

CETECOM™

CETECOM ICT Services
consulting - testing - certification >>>

TEST REPORT

1-4254/12-76-03



Deutsche
Akkreditierungsstelle
D-PL-12076-01-01

Testing Laboratory

CETECOM ICT Services GmbH
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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

Sony Mobile Communications AB
Nya Vattentornet
22188 Lund/SWEDEN
Phone: +46 46 19 30 00
Fax: +46 46 19 32 95
Contact: Håkan Sjöberg
e-mail: hakan.sjoberg@sonymobile.com
Phone: +46 46 19 35 59

Manufacturer

Sony Mobile Communications AB
Nya Vattentornet
22188 Lund/SWEDEN

Test Standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - Gen Issue 3	General Requirements and Information for the Certification of Radiocommunication Equipment

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

Test Item

Kind of test item:	Tablet PC GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/V/VI/XIX; LTE FDD1/19/21; WLAN a/b/g/n; BT 3.1; BT LE; RFID; FM Rx; A-GPS
Model name:	TM-0000-BV
Frequency [MHz]:	GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 UMTS: 826.4 – 846.6 MHz
Technology tested:	GSM / EDGE, UMTS
Antenna:	Integrated antenna
Power Supply:	3.7 V DC by Li-ION battery
Temperature Range:	-30°C to +60 °C

Test report authorised:

2013-01-18 Stefan Bös
Senior Testing Manager

Test performed:

2013-01-18 Andreas Luckenbill
Expert

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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.

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.

The testing service provided by CETECOM ICT Services GmbH has been rendered under the current "General Terms and Conditions for CETECOM ICT Services GmbH".

CETECOM ICT Services GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.

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All rights and remedies regarding vendor's products and services for which CETECOM ICT Services GmbH has prepared this test report shall be provided by the party offering such products or services and not by CETECOM ICT Services GmbH.

In no case this test report can be considered as a Letter of Approval.

2.2 Application details

Date of receipt of order:	2012-12-14
Date of receipt of test item:	2012-12-14
Start of test:	2013-01-02
End of test:	2013-01-10
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 - Gen Issue 3	2010-12	General Requirements and Information for the Certification of Radiocommunication Equipment

4 Test Environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+60 °C during high temperature tests
	T_{min}	-30 °C during low temperature tests
Relative humidity:		42 %
Air pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.7 V DC by Li-ION battery
	V_{max}	4.4 V
	V_{min}	3.3 V

5 Test item

Kind of test item	:	Tablet PC GPRS/EGPRS 850/900/1800/1900; UMTS HSPA FDDI/V/VI/XIX; LTE FDD1/19/21; WLAN a/b/g/n; BT 3.1; BT LE; RFID; FM Rx; A-GPS
Type identification	:	TM-0000-BV
S/N serial number	:	Rad. CB5A1MD9BX, CB5A1MD9BK Cond. CB5A1MD998, CB5A1MD998H
HW hardware status	:	AP
SW software status	:	10.1.E.0.61
Frequency Band [MHz]	:	GSM: 824.2 – 848.8 MHz, 1850.2 – 1909.8 UMTS: 826.4 – 846.6 MHz
Type of Modulation	:	GMSK, 8-PSK, QPSK
Antenna	:	Integrated antenna
Power Supply	:	3.7 V DC by Li-ION battery
Temperature Range	:	-30 °C to +60 °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 15.107, 15.109 RSS-GEN, Issue 3	passed	2013-02-14	-/-

7.1 Receiver

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

Note:

NA = Not applicable; NP = Not performed

8 Measurement Results

8.1 RX Spurious Emissions Conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to Idle mode. Both power lines, phase and neutral line, are measured. Found peaks are remeasured with average and quasi peak detection to show compliance to the limits.

Measurement:

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

Limits:

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

*Decreases with the logarithm of the frequency

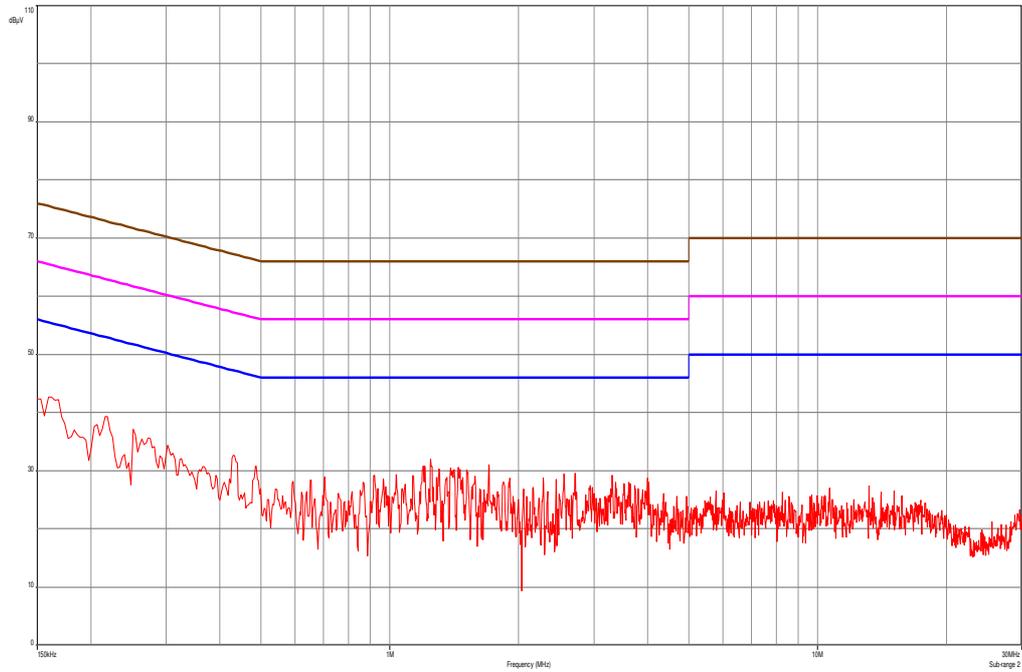
Result: Also see plots

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

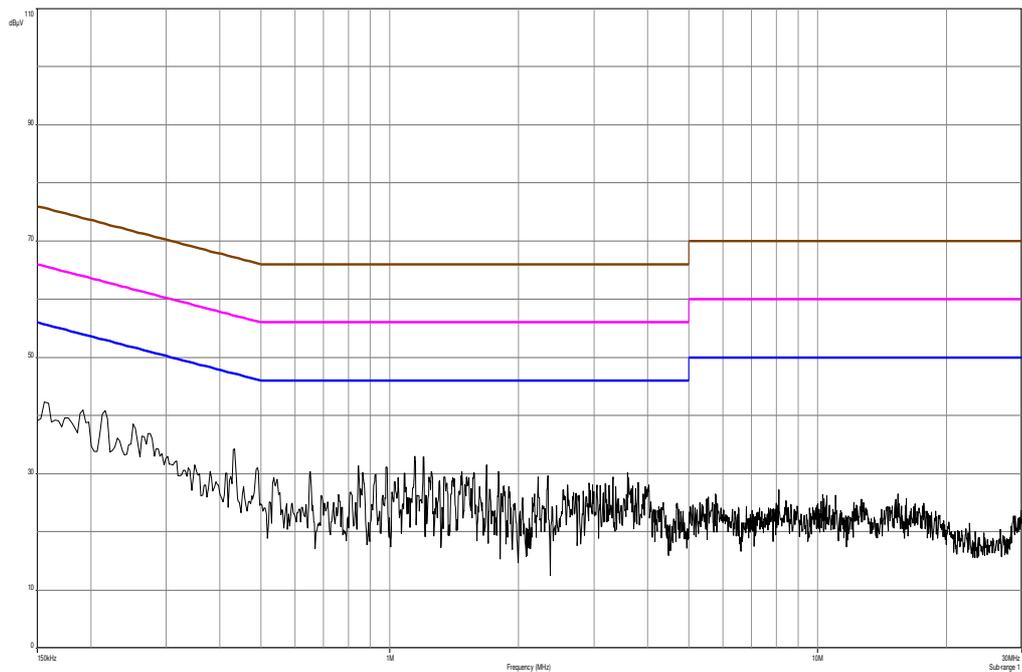
Result: Passed

Plots:

Plot 1: 150 kHz to 30 MHz / Phase Line, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Plot 2: 150 kHz to 30 MHz / Neutral Line, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



8.2 Spurious Emissions Radiated – Receiver Mode

Description:

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

Measurement:

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

Limits:

FCC		IC	
CFR Part 15.109 CFR Part 2.1053		RSS Gen, Issue 3, Section 4.10 ICES-003 Issue 5	
Spurious Emissions Radiated – Receiver Mode			
Frequency (MHz)	Field Strength (dB μ V/m)	Measurement distance (m)	
30 – 88	30.0	10	
88 - 216	33.5	10	
216 – 960	36.0	10	
Above 960	54.0	3	

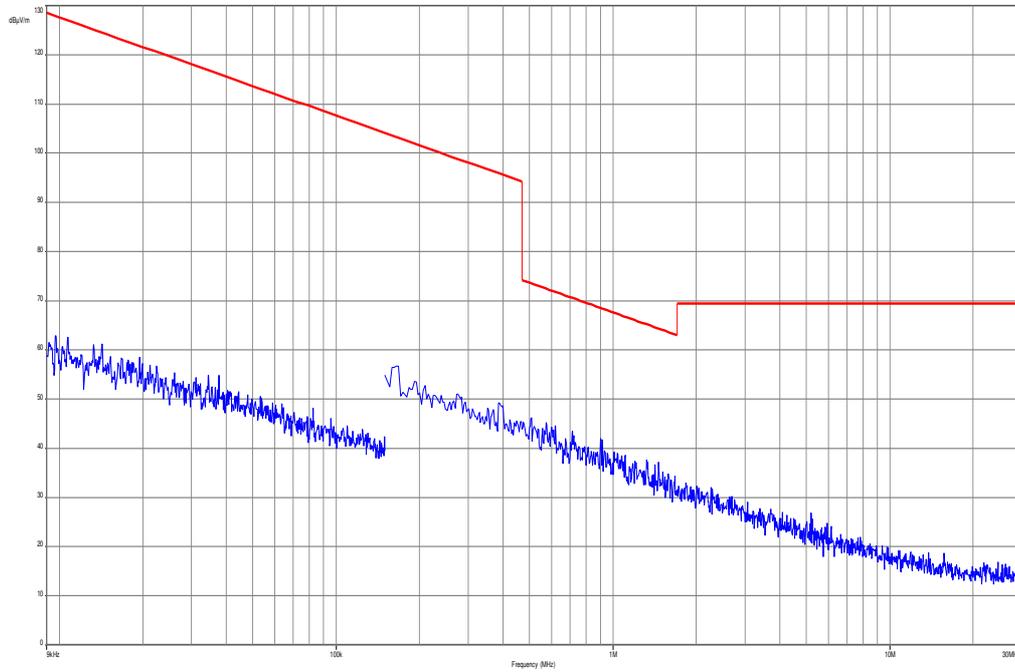
Results:

Spurious Emission Level (dB μ V/m)		
Frequency (MHz)	Detector	Level (dB μ V/m)
No critical peaks detected. All detected peaks are more than 6 dB below the limit!		
Measurement uncertainty		± 3 dB

Result: Passed

Plots:

Plot 1: Receiver mode up to 30 MHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Plot 2: Receiver mode 30 MHz to 1 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card

Common Information

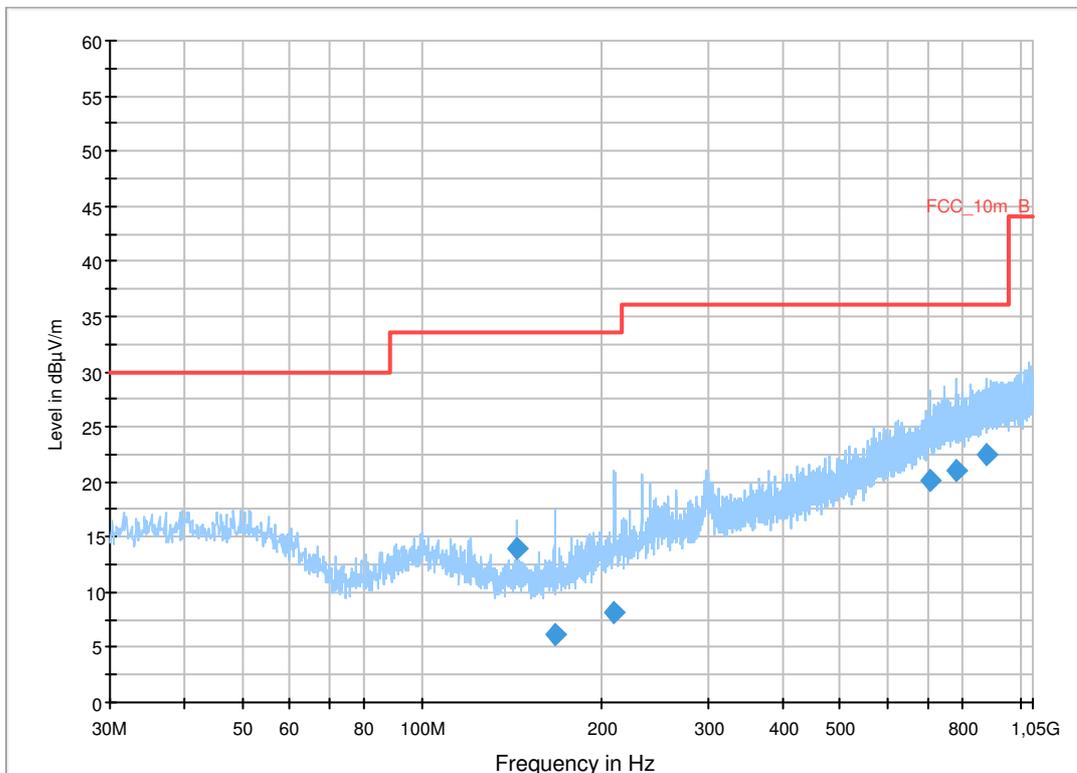
EUT: TM-0000-BV
 Serial Number: CB5A1MD9BX
 Test Description: FCC part 15 B class B @ 10 m
 Operating Conditions: GSM + GPS idle + connected to notebook + charging
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz; directly connected to notebook with SD card and USB memory stick

Scan Setup: STAN_Fin [EMI radiated]

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

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

FCC_10m(B)_3



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
144.008700	14.0	1000.0	120.000	105.0	V	10.0	8.8	19.5	33.5	
166.603950	6.2	1000.0	120.000	170.0	V	180.0	9.6	27.3	33.5	
209.133000	8.1	1000.0	120.000	112.0	V	190.0	12.0	25.4	33.5	
706.462050	20.1	1000.0	120.000	170.0	V	266.0	22.7	15.9	36.0	
783.584850	21.0	1000.0	120.000	120.0	V	190.0	23.8	15.0	36.0	
878.742000	22.4	1000.0	120.000	170.0	H	2.0	24.9	13.6	36.0	

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

Subrange 1

Frequency Range: 30 MHz - 2 GHz

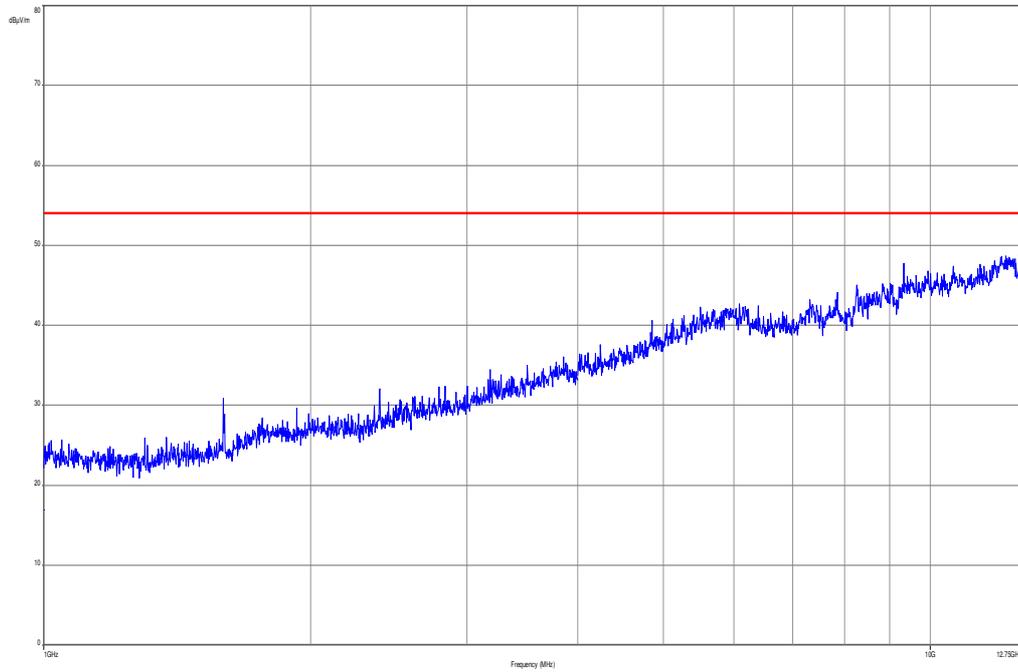
Receiver: Receiver [ESCI 3]
 @ GPIB0 (ADR 20), SN 100083/003, FW 4.42
 Signal Path: without Notch
 FW 1.0

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

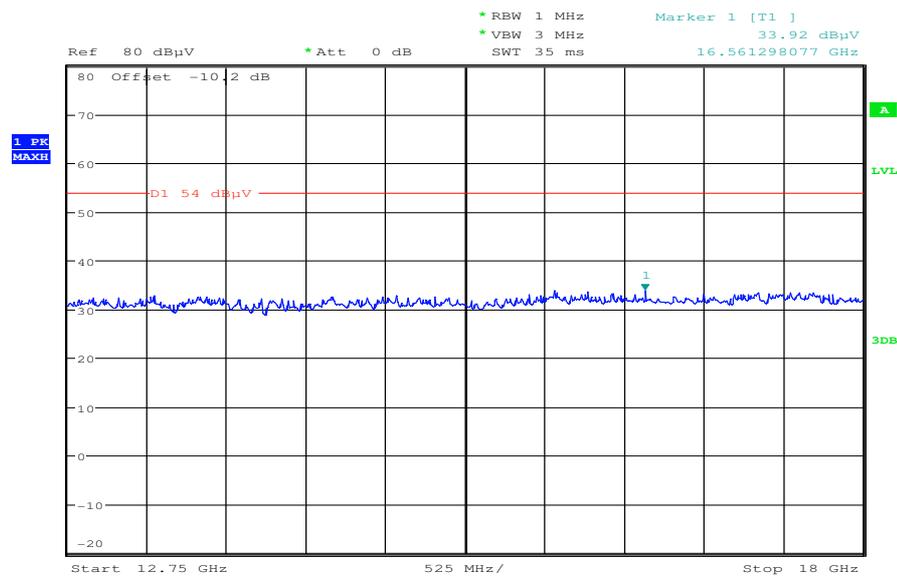
Antenna Tower: Tower [EMCO 2090 Antenna Tower]
 @ GPIB0 (ADR 8), FW REV 3.12

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

Plot 3: Receiver mode 1 GHz to 12.75 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card

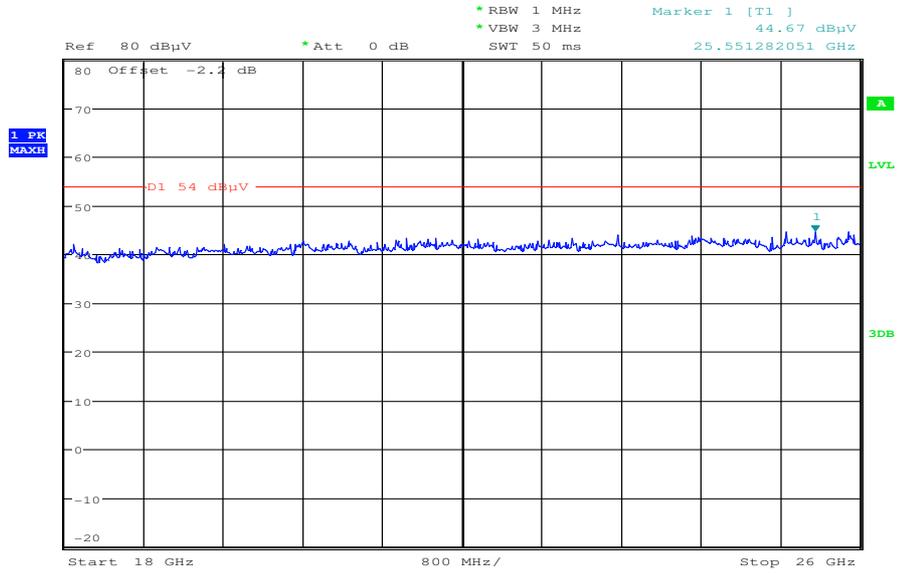


Plot 4: Receiver mode 12.75 GHz to 18 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Date: 11.JAN.2013 13:03:27

Plot 5: Receiver mode 18 GHz to 25 GHz, Mobile connected to a Notebook via USB, serial connection data transfer & Data transfer to connected SD-Card



Date: 11.JAN.2013 13:02:32

9 Test equipment and ancillaries used for tests

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

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

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSIQ26	R&S	835111/0004	300002678	Ve	04.11.2010	
2	n. a.	Universal Communication Tester	CMU200	R&S	832221/072	300003890	ne	04.11.2008	
3	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	11.05.2011	11.05.2013
4	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
5	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
6	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
7	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
8	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
9	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
10	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	14.10.2011	14.10.2014
11	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	19.12.2011	
12	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
13	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2012	06.01.2014
14	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
15	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
16	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
17	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081; B5979	300000210	ne		
18	n. a.	EMI Test Receiver	ESCI 1166.5950.03	R&S	100083	300003312	k	04.01.2012	
19	n. a.	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0205	300003314	k	14.07.2011	14.07.2013
20	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
21	n. a.	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
22	n. a.	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		

23	n. a.	Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
24	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	12.04.2012	12.04.2014
25	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	06.01.2012	06.01.2014

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
vkI!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

10 Observations

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

Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2013-01-18

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
- Shirt 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) Ralf Egner
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.
See annex coverleaf

Deutsche Akkreditierungsstelle GmbH

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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. 2625) 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_Akkredi_Urk_EN17025-En_incl_Annex.pdf