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TEST REPORT

Test report no.: 1-9460/15-01-03



Deutsche
Akkreditierungsstelle
D-PL-12076-01-00

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-12076-01-00

Applicant

Steute Schaltgeräte GmbH

Brückstraße 91
32584 Löhne / GERMANY

Phone: -/-
Fax: -/-
Contact: Nils Fischer
e-mail: n.fischer@steute.de
Phone: +49 573 174-5203

Manufacturer

Steute Schaltgeräte GmbH

Brückstraße 91
32584 Löhne / GERMANY

Test standard/s

47 CFR Part 15

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

RSS - 210 Issue 8

Spectrum Management and Telecommunications Radio Standards Specification - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

RSS - 210 Issue 8
Amendment 1

RSS-210, Amendment 1 — Licence-Exempt, Low-Power Radio Apparatus
Operating in the Television Bands (February 2015)

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

Test Item

Kind of test item: **BlueMod+SR with external antenna**

Model name: **Bluetooth 4.0 Dual Mode Module**

FCC ID: **XK5-BMPSR**

IC: **5158A-BMPSR**

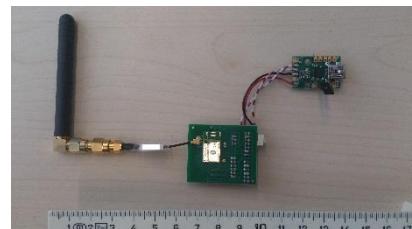
Frequency: 2400 MHz to 2483.5 MHz DTS band

Technology tested: Bluetooth® LE

Antenna: External antenna

Power supply: 5.0 V DC USB powered

Temperature range: -25°C to +75°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:

Andreas Luckenbill
Radio Communications & EMC

Test performed:

David Lang
Radio Communications & EMC

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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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2.2 Application details

Date of receipt of order:	2015-02-24
Date of receipt of test item:	2015-02-23
Start of test:	2015-02-25
End of test:	2015-03-02
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15		Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 8	01.12.2010	Spectrum Management and Telecommunications Radio Standards Specification - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
RSS - 210 Issue 8 Amendment 1	05.02.2015	RSS-210, Amendment 1 — Licence-Exempt, Low-Power Radio Apparatus Operating in the Television Bands (February 2015)

3.1 Measurement guidance

DTS : KDB 558074	2014-06	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
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4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+75 °C during high temperature tests
	T_{min}	-25 °C during low temperature tests
Relative humidity content:		54 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	5.0 V DC USB powered
	V_{max}	5.5 V
	V_{min}	4.5 V

5 Test item

Kind of test item :	BlueMod+SR with external antenna
Type identification :	Bluetooth 4.0 Dual Mode Module
S/N serial number :	Not available
HW hardware status :	V3.1
SW software status :	V1.02
Frequency band [MHz] :	2400 MHz to 2483.5 MHz DTS band
Type of radio transmission :	DSSS
Use of frequency spectrum :	
Type of modulation :	GFSK
Number of channels :	39
Antenna :	External antenna
Power supply :	5.0 V DC USB powered
Temperature range :	-25°C to +75°C

5.1 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-9460/15-01-01_AnnexA
 1-9460/15-01-01_AnnexB
 1-9460/15-01-01_AnnexD

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
 This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark				
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2015-03-09	Module integration! Only radiated measurements.				

Test specification clause	Test case	Guideline	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	-/-	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	KDB 558074 DTS clause: 10.6	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Note *1
§15.247(a)(2) RSS 210 / A8.2(a)	DTS bandwidth – 6 dB bandwidth	KDB 558074 DTS clause: 8.1	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Note *1
RSS Gen clause 4.6.1	Occupied bandwidth	-/-	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Note *1
§15.247(b)(3) RSS-210 / A8.4(4)	Maximum output power	KDB 558074 DTS clause: 9.1.1	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	Detailed spurious emissions @ the band edge - conducted	-/-	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Note *1
§15.205 RSS-210 / A8.5	Band edge compliance radiated	KDB 558074 DTS clause: 13.3.2	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	KDB 558074 DTS clause: 11.1 & 11.2 11.3	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Note *1
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	-/-	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.109 RSS-Gen	RX spurious emissions radiated	-/-	Nominal	Nominal	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	-/-	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a) §15.207	Conducted emissions < 30 MHz	-/-	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Note *1

Note: NA = Not Applicable; NP = Not Performed; *1 Module integration (for reference see section 8 of this test report)

The antenna as referenced in section 8 was used for testing.

8 Additional comments

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Reference documents: Module report SZ13040106W03 issued by MORLAB Communication Technology Co., Ltd., 2013-05-27

Antenna specification:
WiMo Antennen und Elektronik GmbH; Rubber antenna 2.4 GHz, SMA
(Best.Nr. 17010.11REV)

Configuration descriptions: TX tests: were performed with LE packets (37 byte payload) and static PRBS pattern.
RX/Standby tests: BT enabled, TX Idle

Test mode:

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

9 Measurement results

9.1 Antenna gain

Measurement:

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal Bluetooth® devices, the GFSK modulation is used.

Measurement parameters:

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

Limits:

FCC	IC
Antenna Gain	
6 dBi	

Results:

T _{nom}	V _{nom}	lowest channel 2402 MHz	middle channel 2440 MHz	highest channel 2480 MHz
Conducted power [dBm] Measured with GFSK modulation		6.4	6.6	6.2
Radiated power [dBm] Measured with GFSK modulation		9.5	10.8	10.7
Gain [dBi] Calculated		3.1	4.1	4.0

Note:

Conducted and radiated power values for Gain calculation taken from the BT EDR Report (1-9460/15-01-02).

Verdict: **Passed**

9.2 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
Resolution bandwidth:	3 MHz
Video bandwidth:	3 MHz
Span:	3 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
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	Maximum output power conducted [dBm]		
	2402 MHz	2440 MHz	2480 MHz
GFSK	7.5	9.1	9.8
Measurement uncertainty	± 1.5 dB		

Modulation	Maximum output power radiated - EIRP [dBm]		
	2402 MHz	2440 MHz	2480 MHz
GFSK	10.6	13.2	13.8
Measurement uncertainty	± 3 dB		

*) - Values calculated with antenna gain

Verdict: Passed

9.3 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 39 for the upper restricted band. Measurement distance is 3m.

Measurement:

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

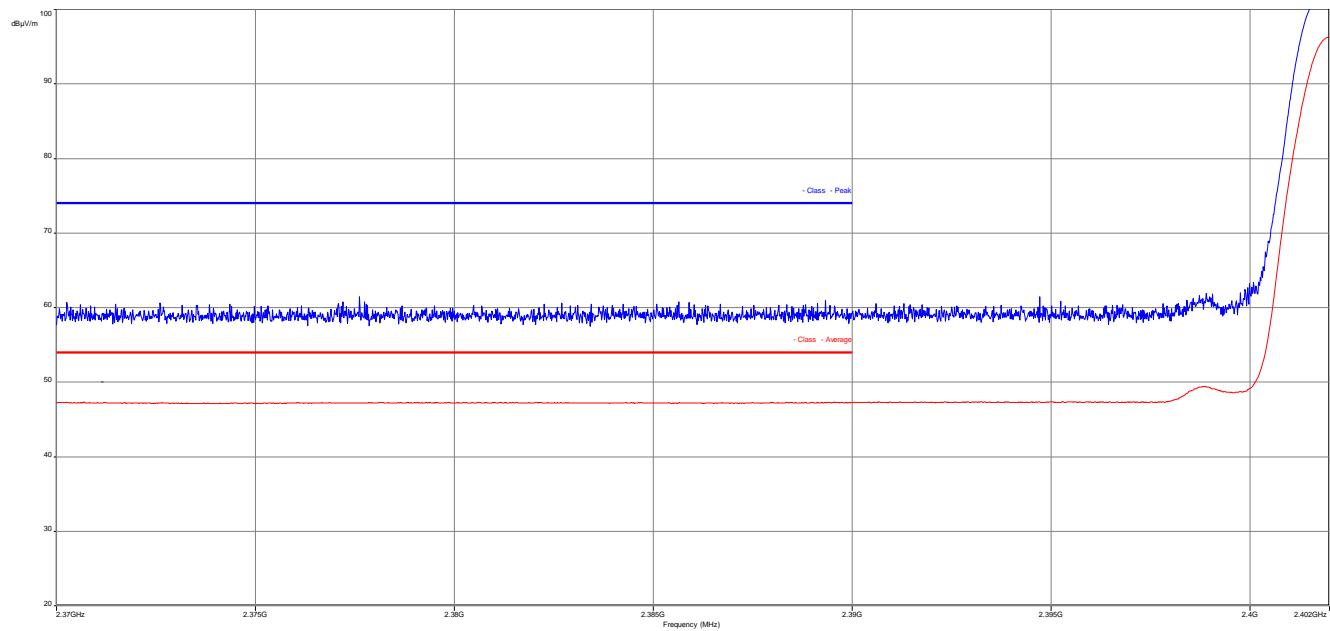
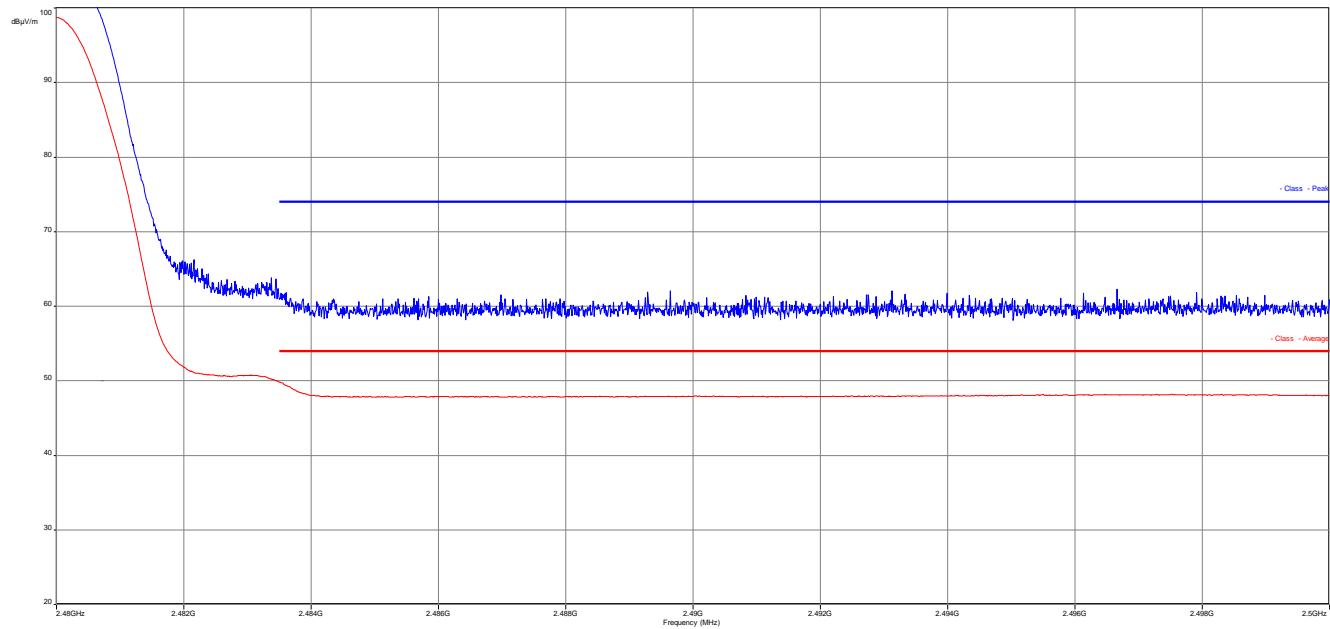
Limits:

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

Result:

Scenario	Band edge compliance radiated [dB μ V/m]
	GFSK
Lower restricted band	< 54 (see plot 1)
Upper restricted band	< 54 (see plot 2)
Measurement uncertainty	± 3 dB

Verdict: Passed

Plots:**Plot 1: Lower restricted band****Plot 2: Upper restricted band**

9.4 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 19 and channel 39.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	3 x RBW Remeasurement: 10 Hz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold
Measured Modulation:	GFSK

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:

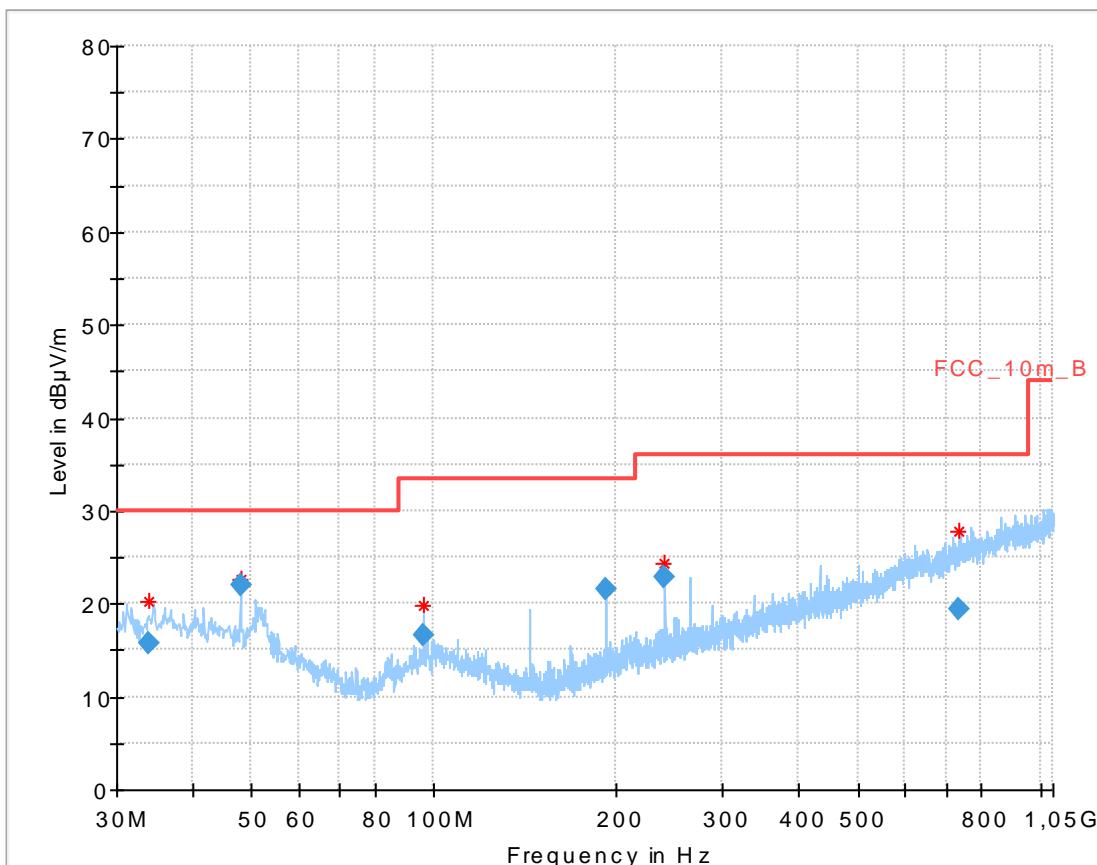
FCC	IC															
TX spurious emissions radiated																
<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.</p> <p>In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</p>																
§15.209																
<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Field strength (dBμV/m)</th> <th>Measurement distance</th> </tr> </thead> <tbody> <tr> <td>30 - 88</td> <td>30.0</td> <td>10</td> </tr> <tr> <td>88 - 216</td> <td>33.5</td> <td>10</td> </tr> <tr> <td>216 - 960</td> <td>36.0</td> <td>10</td> </tr> <tr> <td>Above 960</td> <td>54.0</td> <td>3</td> </tr> </tbody> </table>		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
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:

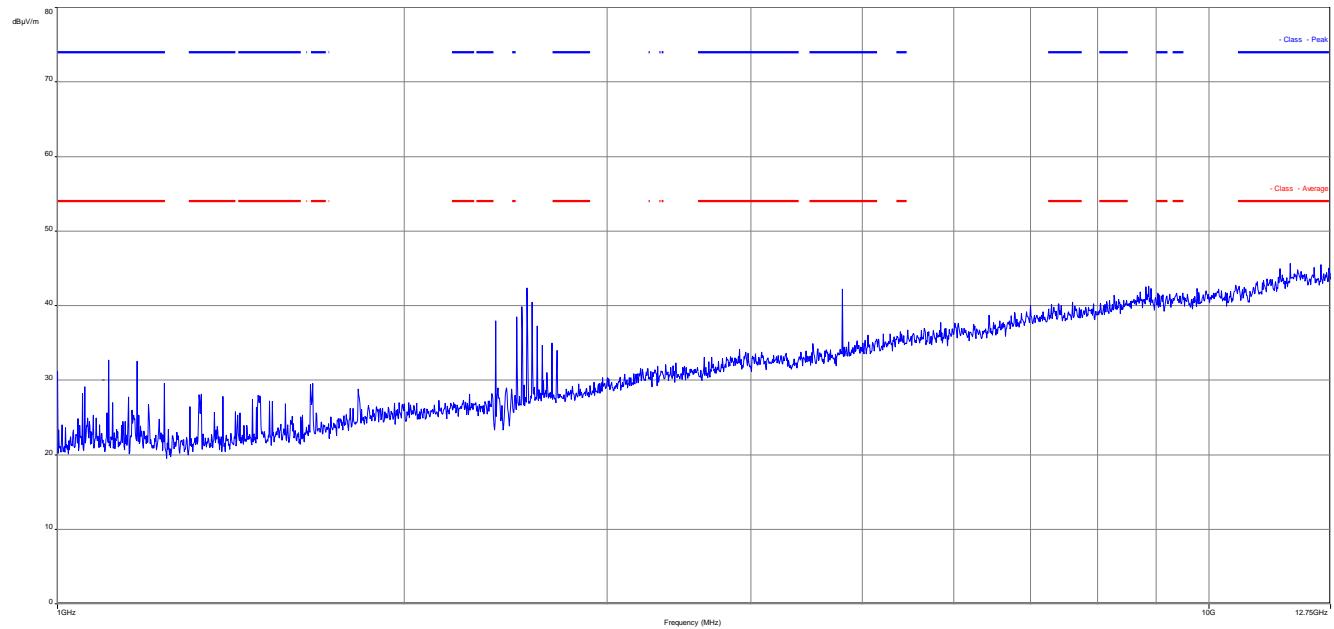
TX spurious emissions radiated [dB μ V/m]								
2402 MHz			2440 MHz			2480 MHz		
F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]	F [MHz]	Detector	Level [dB μ V/m]
4804.1	Peak	42.0	4959.7	Peak	51.8	4880.1	Peak	48.2
19216.0	Peak	45.9	14640.0	Peak	41.4	19840.0	Peak	45.7
-/-	-/-	-/-	24096.0	Peak	45.9	-/-	-/-	-/-
Measurement uncertainty			\pm 3 dB					

Verdict: **Passed**

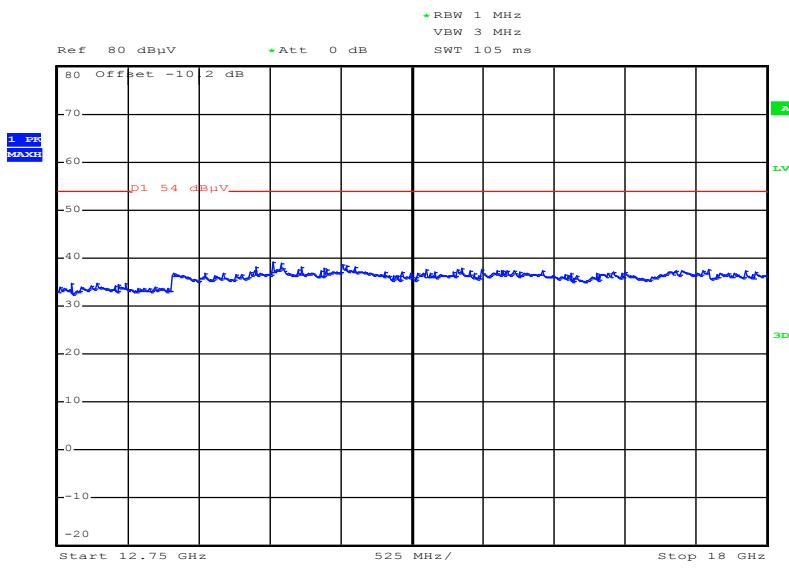
Note: The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

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


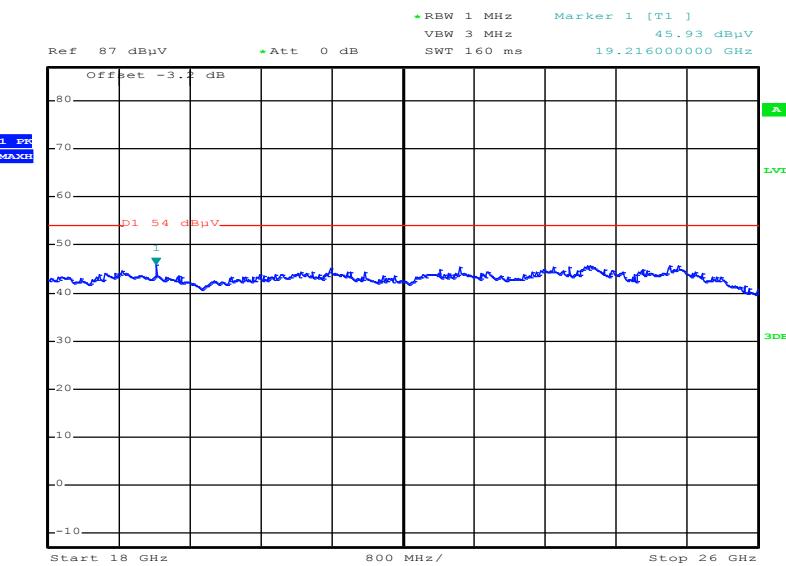
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
34.011600	15.76	30.00	14.24	1000.0	120.000	98.0	V	65	13.7
48.103350	21.95	30.00	8.05	1000.0	120.000	98.0	V	83	13.1
96.201450	16.60	33.50	16.90	1000.0	120.000	101.0	V	65	11.5
192.360600	21.64	33.50	11.86	1000.0	120.000	98.0	V	295	11.2
240.459450	22.94	36.00	13.06	1000.0	120.000	98.0	V	173	13.1
736.693200	19.30	36.00	16.70	1000.0	120.000	101.0	V	263	22.4

Plot 2: 1 GHz to 12.75 GHz, lowest channel, vertical & horizontal polarization


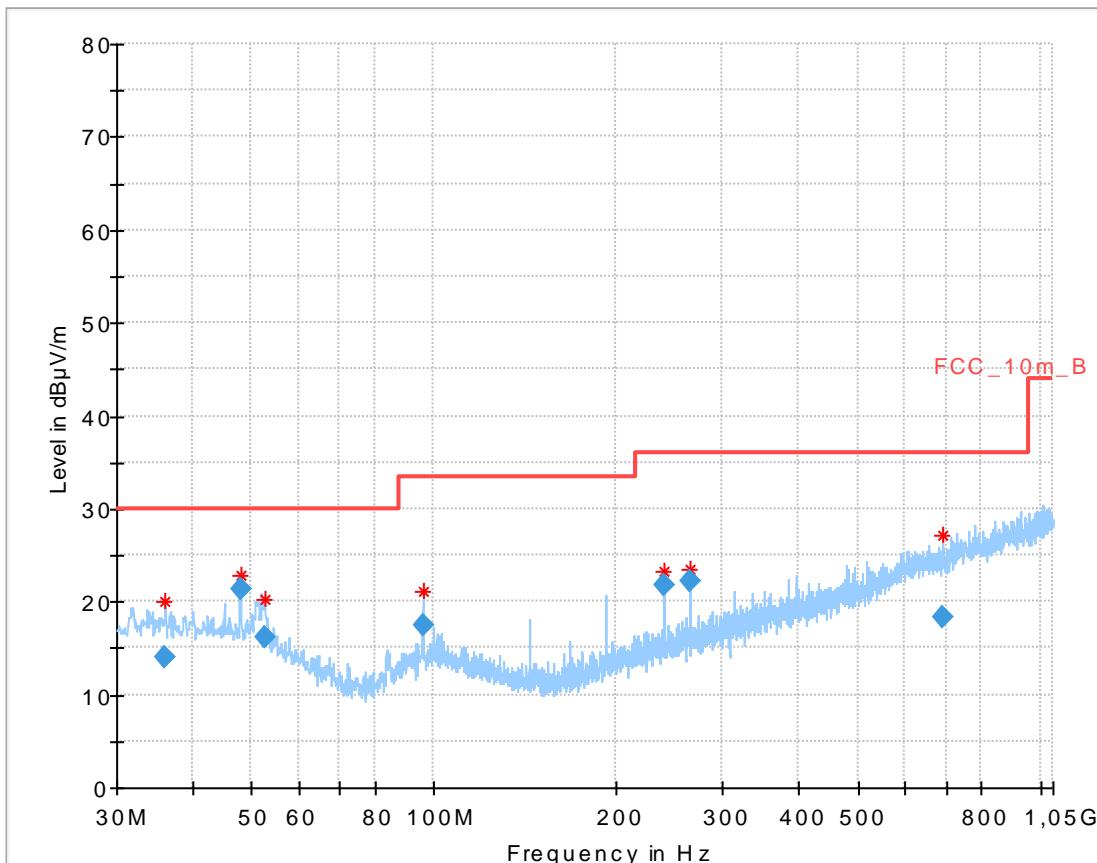
Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 3: 12 GHz to 18 GHz, lowest channel, vertical & horizontal polarization – valid for all channels


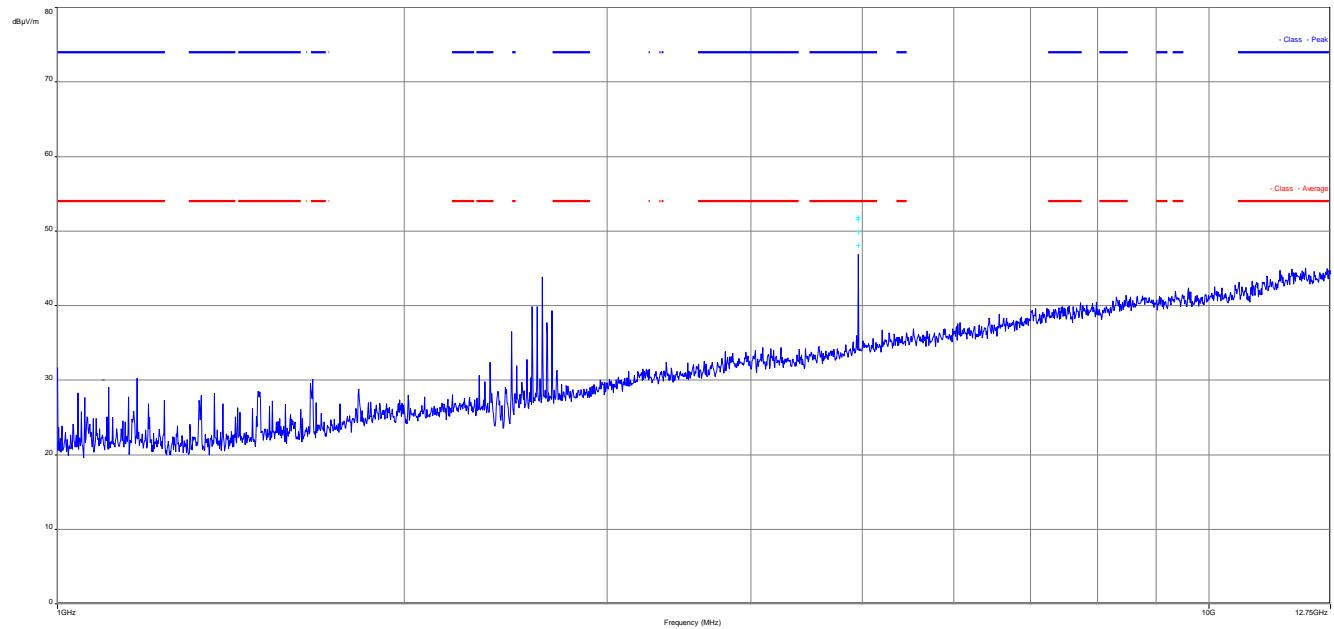
Date: 2.MAR.2015 14:07:02

Plot 4: 18 GHz to 25 GHz, lowest channel, vertical & horizontal polarization – valid for all channels

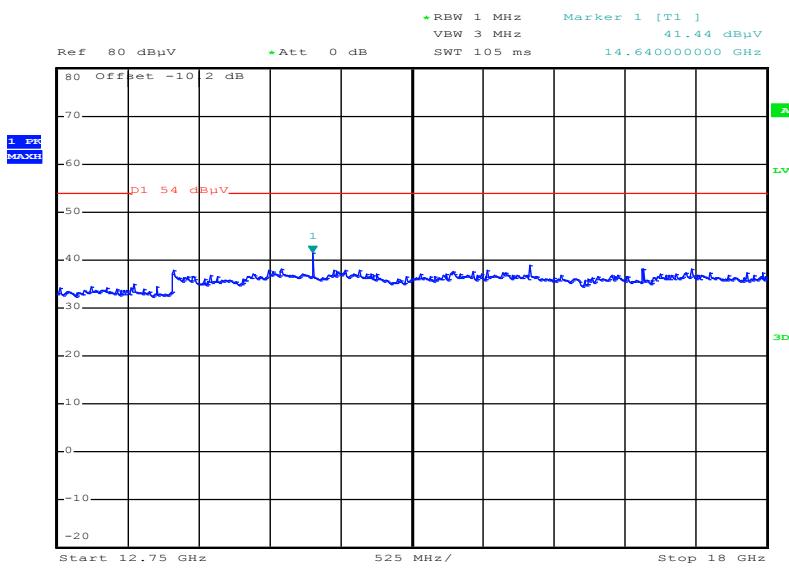
Date: 2.MAR.2015 14:17:23

Plot 5: 30 MHz to 1 GHz, mid channel, vertical & horizontal polarization


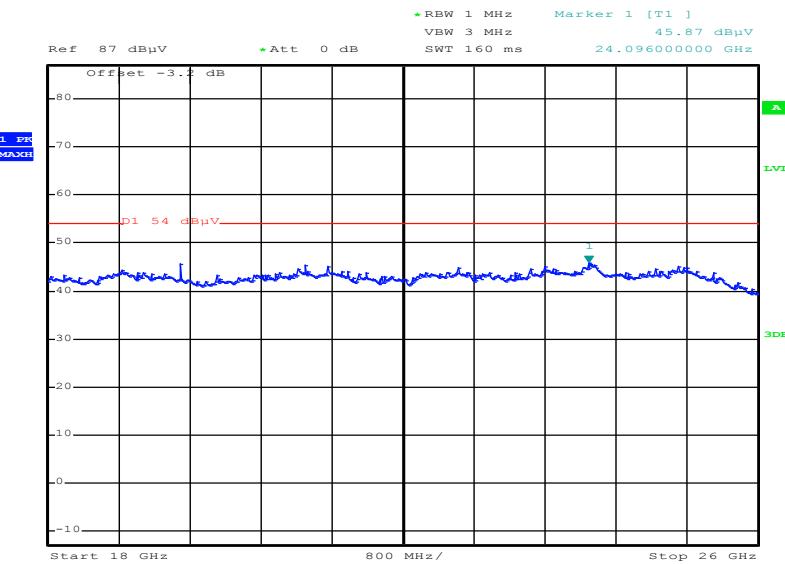
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.036300	13.97	30.00	16.03	1000.0	120.000	170.0	V	-6	13.8
48.024900	21.44	30.00	8.56	1000.0	120.000	98.0	V	84	13.1
52.642200	16.17	30.00	13.83	1000.0	120.000	98.0	V	-4	12.2
96.018000	17.48	33.50	16.02	1000.0	120.000	101.0	V	83	11.5
240.009600	21.72	36.00	14.28	1000.0	120.000	98.0	V	196	13.0
264.046050	22.22	36.00	13.78	1000.0	120.000	98.0	V	173	13.7
691.121400	18.38	36.00	17.62	1000.0	120.000	170.0	H	264	21.5

Plot 6: 1 GHz to 12.75 GHz, mid channel, vertical & horizontal polarization

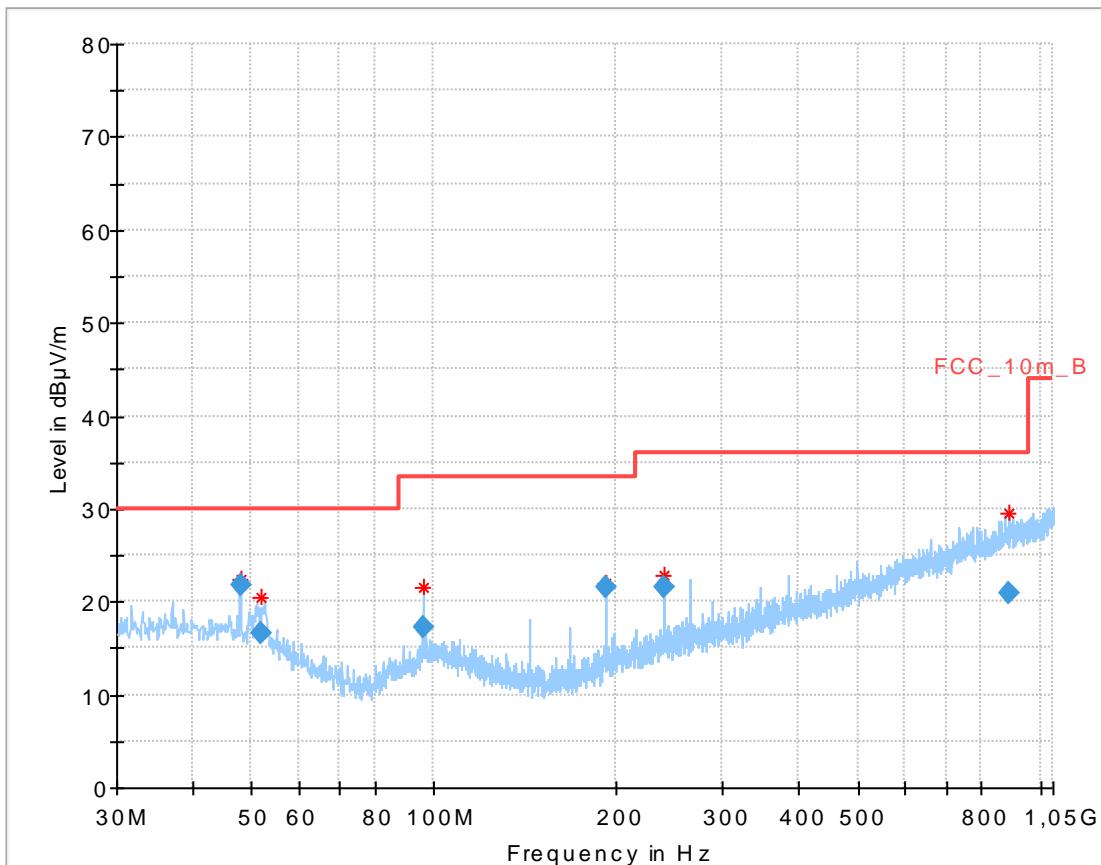
Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 7: 12 GHz to 18 GHz, mid channel, vertical & horizontal polarization – valid for all channels

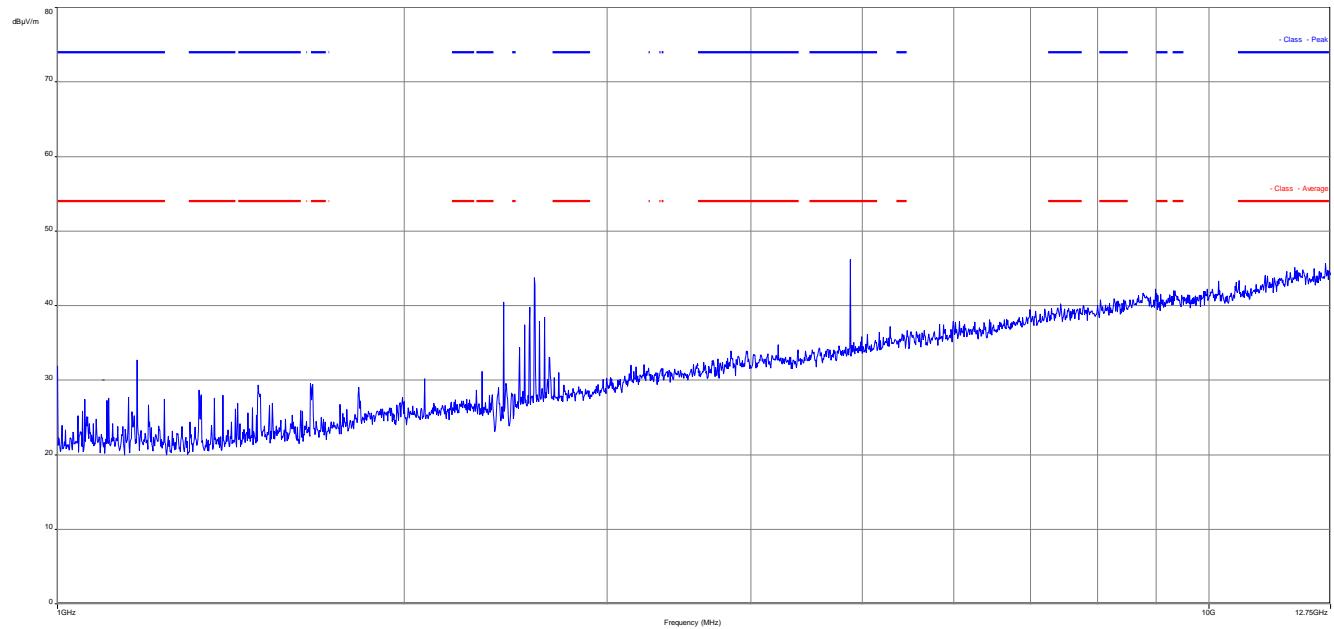
Date: 2.MAR.2015 14:08:16

Plot 8: 18 GHz to 25 GHz, mid channel, vertical & horizontal polarization – valid for all channels

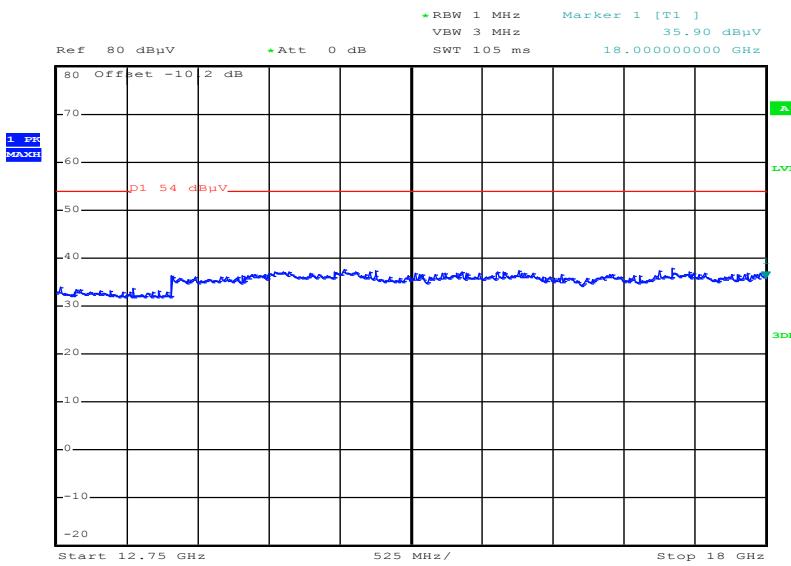
Date: 2.MAR.2015 14:18:13

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


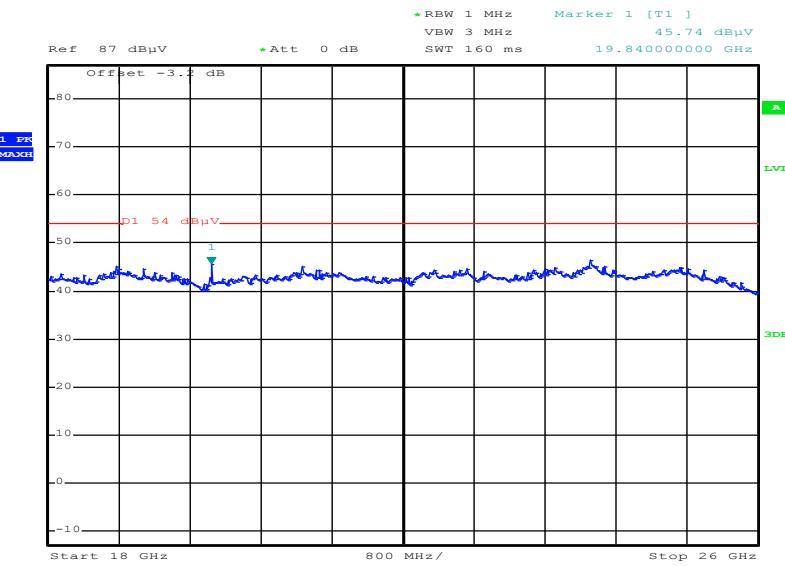
Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
47.992950	21.75	30.00	8.25	1000.0	120.000	98.0	V	155	13.1
51.992400	16.64	30.00	13.36	1000.0	120.000	98.0	V	263	12.3
96.005850	17.31	33.50	16.19	1000.0	120.000	98.0	V	83	11.5
192.015150	21.47	33.50	12.03	1000.0	120.000	98.0	V	-25	11.2
240.039600	21.57	36.00	14.43	1000.0	120.000	98.0	V	173	13.0
886.603200	20.96	36.00	15.04	1000.0	120.000	98.0	V	295	23.9

Plot 10: 1 GHz to 12.75 GHz, highest channel, vertical & horizontal polarization


Carrier suppressed with a 2.4 GHz-band rejection filter.

Plot 11: 12 GHz to 18 GHz, highest channel, vertical & horizontal polarization – valid for all channels


Date: 2.MAR.2015 15:10:03

Plot 12: 18 GHz to 25 GHz, highest channel, vertical & horizontal polarization – valid for all channels

Date: 2.MAR.2015 14:19:10

9.5 RX spurious emissions radiated

Description:

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

Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Video bandwidth:	3 x RBW Remeasurement: 10 Hz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

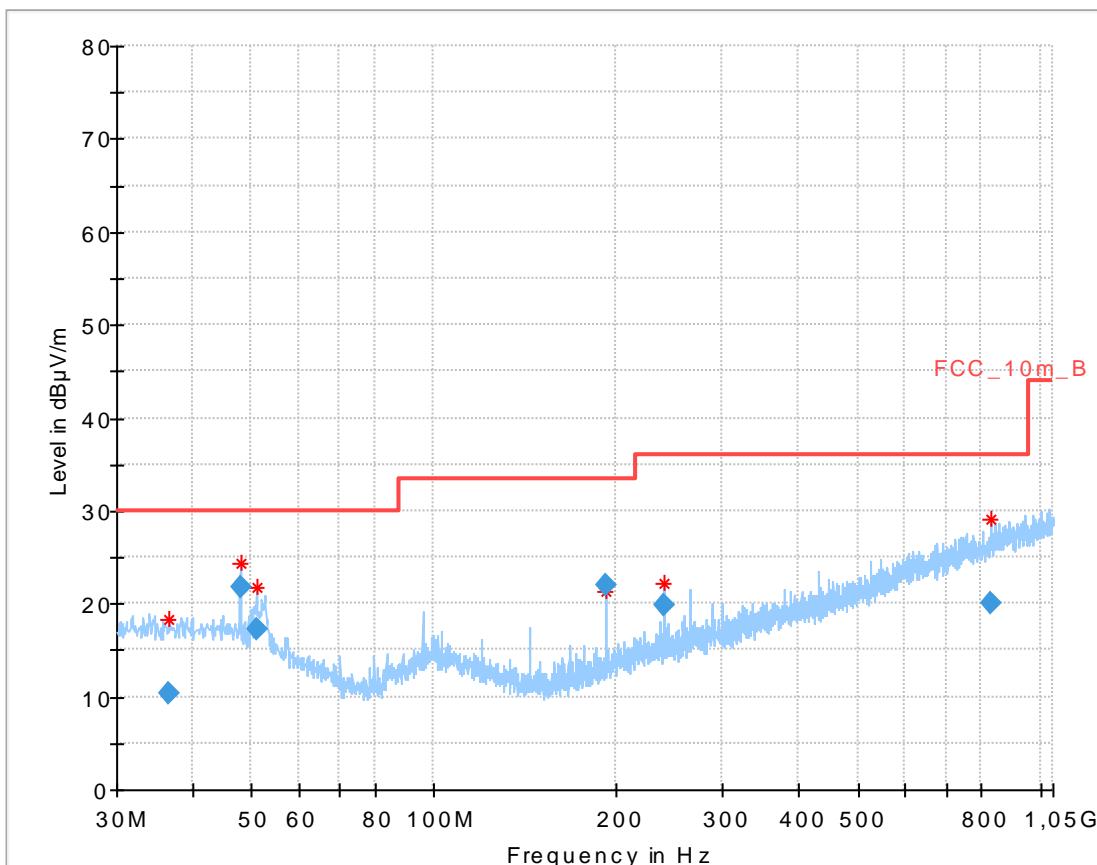
FCC	IC	
RX Spurious Emissions Radiated		
Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
Above 960	54.0	3

Results:

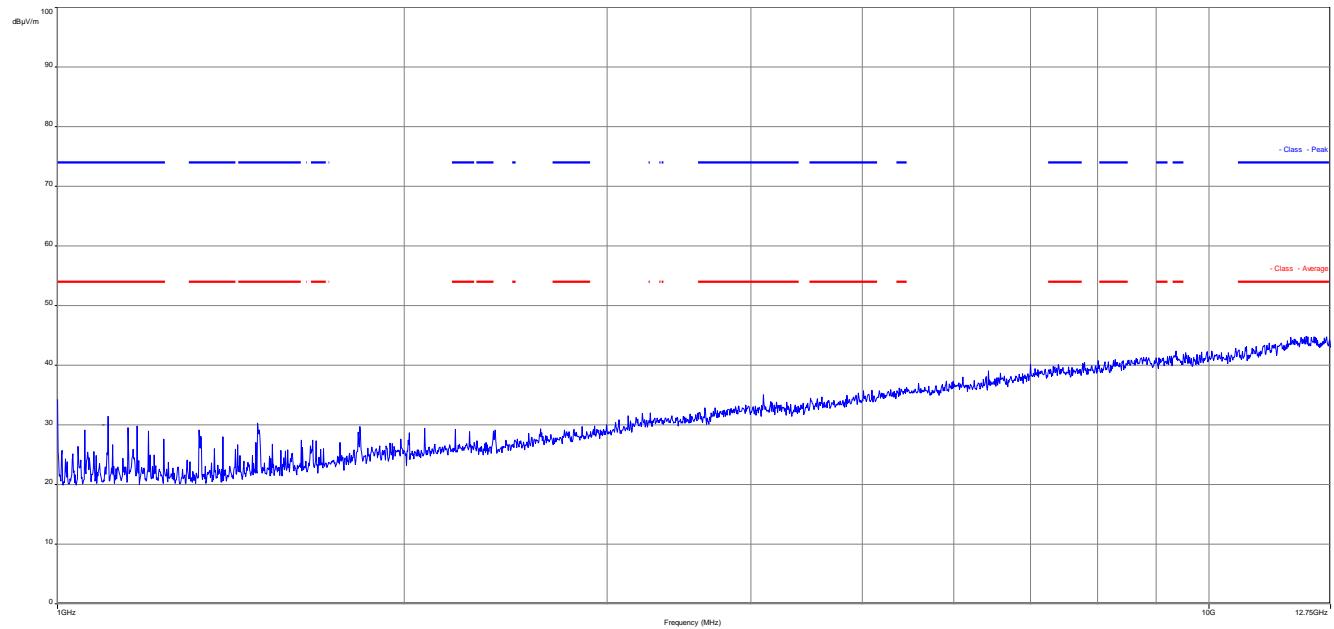
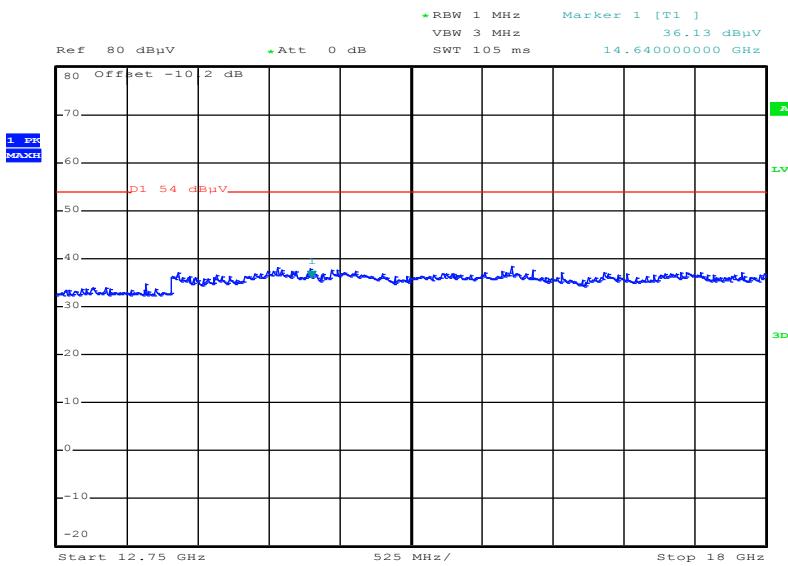
RX spurious emissions radiated [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
No peaks found		
Measurement uncertainty		±3 dB

Verdict: Passed

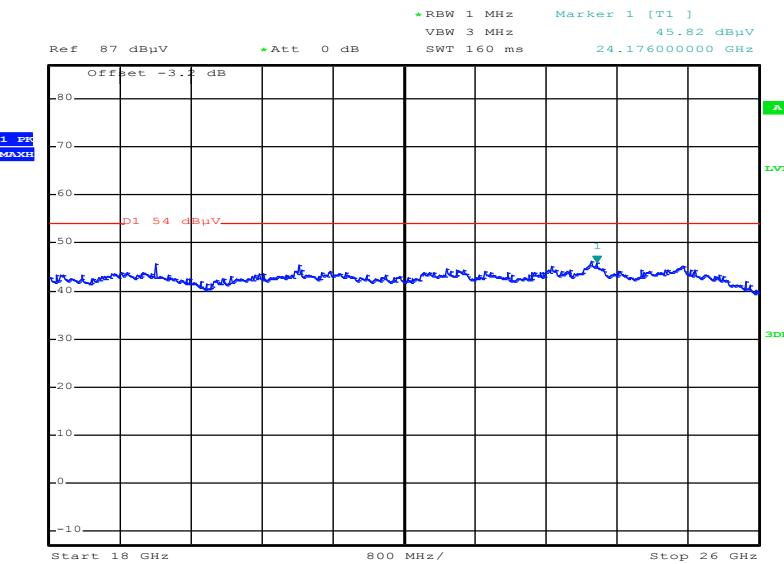
Note: The limit was recalculated with 20 dB / decade (Part 15.31) for all radiated spurious emissions 30 MHz to 1 GHz from 3 meter limit to a 10 meter distance. (40dB/decade for emissions < 30MHz)

Plots:
Plot 1: 30 MHz to 1 GHz, RX / idle – mode, vertical & horizontal polarization


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.696600	10.43	30.00	19.57	1000.0	120.000	101.0	H	287	13.9
47.968350	21.69	30.00	8.31	1000.0	120.000	98.0	V	17	13.1
51.103350	17.30	30.00	12.70	1000.0	120.000	98.0	V	263	12.5
191.962800	22.07	33.50	11.43	1000.0	120.000	98.0	V	-25	11.2
239.913450	19.87	36.00	16.13	1000.0	120.000	170.0	V	155	13.0
830.139450	20.16	36.00	15.84	1000.0	120.000	170.0	H	197	23.2

Plot 2: 1 GHz to 12.75 GHz, RX / idle – mode, vertical & horizontal polarization

Plot 3: 12 GHz to 18 GHz, RX / idle – mode, vertical & horizontal polarization


Date: 2.MAR.2015 14:10:53

Plot 4: 18 GHz to 25 GHz, RX / idle – mode, vertical & horizontal polarization

Date: 2.MAR.2015 14:20:31

9.6 Spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 19. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 39 will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

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

Limits:

FCC	IC	
TX spurious emissions radiated < 30 MHz		
Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

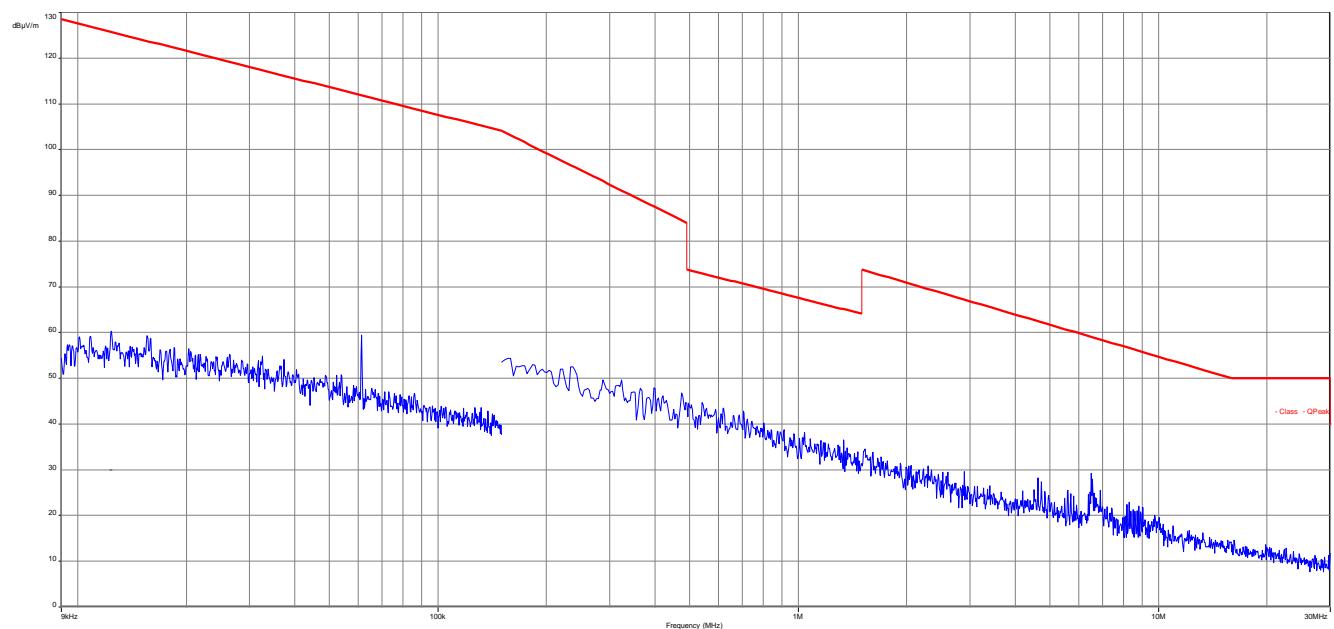
Results:

TX spurious emissions radiated < 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
All detected peaks are more than 20 dB below the limit.		
Measurement uncertainty		± 3 dB

Verdict: Passed

Plot:

Plot 1: 9 kHz to 30 MHz, TX mode



10 Test equipment and ancillaries used for tests

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

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

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP	2719A14505	300000368	g		
2	45	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	26.01.2015	26.01.2016
3	45	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw		
4	45	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw		
5	45	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw		
6	45	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016
7	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKI!	08.05.2013	08.05.2015
8	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
9	n. a.	Switch / Control Unit	3488A	HP	*	300000199	ne		
10	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
11	90	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
12	90	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
13	90	MXE EMI Receiver 20 Hz to 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	13.03.2014	13.03.2015
14	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP	00419	300002268	ev		
15	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
16	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	k	19.07.2013	19.07.2015
17	A029	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	22.01.2015	22.01.2016

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
 vIKI! 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 except those reported with the single test cases have been made.

Annex A Document history

Version	Applied changes	Date of release
	Initial release	2015-03-09

Annex B 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 C Accreditation Certificate

Front side of certificate



Deutsche Akkreditierungsstelle GmbH

Basislizenz gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichner der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung 

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

CETECOM ICT Services GmbH
Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen
durchzuführen:

Drahtgebundene Kommunikation einschließlich xDSL
VDSL und DECT
Akustik
Funk einschließlich WLAN
Short Range Devices (SRD)
RFID
WiMax und Richtfunk
Mobilfunk (GSM / DCS, Over the Air (OTA) Performance)
Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive
Produktsicherheit
SAR und Hearing Aid Compatibility (HAC)
Umweltsimulation
Smart Card Terminals
Bluetooth
Wi-Fi-Services

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 07.03.2014 mit der
Akkreditierungsnummer D-PL-12076-01 und ist gültig 17.01.2018. Sie besteht aus diesem Deckblatt, der
Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 77 Seiten.

Registrierungsnummer der Urkunde: D-PL-12076-01-00

Frankfurt am Main, 07.03.2014


In Auftrag D-PL-12076-01 Ralf Igner
Akkreditierungsleiter

Back side of certificate

Deutsche Akkreditierungsstelle GmbH

Standort Berlin
Spittelmarkt 10
10117 Berlin

Standort Frankfurt am Main
Gartenstraße 6
60591 Frankfurt am Main

Standort Braunschweig
Bundesallee 100
38116 Braunschweig

Die auszugsweise Veröffentlichung des Akkreditierungsurkundes bedarf einer vorherigen schriftlichen
Zustimmung der Deutsche Akkreditierungsstelle GmbH (DAkkS). Angemessen davon ist die separate
Weiterverbreitung des Deckblattes durch die umseitig genannte Konformitätsbewertungsstelle in
unveränderter Form.

Es darf nicht der Anschein erweckt werden, dass sich die Akkreditierung auch auf Bereiche erstreckt,
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Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom
31. Juli 2009 (BGBl. I S. 2625) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments
und des Rates vom 9. Juli 2008 über die Verordnung für die Akkreditierung und Marktbereitstellung
von Prüf- und Überwachungsstellen der Prüfung von Produkten (Offizielle Verordnung (EU) Nr. 315/2010).

Die DAkkS ist Unterzeichner der Multilaterale Abkommen zur gegenseitigen Anerkennung der
Europäischen Organisation für Akkreditation (EA), des Internationalen Akkreditierungsrates (IAF) und
der International Laboratory Accreditation Cooperation (ILAC). Die unterzeichner dieser Abkommen
erkennen Ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.org

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/eu/de/cetecom-group/europa/deutschland-saarbruecken/akkreditierungen.html>