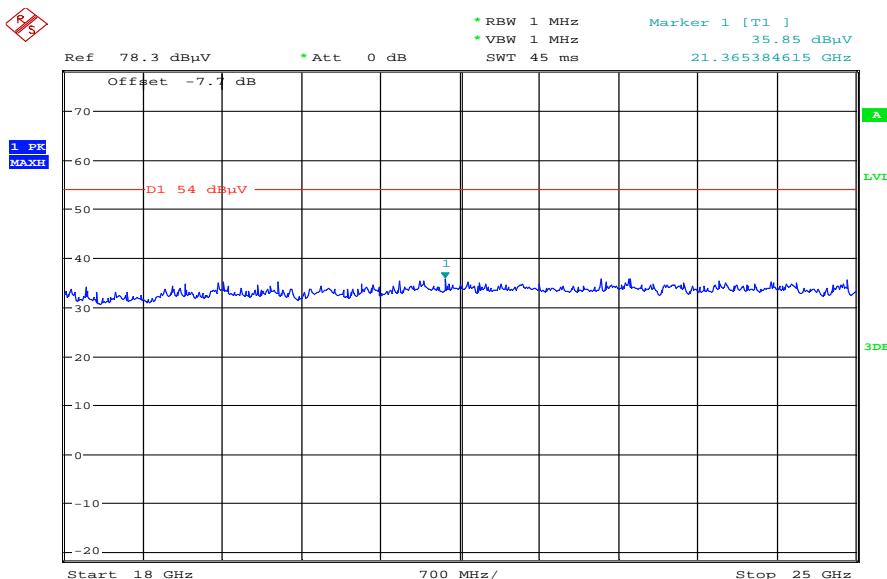
Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Plot 7: TX mode, middle channel, 10 GHz to 18 GHz, vertical & horizontal polarization

Date: 20.APR.2011 17:45:35

Plot 8: TX mode, middle channel, 18 GHz to 25 GHz, vertical & horizontal polarization

Date: 20.APR.2011 17:52:03

Plot 9: TX mode, highest channel, 30 MHz to 1 GHz, vertical & horizontal polarization

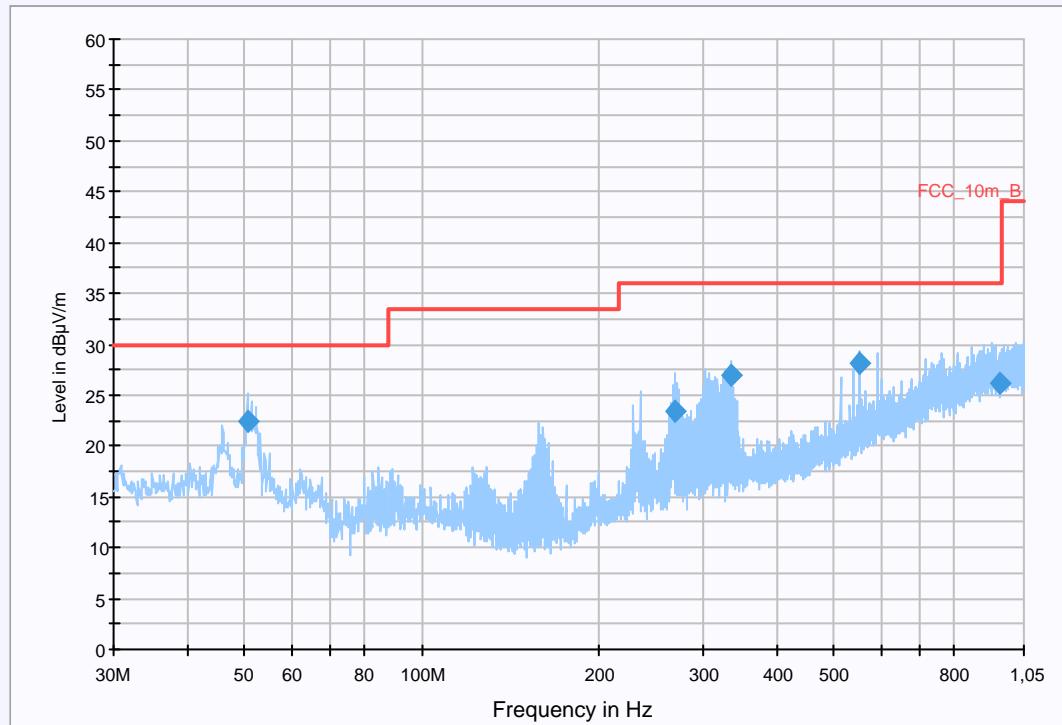
Common Information

EUT: E60
 Serial Number: 4900002
 Test Description: FCC 15
 Operating Conditions: BT testmode, channel 78, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz

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 |

FCC_10m(B)_3



Final Result 1

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------------|---------|
| 50.527950 | 22.5 | 15000.000 | 120.000 | 98.0 | V | 196.0 | 13.3 | 7.5 | 30.0 | |
| 269.315100 | 23.4 | 15000.000 | 120.000 | 135.0 | V | 10.0 | 13.8 | 12.6 | 36.0 | |
| 335.462250 | 26.9 | 15000.000 | 120.000 | 317.0 | H | 8.0 | 15.6 | 9.1 | 36.0 | |
| 553.476600 | 28.1 | 15000.000 | 120.000 | 332.0 | V | -7.0 | 19.5 | 7.9 | 36.0 | |
| 957.382050 | 26.2 | 15000.000 | 120.000 | 98.0 | H | 10.0 | 25.4 | 9.8 | 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: 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

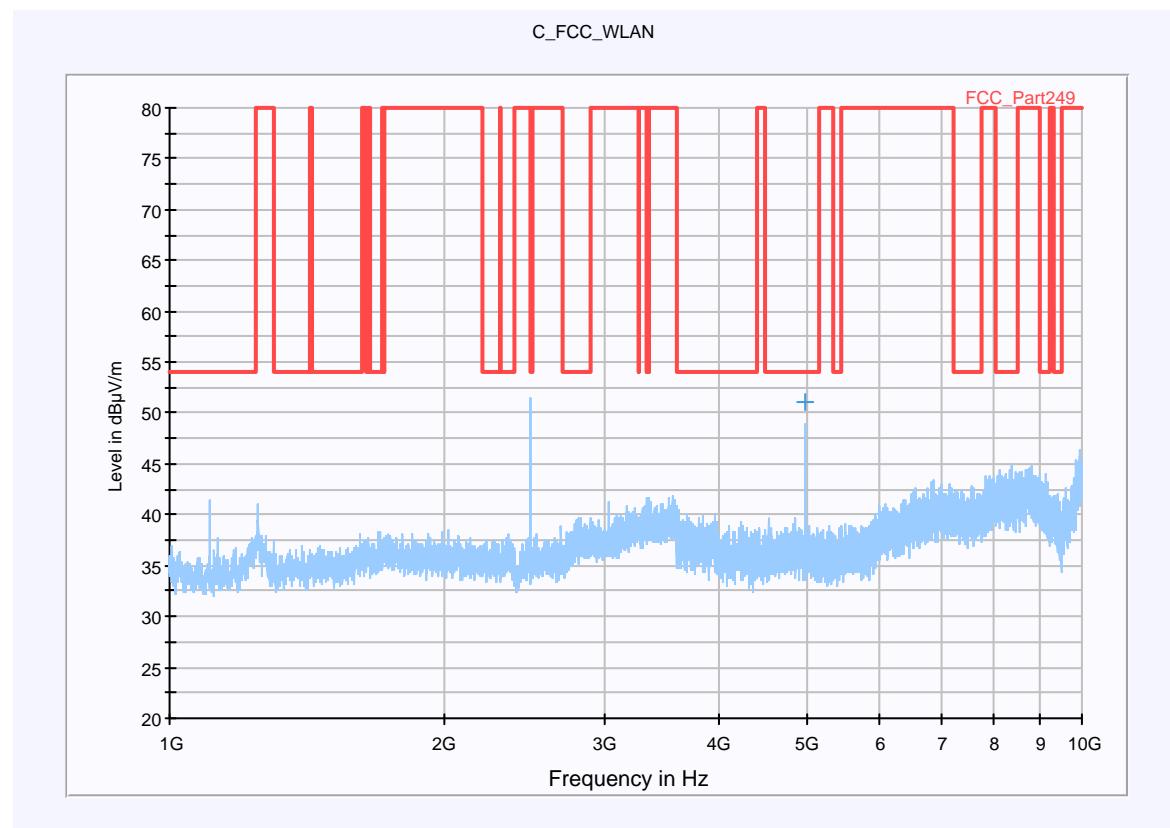
Plot 10: TX mode, highest channel, 1 GHz to 10 GHz, vertical & horizontal polarization

Common Information

EUT: E60
 Serial Number: 49000002
 Test Description: FCC 15
 Operating Conditions: BT testmode, channel 78, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz

Scan Setup: C_FIN [EMI radiated]

| Hardware Setup: | C_MATRIX | IF Bandwidth | Meas. Time | Receiver |
|-----------------|------------------|--------------|------------|----------|
| Level Unit: | dB μ V/m | | | |
| Subrange | Detectors | | | |
| 1 GHz - 4 GHz | Average | 1 MHz | 0,1 s | ESU |
| 4 GHz - 10 GHz | Average | 1 MHz | 0,1 s | ESU |



Copy of Frequency List 1_2

| Frequency (MHz) | MaxPeak-ClearWrite (dB μ V/m) | MaxPeak-MaxHold (dB μ V/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Comment |
|-----------------|-----------------------------------|--------------------------------|---------------------|----------|--------------------------|------------|---------|
| 4963.741000 | --- | 51.0 | 100.0 | V | 184.0 | 1.3 | D1 |

Hardware Setup: EMI radiated\C_MATRIX - [EMI radiated]**Subrange 1**

Frequency Range: 1 GHz - 4 GHz

Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_NOTCH
FW 1.0
Correction Table: LNA_EN (Notch)
Correction Table: 3_5m

Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Subrange 2

Frequency Range: 4 GHz - 10 GHz

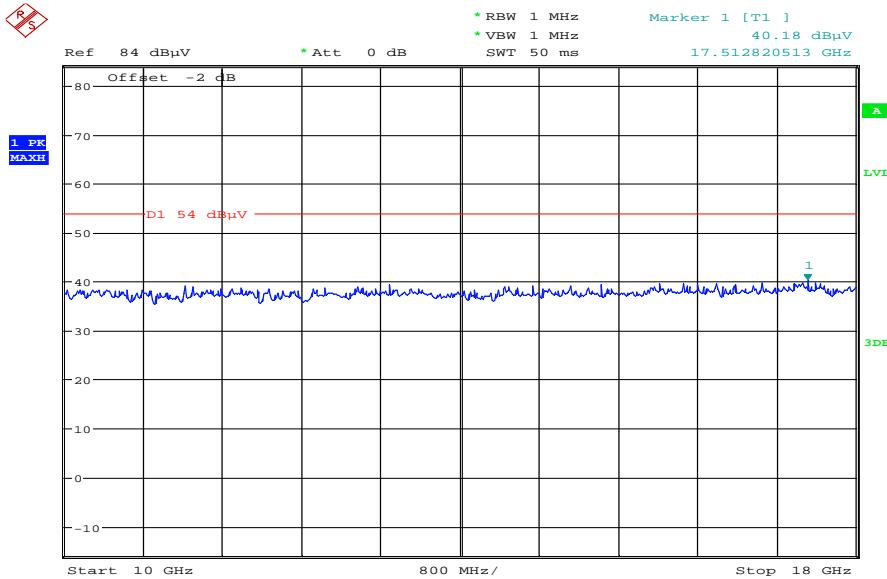
Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_HP
Correction Table: 3_5m
Correction Table: LNA_EN (HP)

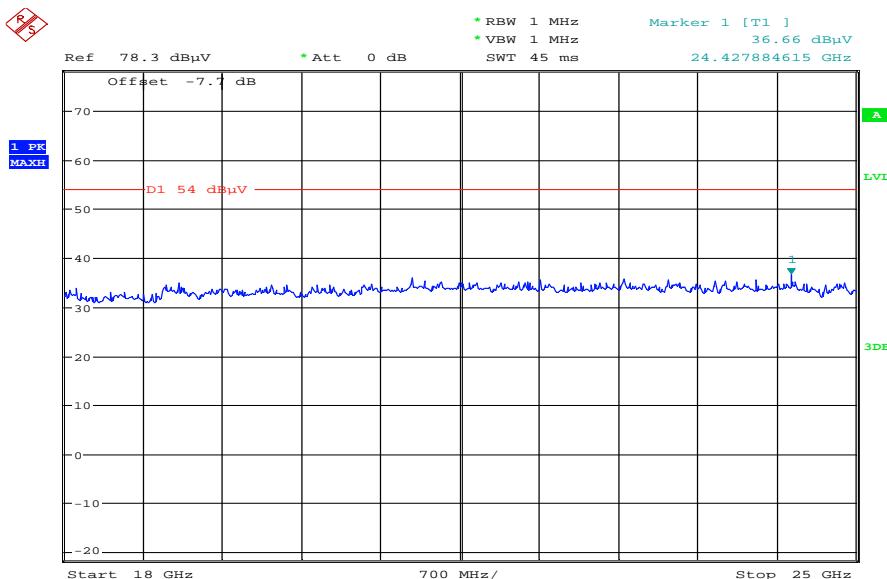
Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Plot 11: TX mode, highest channel, 10 GHz to 18 GHz, vertical & horizontal polarization

Date: 20.APR.2011 17:47:28

Plot 12: TX mode, highest channel, 18GHz to 25 GHz, vertical & horizontal polarization

Date: 20.APR.2011 17:50:53

9.12 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode. The results are valid for both modes.

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] |
| For emissions below 10 GHz, please take a look at the table below the plots. | For emissions below 10 GHz, please take a look at the table below the plots. | For emissions below 10 GHz, please take a look at the table below the plots. |
| For emissions above 10 GHz, please take a look at the plots. | For emissions above 10 GHz, please take a look at the plots. | For emissions above 10 GHz, please take a look at the plots. |
| Measurement uncertainty | | ± 3 dB |

Result: The measurement is passed.

Plots: RX / Idle – mode

Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization

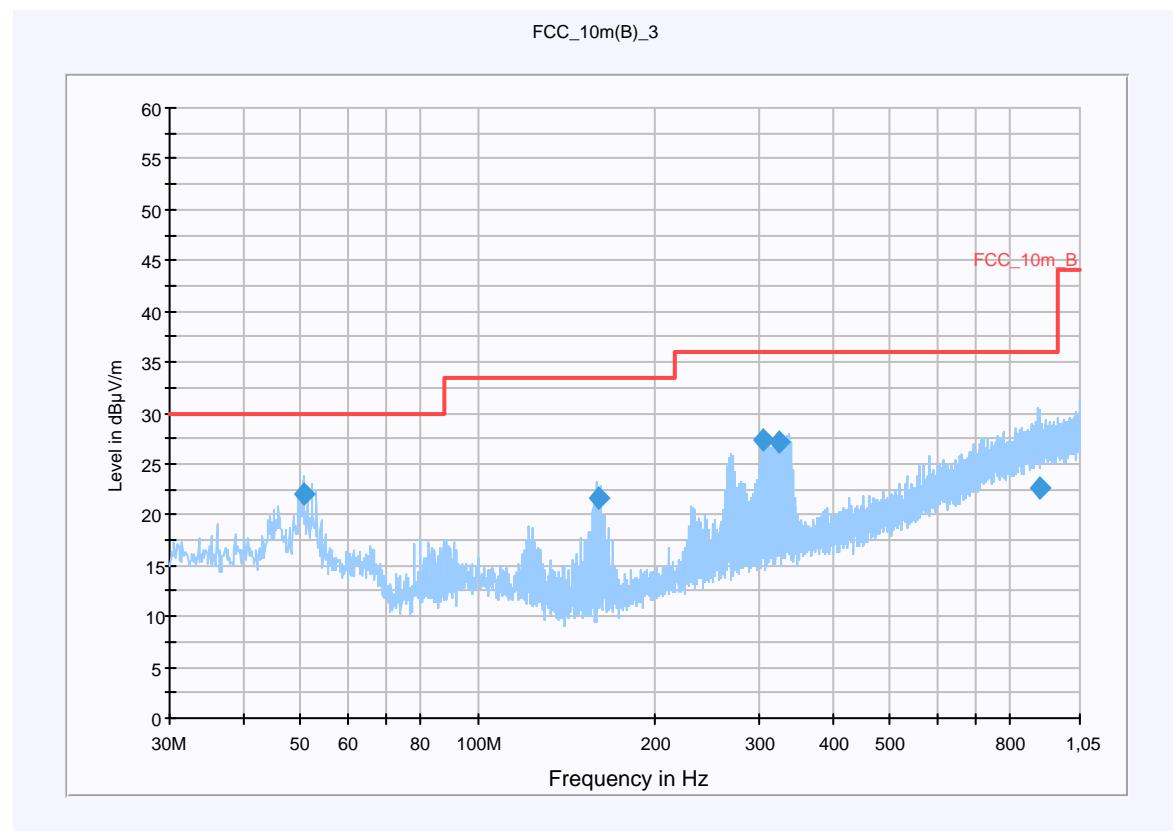
Common Information

| | |
|-----------------------|-----------------------------|
| EUT: | E60 |
| Serial Number: | 49000002 |
| Test Description: | FCC 15 |
| Operating Conditions: | WLAN testmode, RX, charging |
| Operator Name: | Hennemann |
| Comment: | Power 115V/60Hz |

Scan Setup: STAN_Fin [EMI radiated]

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

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



Final Result 1

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) | Limit (dB μ V/m) | Comment |
|-----------------|--------------------------|-----------------|-----------------|---------------------|----------|--------------------------|------------|-------------|----------------------|---------|
| 50.558850 | 22.1 | 15000.000 | 120.000 | 98.0 | V | 275.0 | 13.3 | 7.9 | 30.0 | |
| 159.970350 | 21.7 | 15000.000 | 120.000 | 98.0 | V | 268.0 | 9.2 | 11.8 | 33.5 | |
| 305.179800 | 27.3 | 15000.000 | 120.000 | 98.0 | V | 284.0 | 14.7 | 8.7 | 36.0 | |
| 323.584500 | 27.1 | 15000.000 | 120.000 | 98.0 | V | 284.0 | 15.3 | 8.9 | 36.0 | |
| 895.080000 | 22.6 | 15000.000 | 120.000 | 350.0 | H | -2.0 | 25.1 | 13.4 | 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: Cable_EN_1GHz (1005)

Antenna Tower: Tower [EMCO 2090 Antenna Tower]

@ GPIB0 (ADR 8), FW REV 3.12

Turntable: Turntable [EMCO Turntable]

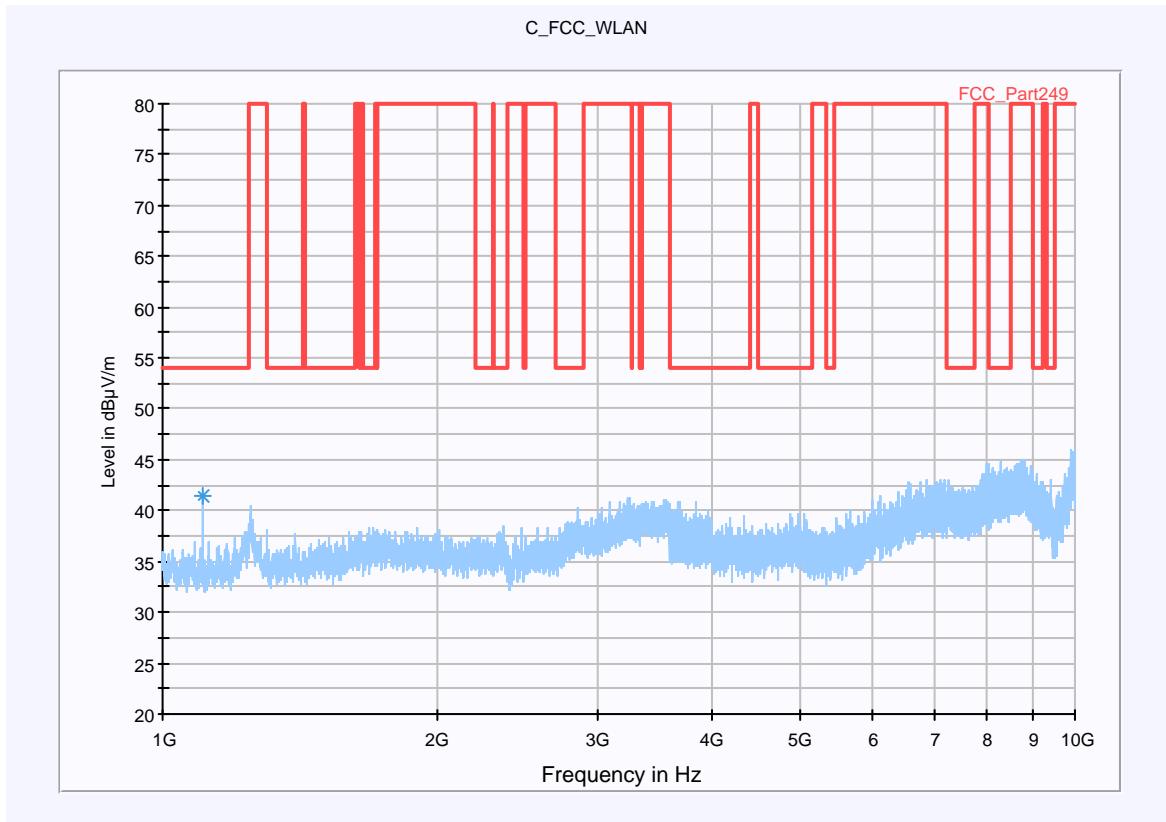
@ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

Plot 2: 1 GHz to 10 GHz, vertical & horizontal polarization

Common Information

EUT: E60
 Serial Number: 49000002
 Test Description: FCC 15
 Operating Conditions: WLAN testmode, RX, charging
 Operator Name: Hennemann
 Comment: Power 115V/60Hz



Data Reduction 1 [1]

| Frequency (MHz) | MaxPeak-MaxHold (dB μ V/m) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Comment |
|-----------------|--------------------------------|---------------------|----------|--------------------------|------------|---------|
| 1104.700000 | 41.5 | 100.0 | H | 317.0 | -4.8 | |

Hardware Setup: EMI radiated\C_MATRIX - [EMI radiated]

Subrange 1

Frequency Range: 1 GHz - 4 GHz

Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_NOTCH
FW 1.0
Correction Table: LNA_EN (Notch)
Correction Table: 3_5m

Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Subrange 2

Frequency Range: 4 GHz - 10 GHz

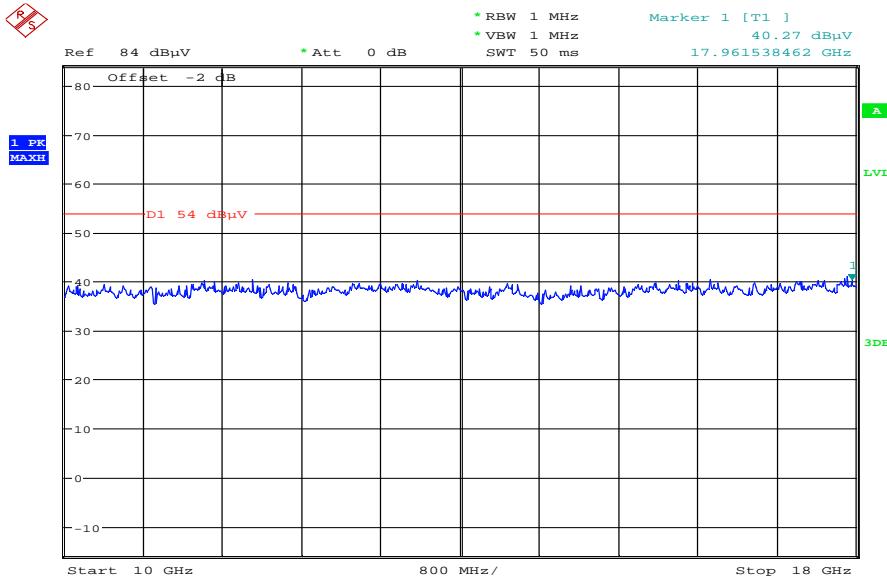
Receiver: ESU [ESU 26]
@ GPIB0 (ADR 17), SN 100037/026, FW 4.43

Signal Path: EN_HP
Correction Table: 3_5m
Correction Table: LNA_EN (HP)

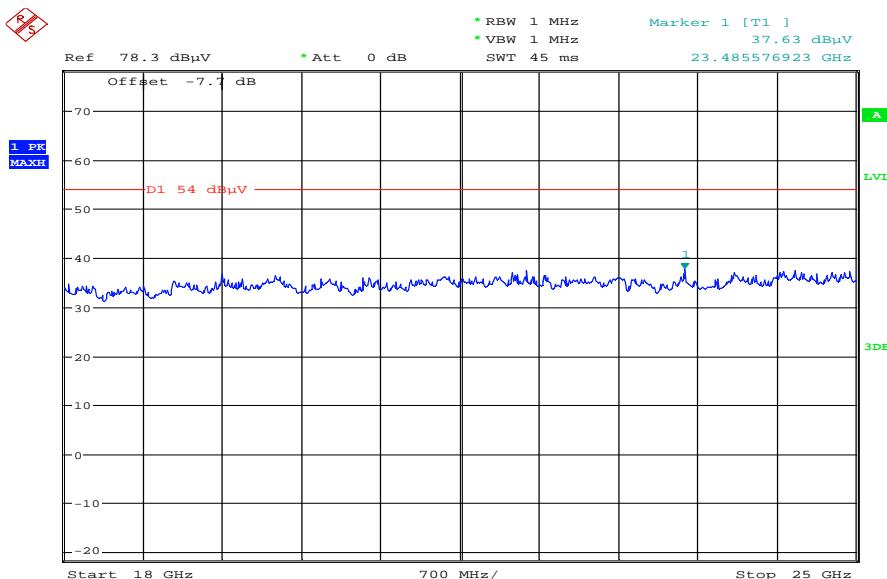
Antenna: BBHA 9120 B
Correction Table (vertical): BBHA9120
Correction Table (horizontal): BBHA9120
Correction Table: Cable_Horn_EN (1103)

Antenna Tower: Generic Tripod [Generic Tripod]
@ GPIB0 (ADR 19), SN ?

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

Plot 3: 10 GHz to 18 GHz, vertical & horizontal polarization

Date: 21.APR.2011 16:00:42

Plot 4: 18 GHz to 25 GHz, vertical & horizontal polarization

Date: 21.APR.2011 15:57:59

9.13 TX spurious emissions radiated < 30 MHz

Not performed!

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:

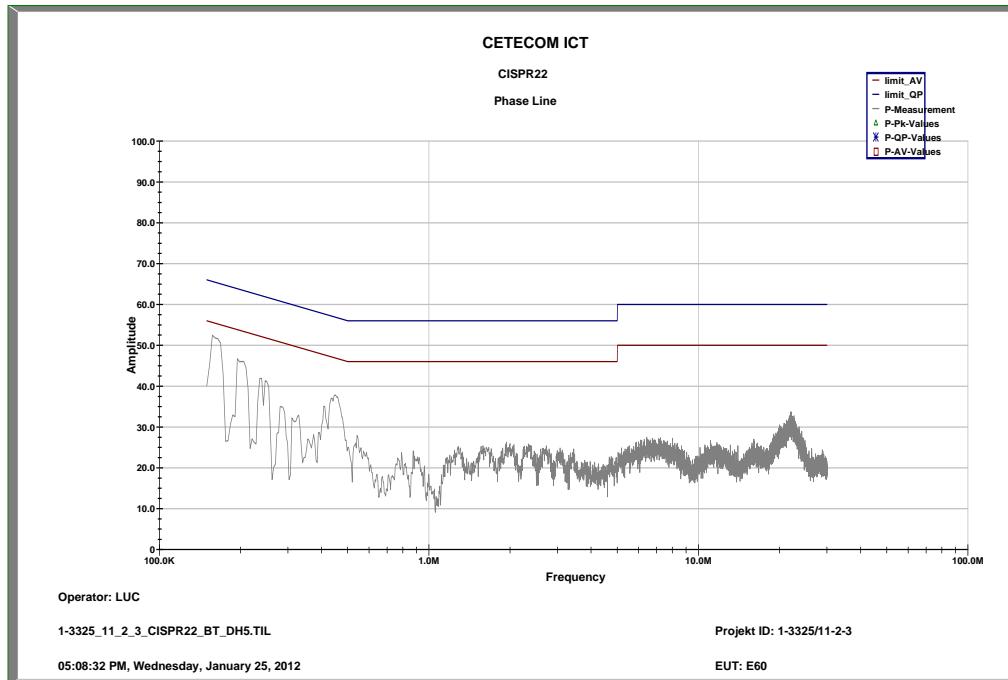
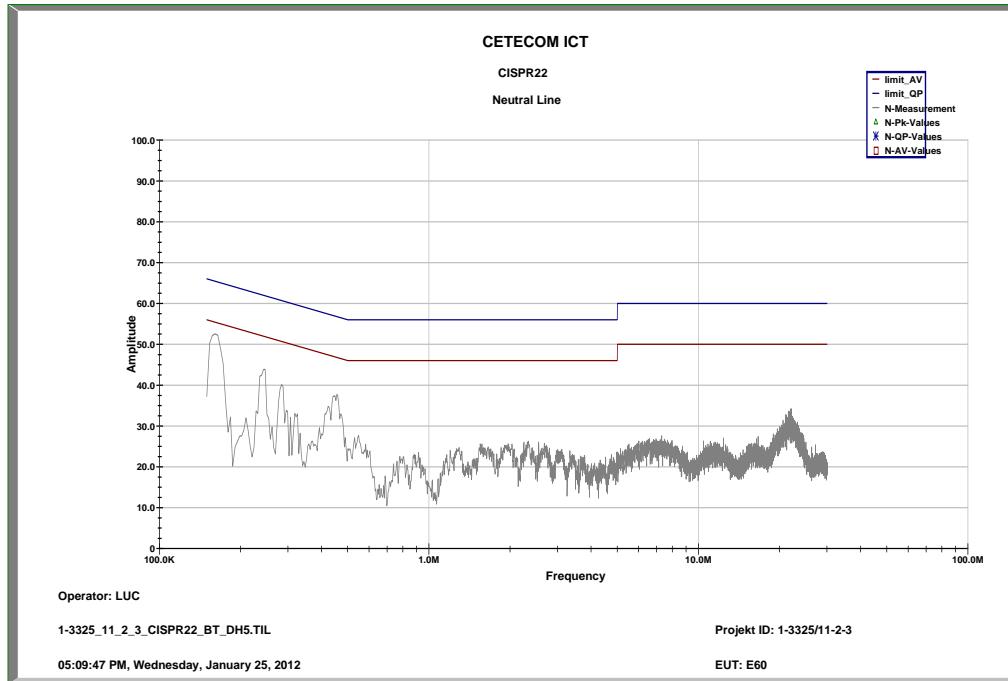
| FCC | IC | |
|--|---------------------------|------------------------|
| CFR Part 15.107(a) | ICES-003, Issue 4 | |
| TX spurious emissions conducted < 30 MHz | | |
| Frequency (MHz) | Quasi-peak (dB μ V/m) | Average (dB μ V/m) |
| 0.15 – 0.5 | 66 to 56* | 56 to 46* |
| 0.5 – 5 | 56 | 46 |
| 5 – 30.0 | 60 | 50 |

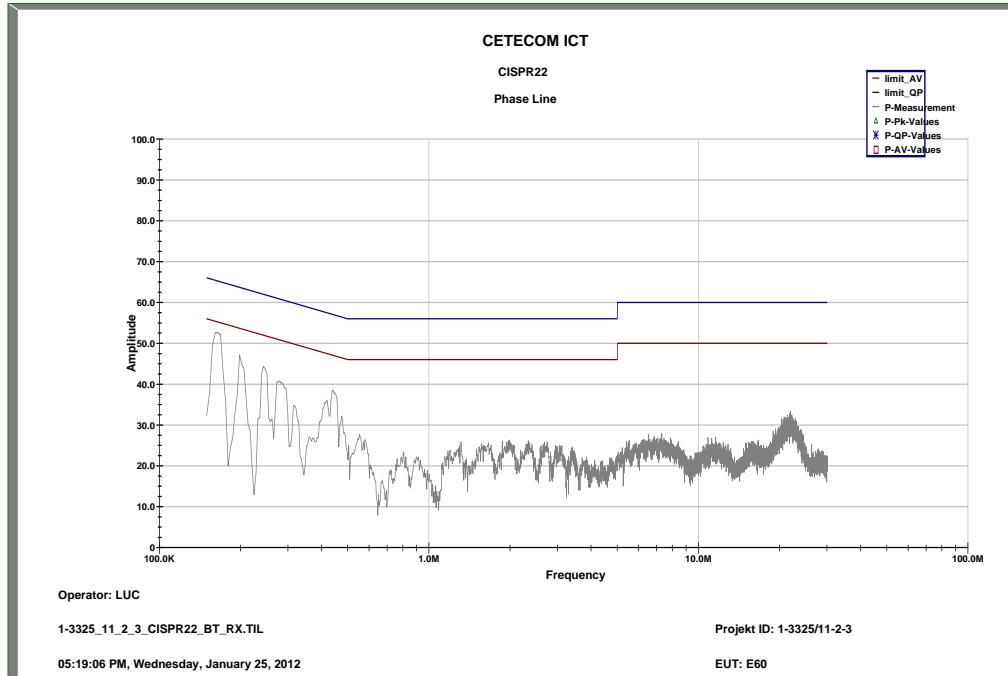
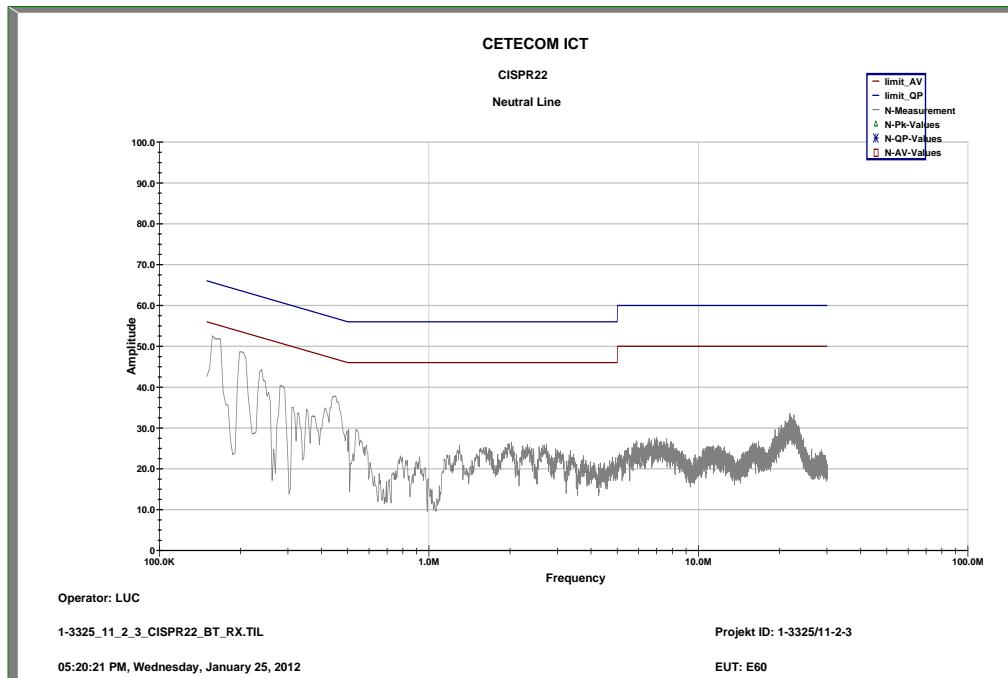
*Decreases with the logarithm of the frequency

Results:

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

Result: 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 | 9 | Artificial Mains 9 kHz to 30 MHz | ESH3-Z5 | R&S | 828576/020 | 300001210 | Ve | 06.01.2012 | 06.01.2014 |
| 2 | n. a. | Relais Matrix | PSU | R&S | 890167/024 | 300001168 | ne | | |
| 3 | n. a. | Isolating Transformer | RT5A | Grundig | 9242 | 300001263 | ne | | |
| 4 | n. a. | TILE-Software Emission | Quantum Change, Modell TILE- ICS/FULL | EMCO | none | 300003451 | ne | | |
| 5 | n. a. | PSA Spectrum Analyzer 3 Hz - 26.5 GHz | E4440A | Agilent Technologies | MY48250080 | 300003812 | k | 08.09.2010 | 08.09.2012 |
| 6 | n. a. | RF Filter Section 9kHz - 1GHz | N9039A | Agilent Technologies | MY48260003 | 300003825 | vIKI! | 08.09.2010 | 08.09.2012 |
| 7 | n. a. | Spectrum Analyzer 20 Hz - 50 GHz | FSU50 | R&S | 200012 | 300003443 | ve | 01.07.2010 | 01.07.2012 |
| 8 | 45 | Switch-Unit | 3488A | HP Meßtechnik | 2719A14505 | 300000368 | g | | |
| 9 | n. a. | software | SPS_PHE 1.4f | Spitzberger & Spieß | B5981; 5D1081;B59 79 | 300000210 | ne | | |
| 10 | n. a. | EMI Test Receiver | ESCI 1166.5950. 03 | R&S | 100083 | 300003312 | k | 05.01.2011 | 05.01.2013 |
| 11 | n. a. | Amplifier | JS42- 00502650- 28-5A | MITEQ | 1084532 | 300003379 | ev | | |
| 12 | n. a. | Antenna Tower | Model 2175 | ETS- LINDGREN | 64762 | 300003745 | izw | | |
| 13 | n. a. | Positioning Controller | Model 2090 | ETS- LINDGREN | 64672 | 300003746 | izw | | |
| 14 | n. a. | Turntable Interface-Box | Model 105637 | ETS- LINDGREN | 44583 | 300003747 | izw | | |
| 15 | n. a. | TRILOG Broadband Test-Antenna 30 MHz - 3 GHz | VULB9163 | Schwarzbeck | 295 | 300003787 | k | 01.04.2010 | 01.04.2012 |
| 16 | n. a. | Spectrum- Analyzer | FSU26 | R&S | 200809 | 300003874 | k | 10.01.2011 | 10.01.2013 |
| 17 | n. a. | Isolating Transformer | RT5A | Grundig | 8041 | 300001626 | g | | |
| 18 | n. a. | DC power supply, 60Vdc, 50A, 1200 W | 6032A | HP Meßtechnik | 2818A03450 | 300001040 | Ve | 08.01.2009 | 08.01.2012 |
| 19 | n. a. | Coaxial Attenuator 30dB/500W | 8325 | Bird | 1530 | 300001595 | ev | | |
| 20 | n. a. | Double-Ridged Waveguide Horn Antenna 1-18.0GHz | 3115 | EMCO | 8812-3088 | 300001032 | vIKI! | 05.03.2009 | 05.09.2012 |
| 21 | n. a. | Active Loop Antenna | 6502 | EMCO | 2210 | 300001015 | ne | | |
| 22 | n. a. | Anechoic chamber | FAC 3/5m | MWB / TDK | 87400/02 | 300000996 | | 23.03.2009 | |
| 23 | Spec.A. | System rack for | 85900 | HP I.V. | * | 300000222 | ne | | |

| | 2_2e | EMI measurement solution | | | | | | | |
|----|-------|---------------------------------------|----------------------------------|----------------------|------------|-----------|----|------------|------------|
| 24 | n. a. | Relais Matrix | 3488A | HP Meßtechnik | 2719A15013 | 300001156 | ne | | |
| 25 | n. a. | Relais Matrix | PSU | R&S | 890167/024 | 300001168 | ne | | |
| 26 | n. a. | Isolating Transformer | RT5A | Grundig | 9242 | 300001263 | ne | | |
| 27 | n. a. | Three-Way Power Splitter, 50 Ohm | 11850C | HP Meßtechnik | | 300000997 | ne | | |
| 28 | n. a. | Switch / Control Unit | 3488A | HP | 2605e08770 | 300001443 | ne | | |
| 29 | n. a. | Amplifier | js42-00502650-28-5a | Parzich GMBH | 928979 | 300003143 | ne | | |
| 30 | n. a. | Band Reject filter | WRCG185 5/1910-1835/1925-40/8SS | Wainwright | 7 | 300003350 | ev | | |
| 31 | n. a. | Band Reject filter | WRCG240 0/2483-2375/2505-50/10SS | Wainwright | 11 | 300003351 | ev | | |
| 32 | n. a. | Highpass Filter | WHKX2.9/1 8G-12SS | Wainwright | 1 | 300003492 | ev | | |
| 33 | n. a. | Highpass Filter | WHK1.1/15 G-10SS | Wainwright | 3 | 300003255 | ev | | |
| 34 | n. a. | Highpass Filter | WHKX7.0/1 8G-8SS | Wainwright | 18 | 300003789 | ne | | |
| 35 | n. a. | MXG Microwave Analog Signal Generator | N5183A | Agilent Technologies | MY47420220 | 300003813 | k | 13.09.2010 | 13.09.2012 |
| 36 | A014 | Std. Gain Horn Antenna 9.84-15.0 GHz | 1724-20 | Flann | 89 | 300001957 | ne | | |
| 37 | A016 | Std. Gain Horn Antenna 14.5-22.0 GHz | 1924-20 | Flann | 33 | 300001963 | ne | | |
| 38 | A019 | Std. Gain Horn Antenna 17.6-26.7 GHz | 2024-20 | Flann | 156 | 300001968 | ne | | |

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
 vlk! 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

11 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A Photographs of the test setup

Photo documentation:

Photo 1:

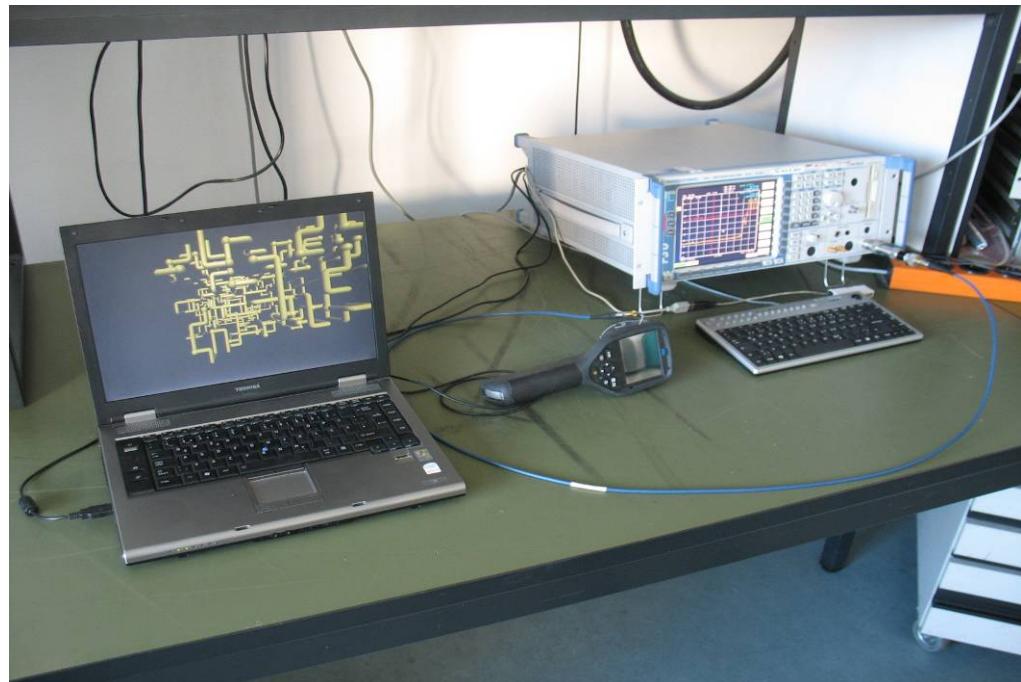


Photo 2:



Photo 3: (Chamber F)

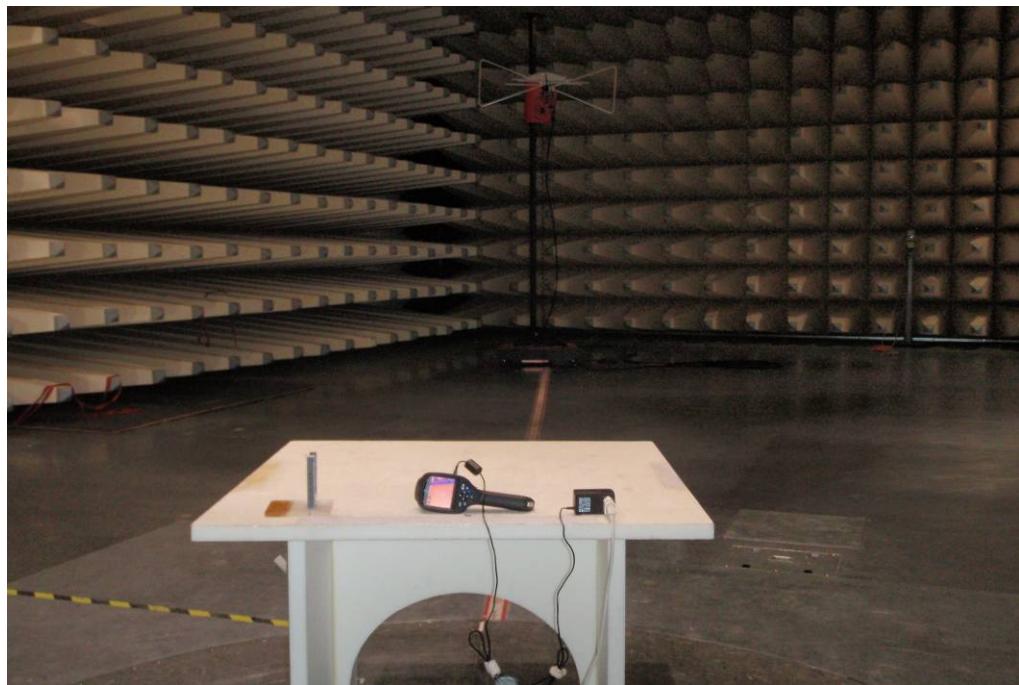


Photo 4: (Chamber F)

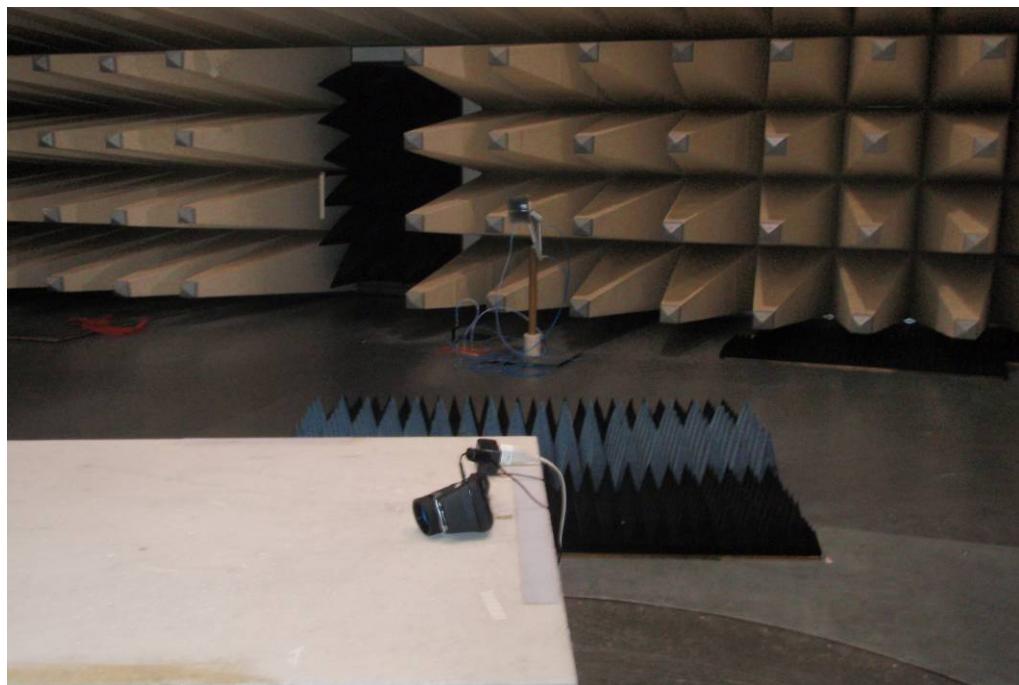


Photo 5: (Chamber F)



Annex B External 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:



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:

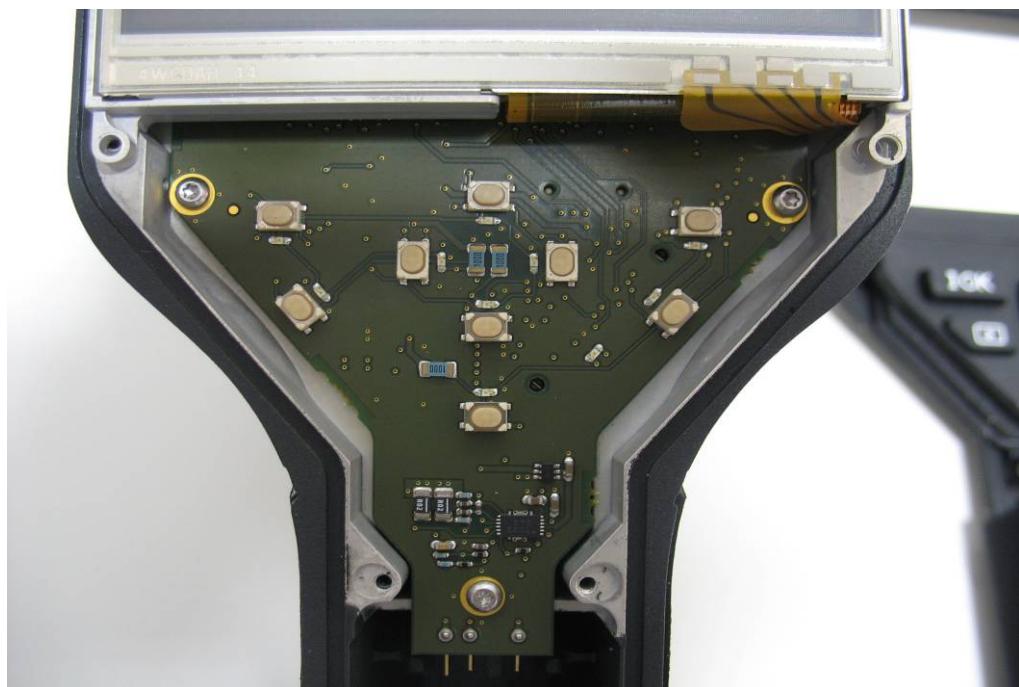


Photo 9:



Photo 10:

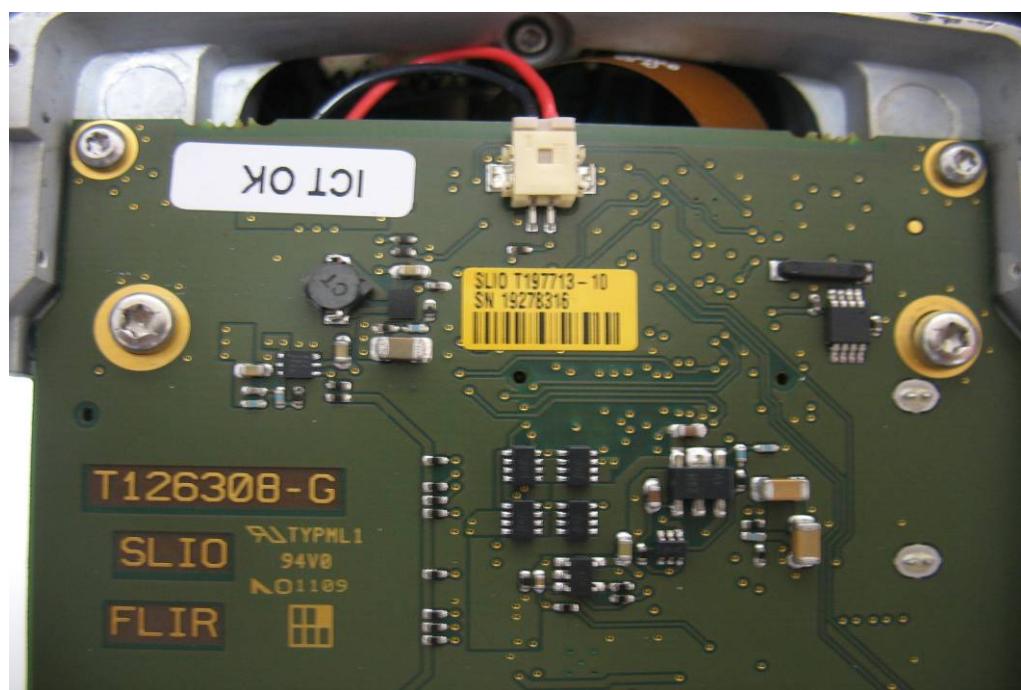


Photo 11:

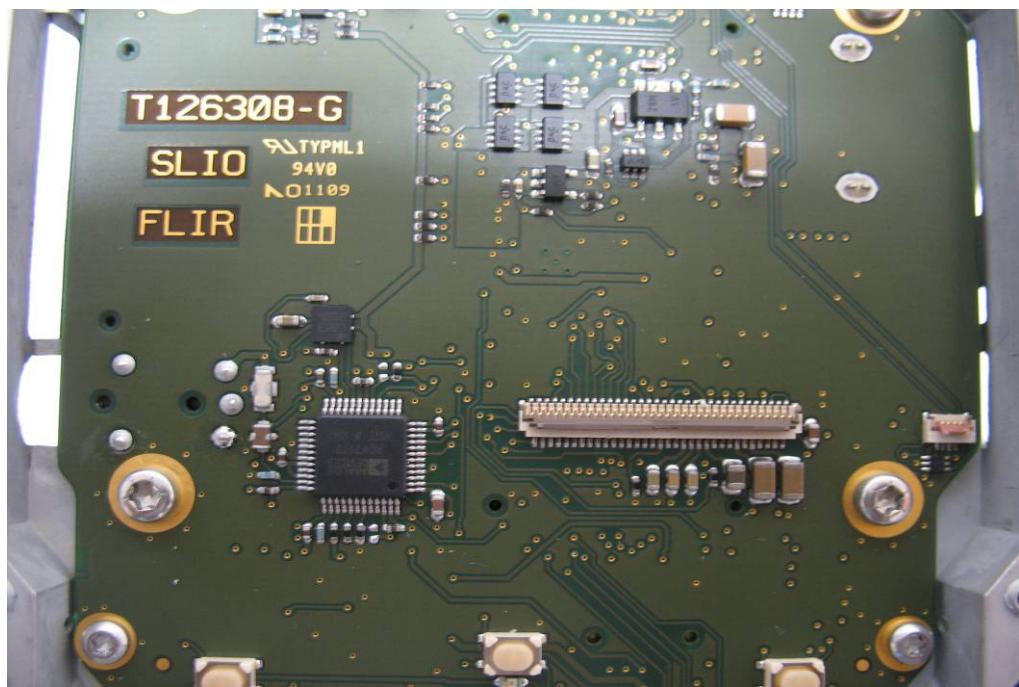


Photo 12:

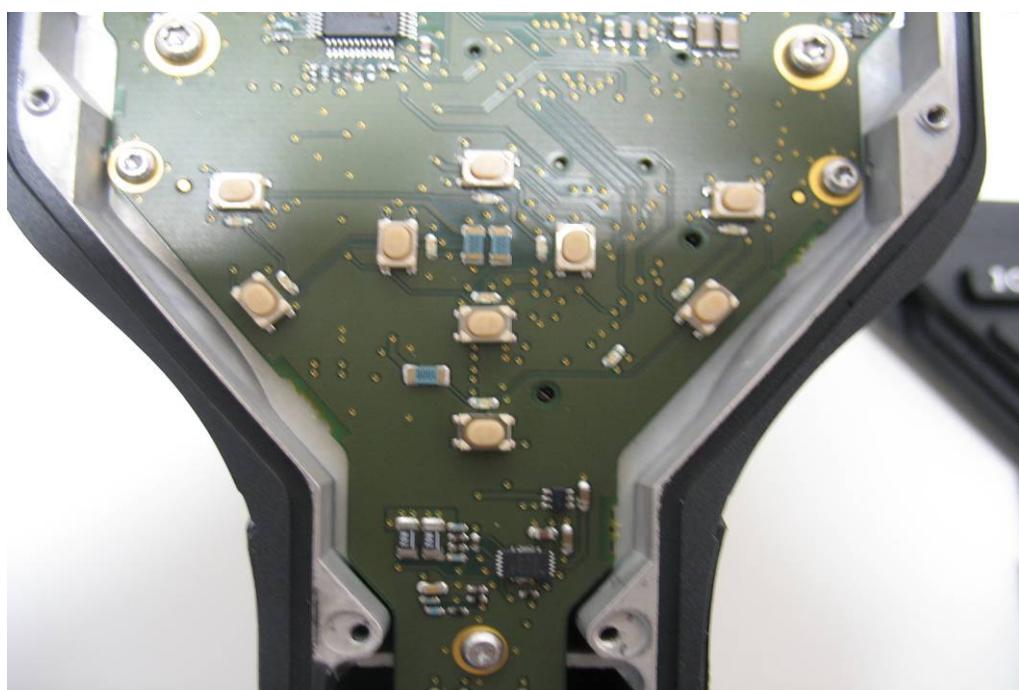


Photo 13:



Photo 14:

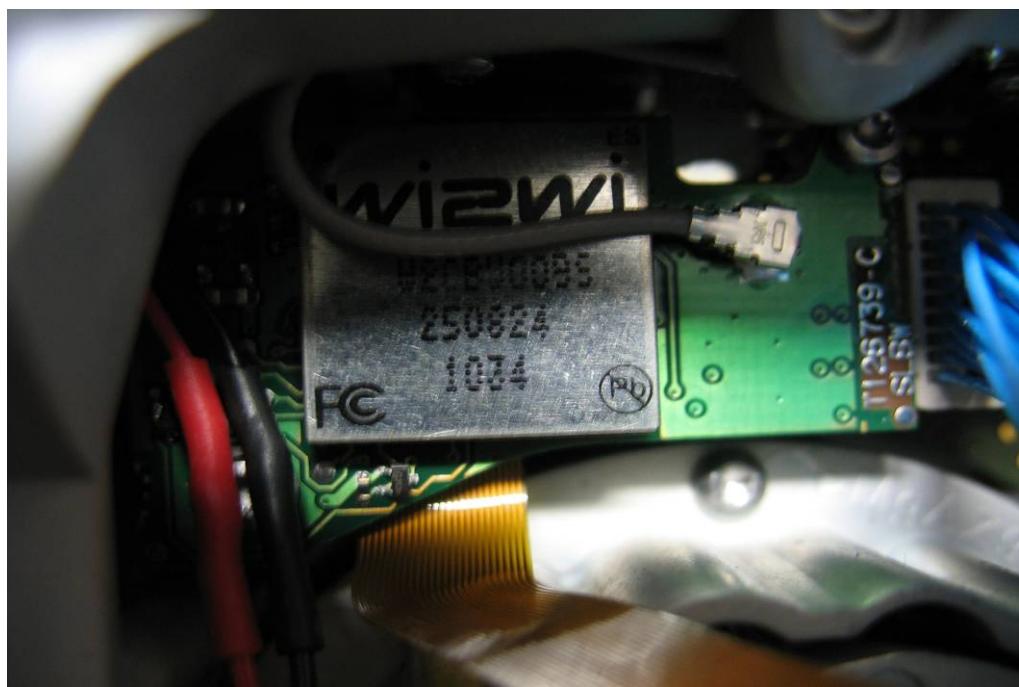


Photo 15:

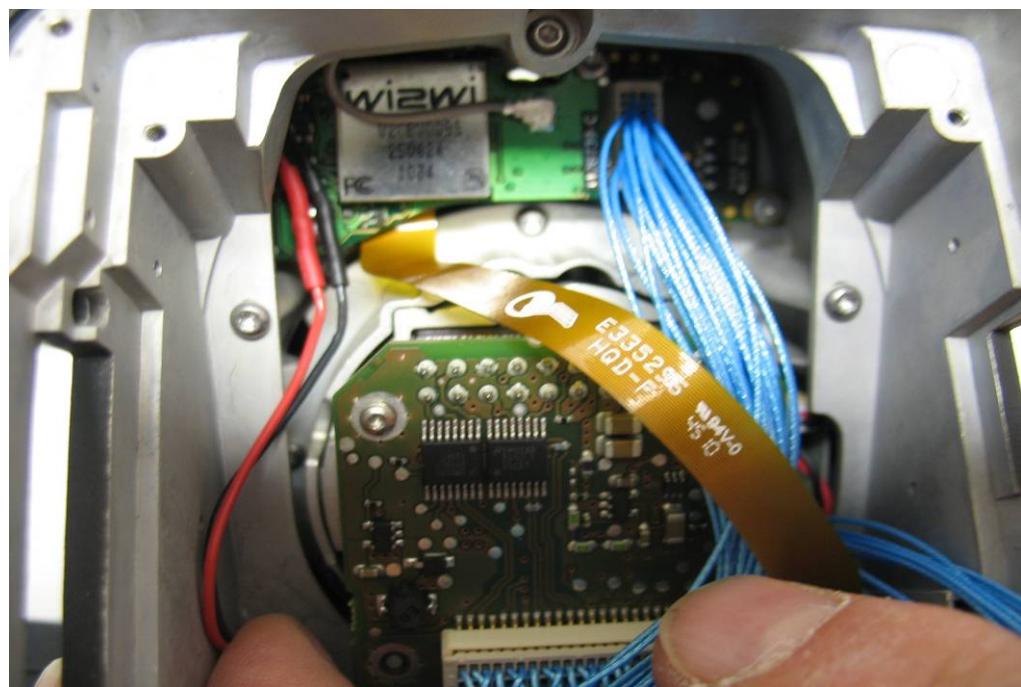


Photo 16:



Photo 17:

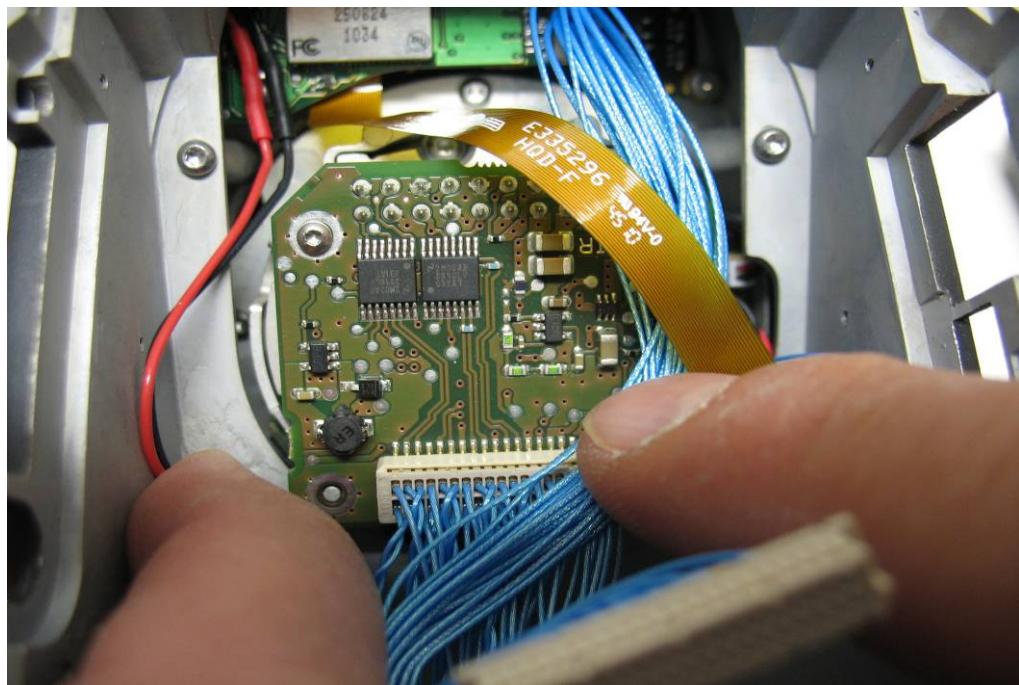


Photo 18:

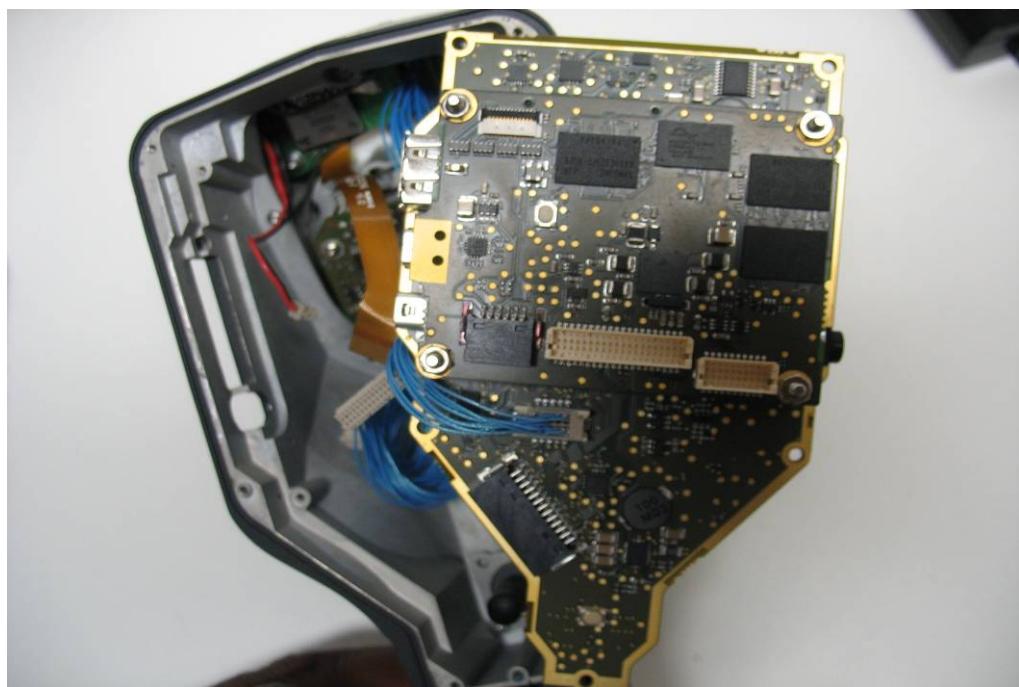


Photo 19:



Photo 20:

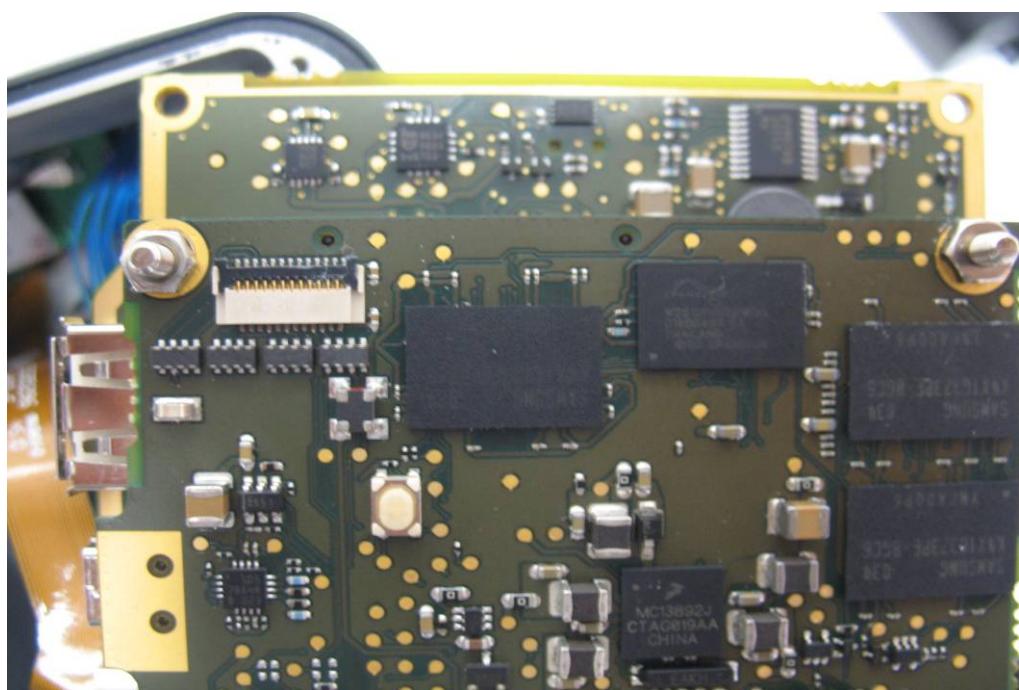


Photo 21:

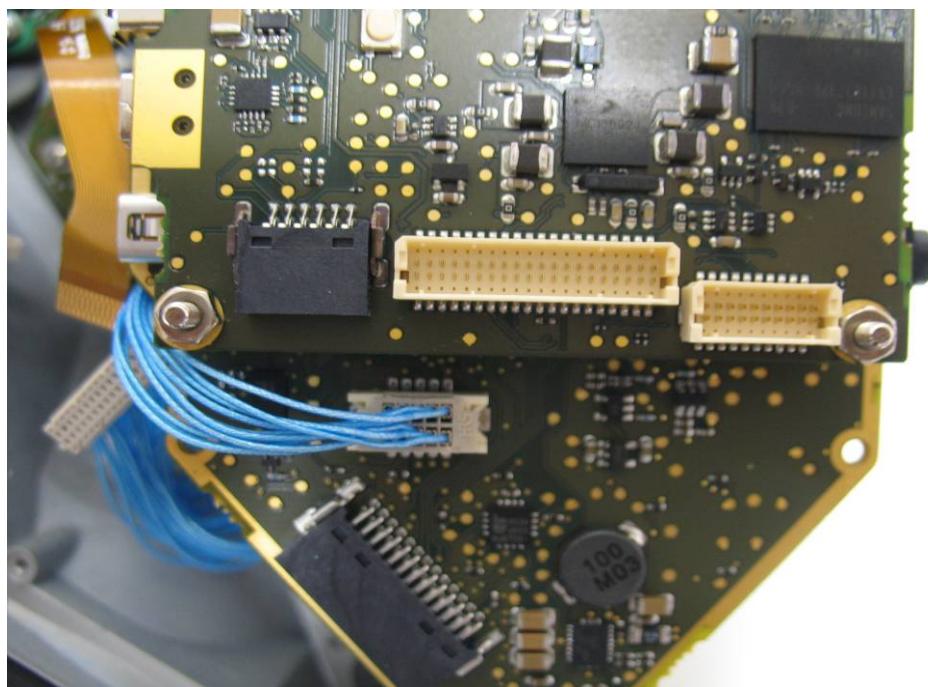


Photo 22:



Annex D Document history

| Version | Applied changes | Date of release |
|---------|--|-----------------|
| 1.0 | Initial release | 2012-02-03 |
| -A | Merge with radiated measurements This report replaces the report 1-3325/11-02-03 dated 2012-02-03 | 2012-02-23 |

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 |

Annex F Accreditation Certificate



Deutsche Akkreditierungsstelle GmbH
German Accreditation Body

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1
subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) attests that the testing laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6-10
66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

- Wired communications and DECT
- Acoustic
- Radio
- Short Range Devices (SRD)
- RFID
- WiMax and Richtfunk
- Mobile radio (GSM / DCS), Over the Air (OTA) Performance
- Electromagnetic Compatibility (EMC) incl. Automotive
- Product safety
- SAR and Hearing Aid Compatibility (HAC)
- Environmental simulation
- Smart Card Terminals
- Bluetooth®
- Wi-Fi-Services

The accreditation certificate shall only apply in connection with the notice of accreditation of 13.04.2011 with the accreditation number D-PL-12076-01 and is valid until 03.09.2014. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 82 pages.

Registration number of the certificate: **D-PL-12076-01-01**

Frankfurt am Main, 13.04.2011

Dipl.-Ing. (FH) Rolf Eigner
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.
See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2635) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Front side of certificate

Back side of certificate

Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

http://www.cetecom.com/fileadmin/de/CETECOM_D_Saarbruecken/accreditations_Jan_2010/DAKKs_Akkreditierung_URK_EN17025-En_incl_Annex.pdf