

InterLab[®]

Final Report on GSM Desktop Phone Model GDP-04Ai

Report Reference: MDE_JABLO_0903_FCCb
Test Specification FCC 15b
Date: January 21, 2010

Test Laboratory:

7 layers AG
Borsigstr. 11
40880 Ratingen
Germany



DGA-PL-192/99-02

Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

7 layers AG
Borsigstrasse 11
40880 Ratingen, Germany
Phone: +49 (0) 2102 749 0
Fax: +49 (0) 2102 749 350
www.7Layers.com

Aufsichtsratsvorsitzender •
Chairman of the Supervisory Board:
Markus Becker
Vorstand • Board:
Dr. Hermann Buitkamp
Wilfried Klassmann

Registergericht • registered in:
Düsseldorf, HRB 44096
USt-IdNr • VAT No.:
DE 203159652
TAX No. 147/5869/0385

1 Administrative Data**1.1 Project Data**

Project Responsible: Mr. René Houx
Date Of Test Report: 2010/01/21
Date of first test: 2009/11/27
Date of last test: 2009/12/01

1.2 Applicant Data

Company Name: JabloCOM s.r.o.
Street: V Nivách 12
City: 466 01 Jablonec nad Nisou
Country: Czech Republic
Contact Person: Mr. Ing. Filip Kopriva
Function: Hardware Engineer
Phone: +420 483 559 711
Fax: +420 483 559 713
E-Mail: kopriva@jablocom.com

1.3 Test Laboratory Data

The following list shows all places and laboratories involved for test result generation:

7 layers DE

Company Name : 7 layers AG
Street : Borsigstrasse 11
City : 40880 Ratingen
Country : Germany
Contact Person : Mr. Michael Albert
Phone : +49 2102 749 201
Fax : +49 2102 749 444
E Mail : michael.albert@7Layers.de

Laboratory Details

Lab ID	Identification	Responsible	Accreditation Info
Lab 1	Conducted Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAR-Registration no. DGA-PL-192/99-02
Lab 2	Radiated Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAR-Registration no. DGA-PL-192/99-02

1.4 Signature of the Testing Responsible

Robert Machulec
responsible for tests performed in: Lab 1, Lab 2

1.5 Signature of the Accreditation Responsible



Accreditation scope responsible person
responsible for Lab 1, Lab 2

2 Test Object Data

2.1 General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

OUT: GDP-04Ai

Type / Model / Family:	GSM Desktop Phone Model GDP-04Ai
Product Category:	Others
Manufacturer:	
Company Name:	JabloCOM s.r.o.
Street:	V Nivách 12
City:	466 01 Jablonec nad Nisou
Country:	Czech Republic
Company URL:	http://www.jablocom.com
Contact Person:	Mr. Ing. Filip Kopriva
Function:	Hardware Engineer
Phone:	+420 483 559 711
Fax:	+420 483 559 713
E-Mail:	kopriva@jablocom.com

Ancillary Equipment: AC Adapter UP0121A-06PE

Type / Model / Family:	Accessory Made by UMEC
Product Category:	Others

2.2 Detailed Description of OUT Samples

Sample : a01

<i>OUT Identifier</i>	GDP-04Ai		
<i>Sample Description</i>	sample #01		
<i>Serial No.</i>	356614020036602		
<i>HW Status</i>	XC13003		
<i>SW Status</i>	XC609.2.1.15		
<i>Date of Receipt</i>	2009/11/20		
		<i>Low Temp.</i>	-10 °C
		<i>High Temp.</i>	+55 °C
<i>Nominal Voltage</i>	120 V	<i>Normal Temp.</i>	+23 °C

Sample : b01

<i>OUT Identifier</i>	GDP-04Ai		
<i>Sample Description</i>	sample #02		
<i>Serial No.</i>	356614020036693		
<i>HW Status</i>	XC13003		
<i>SW Status</i>	XC609.2.1.15		
<i>Date of Receipt</i>	2009/11/20		
		<i>Low Temp.</i>	-10 °C
		<i>High Temp.</i>	+55 °C
<i>Nominal Voltage</i>	120 V	<i>Normal Temp.</i>	+23 °C

Sample : AC/DC01

<i>OUT Identifier</i>	AC Adapter UP0121A-06PE
<i>Sample Description</i>	AC/DC Adapter #01
<i>Date of Receipt</i>	2009/11/20

Sample : AC/DC02

<i>OUT Identifier</i>	AC Adapter UP0121A-06PE
<i>Sample Description</i>	AC/DC Adapter #02
<i>Date of Receipt</i>	2009/11/20

2.3 OUT Features

Features for OUT: GDP-04Ai

Designation	Description	Allowed Values	Supported Value(s)
Features for scope: FCC_v2			
AC	The OUT is powered by or connected to AC Mains		
GSM850	EUT supports GSM850 band 824MHz - 849MHz		
Iant	Integral Antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment		
PCS1900	EUT supports PCS1900 band 1850MHz - 1910MHz		

2.4 Auxiliary Equipment

AE No.	Type Designation	Serial No.	HW Status	SW Status	Description
AE Laptop2	IBM lenovo R60 9461-54G	L3-AA471 06/10			laptop IBM
AE ACadap2	lenovo 90W 20V 92P1103	11S92P1103Z1Z BEF7161JH			AC Adapter IBM
AE TFT	LG Flatron L1740BQ	509WANF1W607			TFT display LG
AE Mouse	M-BB48	LZC90505478			Mouse Logitech
AE ACadap1	PA3378E-3AC3	G71C0006R210			AC Adapter Toshiba
AE Key	RS 6000	G 0000273 2P28			Keyboard Cherry
AE Laptop1	TECRA M9	87060248H			Laptop Toshiba

2.5 Operating Mode(s)

Ref. -No.	Description
TCH661	Sample is transmitting on channel 661, TCH, GSM1900

2.6 Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used. The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

Setup No.	List of OUT samples		List of auxiliary equipment	
Sample No.	Sample Description	AE No.	AE Description	
A01ACDC01_FCC15b (set-up for FCC 15b tests with peripheral equipment)				
Sample: AC/DC01	AC/DC Adapter #01	AE TFT	TFT display LG	
Sample: a01	sample #01	AE Mouse	Mouse Logitech	
		AE ACadap1	AC Adapter Toshiba	
		AE Key	Keyboard Cherry	
		AE Laptop1	Laptop Toshiba	
B01ACDC02_FCC15b (set-up for FCC 15b tests with peripheral equipment)				
Sample: AC/DC02	AC/DC Adapter #02	AE Laptop2	laptop IBM	
Sample: b01	sample #02	AE ACadap2	AC Adapter IBM	
		AE TFT	TFT display LG	
		AE Mouse	Mouse Logitech	
		AE Key	Keyboard Cherry	

3 Results

3.1 General

Documentation of tested devices:

Available at the test laboratory.

Interpretation of the test results:

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.

In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation.

3.2 List of the Applicable Body

(Body for Scope: FCC_v2)

Designation	Description
FCC47CFRChIPART15bRADIO FREQUENCY DEVICES	Part 15, Subpart B - Unintentional Radiators

3.3 List of Test Specification

<i>Test Specification:</i>	FCC part 2 and 15
<i>Date / Version</i>	2009/03/26 Version: 10-1-08 Edition
<i>Title:</i>	PART 2 - GENERAL RULES AND REGULATIONS PART 15 - RADIO FREQUENCY DEVICES

3.4 Summary

Test Case Identifier / Name		Lab		
Test (condition)	Result	Date of Test	Ref.	Setup
15b.1 Conducted Emissions (AC Power Line) §15.107				
15b.1; Mode = transmit	Passed	2009/11/27	Lab 1	A01ACDC01_FC C15b
	operating mode: TCH661			
15b.2 Spurious Radiated Emissions §15.109				
15b.2; Mode = transmit	Passed	2009/12/01	Lab 2	B01ACDC02_FC C15b
	operating mode: TCH661			



Reference: MDE_JABLO_0903_FCCb

Test Specification FCC 15b

3.5 Detailed Results

3.5.1 15b.1 Conducted Emissions (AC Power Line) §15.107

Test: 15b.1; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	A01ACDC01_FCC15b
<i>Date of Test:</i>	2009/11/27 6:42
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

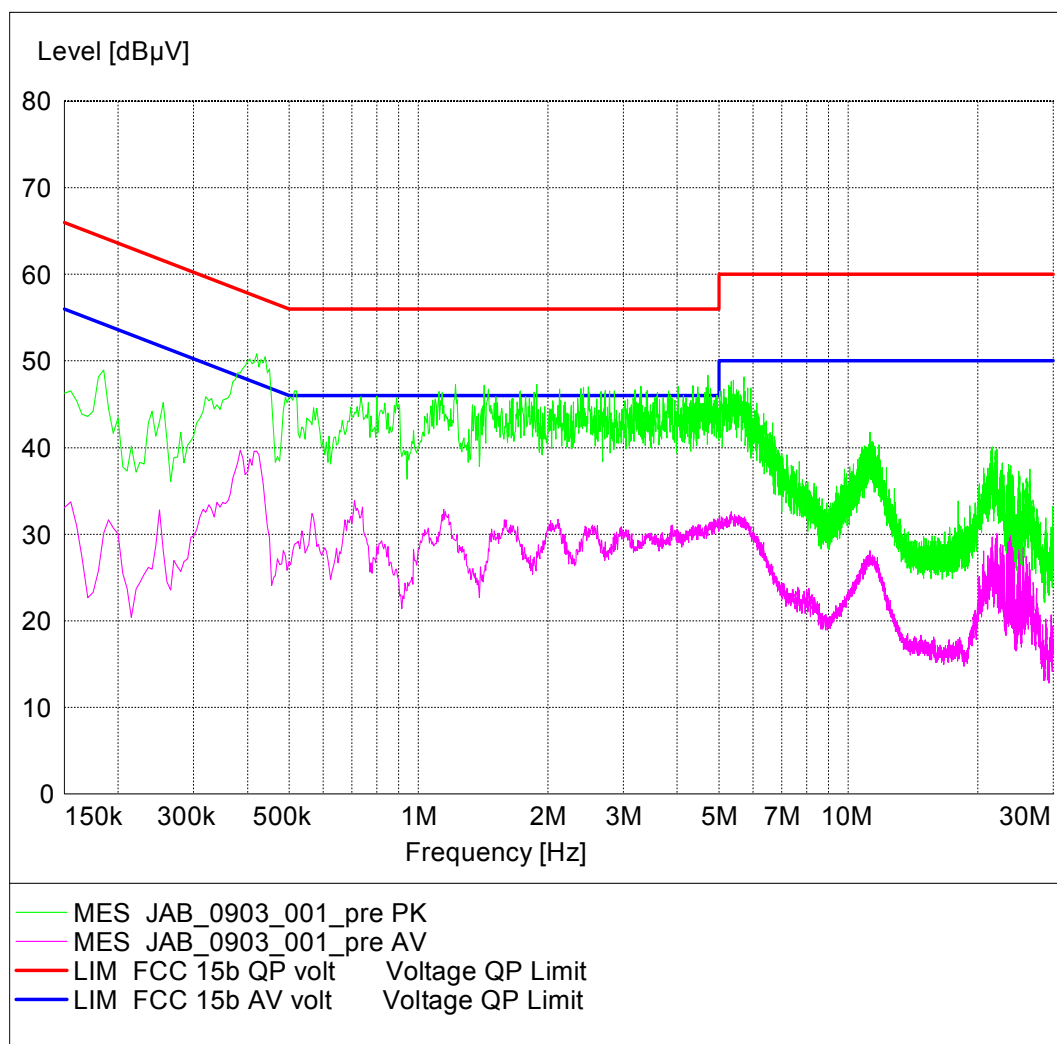
Detailed Results:

AC MAINS CONDUCTED

EUT: GDP-04Ai (EN000A01) / 27.11.2009
 Manufacturer: JabloCOM s.r.o.
 Operating Condition: GSM 1900 TCH 661, USB link to PC
 Test Site: 7 layers Ratingen
 Operator: Mom
 Test Specification: FCC part 15 b (ANSI C63.4; FCC 15.107 / 15.207)
 Comment: 120 V / 60 Hz
 Start of Test: 27.11.2009 / 18:30:45

SCAN TABLE: "FCC Voltage"

Short Description:			FCC Voltage			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	20.0 ms	9 kHz	ESH3-Z5
			Average			



3.5.2 15b.2 Spurious Radiated Emissions §15.109

Test: 15b.2; Mode = transmit

<i>Result:</i>	Passed
<i>Setup No.:</i>	B01ACDC02_FCC15b
<i>Date of Test:</i>	2009/12/01 6:47
<i>Body:</i>	FCC47CFRChIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

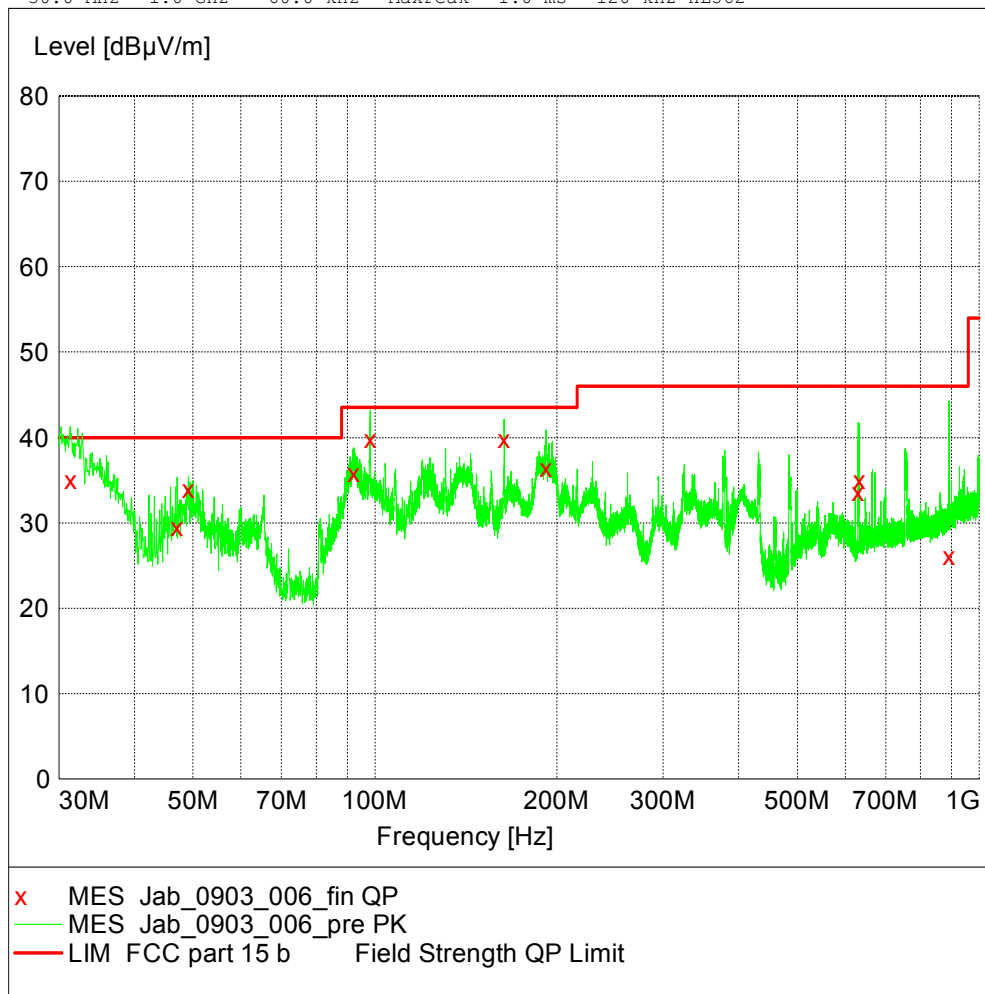
Detailed Results:

EMI RADIATED TEST

EUT: GDP-04Ai (EN000b01)
 Manufacturer: JabloCOM s.r.o.
 Operating Condition: GSM 1900 TCH 661, USB link to PC IBM
 Test Site: 7 layers, Ratingen
 Operator: Pet
 Test Specification: FCC part 15 b
 Comment: Horizontal EUT position, 120 V / 60 Hz
 Start of Test: 01.12.2009 / 16:15:02

SCAN TABLE: "FCC part 15 b"

Short Description: FCC part 15 b
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 30.0 MHz 1.0 GHz 60.0 kHz MaxPeak 1.0 ms 120 kHz HL562



MEASUREMENT RESULT: "Jab_0903_006_fin QP"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
31.320000	35.10	20.1	40.0	4.9	112.0	67.00	VERTICAL
47.040000	29.50	10.9	40.0	10.5	101.0	247.00	VERTICAL
49.080000	33.90	9.6	40.0	6.1	101.0	248.00	VERTICAL
92.280000	35.90	10.3	43.5	7.6	108.0	12.00	VERTICAL
98.160000	39.80	10.5	43.5	3.7	320.0	4.00	HORIZONTAL
163.620000	39.80	9.2	43.5	3.7	100.0	359.00	VERTICAL
191.940000	36.40	9.2	43.5	7.1	117.0	67.00	VERTICAL
630.420000	33.60	22.1	46.0	12.4	105.0	67.00	VERTICAL
633.000000	35.00	22.2	46.0	11.0	108.0	67.00	VERTICAL
891.420000	26.10	27.0	46.0	19.9	400.0	67.00	VERTICAL

4 Test Equipment Details

4.1 List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

Test Equipment Anechoic Chamber

Lab ID:	Lab 2		
Manufacturer:	Frankonia		
Description:	Anechoic Chamber for radiated testing		
Type:	10.58x6.38x6		
	<i>Calibration Details</i>	<i>Last Execution</i>	<i>Next Exec.</i>
	FCC renewal	2006/12/19	2009/12/19
	IC renewal	2009/01/21	2011/01/20
	FCC renewal	2009/01/07	2011/01/06

Single Devices for Anechoic Chamber

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Air compressor	none	-	Atlas Copco
Anechoic Chamber	10.58 x 6.38 x 6	none	Frankonia
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	FCC listing 96716 3m Part15/18		2009/01/07 2011/01/06
	ANSI C64.3 NSA		2009/01/21 2011/01/20
Controller Innco 2000	CO 2000	CO2000/328/124 70406/L	Innco innovative constructions GmbH
EMC camera	CE-CAM/1	-	CE-SYS
EMC camera Nr.2	CCD-400E	0005033	Mitsubishi
Filter ISDN	B84312-C110-E1		Siemens&Matsushita
Filter Universal 1A	BB4312-C30-H3	-	Siemens&Matsushita

Test Equipment Auxiliary Equipment for Conducted emissions

Lab ID:	Lab 1
Manufacturer:	Rohde & Schwarz GmbH & Co.KG
Description:	EMI Conducted Auxiliary Equipment

Single Devices for Auxiliary Equipment for Conducted emissions

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber&Suhner
Coupling-Decoupling- Network	CDN ENY41	100002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2008/03/06 2011/03/05
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz GmbH & Co. KG
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	DKD calibration		2008/10/13 2011/10/12

Test Equipment Auxiliary Equipment for Radiated emissions

Lab ID: **Lab 2**
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Auxiliary Equipment for Radiated emissions

Single Device Name	Type	Serial Number	Manufacturer		
Antenna mast	AS 620 P		HD GmbH		
Biconical dipole	VUBA 9117	9117108	Schwarzbeck		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Standard Calibration		2008/10/27	2013/10/26	
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P	849785	Miteq		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01- 2+W38.01-2	Kabel Kusch		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
Cable "ESI to Horn Antenna"	UFB311A+UFB293C	W18.02- 2+W38.02-2	Rosenberger Micro-Coax		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Standard Calibration		2009/04/16	2012/04/15	
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz GmbH & Co. KG		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Standard Calibration		2009/04/28	2012/04/27	
Dreheinheit	DE 325		HD GmbH		
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	
	Path Calibration		2009/11/16	2010/05/15	
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG		
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>	

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

Single Device Name	Type	Serial Number	Manufacturer	
Loop Antenna	Standard Calibration		2009/05/27	2012/05/26
	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	DKD calibration		2008/10/07	2011/10/06
Pyramidal Horn Antenna 26,5 GHz	3160-09	00083069	EMCO Elektronik GmbH	
Pyramidal Horn Antenna 40 GHz	3160-10	00086675	EMCO Elektronik GmbH	

Test Equipment Auxiliary Test Equipment

Lab ID:	Lab 2
Manufacturer:	see single devices
Description:	Single Devices for various Test Equipment
Type:	various
Serial Number:	none

Single Devices for Auxiliary Test Equipment

Single Device Name	Type	Serial Number	Manufacturer	
AC Power Source	Chroma 6404	64040001304	Chroma ATE INC.	
Broadband Power Divider N (Aux)	1506A / 93459	LM390	Weinschel Associates	
Broadband Power Divider SMA	WA1515	A855	Weinschel Associates	
Digital Multimeter 01 (Multimeter)	Voltcraft M-3860M	IJ096055	Conrad Electronics	
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	Fluke Europe B.V.	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard calibration		2009/10/07	2011/10/06
Digital Oscilloscope [SA2] (Aux)	TDS 784C	B021311	Tektronix GmbH	
Fibre optic link Satellite (Aux)	FO RS232 Link	181-018	Pontis	
Fibre optic link Transceiver (Aux)	FO RS232 Link	182-018	Pontis	
Isolating Transformer	LTS 604	1888	Thalheimer Transformatorenwerke GmbH	
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	Wainwright	
Spectrum Analyser	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	DKD calibration		2008/10/06	2011/10/05

Test Equipment Digital Signalling Devices

Lab ID:

Lab 1, Lab 2

Description:

Signalling equipment for various wireless technologies.

Single Devices for Digital Signalling Devices

Single Device Name	Type	Serial Number	Manufacturer	
Bluetooth Signalling Unit CBT	CBT	100589	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard Calibration		2008/08/14	2011/08/13
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard calibration		2008/10/07	2010/10/06
Digital Radio Test Set	6103E	2359	Racal Instruments, Ltd.	
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard calibration		2009/02/16	2011/02/15
	<i>HW/SW Status</i>		<i>Date of Start</i>	<i>Date of End</i>
	Hardware:		2007/07/16	
	B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B56V14, B68 3v04, PCMCIA, U65V04 Software: K21 4v21, K22 4v21, K23 4v21, K24 4v21, K42 4v21, K43 4v21, K53 4v21, K56 4v22, K57 4v22, K58 4v22, K59 4v22, K61 4v22, K62 4v22, K63 4v22, K64 4v22, K65 4v22, K66 4v22, K67 4v22, K68 4v22, K69 4v22 Firmware: µP1 8v50 02.05.06 ---			
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard calibration		2008/12/01	2011/11/30
	<i>HW/SW Status</i>		<i>Date of Start</i>	<i>Date of End</i>
	HW options:		2007/01/02	
	B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B54V14, B56V14, B68 3v04, B95, PCMCIA, U65V02 SW options: K21 4v11, K22 4v11, K23 4v11, K24 4v11, K27 4v10, K28 4v10, K42 4v11, K43 4v11, K53 4v10, K65 4v10, K66 4v10, K68 4v10, Firmware: µP1 8v40 01.12.05 --- SW: K62, K69		2008/11/03	
Vector Signal Generator	SMU200A	100912	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard calibration		2008/10/28	2011/10/27

Test Equipment Emission measurement devices

Lab ID: Lab 1, Lab 2
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Emission measurement devices

Single Device Name	Type	Serial Number	Manufacturer	
Personal Computer	Dell	30304832059	Dell	
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG	
		Calibration Details	Last Execution	Next Exec.
		Standard Calibration	2007/12/05	2010/12/04
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG	
		Calibration Details	Last Execution	Next Exec.
		Standard Calibration	2007/12/06	2009/12/05

Test Equipment Shielded Room 02

Lab ID: Lab 1
Manufacturer: Frankonia
Description: Shielded Room for conducted testing
Type: 12 qm
Serial Number: none

4.2 Laboratory Environmental Conditions

Laboratory	Date	Temperature	Humidity	Air Pressure
Lab 1	2009/11/27	25 °C	31 %	999 hPa
Lab 2	2009/12/01	24 °C	36 %	1005 hPa

5 Annex

5.1 Additional Information for OUT Description



front view



back view

5.2 Additional Information for Test Plan



setup for the test conducted emissions



setup for the test radiated emissions



Reference: MDE_JABLO_0903_FCCb

Test Specification FCC 15b

5.3 Additional Information for Report

Test Description

Conducted emissions (AC power line)

Standard FCC Part 15, 10-1-08
Subpart B

The test was performed according to: ANSI C 63.4, 2003

Test Description

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003.

The Equipment Under Test (EUT) was setup in a shielded room to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from 50 μ H || 50 Ohm Line Impedance Stabilization Network (LISN). The LISN's unused connections were terminated with 50 Ohm loads.

The measurement procedure consists of two steps. It is implemented into the EMI test software ES-K1 from R&S.

Step 1: Preliminary scan

Intention of this step is, to determine the conducted EMI-profile of the EUT.

EMI receiver settings:

- Detector: Peak - Maxhold
- Frequency range: 150 kHz – 30 MHz
- Frequency steps: 5 kHz
- IF-Bandwidth: 9 kHz
- Measuring time / Frequency step: 20 ms
- Measurement on phase + neutral lines of the power cords

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2: Final measurement

Intention of this step is, to determine the highest emissions with the settings defined in the test specification for the frequencies identified in step 1.

EMI receiver settings:

- Detector: Quasi-Peak
- IF - Bandwidth: 9 kHz
- Measuring time: 1 s / frequency

At each frequency determined in step 1, four measurements are performed in the following combinations:

- 1) Neutral lead - reference ground (PE grounded)
- 2) Phase lead - reference ground (PE grounded)
- 3) Neutral lead - reference ground (PE floating)
- 4) Phase lead - reference ground (PE floating)

The highest value is reported.

Test Requirements / Limits

If not stated within the measurement plot and/or test result, class B limits are applied.

FCC Part 15, Subpart B, §15.107, Class B Limit

Frequency Range (MHz)	QP Limit (dB μ V)	AV Limit (dB μ V)
0.15 – 0.5	66 to 56	56 to 46
0.5 – 5	56	46
5 – 30	60	50

FCC Part 15, Subpart B, §15.107, Class A Limit

Frequency Range (MHz)	QP Limit (dBµV)	AV Limit (dBµV)
0.15 - 0.5	79	66
0.5 - 30	73	60

Used conversion factor: Limit (dBµV) = 20 log (Limit (µV)/1µV).

NOTE: a missing result table in the corresponding test report section means, that no final measurement was performed because no relevant frequencies (peaks) were found in the preliminary scan.

Spurious radiated emissions

Standard FCC Part 15, 10-1-08, Subpart B

The test was performed according to: ANSI C 63.4, 2003

Test Description

Measurement below 1 GHz:

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2003.

The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

The radiated emissions measurements were made in a typical installation configuration.

The measurement procedure is implemented into the EMI test software ES-K1 from R&S.

Step 1: Preliminary scan (test to identify the highest amplitudes relative to the limit)

Intention of this step is, to determine the radiated EMI-profile of the EUT.

Settings for step 1:

- Detector: Peak-Maxhold
- Frequency range: 30 – 1000 MHz
- Frequency steps: 60 kHz
- IF-Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 µs
- Turntable angle range: -180° to 180°
- Turntable step size: 90°
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2:

A further measurement will be performed on the frequencies determined in step 1. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.

Settings for step 2:

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: -180° to 180°
- Turntable step size: 45°
- Height variation range: 1 – 4 m
- Height variation step size: 0.5 m
- Polarisation: horizontal + vertical

After this step the EMI test system has determined the following values for each frequency (of step 1):

- Frequency
- Azimuth value (of turntable)
- Antenna height

The last two values have now the following accuracy:

- Azimuth value (of turntable): 45°
- Antenna height: 0.5 m

Step 3: final measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will be slowly varied by $\pm 22.5^\circ$ around this value. During this action the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position the antenna height is also slowly varied by ± 25 cm around the antenna height determined. During this action the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100ms
- Turntable angle range: -22.5° to $+ 22.5^\circ$ around the determined value
- Height variation range: -0.25m to $+ 0.25\text{m}$ around the determined value

Step 4: Final measurement (with QP detector)

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- Detector: Quasi-Peak(< 1GHz)
- Measured frequencies: in step 3 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

Measurement above 1 GHz:

The following modifications apply to the measurement procedure for the frequency range above 1 GHz:

The measurement distance was reduced to 1 m. The results were extrapolated by the extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements, inverse-linear-distance-squared for the power density measurements). Due to the fact that in this frequency range a double ridged wave guided horn antenna (up to 18 GHz) and a horn antenna (18–25 GHz) are used, the steps 2-4 as described before, are omitted. Step 1 was performed at one height of the receiving antenna only.

Detector: Peak, Average (simultaneously)

RBW = VBW = 1 MHz; above 7 GHz 100 kHz

Test Requirements / Limits

If not stated within the measurement plot and/or test result, class B limits are applied.

FCC Part 15, Subpart B, §15.109, Radiated Emission Limits

Frequency Range (MHz): Class B Limit (dB μ V/m)

Frequency Range (MHz)	Class B Limit (dB μ V/m)
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
above 960	54.0

Frequency Range (MHz)	Class A Limit (dB μ V/m) / @ 3m !
30 – 88	49.5
88 – 216	54.0
216 – 960	56.9
above 960	60.0

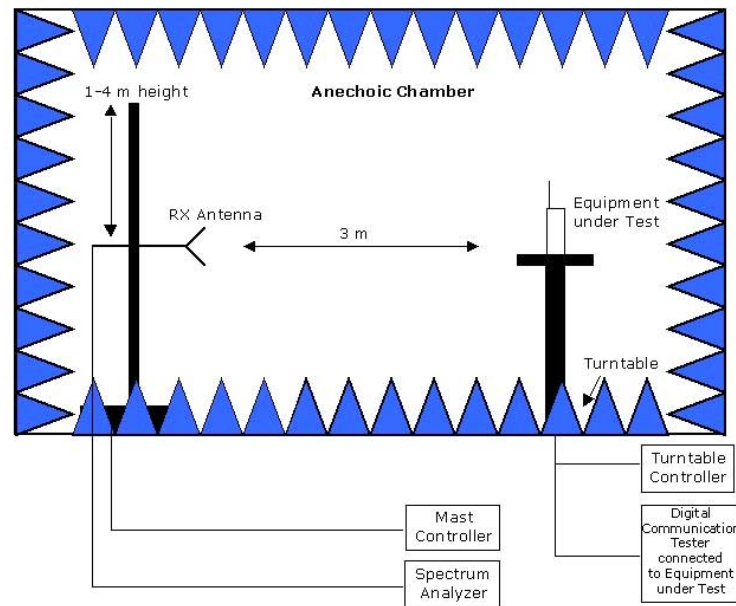
§15.35(b)

..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: Limit (dB μ V/m) = 20 log (Limit (μ V/m)/1 μ V/m)

NOTE: a missing result table in the corresponding test report section means, that no final measurement was performed because no relevant frequencies (peaks) were found in the preliminary scan.

Setup Drawings



Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting ground plane.

6 Index

1	Administrative Data	2
1.1	Project Data	2
1.2	Applicant Data	2
1.3	Test Laboratory Data	2
1.4	Signature of the Testing Responsible	2
1.5	Signature of the Accreditation Responsible	3
2	Test Object Data	3
2.1	General OUT Description	3
2.2	Detailed Description of OUT Samples	4
2.3	OUT Features	5
2.4	Auxiliary Equipment	5
2.5	Operating Mode(s)	5
2.6	Setups used for Testing	6
3	Results	6
3.1	General	6
3.2	List of the Applicable Body	6
3.3	List of Test Specification	7
3.4	Summary	8
3.5	Detailed Results	9
3.5.1	15b.1 Conducted Emissions (AC Power Line) §15.107	9
3.5.2	15b.2 Spurious Radiated Emissions §15.109	11
4	Test Equipment Details	13
4.1	List of Used Test Equipment	13
4.2	Laboratory Environmental Conditions	17
5	Annex	18
5.1	Additional Information for OUT Description	18
5.2	Additional Information for Test Plan	20
5.3	Additional Information for Report	22



.....