

**CETECOM™****CETECOM ICT Services**  
consulting - testing - certification >>>

## TEST REPORT

Test report no.: 1-0255/15-01-05

Deutsche  
Akkreditierungsstelle  
D-PL-12076-01-00

### Testing laboratory

**CETECOM ICT Services GmbH**

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Internet: <http://www.cetecom.com>e-mail: [ict@cetecom.com](mailto:ict@cetecom.com)**Accredited Testing Laboratory:**

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

The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-00

### Applicant

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### Manufacturer

**Worldline SA**

Chaussee de Haecht 1442

1130 Bruxelles / BELGIUM

### 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 - License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

RSS - Gen Issue 4

Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus

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

### Test Item

**Kind of test item:** Terminal**Model name:** YOMANI 2 (YOMANI ML / YOMANI TS XR )**FCC ID:** SEKMA512**IC:** 5264A-MA512

Frequency: 13.56 MHz

Technology tested: RFID

Antenna: Integrated loop antenna

Power supply: 115 V AC by mains

Temperature range: -20°C to +50°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 authorized:

Andreas Luckenbill  
Lab Manager  
Radio Communications & EMC

### Test performed:

p.o.  
Michael Berg  
Lab Manager  
Radio Communications & EMC

## 1 Table of contents

1	Table of contents .....	2
2	General information .....	3
2.1	Notes and disclaimer .....	3
2.2	Application details .....	3
3	Test standard/s .....	3
3.1	Measurement guidance .....	4
4	Test environment .....	5
5	Test item .....	5
5.1	General description .....	5
5.2	Additional information .....	5
6	Test laboratories sub-contracted .....	5
7	Description of the test setup .....	6
7.1	Shielded semi anechoic chamber .....	7
7.2	Shielded fully anechoic chamber .....	8
7.3	Radiated measurements RF Laboratory .....	9
7.4	AC conducted .....	10
7.5	Relative measurements normal and extreme conditions .....	11
8	Measurement uncertainty .....	12
9	Sequence of testing .....	13
9.1	Sequence of testing 9 kHz to 30 MHz .....	13
9.2	Sequence of testing 30 MHz to 1 GHz .....	14
10	Summary of measurement results .....	15
11	Additional comments .....	15
12	Measurement results .....	16
12.1	Occupied bandwidth .....	16
12.2	Field strength of the fundamental .....	18
12.3	Field strength of the harmonics and spurious .....	19
12.4	Conducted limits .....	26
12.5	Frequency error .....	31
13	Observations .....	32
Annex A	Document history .....	32
Annex B	Further information .....	32
Annex C	Accreditation Certificate .....	33

## 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 electronic signatures, the public keys can be requested at the testing laboratory.

### 2.2 Application details

Date of receipt of order:	2015-09-07
Date of receipt of test item:	2015-09-23
Start of test:	2015-09-23
End of test:	2015-11-17
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	December 2010	Spectrum Management and Telecommunications Radio Standards Specification - License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
RSS - Gen Issue 4	November 2014	Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus

### 3.1 Measurement guidance

Guidance	Version	Description
ANSI C63.4-2014	-/-	American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
ANSI C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices

## 4 Test environment

Temperature	:	T <sub>nom</sub> T <sub>max</sub> T <sub>min</sub>	+22 °C during room temperature tests +55 °C during high temperature tests -20 °C during low temperature tests
Relative humidity content	:		55 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	V <sub>nom</sub> V <sub>max</sub> V <sub>min</sub>	115.0 V 132.3 V 97.8 V AC by mains

## 5 Test item

### 5.1 General description

Kind of test item	:	<b>Terminal</b>
Type identification	:	<b>YOMANI 2 (YOMANI ML / YOMANI TS XR )</b>
PMN	:	YOMANI
HVIN	:	YOMANI (T) ML NFC YOMANI (T) XR NFC
FVIN	:	-/-
HMN	:	-/-
S/N serial number	:	BHV2847 / BEE8718
HW hardware status	:	Rev AC
SW software status	:	WLAN Test CE
Frequency band	:	13.56 MHz
Type of radio transmission	:	single modulated carrier
Use of frequency spectrum	:	
Type of modulation	:	A1D
Number of channels	:	1
Antenna	:	Integrated loop antenna
Power supply	:	115 V AC by mains
Temperature range	:	-20°C to +50°C

### 5.2 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:

1-0254/15-02-01\_AnnexA  
1-0254/15-02-01\_AnnexB  
1-0254/15-02-01\_AnnexC

## 6 Test laboratories sub-contracted

None

## 7 Description of the test setup

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 signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

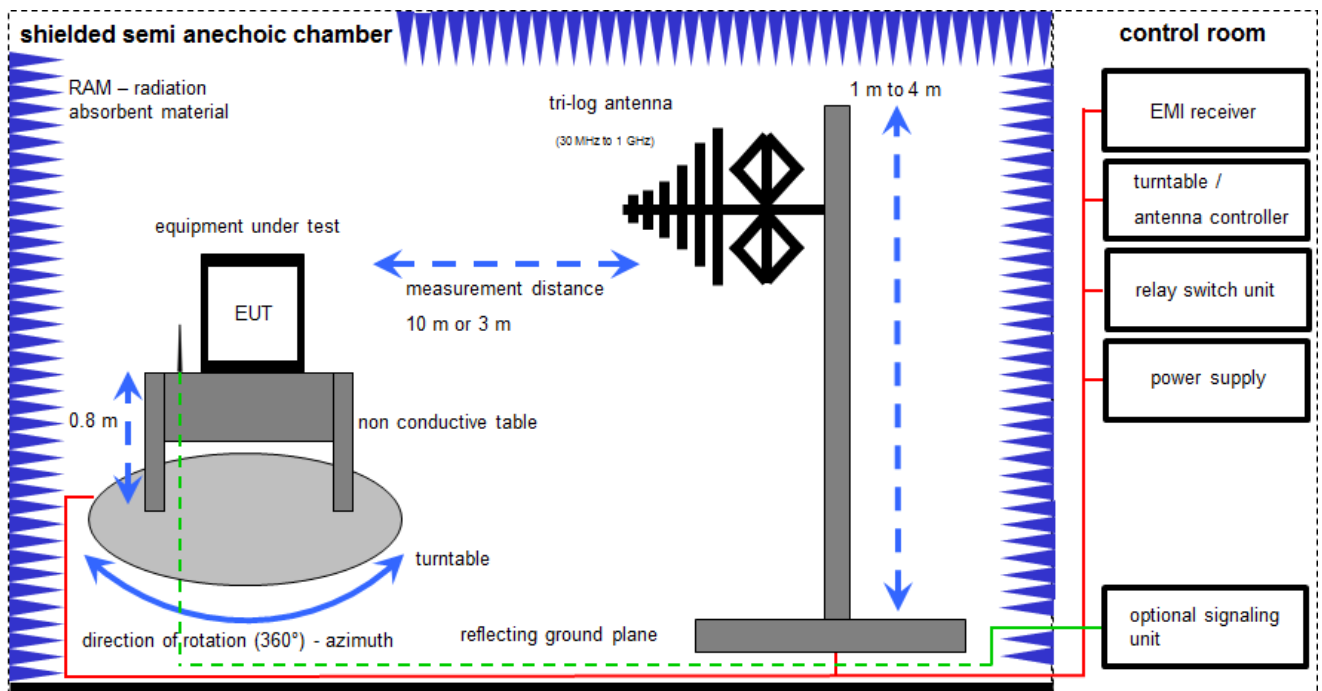
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

**Agenda:** Kind of Calibration

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

## 7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 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. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



$$FS = UR + CL + AF$$

(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

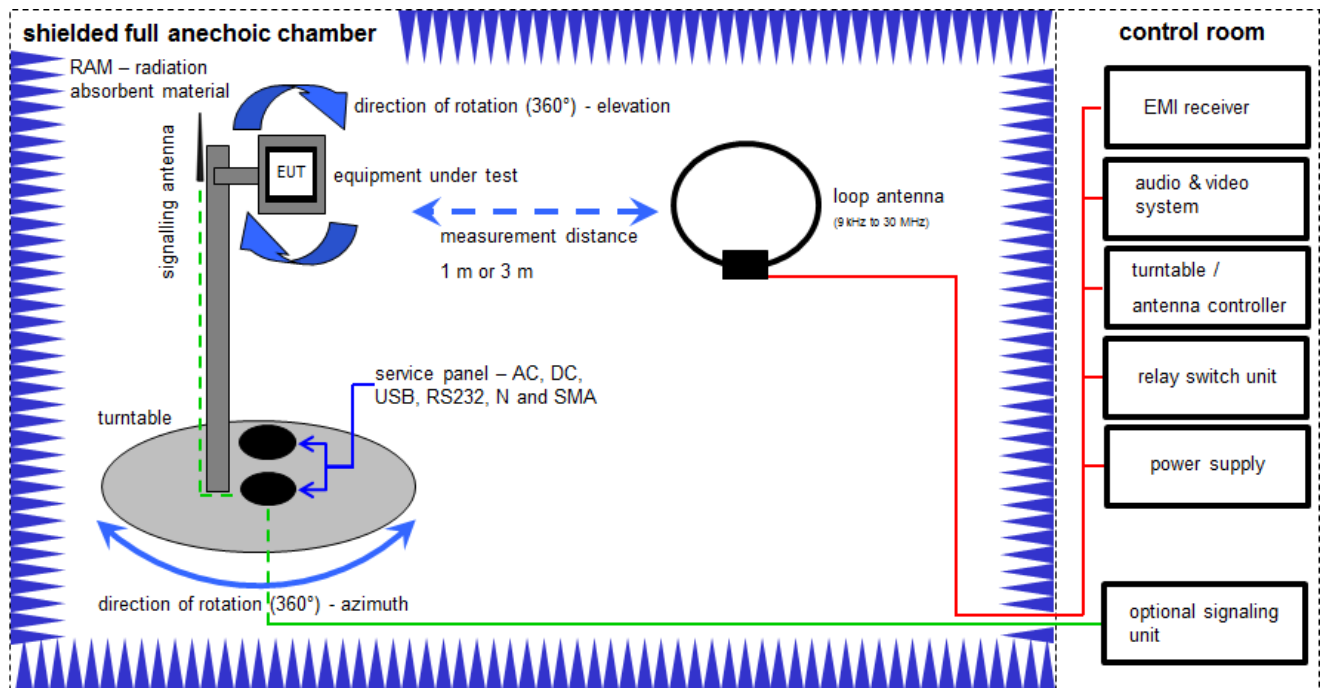
### Example calculation:

$$FS \text{ [dB}\mu\text{V/m]} = 12.35 \text{ [dB}\mu\text{V/m]} + 1.90 \text{ [dB]} + 16.80 \text{ [dB/m]} = 31.05 \text{ [dB}\mu\text{V/m]} \text{ (35.69 } \mu\text{V/m)}$$

### Equipment table:

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2920A04466	300000580	ne	-/-	-/-
3	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	26.01.2015	26.01.2016
4	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
5	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
6	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
7	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016

## 7.2 Shielded fully anechoic chamber



$$FS = UR + CA + AF$$

(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

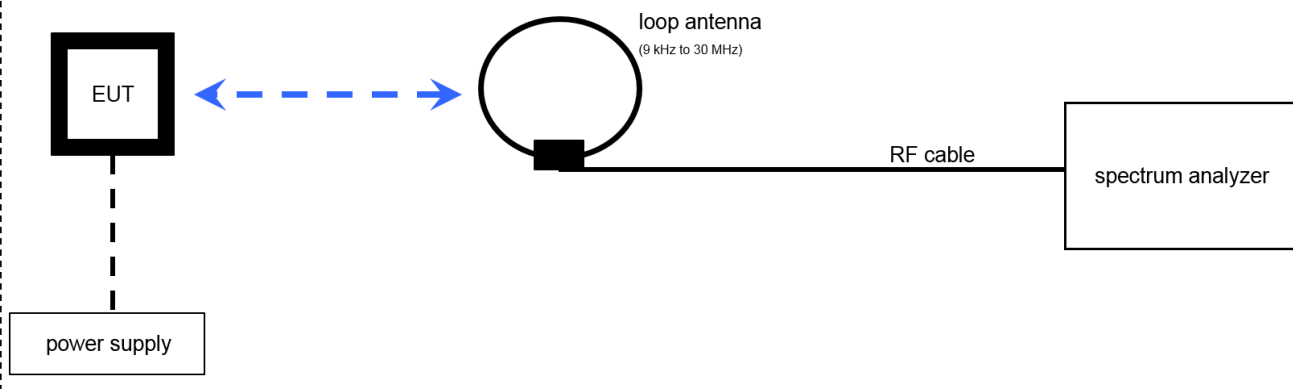
### Example calculation:

$$FS [dB\mu V/m] = 40.0 [dB\mu V/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dB\mu V/m] (71.61 \mu V/m)$$

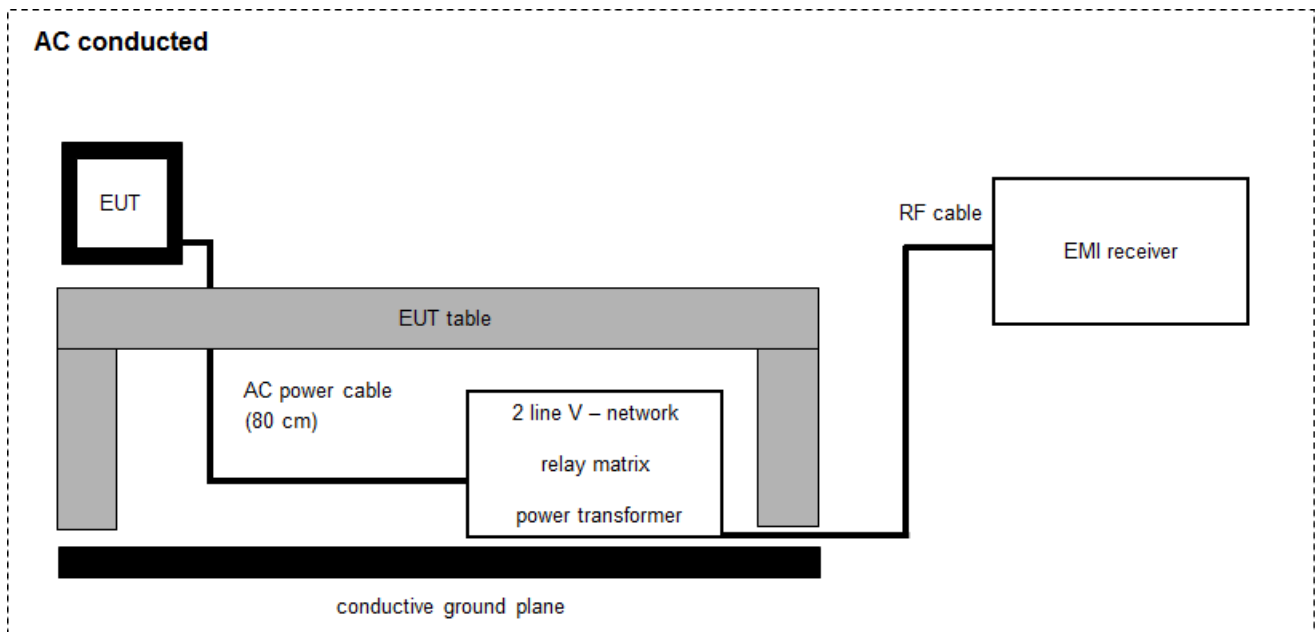
### Equipment table:

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2818A03450	300001040	Ve	20.01.2015	20.01.2018
2	A	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
3	A	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
4	A	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	24.06.2015	24.06.2017
5	A	MXE EMI Receiver 20 Hz to 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	06.03.2015	06.03.2016
6	A	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-



**7.3 Radiated measurements RF Laboratory****Radiated measurements RF laboratory****Equipment table:**

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	EMI Test Receiver 9 kHz - 3 GHz incl. Preselector	ESPI3	R&S	101713	300004059	k	23.01.2015	23.01.2016
2	A	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO/2	8905-2342	300000256	k	24.06.2015	24.06.2017
3	A	RF Cable BNC	RG58	Huber & Suhner		400001209	ev	-/-	-/-
4	A	Radiocom. Analyzer	CMTA 84	R&S	894199/012	300001176	vIKI!	29.01.2014	29.01.2016

**7.4 AC conducted****AC conducted**

$$FS = UR + CF + VC$$

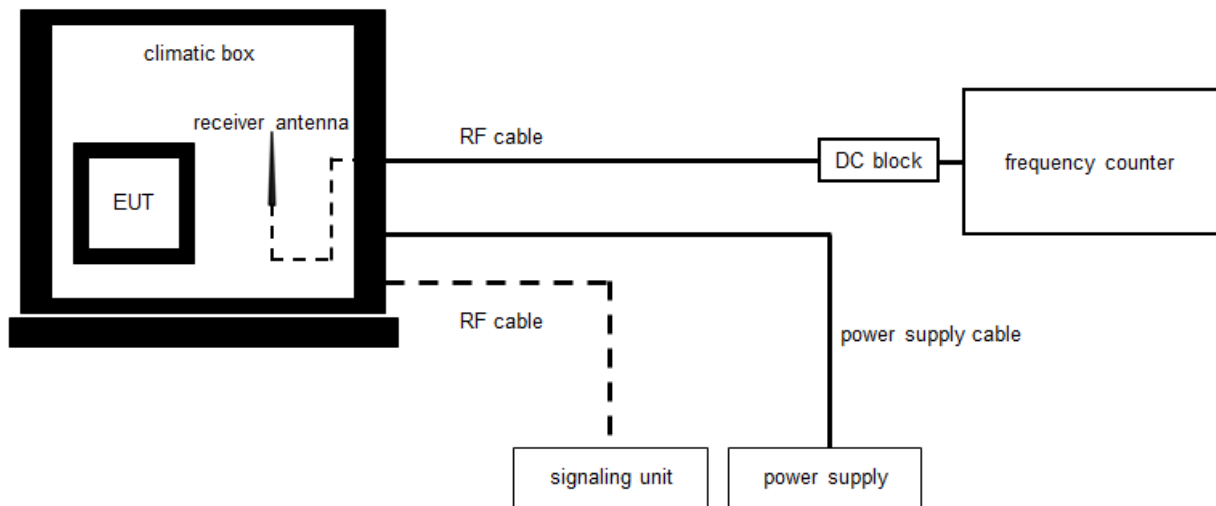
(FS-field strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

Example calculation:

$$FS [dB\mu V/m] = 37.62 [dB\mu V/m] + 9.90 [dB] + 0.23 [dB] = 47.75 [dB\mu V/m] (244.06 \mu V/m)$$

**Equipment table:**

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Netznachbildung	ESH3-Z5	R&S	892475/017	300002209	k	17.06.2014	17.06.2016
2	A	EMI-Receiver	8542E	HP	3617A00170	300000568	k	28.01.2015	28.01.2016
3	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	Ve	11.02.2014	11.02.2016

**7.5 Relative measurements normal and extreme conditions****frequency error****Equipment table:**

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	EMI Test Receiver 9 kHz - 3 GHz incl. Preselector	ESPI3	R&S	101713	300004059	k	23.01.2015	23.01.2016
2	A	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO/2	8905-2342	300000256	k	24.06.2015	24.06.2017
3	A	RF Cable BNC	RG58	Huber & Suhner		400001209	ev	-/-	-/-
4	A	Radiocom. Analyzer	CMTA 84	R&S	894199/012	300001176	vIKI!	29.01.2014	29.01.2016

**8 Measurement uncertainty**

Measurement uncertainty	
Test case	Uncertainty
Antenna gain	± 3 dB
Spectrum bandwidth	± 21.5 kHz absolute; ± 15.0 kHz relative
Maximum output power	± 1 dB
Detailed conducted spurious emissions @ the band edge	± 1 dB
Band edge compliance radiated	± 3 dB
Spurious emissions conducted	± 3 dB
Spurious emissions radiated below 30 MHz	± 3 dB
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB
Spurious emissions radiated above 12.75 GHz	± 4.5 dB
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB

## **9 Sequence of testing**

### **9.1 Sequence of testing 9 kHz to 30 MHz**

#### **Setup**

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter (see ANSI C 63.4) – see each test details
- The EUT was set into operation.

#### **Premeasurement**

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.5 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

#### **Final measurement**

- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axis (0° to 360°).
- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK (QPK / see ANSI C 63.4) detector
- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

## 9.2 Sequence of testing 30 MHz to 1 GHz

### Setup

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 10 or 3 meter (see ANSI C 63.4) – see each test details
- The EUT was set into operation.
- 

### Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 to 3 meter.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions
- 

### Final measurement

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position ( $\pm 45^\circ$ ) and antenna movement between 1 and 4 meter.
- The final measurement will be done with QP (Quasi-Peak / see ANSI C 63.4) detector with an EMI receiver
- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

## 10 Summary of measurement results

<input checked="" type="checkbox"/>	No deviations from the technical specifications were ascertained
<input type="checkbox"/>	There were deviations from the technical specifications ascertained
<input type="checkbox"/>	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 RSS Gen Issue 4	See table!	2015-12-04	-/-

Test specification clause	Test case	Temperature conditions	Power source conditions	C	NC	NA	NP	Remark
RSS Gen Issue 4	Occupied bandwidth	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.225 (a)	Field strength of the fundamental	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.209 & § 15.225 (b-d)	Field strength of the harmonics and spurious	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.109	Receiver spurious emissions and cabinet radiations	Nominal	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-/-
§15.107 §15.207	Conducted limits	Nominal	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§ 15.225 (a)	Frequency tolerance	Normal & extreme conditions	Normal & extreme conditions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-

**Note:** C = Compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

## 11 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

## 12 Measurement results

### 12.1 Occupied bandwidth

#### Measurement:

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal.

Measurement parameters	
Detector:	Peak
Resolution bandwidth:	1 % – 5 % of the occupied bandwidth
Video bandwidth:	$\geq 3 \times \text{RBW}$
Trace mode:	Max hold
Analyzer function:	99 % power function
Used equipment:	See chapter 7.5 - A
Measurement uncertainty:	See chapter 8

#### Limit:

IC
for RSP-100 test report coversheet only

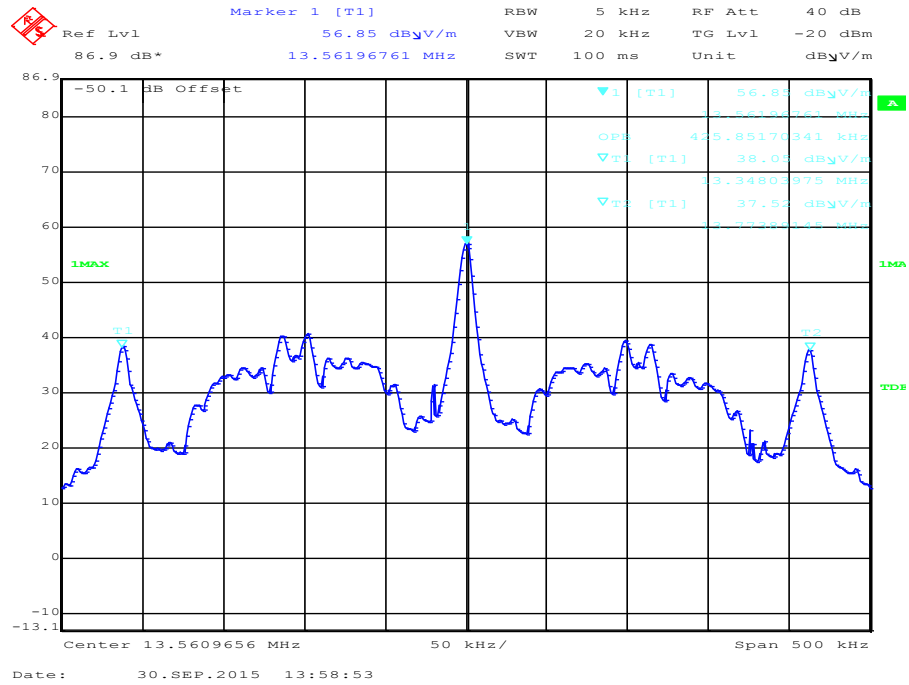
#### Result:

99% emission bandwidth
425.9 kHz



**Plot:**

**Plot 1: 99 % emission bandwidth**



## 12.2 Field strength of the fundamental

### Measurement:

The maximum detected field strength for the carrier signal.

Measurement parameters	
Detector:	Quasi peak / peak (worst case)
Resolution bandwidth:	9 kHz
Video bandwidth:	$\geq 3 \times \text{RBW}$
Trace mode:	Max hold
Used equipment:	See chapter 7.2 – A
Measurement uncertainty:	See chapter 8

### Limit:

FCC & IC		
Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Measurement distance (m)
13.553 to 13.567	15,848 (84 dB $\mu\text{V/m}$ )	30

### Recalculation:

According to ANSI C63.10		
Frequency	Formula	Correction value
13.56 MHz	$\text{FS}_{\text{limit}} = \text{FS}_{\text{max}} - 40 \log\left(\frac{d_{\text{nearfield}}}{d_{\text{measure}}}\right) - 20 \log\left(\frac{d_{\text{limit}}}{d_{\text{nearfield}}}\right)$	-21.39

According to ANSI C63.10
--------------------------

### Result: (worst case)

Field strength of the fundamental		
Frequency	13.56 MHz	
Distance	@ 3 m	@ 30 m
Measured / calculated value YOMANI ML	78.4 dB $\mu\text{V/m}$	57.0 dB $\mu\text{V/m}$
Measured / calculated value YOMANI TS XR	78.6 dB $\mu\text{V/m}$	57.2 dB $\mu\text{V/m}$

### 12.3 Field strength of the harmonics and spurious

#### Measurement:

The maximum detected field strength for the harmonics and spurious.

Measurement parameters	
Detector:	Quasi peak / average or peak (worst case – pre-scan)
Resolution bandwidth:	F < 150 kHz: 200 Hz 150 kHz < F < 30 MHz: 9 kHz 30 MHz < F < 1 GHz: 120 kHz
Video bandwidth:	F < 150 kHz: 1 kHz 150 kHz < F < 30 MHz: 100 kHz 30 MHz < F < 1 GHz: 300 kHz
Trace mode:	Max hold
Used equipment:	See chapter 7.1, 7.2, 7.3 (A)
Measurement uncertainty:	See chapter 8

#### Limit:

FCC & IC		
Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30 (29.5 dBμV/m)	30
30 – 88	100 (40 dBμV/m)	3
88 – 216	150 (43.5 dBμV/m)	3
216 – 960	200 (46 dBμV/m)	3

**Note:** For a reduced measurement distance, please take a look at the limit line and the ANSI C63.10-2013 sub clause 6.4 radiated emissions from unlicensed wireless devices below 30 MHz.

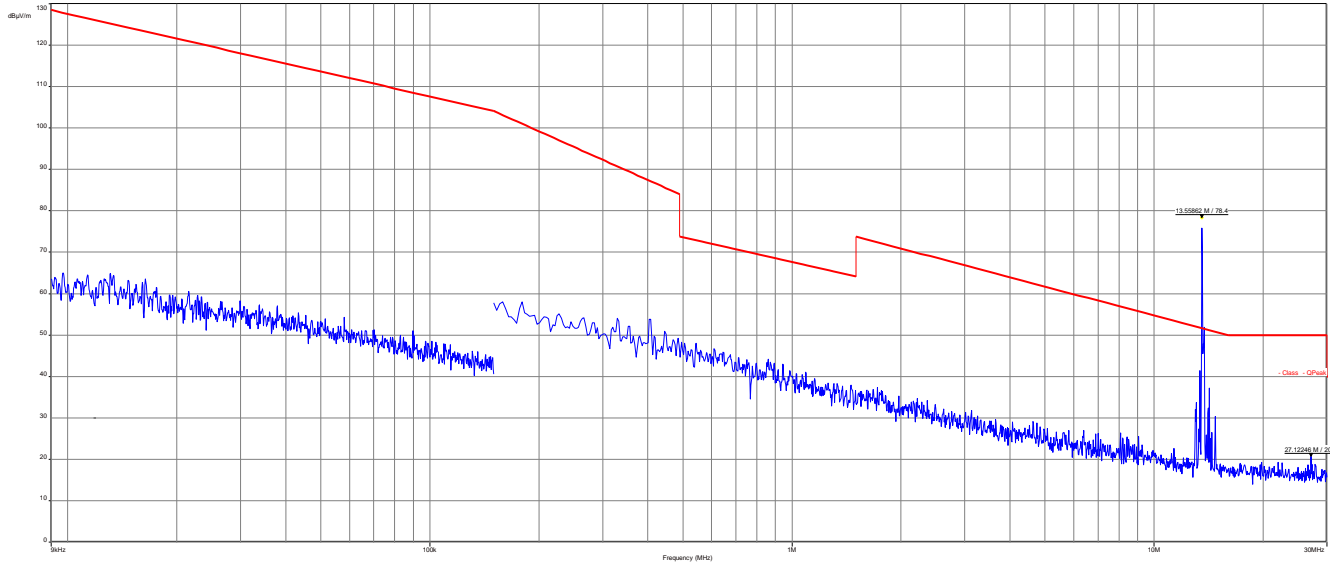
#### Result:

Detected emissions			
Frequency (MHz)	Detector	Resolution bandwidth (kHz)	Detected value
27.12	QP	9 kHz	20.7 dBμV/m @ 3m

**Plots:**

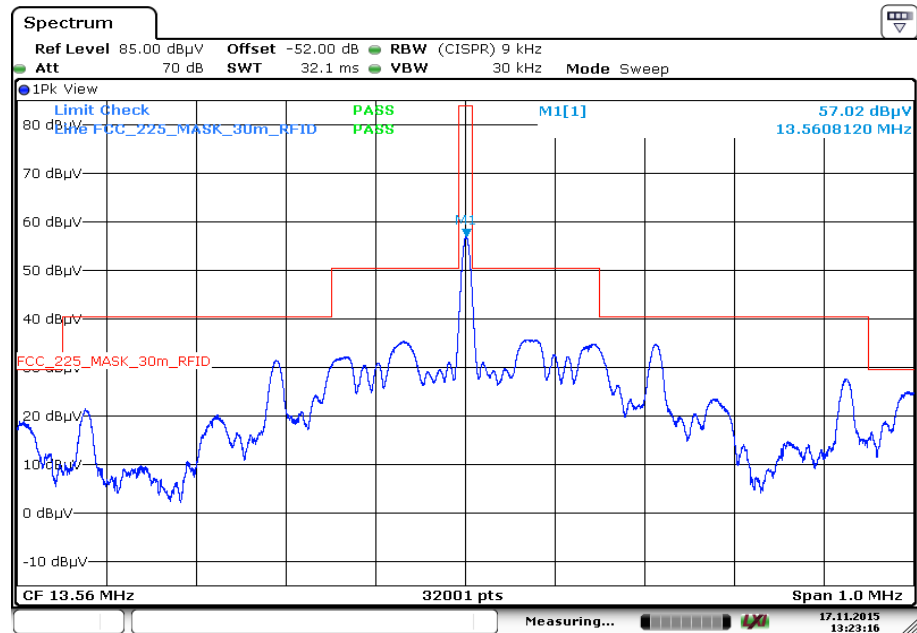
YOMANI ML

**Plot 1:** 9 kHz – 30 MHz, magnetic emissions



YOMANI ML

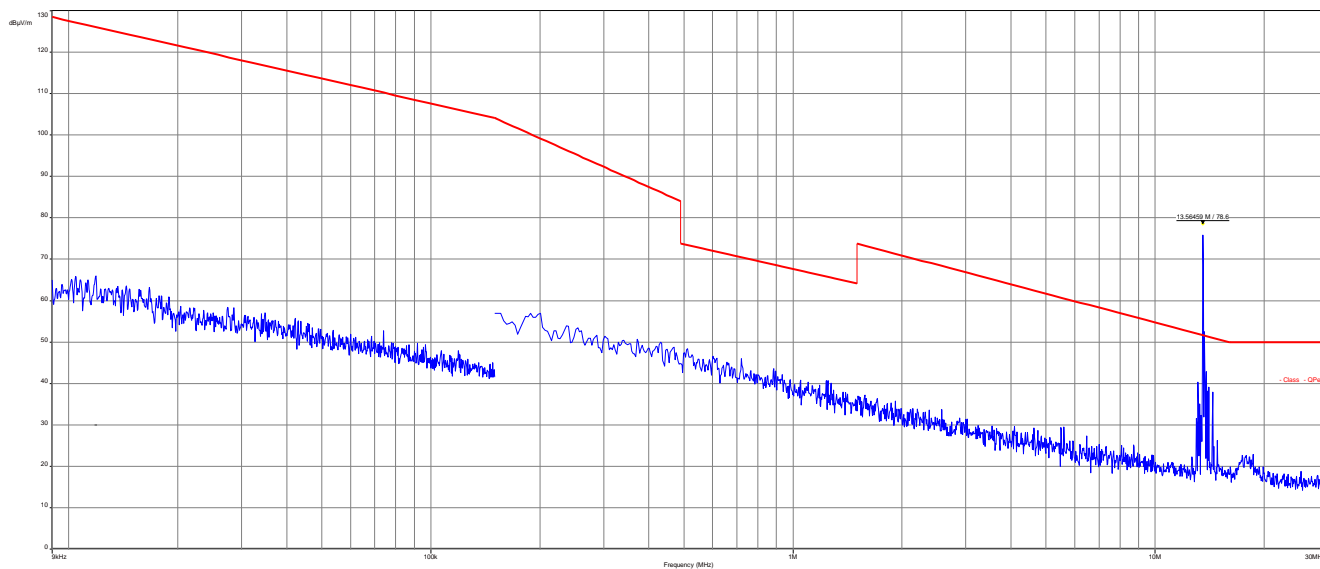
Plot 2: Spectrum mask



Date: 17.NOV.2015 13:23:16

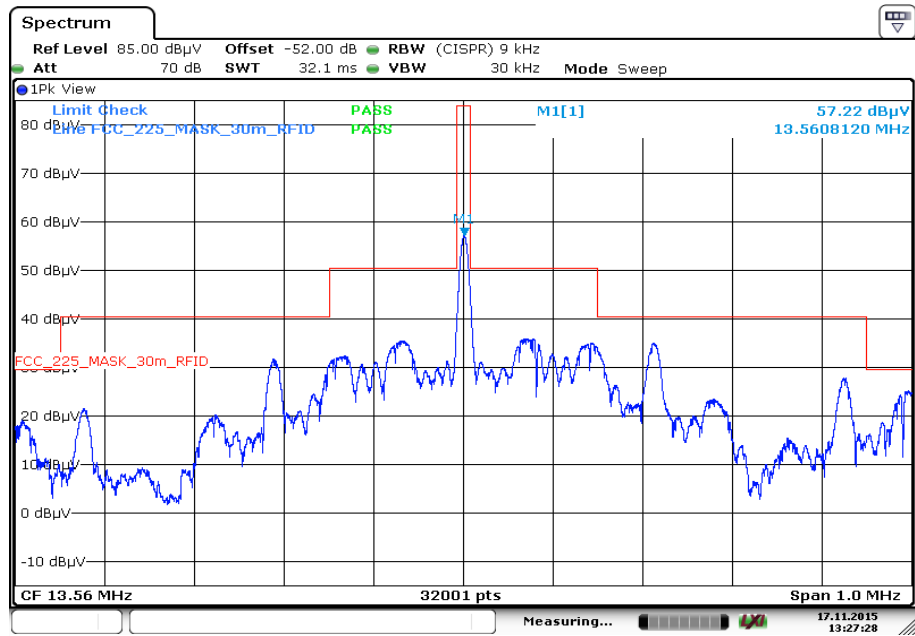
YOMANI TS XR

**Plot 3:** 9 kHz – 30 MHz, magnetic emissions



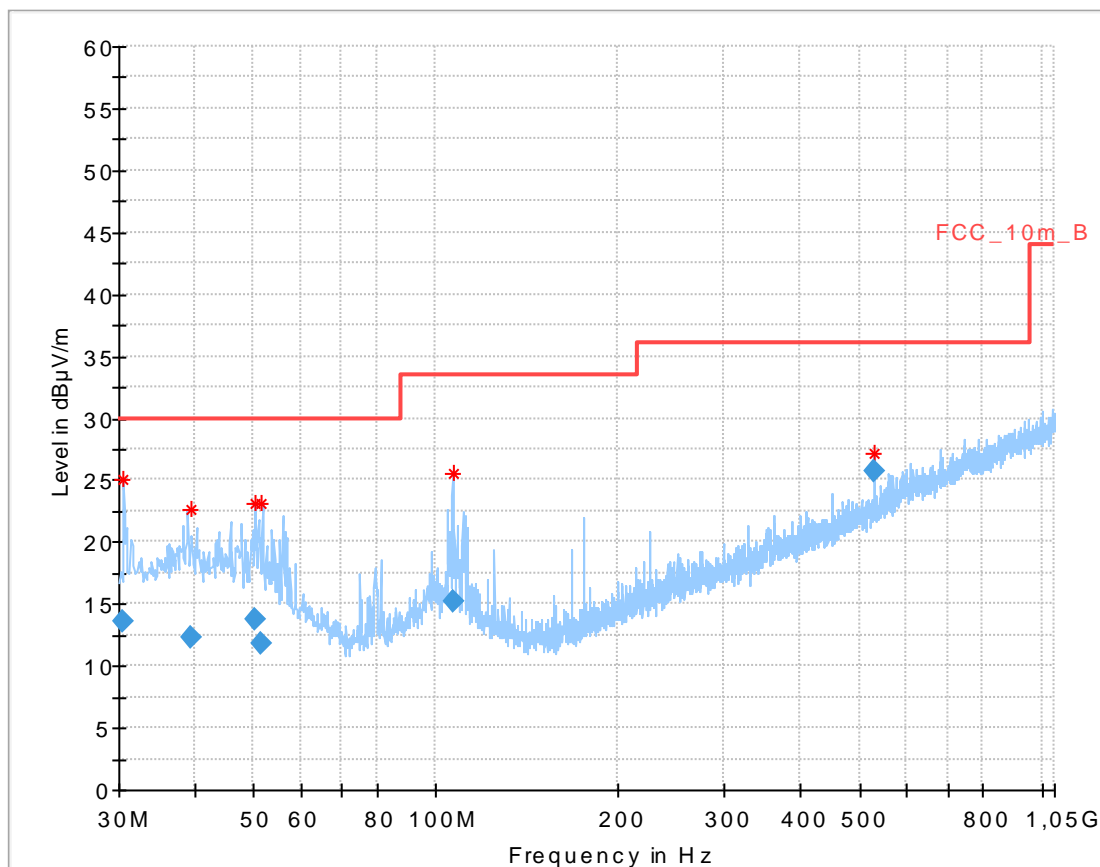
YOMANI TS XR

Plot 4: Spectrum mask



Date: 17.NOV.2015 13:27:28

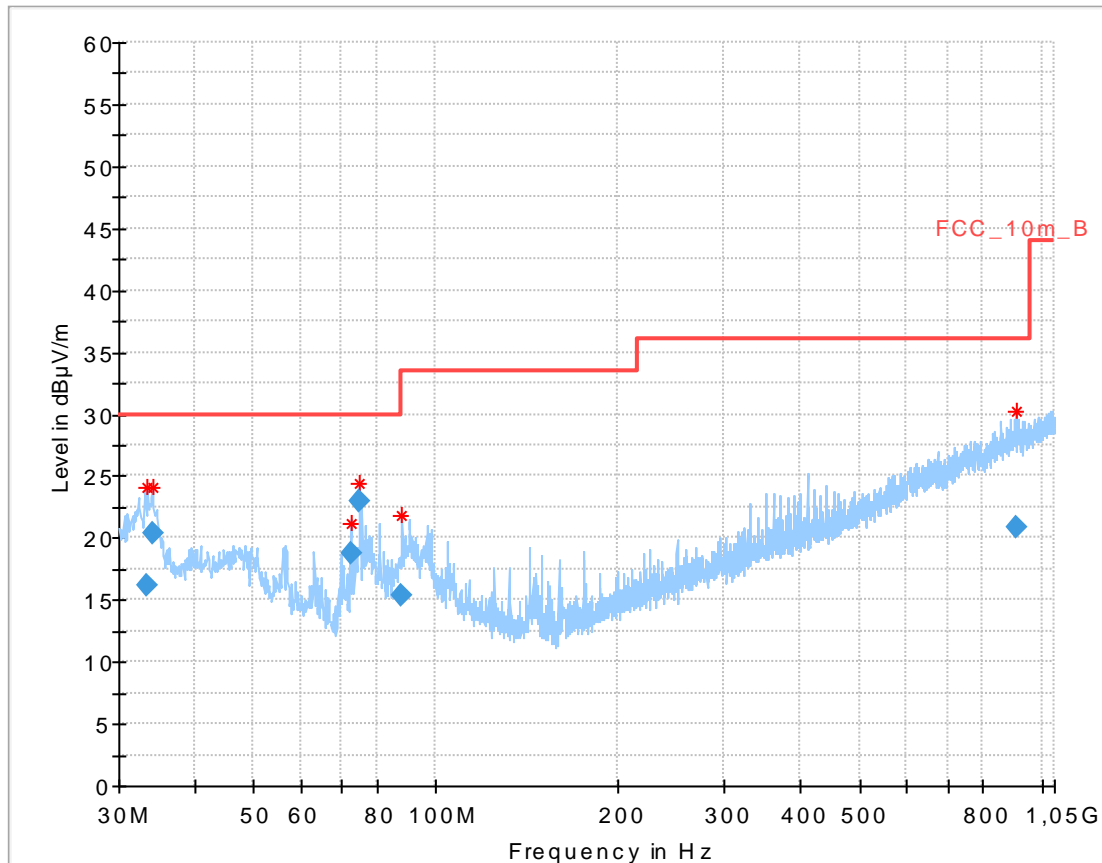
YOMANI ML

**Plot 5:** 30 MHz – 1 GHz, vertical and horizontal polarization**Final\_Result:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.569152	13.63	30.00	16.37	1000.0	120.000	172.0	V	144	13.4
39.469950	12.29	30.00	17.71	1000.0	120.000	103.0	V	162	14.0
50.418600	13.69	30.00	16.31	1000.0	120.000	98.0	V	85	12.6
51.337950	11.74	30.00	18.26	1000.0	120.000	98.0	V	162	12.4
106.773000	15.14	33.50	18.36	1000.0	120.000	101.0	V	162	11.5
528.014700	25.78	36.00	10.22	1000.0	120.000	101.0	V	251	19.0



YOMANI TS XR

**Plot 6:** 30 MHz – 1 GHz, vertical and horizontal polarisation**Final\_Result:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.346800	16.24	30.00	13.76	1000.0	120.000	174.0	V	1	13.6
34.100250	20.36	30.00	9.64	1000.0	120.000	105.0	V	72	13.7
72.460050	18.74	30.00	11.26	1000.0	120.000	272.0	V	40	8.3
75.019800	22.95	30.00	7.05	1000.0	120.000	400.0	V	-50	8.2
88.064250	15.35	33.50	18.15	1000.0	120.000	275.0	V	320	10.0
905.432250	20.85	36.00	15.15	1000.0	120.000	400.0	V	252	24.1

## 12.4 Conducted limits

### Measurement:

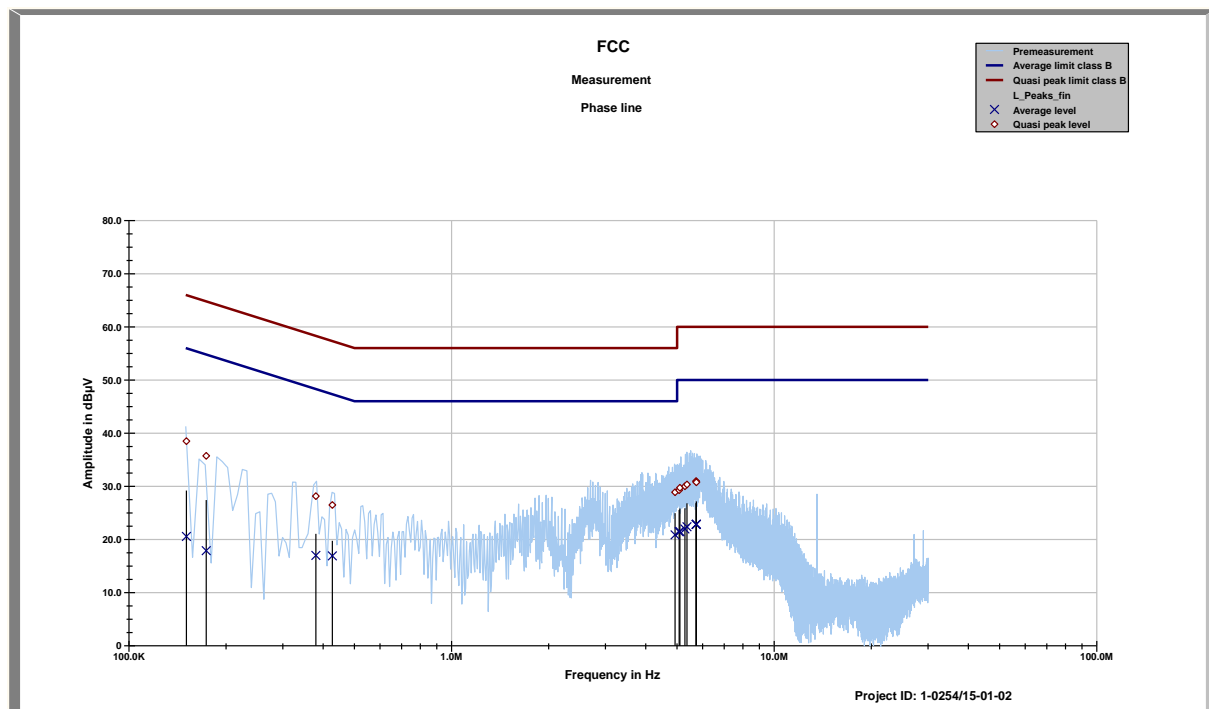
Measurement of the conducted spurious emissions for an intentional radiator that is designed to be connected to the public utility (AC) power line.

Measurement parameters	
Detector:	Quasi peak / average or peak (worst case – pre-scan)
Resolution bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Video bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Trace mode:	Max hold
Used equipment:	See chapter 7.4 - A
Measurement uncertainty:	See chapter 8

### Limit:

FCC & IC		
Frequency (MHz)	Quasi-peak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

**Plots:** YOMANI ML (measurements made during another project, therefore the project ID is different)



FCC

Phase line tbl

Project ID: 1-0254/15-01-02

09:01:32 AM, Wednesday, September 30, 2015

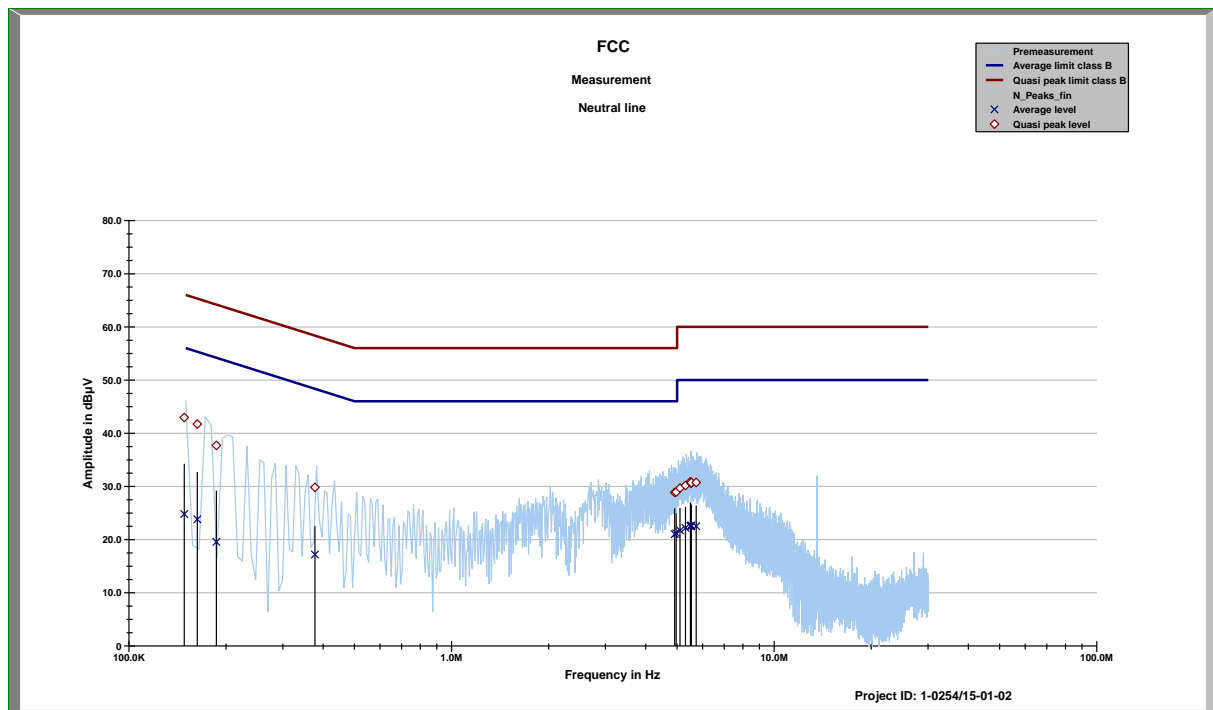
Frequency MHz	Quasi peak level dBμV	Margin quasi peak dBμV	Average level dBμV	Margin average dBμV
0.15071	38.49	27.47	20.57	35.41
0.17356	35.72	29.07	17.88	37.45
0.37966	28.14	30.15	16.99	32.45
0.42703	26.49	30.82	16.91	31.18
4.9282	28.88	27.12	20.86	25.14
5.0732	29.26	30.74	21.44	28.56
5.101	29.72	30.28	21.48	28.52
5.2843	30.00	30.00	21.97	28.03
5.3637	30.34	29.66	22.38	27.62
5.7263	30.99	29.01	22.80	27.20
5.7309	30.86	29.14	22.86	27.14
5.7371	30.75	29.25	22.86	27.14

Project ID - 1-0254/15-01-02

EUT - YOMANI ML

Serial Number - BHV2847

Operating mode - NFC on, NFC antenna terminated



FCC  
Neutral line tbl

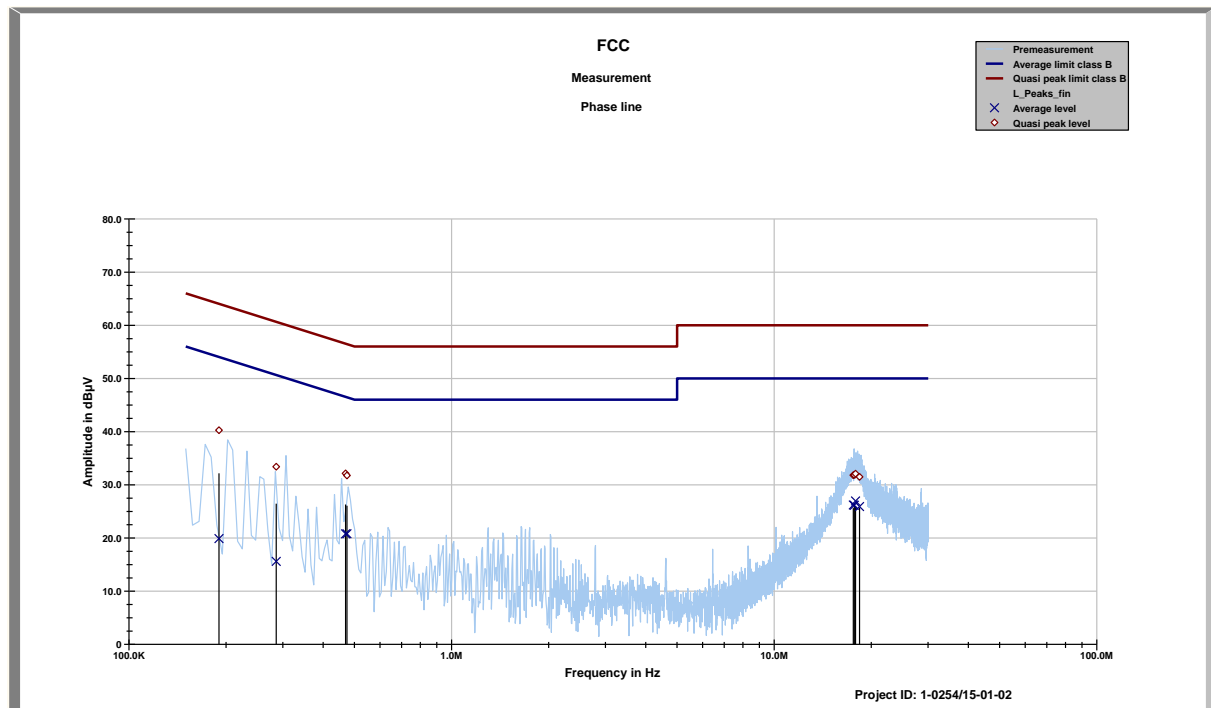
Project ID: 1-0254/15-01-02

09:01:32 AM, Wednesday, September 30, 2015

Frequency MHz	Quasi peak level dBµV	Margin quasi peak dBµV	Average level dBµV	Margin average dBµV
0.14842	42.96	NAN	24.80	NAN
0.16293	41.72	23.60	23.80	31.83
0.18666	37.70	26.49	19.57	35.39
0.37722	29.82	28.52	17.18	32.33
4.913	28.86	27.14	21.02	24.98
4.9673	28.93	27.07	21.20	24.80
5.1038	29.69	30.31	21.73	28.27
5.3056	30.17	29.83	22.20	27.80
5.4984	30.88	29.12	22.54	27.46
5.5275	30.56	29.44	22.49	27.51
5.5294	30.73	29.27	22.68	27.32
5.7297	30.74	29.26	22.53	27.47

Project ID - 1-0254/15-01-02  
EUT - YOMANI ML  
Serial Number - BHV2847  
Operating mode - NFC on, NFC antenna terminated

**Plots:** YOMANI TS XR, (measurements made during another project, therefore the project ID is different)



FCC

Phase line tbl

Project ID: 1-0254/15-01-02

08:33:01 AM, Wednesday, September 30, 2015

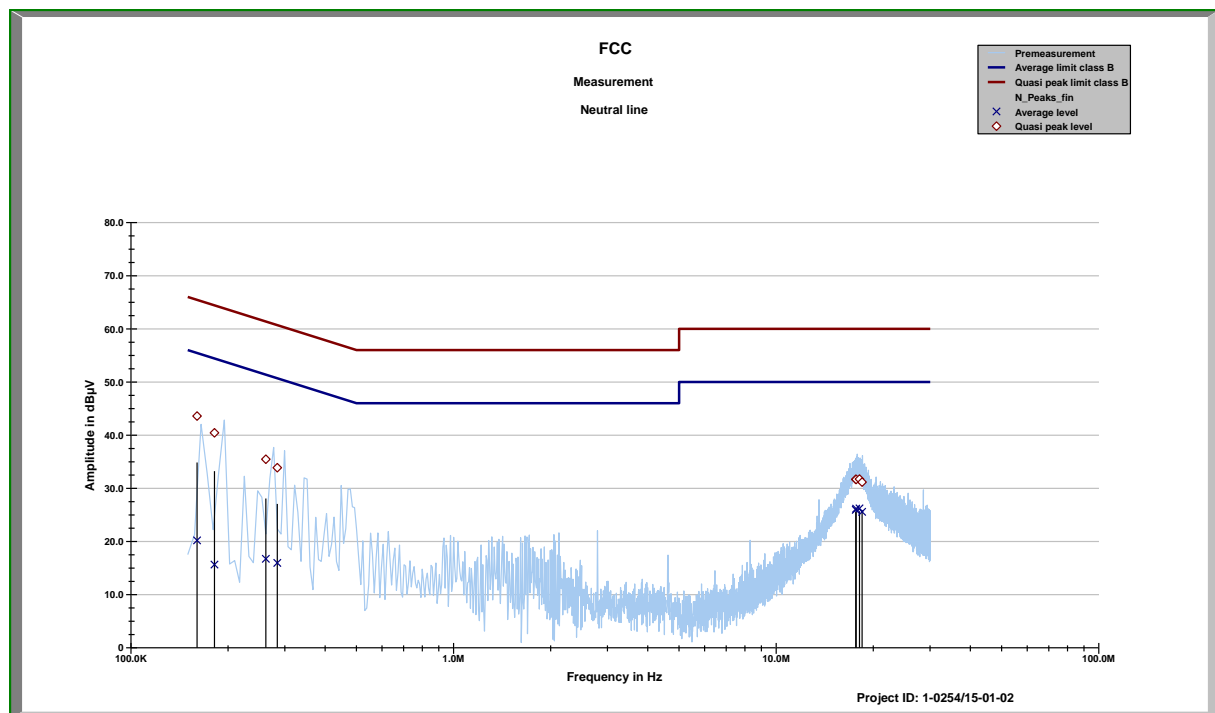
Frequency MHz	Quasi peak level dBµV	Margin quasi peak dBµV	Average level dBµV	Margin average dBµV
0.19019	40.27	23.76	19.89	34.96
0.28609	33.40	27.24	15.59	36.52
0.46939	32.13	24.39	20.77	26.11
0.47408	31.76	24.68	20.80	25.94
17.572	31.80	28.20	26.20	23.80
17.705	31.87	28.13	26.15	23.85
17.856	32.08	27.92	26.96	23.04
18.379	31.49	28.51	25.91	24.09

Project ID - 1-0254/15-01-02

EUT - YOMANI touch XR

Serial Number - BEE8718

Operating mode - NFC on, NFC antenna terminated



FCC  
Neutral line tbl

Project ID: 1-0254/15-01-02

08:33:01 AM, Wednesday, September 30, 2015

Frequency MHz	Quasi peak level dBμV	Margin quasi peak dBμV	Average level dBμV	Margin average dBμV
0.16026	43.59	21.86	20.20	35.50
0.18152	40.44	23.97	15.64	39.46
0.26195	35.46	25.91	16.73	36.08
0.28418	33.87	26.83	15.96	36.21
17.637	31.68	28.32	25.94	24.06
17.684	31.67	28.33	26.17	23.83
18.11	31.73	28.27	26.23	23.77
18.448	31.16	28.84	25.58	24.42

Project ID - 1-0254/15-01-02  
 EUT - YOMANI touch XR  
 Serial Number - BEE8718  
 Operating mode - NFC on, NFC antenna terminated

## 12.5 Frequency error

### Measurement:

The maximum detected field strength for the spurious.

Measurement parameters	
Detector:	Peak detector
Resolution bandwidth:	10 Hz
Video bandwidth:	> RBW
Trace mode:	Max hold
Used equipment:	See chapter 7.5
Measurement uncertainty:	See chapter 8

### Limit:

FCC
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. ( $\pm 1.356$ kHz)

### Result: Temperature variation

Frequency tolerance		
Measured frequency (MHz)	Conditions	Result
13.559935	-20 °C & 100% voltage	compliant
13.559943	-10 °C & 100% voltage	compliant
13.559951	0 °C & 100% voltage	compliant
13.559951	+10 °C & 100% voltage	compliant
13.559935	+20 °C & 100% voltage	compliant
13.559919	+30 °C & 100% voltage	compliant
13.559896	+40 °C & 100% voltage	compliant
13.559872	+50 °C & 100% voltage	compliant

### Result: Voltage variation

Frequency tolerance		
Measured frequency (MHz)	Temperature	Result
13.559934	+20 °C & 85% voltage	compliant
13.559935	+20 °C & 100% voltage	compliant
13.559935	+20 °C & 115% voltage	compliant

### 13 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	2015-12-04

### 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
PMN		Product marketing name
HMN		Host marketing name
HVIN		Hardware version identification number
FVIN		Firmware version identification number



## Annex C Accreditation Certificate

Front side of certificate



Deutsche Akkreditierungsstelle GmbH

Befähigung gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV  
 Unterzeichnerin 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  
 VoIP und DECT  
 Akustik  
 Funk einschließlich WLAN  
 Short Range Devices (SRD)  
 RFID  
 WLAN und Richtfunk  
 Mobilfunk (GSM / GPRS / UMTS / LTE) 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 bis 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

Date of issue of the certificate

*[Signature]*  
 Dr. Ingrid Dittmann, Vizepräsidentin  
 Akkreditierungsstelle

Back side of certificate

Deutsche Akkreditierungsstelle GmbH

Standort Berlin  
 Spittelmarkt 10  
 10117 Berlin

Standort Frankfurt am Main  
 Gartenstraße 6  
 60594 Frankfurt am Main

Standort Braunschweig  
 Bundesallee 100  
 38115 Braunschweig

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 unveränderter Form.

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 die über den durch die DAkkS bestätigten Akkreditierungsbereich hinausgehen.

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 und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung  
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 der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen  
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### Note:

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

<https://www.cetecom.com/en/cetecom-group/europe/germany-saarbruecken/accreditations.html>